Facilities Plan Update

Town of Coventry, Rhode Island

October 2016

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RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

October 20, 2016
25 HV

CERTIFIED MAIL

Graham Waters, Town Manager
1670 Flat River Rd.
Coventry, RI 02816

RE: Approval of Facilities Plan Update and Finding of No Significant Impact (DEM file #16-C) Coventry, Rhode Island

Dear Mr. Waters:

This letter is in regard to the Town of Coventry's request for the Rhode Island Department of Environmental Management, Office of Water Resources' (OWR) approval of the above-referenced Facilities Plan Update (FPU) and the FPU's associated environmental review findings.

The Town submitted the FPU approval request based on "Facilities Plan Update Town of Coventry, Rhode Island" prepared by Weston & Sampson dated October, 2016. The proposed projects involve the design and construction of wastewater collection systems within the Town.

Based on our review, OWR hereby approves this document as the FPU for the Town of Coventry.

The FPU sufficiently addresses the statutory intent of the environmental review requirements of the Federal Water Pollution Control Act (commonly known as the Clean Water Act) and **OWR is hereby issuing a Finding of No Significant Impact (FONSI)** for the proposed projects identified in the FPU. Please note that unless reaffirmed, this environmental review approval expires five (5) years from the date of issuance.

This approval maintains eligibility for construction assistance programs administered by OWR that contain funds allotted to the state under provisions of the Clean Water Act.

If you have any questions, please call our office at 222-4700.

Sincerely,

Angelo S. Liberti, P.E., Chief
Surface Water Protection Section
Office of Water Resources

ASL/AGZ/agz

Enclosure: Finding of No Significant Impact

Electronic copies: Jay Manning, OWR/SRF
Tim DeGuglielmo, Weston & Sampson
Robert Joyal, Coventry Town Engineer

R.I. DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Office of Water Resources

FINDING OF NO SIGNIFICANT IMPACT

The Office of Water Resources has reviewed "Facility Plan Update, Town of Coventry, Rhode Island" prepared by Weston & Sampson, dated March 2016 (revised September 2016), for the Town of Coventry, Rhode Island, in conjunction with a request for approval of this Facilities Plan Update (FPU) and the water pollution abatement projects proposed therein, and

Pursuant to the requirements and authority set forth in Chapter 46-12.2 of the General Laws of Rhode Island, 1956, as amended, and the "Rules and Regulations for the State Revolving Fund (SRF) Program", DEM has determined that the projects identified in the above FPU will not cause significant detrimental effects, the quality of the environment will be improved by the proposed projects, and an Environmental Impact Statement will not be required. The environmental information provided has met the statutory intent of the Federal Clean Water Act environmental review requirements.

DEM is hereby issuing a formal FINDING OF NO SIGNIFICANT IMPACT for the above FPU.

The approval of the projects identified above and contained in the study area of this FPU is recommended for immediate implementation and will not foreclose alternatives to the Town in other areas.

The proposed projects involve the design and construction of a wastewater collection system to mitigate the adverse water quality impacts to Tiogue Lake, Pawtuxet River, Flat River Reservoir, and Mishnock River, as well as other surface waters.

Project Name: Town of Coventry FPU

Project Location: Town-wide

Project Description: Design and construction of wastewater collection systems.

Anticipated Environmental Impacts:

Long Term: No detrimental impacts; beneficial impacts include enhancing the quality of the surface waters in the areas recommended to be sewered.

Short Term: Construction-related impacts only

Required Mitigation Measures:

Sedimentation and erosion control, as necessary, during construction.

Angelo S. Liberti

Angelo S. Liberti, P.E., Chief, Surface Water Protection Section
Office of Water Resources, DEM

DATE: October 25, 2016

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1 EXECUTIVE SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1.0 General

There is currently only a limited wastewater collection system existing in the Town of Coventry. Approximately 97 percent of the residences in Coventry rely on onsite wastewater treatment systems (OWTSs) for treatment and disposal of wastewater.

Previous wastewater planning studies for Coventry recommended construction of wastewater collection facilities, with transmission to the regional wastewater treatment facility (WWTF) in West Warwick for treatment, to serve much of the densely populated eastern portion of Town. OWTS problems in the eastern portions of Town are common. In 1984 the Town executed an inter-municipal agreement (IMA) with West Warwick reserving an average daily flow of 2.25 million gallons per day (MGD) of wastewater capacity in their regional WWTF. In December 2013, the Town acquired a pump station and forcemain that were previously privately owned by the Woodland Manor Estates development. This pump station/forcemain serves properties whose capacity fall under a separate 200,000 gallons per day flow allocation in the West Warwick WWTF (future IMA revisions will be needed to address allocating this capacity to the Town).

Since the installation of the main interceptor, which collects and transports wastewater to the WWTF, the Town has begun to expand their collection system to congested and environmentally sensitive areas.

The purpose of this Facility Plan (FP) Update is to investigate and address the following:

1. Update of the projected wastewater flows for the 20-year (2035) and 50-year (2065) planning periods.
2. Provide review and evaluation of need for wastewater collection facilities, including:
    a. delineation of problem areas,
    b. determination of OWTS rehabilitation (or repair) feasibility, and
    c. prioritization of sewer needs areas.
3. Examine relevant wastewater project financing options available and feasibility of implementation.

1.1 Findings

Chapters 3 and 4 of this Facilities Plan examine the current and expected future conditions in eastern Coventry, with specific interest in the treatment and disposal of wastewater. The investigations performed included review of all available relevant documents. The results of the OWTS survey (**Appendix A**) confirms a preponderance of OWTS problems in several areas of eastern Coventry. These areas have been delineated and were prioritized (Phase I) for sewering in the 1995 FP and subsequent reaffirmations/updates. The conclusion reached through these examinations is that the current system of wastewater disposal through onsite wastewater treatment systems (OWTSs) is not an acceptable long term solution in some areas of eastern Coventry. Continued operation of OWTSs may increase pollutant loads to ground and surface

water resources, limit property values, negatively impact quality of life for residents and introduce potential public health concerns.

Chapter 5 examines several alternatives available to the Town for wastewater management and disposal, including no action, on-site or OWTS type options (including OWTS rehabilitation), and construction of a sewer collection system. Several specific concerns were identified in the preparation of the facilities plan, including:

- Several areas of eastern Coventry are experiencing significant OWTS problems which cannot be resolved through conventional on-site (OWTS) solutions such as system rehabilitation or reconstruction due to site specific limitations.
- Coventry has invested at least $20.6 million dollars to date in a wastewater collection system which benefits very few residents due to the lateral sewer system not being completely built (approx. 3% of the total Town parcels are sewered).
- Negative environmental and financial impacts associated with the construction of a sewer collection system need to be minimized, and positive impacts must be maximized.

1.2 Recommended System

The recommended plan was prepared to specifically address the wastewater management problems in Coventry. The plan includes the following components:

- Continued expansion of the wastewater collection and transmission system to serve portions of eastern Coventry which remain unsewered.
- The continued use of onsite wastewater treatment systems (OWTS) for wastewater disposal in areas where this option is feasible.
- Treatment of wastewater and septage from Coventry at the West Warwick Regional Wastewater Treatment Facility.

The recommended wastewater collection and transmission system is divided into three main phases, the Initial Sewer Construction Program (Phase I) which is now approximately 85% complete, the Continuing Sewer Construction Program (Phase II), and the Future Construction Program (Phase III). Phase I and II sewer programs are intended to represent all successive study areas and needs as included in the current list of future sewer contracts, as shown on the Town's Project Priority List included in **Appendix G**. The remaining planning areas will then be sewered by study area as needed. The areas generally served by each of these programs are shown on **Figure 6-1**.

The Phase I sewer program, as currently constructed, consists of approximately 75,000 feet of interceptor and lateral sewers (gravity and low pressure), and one main wastewater pump station (located on Sandy Bottom Road). This program includes construction of the main interceptor sewer which represents the 'backbone' of the Town sewer system. This pipeline will be utilized by a majority of the planning areas to be sewered for transporting wastewater from the initial and future sewer service areas to the West Warwick regional sewer system. The previously installed "dry" sewer in Hopkins Hill Road, as discussed in the 1995 FP, has been activated and receives flow from the Amgen industrial facility, a portion of the Center Of New England Development

and adjacent parcels along Hopkins Hill Road. The Phase I system, when completed, will also directly service approximately 933 properties, including many multi-family and commercial properties. The capital cost associated with the remaining Phase I construction program (Contracts 8, 9 and 11) is approximately $6,681,000 (2015 dollars). Chapter 7 in this report outlines the implementation necessary to maintain and continue the expansion of the existing sewer system.

The Phase II sewer program could be implemented both during and following completion of Phase I, depending on economic feasibility and need. Phase II consists of approximately 203,400 feet of interceptor and lateral sewers, and eight wastewater pump stations with approximately 6,375 feet of forcemains. The Phase II system consists mainly of lateral (collector) sewers, and when completed will service approximately 3,846 properties (in addition to those served by Phase I). The total capital cost associated with Phase II is approximately $51,662,000 (2015 dollars). Due to its magnitude, this phase would most likely be constructed over an eight to ten year period.

The Phase III sewer program could be implemented both during and after completion of the Phase II system, depending on economic feasibility and need. Phase III consists of approximately 45,150 feet of lateral sewers, and three wastewater pump stations with approximately 2,800 feet of forcemains. The Phase III system would service approximately 1,064 properties (in addition to those served by Phases I and II) when completed. The total construction cost associated with Phase III is approximately $11,554,000 (2015 dollars). At this time, construction of the Phase III system may not commence for eight to ten years. Sewers under this phase would likely be constructed on an area by area (contract) basis, as needs arise.

Once constructed, administration, operation and maintenance of the wastewater collection system should be provided by the Town of Coventry. This will likely continue to initially include the hiring of private contractors to provide sewer system operation and maintenance services. The eventual establishment of a Coventry Sewer Department, under the current Public Works Department, is also a possibility. Included in the sewer system administration tasks would be the billing of Coventry sewer users.

Portions of Town to the north and west of the areas to be sewered will continue to be served by OWTS. Septage from the periodic pumping of these OWTSs should be disposed of at the West Warwick Regional WWTF, or Cranston WWTF. In these areas, and more importantly in areas where OWTS problems are prevalent, future provisions should be made for a public information program on the proper care and maintenance of OWTSs.

1.3 West Warwick Regional Sewer System

Wastewater and septage generated in Coventry will be transported to the West Warwick Regional Wastewater Treatment Facility (WWTF). Coventry currently has a reserve capacity of 2.25 mgd (average daily flow) in the WWTF. This is sufficient to cover the design year 2035 flow of 1.985 mgd from all phases outlined in the recommended sewer program. As of 2014, Coventry is contributing about 0.226 mgd (average daily flow) to the West Warwick WWTF (not including flows from the Woodland Manor sewer system which total 0.065 mgd, and East Greenwich/Amgen Pharmaceuticals). To date, Coventry has paid approximately $10.9 million (in addition to the amount paid for the acquisition of the Woodland Manor infrastructure) for this capacity in West Warwick

through upgrades to the treatment plant and common interceptor sewers in West Warwick.

1.4 Implementation and Cost

The Town has begun installation of the previous Facilities Plan's identified Phase I sewer program. Therefore, the Town has a vested interest in continuing to install the remaining Phase I sewer collection systems in order of need. The Town also has over $2 million in funds bonded through the RI-SRF program and RI Infrastructure Bank (formerly CWFA) that remain available for sewer construction. A plan for utilization of these funds is needed immediately.

This Facilities Plan will require that the Town perform the following tasks:

- Submit the draft Wastewater Facility Plan Update to the RI-DEM Division of Water Resources for review and comment. Respond to or incorporate RI-DEM comments as necessary.
- Conduct a formal public hearing to present the conclusions and recommendations of the Wastewater Facility Plan Update.
- Finalize the report and submit the final Wastewater Facility Plan Update to RI-DEM Division of Water Resources for final review and approval.
- Submit project information to RI-DEM to remain on the state's Project Priority List (PPL) for receipt of future design and construction grants/loans.
- Perform necessary steps for the design, permitting and construction of the recommended sewer plan, which include:
    - Submitting formal funding applications to RI-DEM to receive grant and/or loans to fund the design and construction phases. Funding programs to be used include (State Revolving Loan Fund (SRF), or Interceptor Bond Fund (IBF), if applicable/available),
    - Entering into a contract with a qualified engineering firm to design and prepare final plans and specifications for the future construction projects, as discussed in this FP Update, including permit applications and regulatory agency review submissions.
    - Implementing the appropriate construction financing arrangements to coincide with the current regulations.
    - Securing competitive bids for the construction of future construction projects.
    - Awarding construction contract(s).
    - Initiating sewer construction and overseeing construction completion.
- Continue to review/revise the local sewer use ordinance, including implementation of the required industrial pretreatment requirements (at least equivalent to those in place in West Warwick), and the user charge and betterment assessment programs.
- Ensure programs and mechanisms are in place for the proper administration and operation and maintenance of the new sewer system.
- Following approval by the appropriate agencies, commence operation by allowing the connection of properties to the completed sewer system, assessing sewer betterments and collecting sewer use charges.

Chapter 7 presents a method of financing the estimated costs of the proposed sewer

program. The cost of the sewer projects will be paid for through assessments to sewered properties. The Town has established the method of assessment in their sewer use ordinance. This method is summarized in **Chapter 7**.

1.5 Summary

The conclusions reached from this FP Update echo those conclusions from the 1995 FP, the 2003 FP Reaffirmation and the 2010 FP Update. It is recommended that the existing sewer system be expanded to serve portions of eastern Coventry that can no longer rely on OWTSs for long term wastewater management. The plan recommended herein, however, revises the previous recommended sewer plan to provide flow allocations in areas where future development will require additional wastewater management capacity and/or add additional areas based on the additional capacity available for the Woodland Manor pump station/forcemain acquisition. This plan will still meet the need for sewering of the more densely populated areas within eastern Coventry, while also allowing the Town to provide sewer capacity for proposed developments, which are important to the local economy.

The recommended plan should be adopted, and implementation of the remainder of the Phase I sewer construction program should continue, as outlined in Chapter 7. This plan will result in a fully functioning sewer system which will serve Coventry through the year 2035 and beyond.

In order to remain eligible for State and/or Federal funding assistance, this Wastewater Treatment Facilities Plan should be reaffirmed every five years and should be updated or amended as necessary when significant changes occur that might otherwise impact the recommendations outlined in this report.

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2 INTRODUCTION

2.0 Study Purpose

This facilities plan report has been prepared for the Town of Coventry as an intermediate step towards the continued implementation for wastewater management within the town. The Town of Coventry has, over the past 40± years, performed several studies addressing the requirements for wastewater disposal from residential, commercial, industrial and municipal sources within the Town. This updated facility plan is based on the following:

- The original wastewater facilities plan for the town, which was completed in 1995.
- The last reaffirmation of the 1995 Facilities Plan, which was completed in 2003.
- The last update of the 1995/2003 Facilities Plan, which was completed in 2010.
- An updated facilities plan is a prerequisite for future state and/ or federal financing of wastewater collection and treatment facilities.
- An updated inventory of existing Onsite Wastewater Treatment Systems (OWTS) is needed for accuracy.
- Sewer needs areas within the town need to be re-evaluated to reflect the current conditions.
- Estimated sewer project costs and possible financial assistance for recommended facilities needs to be updated.
- Provisions of the existing inter-municipal agreement with West Warwick should be reviewed and/or clarified, including the status of regional projects, the disposition of costs paid to date by Coventry, and the estimated future costs incurred by Coventry.
- The use of existing sewer facilities in Coventry (including the Hopkins Hill Road sewer, Woodland Manor sewer, etc.) needs to be optimized.
- A reasonable method for allocation of project costs needs to be optimized.

The previously completed wastewater facilities plan and relevant wastewater studies for Coventry generally include the following:

1. “Preliminary Engineering Survey and Report on Sewerage and Sewage Treatment for the Town of Coventry”, Fenton G. Keyes Associates, November 1966.
2. “Facilities Plan for Wastewater Collection and Treatment Facilities”, C.E. Maguire, Inc., 1977.
3. “Amended Facilities Plan”, Hayden, Harding, and Buchanan, Inc., June 1981.
4. “Facilities Plan Supplement”, Weston & Sampson Engineers, Inc., August 1982.
5. “Industrial Sewer Study”, Weston & Sampson Engineers, Inc., June 1986.
6. “Wastewater Facilities Plan”, Weston & Sampson Engineers, Inc., June 1995.
7. “Facilities Plan Reaffirmation”, Weston & Sampson Engineers, Inc., September 2003.
8. “Facilities Plan Update”, Weston & Sampson, Inc., February 2010.

Each of these studies recommended a plan for the installation of sewers in the town of Coventry. At this time, there have been seven contracts built under the 1995 Facilities Plan, which was reaffirmed in 2003 and updated in 2010.

In 1991, the Rhode Island Department of Environmental Management (RIDEM) notified cities and towns that an approved Facilities Plan would be required for all projects which were to receive state and/or federal financing. The Town of Coventry, having a plan that RIDEM considered outdated, began the process of preparing their Facilities Plan. The Facility Plan requires the re-evaluation of alternatives from previously approved plan(s), and subsequent reaffirmations and updates.

This Facility Plan Update document was prepared according to the guidelines presented by the RIDEM Division of Water Resources in their Facilities Plan Review Checklist. This Facility Plan Update document is intended to provide a guidance document to the town for use in the effective management of wastewater, as well as to meet the requirements of RIDEM for state funding eligibility of recommended projects.

This facilities plan was prepared with the guidance of the Coventry Department of Public Works, the Planning Department, and the Sewer Sub-committee, and is intended to address the wastewater component of the town's Community Comprehensive Plan (CCP), which is being prepared by Anthony W. Lachowicz and Samuel J. Shamoon, AICP drafted in 2008. This facilities plan will serve to update the Wastewater Management portion of the Community Services and Facilities section of the CCP. Applicable data, maps, figures, and forecasts for development have been extracted from the town-wide Community Comprehensive Plan for inclusion in this report.

2.1 Planning Area

The Town of Coventry is located in Kent County in west central Rhode Island. The town is bordered by Foster, Scituate, and Cranston to the north; West Warwick to the east; East Greenwich and West Greenwich to the South and Connecticut to the West. The Town is rectangular in shape, having dimensions of approximately 11.25 miles east to west and 5.0 miles north to south. The Town has a total land area of 61.4 square miles. The eastern third of the town is characterized by urban-suburban development, while the western end of town is rural, including significant portions of agricultural land and open space.

Due to the population patterns within the town, dense in the east and sparse in the west, the areas of concern for wastewater management are strictly those in eastern Coventry. The western areas of town consist of large (two to five acres) lots, and do not lend themselves well to wastewater management alternatives other than onsite wastewater treatment systems (OWTS). For this reason, this study will primarily concentrate on eastern Coventry, with its higher density of development.

Figure 2-1 shows the planning areas as delineated by Weston & Sampson, Inc. in the 1995 Facilities Plan. These planning areas were referenced by number in the 1995 Facilities Plan and in the 2003 Facilities Plan Reaffirmation. However, due to the confusion incurred with the contract numbers, the 2010 Facilities Plan Update and all proceeding documents will refer to the delineated planning areas by letter. **Table 2-1** specifies the exact reference between letters and numbers.

The Town of Coventry is governed by an elected five member Town Council, and a Town Manager (appointed by the Town Council). The Town has periodic open town

meetings for policy making decisions. Existing sewers within the town generally fall under the control of the Coventry Department of Public Works.

All of the existing sewers in town are tributary to the West Warwick system. System users are billed directly by West Warwick, and are therefore subject to wastewater management by the Town of West Warwick. West Warwick currently charges users of its sewer system, (both within and outside West Warwick) a rate of $4.399 per hundred cubic feet, based upon water consumption data provided by Kent County Water Authority (KCWA). West Warwick's sewer system is controlled directly by the Superintendent of its Sewer Department. The West Warwick Town Council currently acts as the Town Sewer Commission and makes decisions concerning the sewer system. Sewer Commission meetings are also set up to seek input from the following participating communities; Warwick, Coventry, West Greenwich, Scituate, and Cranston.

As part of the implementation of this plan, the Town of Coventry will need to establish a management structure in the future to regulate the sewer system within the town. The proposed wastewater management structure is described in Chapter 7 of this plan.

2.2 Treated Wastewater Effluent Discharge

As provided by the State of Rhode Island, in the 208 Area-wide Water Quality Management Plan (WQMP) for the State of Rhode Island, Coventry is a member community in the West Warwick Regional Wastewater Treatment Plan. As such, all wastewater and septage from the Town of Coventry is slated to be treated and disposed of at the West Warwick Plant. The West Warwick Plant discharges to the main stem of the Pawtuxet River, at a point approximately two-miles west of the confluence of the North Branch and the South Branch of the Pawtuxet River.

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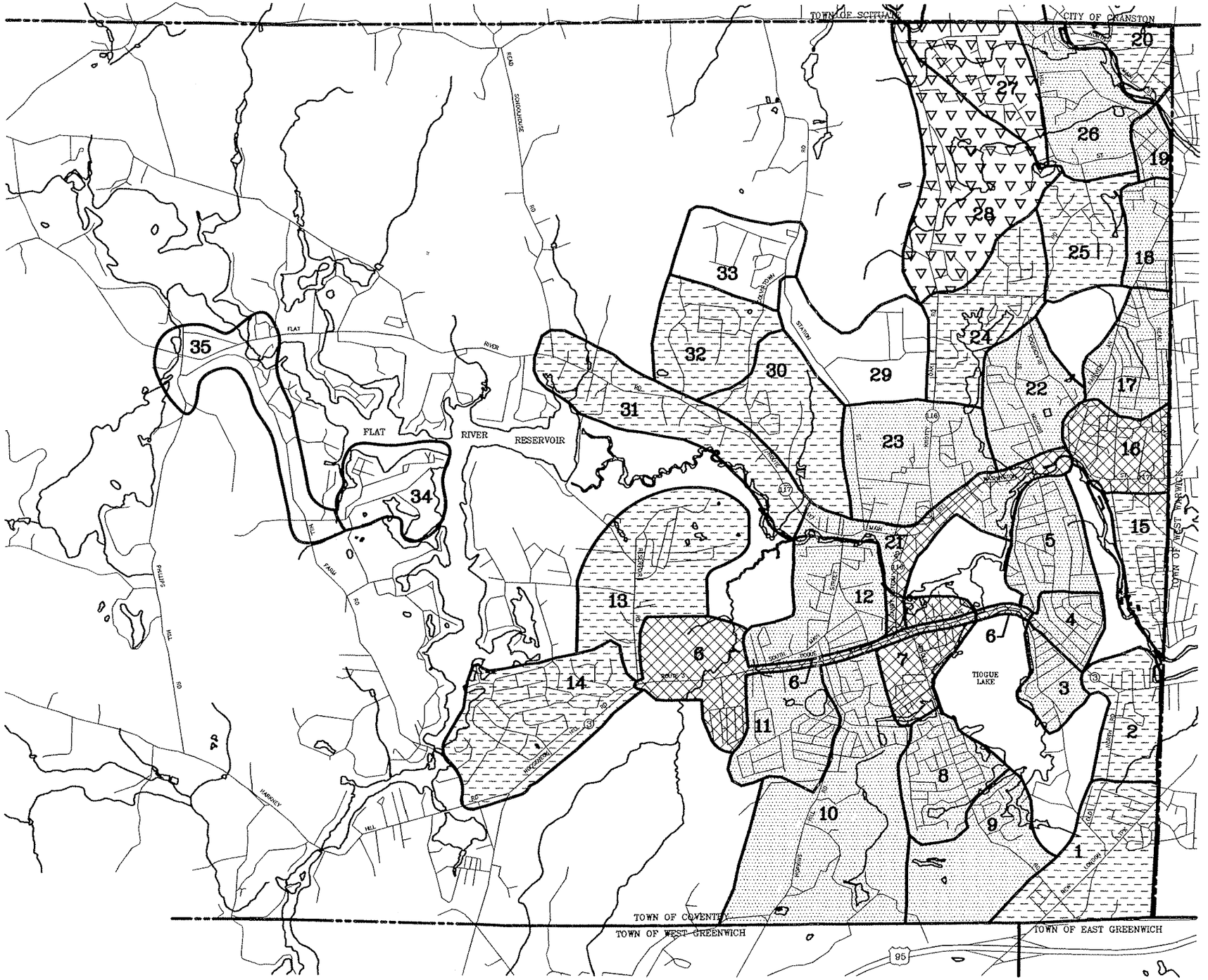
Table 2-1 Referencing Planning Areas

Number referenced in 1995 Facilities Plan and 2003 FP Reaffirmation	Letter referenced in 2010 Facilities Plan Update and all proceeding documents
1	A
2	B
3	C
4	D
5	E
6	F
7	G
8	H
9	I
10	J
11	K
12	L
13	M
14	N
N/A	N1
15	O
16	P
17	Q
18	R
19	S
20	T
21	U
22	V
23	W
24	X
25	Y
26	Z
27	AA
28	AB
29	AC
30	AD
31	AE
32	AF
33	AG
34	AH
35	AI
N/A	AG



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LEGEND:

- PHASE 1 – INITIAL SEWER CONSTRUCTION PROGRAM
- PHASE 2 – CONTINUING SEWER CONSTRUCTION PROGRAM
- PHASE 3 – FUTURE SEWER CONSTRUCTION PROGRAM
- 1995 FACILITY PLAN AREAS REMOVED FROM FUTURE SEWER CONSTRUCTION PROGRAM

NOTE:

BASEMAP SOURCE: RIGIS

FIGURE 2-1

TOWN OF COVENTRY, RHODE ISLAND
2009 FACILITIES PLAN UPDATE

1995 FACILITIES PLAN
PLANNING AREAS

DESIGNED BY: TSD	CHECKED BY: TSD	DATE: AUGUST 2009

Weston&Sampson®

C:\Documents and Settings\degulit\Desktop\Figure 2-1 – 1995 FP Map.dwg

3 EXISTING CONDITIONS IN THE PLANNING AREA

3.0 General

This chapter outlines the current environmental situation in Coventry, including general information on the environment, information on existing onsite wastewater treatment systems (OWTS) and information on the existing wastewater collection and transmission system. The existing conditions in the planning area are generally described, including the physical characteristics of the area, such as soils, topography, geology and hydrology, as well as information on current land use. The principal resources used in the preparation of the existing conditions section of this Facilities Plan were the (draft) RIDEM OWTS records, 2008 Comprehensive Community Plan (CCP), the 2000 CCP, the 2010 Facilities Plan Update, the 2003 Facilities Plan Reaffirmation, the 1995 Facilities Plan, the 1977 Facilities Plan, the 1981 Amended Facilities Plan and the 1982 Facilities Plan Supplement.

3.1 Geophysical Conditions

The following sections discuss the existing geophysical conditions in the project area, including information on soils, topography, geology and hydrology. The information presented is based on the findings of existing reports and documents, unless otherwise noted.

3.1.1 Soils

As discussed in the draft 2008 CCP, the soils in Rhode Island are generally made up of four types of glacial deposits: Upland Till Plains, Narragansett Till Plains, the Charlestown and Block Island Moraines, and Outwash Deposits. Most of Coventry overlies older granite rocks, with some Blackstone series metamorphic and Pennsylvanian sedimentary rocks located in the eastern end of town. Specific geology in the study area is further discussed below. **Figure 3-1** is the detailed soils map from the digitized Soil Survey of Rhode Island, prepared by the U.S. Soil Conservation Service (SCS), made available by Rhode Island Geographic Information Systems (RIGIS). These figures identify the soils in the Coventry study areas by their representative symbol. A table showing the approximate acreage of various types of soils in the town, excerpted from the Inventory and Analysis of Existing Conditions portion of the draft 2008 CCP, is shown on **Table 3-1.**

N

Pawtuxet River

Legend

- Coventry, RI
- Planning Areas
- Soils

3,000 0 3,000

Scale In Feet

FIGURE 3-1

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

SOIL TYPES

September 2015 SCALE: NOTED

Weston&Sampson

Table 3-1 Coventry Soil Types by Acreage

Symbol	Name	Acres
Aa	Adrian Muck	1,050
AfA, AfB	Agawam	250
BmA, BhA, BhB, BmB,BmC, BoC	Bridgehampton	465
CdB, CdA, CdC, CB	Canton and Charlton	14,255
Co	Carlisle Muck	765
Dc	Deerfield	290
Du	Dumps	15
EfA, EfB	Enfield	395
GhC, Ghd	Gloucester-Hinckley	120
HkC, HkA, HkB, HkD	Hinckley	4,195
LgC	Lippitt	895
MmB, MmA, Mu	Merrimac	2,425
NaB, NaA, NbB, NbC, NcC	Narragansett	1,850
Nt	Ninigret	75
PbB, PaA, PaB, PbC, PcC	Paxton	1,655
Pg	(Gravel) Pits	300
Pk	(Quarries) Pits	5
Pp	Podunk	5
RbB, RgA, RgB	Rainbow	15
Rc	Raypol	105
Re, Rf	Ridgebury	3,035
Rp	Rock Outcrop	25
Ru	Rumney	205
Sb	Scarboro	600
ScA, ScB	Scio	30
Ss	Sudbury	585
StB, StA, SuB, SyB	Sutton	965
Tb	Tisbury	35
UD	Udorthents	725
Ur	Urban Land	80
Wa	Walpole	650
WcB, WcB, WdB	Wapping	345
WgA, WgB	Windsor	915
WoB, WhA, WhB, WrB	Woodbridge	2,420
Total Coventry Land Area		**39,745**

3.1.2 Topography

Topography in Coventry includes surface elevations ranging from approximately 150 feet above mean sea level (M.S.L.) to approximately 550 feet above M.S.L. The ground surface rises from low points along the North and South Branches of the Pawtuxet River, and the Flat River Reservoir, in the eastern end to the high ridge in the central part of town. Elevations slope back down from this ridge to the west, dropping below 350 feet above M.S.L. at the Connecticut border. Topography is important since it dictates the limits of natural drainage basins. The general topography in the study area is shown on **Figure 3-2,** made available by the United States Geological Survey (USGS).

3.1.3 Geology

Geologically, Coventry lies within the seaboard lowland physiographic province. The ground surface of the entire New England region was subjected to severe grinding and scouring action by the advancing glaciers of the Ice Age. Debris from this action was deposited beneath the ice sheets as a compact layer of glacial till. This layer of glacial till, also known as ground moraine, is made up of clay, silt, sand, gravel and boulders. Glacial till occurs within about half of Coventry as a thin surface deposit overlying bedrock, and predominantly made up by sand with dispersed boulders and cobbles.

At the end of the Ice Age, streams carried away some of the deposited soil materials. The materials formed outwash deposits, made up generally of silt, sand and gravel, with some boulders also present.

Small portions of the project area are occupied by alluvial flood plains and swamps, created by more recent surface deposits. Flood plains occur generally along the Pawtuxet River and its tributaries. They are typically made up of loose to medium dense layers of fine to medium sand. The swamp areas lie adjacent to the flood plains, and are typically made up of sand and silt, with humus, peat and/or organic silt.

Bedrock in the project area is generally composed of Cowessett granite and Scituate granite gneiss. The eastern portion of Coventry and the western portion of West Warwick are generally occupied by a hard, medium grained granite formation. The remainder of town is occupied by a hard, gray to pink, medium to coarse grained, foliated granite gneiss.

3.1.4 Hydrology

The State of Rhode Island is divided into five major drainage basins: the Narragansett Bay Basin, the Pawcatuck River Basin, the Rhode Island Coastal Basin, the Thomas River Basin and the Massachusetts Coastal Basin. The majority of Coventry lies within two of the basins: the Thomas River Basin, which flows west to the Thomas River in Connecticut; and the Narragansett Bay Basin, which flows east to Narragansett Bay. The Moosup River Basin, which is the major sub-drainage basin to the Thomas River Basin in Rhode Island, drains the areas of Coventry generally west of Route 102. Areas to the east generally drain to the Pawtuxet River Basin, a major tributary to Narragansett Bay. **Figure 3-3**

shows the limits of the sub-drainage areas within the planning area, made available by RIGIS.

The wetlands, surface water and groundwater in Coventry are discussed in detail in the following sections.

3.1.4.a Wetlands

Freshwater Wetlands in Coventry are shown on **Figure 3-4.** This figure indicates that approximately 18.6% of Coventry is devoted to water/wetlands. The following discussion of wetlands in Coventry is excerpted from the 2008 Draft CCP.

"A review of the Town of Coventry indicates a pattern of wetlands evenly distributed town-wide imaging the drainage patterns, streams and brooks and surface water bodies. Their individual character ranges from narrow and linear in nature (the majority), to broad irregular shaped parcels of up to several hundred acres. A number of these larger water bodies and wetlands are located in proximity to the Town's southern boundary (i.e., Mishnock Swamp, Great Grass and Whitford Pond Areas). Criteria for locating the wetland areas have been field investigation, aerial photography and the Rhode Island Geographic Information System (RIGIS), Coventry Soil Analysis 1990, "Hydric Soils" demarcation.

Coventry's wetlands are a vital component in the community's ecological system providing a buffer for groundwater recharge areas, serving in a retention capacity alleviating flooding and providing a habitat for much of the Town's wildlife.

Recognizing both the sensitive nature of and magnitude of importance in the overall ecosystem, strong state and federal regulations have been put in place for the protection of wetlands. The Rhode Island Freshwater Wetlands Act (Rhode Island General Laws Sections 2-1-18 et. seq.) and the Department of Environmental Management's Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act are the primary regulations dealing with the enforcement of wetlands protection, alteration and permitting in Rhode Island."

N

Legend

Coventry, RI

Planning Areas

3,000 0 3,000

Scale In Feet

FIGURE 3-2

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

USGS MAP

September 2015 SCALE: NOTED

Weston&Sampson

PAWTUXET RIVER BASIN
SCITUATE RESERVOIR
SUB-BASIN

PAWTUXET RIVER BASIN
NORTH BRANCH PAWTUXET
RIVER SUB-BASIN

PAWTUXET RIVER BASIN
PAWTUXET
RIVER SUB-BASIN

PAWTUXET RIVER BASIN
FLAT RIVER
RESERVOIR SUB-BASIN

NARRAGANSETT BAY BASIN
GREENWICH
BAY SUB-BASIN

PAWTUXET RIVER BASIN
BIG RIVER SUB-BASIN

PAWTUXET RIVER BASIN
SOUTH BRANCH PAWTUXET
RIVER SUB-BASIN

Hope Furnace Rd
Matteson Rd
Mile Rd
Read School Rd
John Franklin Rd
Burlingame Brook
Clarke Rd
Knotty Oak Rd
Red Oak Dr
Hill St
Howard St
Pawtuxet River North Branch
Black Rock Brook
Pawtuxet River
Flat River
Vine St
Maple Valley Rd
Town Farm Rd
Poor Farm Brook
Old Flat River Rd
Old Carriage Rd
Indian Tr
Pine Haven Rd
Great Rd
Flat River Rd
Ayoho Rd
Bramble Bush Rd
Providence Pl
Flat River Reservoir
Whitehead Rd
Industrial Dr
Pawtuxet River South Branch
Coventry Reservoir
Ledge Rd
Shady Valley Rd
Sharon Dr
Reservoir Rd
Airport Rd
Abbot Crossing
Main St
Station St
Daniel Dr
Leuba Rd
Colvintown Rd
Cynthia Dr
Highwood Dr
Gervais St
Violet St
Black Rock Rd
Fairview Av
Doolittle St
Macarthur Bl
Read Av
Benoit St
Boston St
Washington St
Pilgrim Av
Laurel Av
Princeton Av
Sheltra Av
Quidnick St
Windsor Park Dr
Wesleyan Av
Pembroke Ln
Columbia Av
Tiogue Av
S Main St
Whaley Hollow Rd
Phillips Hill Rd
Camp Rd
Hill Farm Rd
Island Dr
Clubhouse Rd
W View Dr
Magnolia Ln
Wisteria Dr
Harkney Hill Rd
Bear Brook
Rice Tr
Phillips Rd
Fish Hill Rd
Nooseneck Hill Rd
Old Hickory Brook
Mishnock River
Tiogue Lake
Arnold Rd
Mohawk St
E Shore Dr
North Rd
York Dr
Helen Av
Johnson Bl
Clark Mill St
Lydia Rd
Tiffany Rd
Hopkins Hill Rd
Bestwick Tr

AA AB AC AD AE AG AH AI
A B C D E F G H I J K L M N N-1 P Q R S T U V W X Z

N

Legend

- Planning Areas
- Coventry, RI
- Basins
- Roads
- Lakes

3,000 0 3,000
Scale In Feet

FIGURE 3-3

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

DRAINAGE BASINS

September 2015 SCALE: NOTED

Weston&Sampson®

P:\Data\Store\Client\Coventry\Project\2140605.AI\Figure 3-3_Drainage Basins_Rep.mxd Date Saved: 3/22/2016 2:49:48 PM User Name: degulgit

N

Matteson Rd
Mile Rd
Read School Rd
John Franklin Rd
Vine St
Maple Valley Rd
Town Farm Rd
Flat River Reservoir
Old Flat River Rd
Old Carriage Rd
Indian Tr
Pine Haven Rd
Great Rd
Flat River Rd
Bramble Bush Rd
Providence Pl
Coventry Reservoir
Ayrohio Rd
Industrial Dr
Shady Valley Rd
Whaley Hollow Rd
Hill Farm Camp Rd
Sharon Dr
Island Dr
Clubhouse Rd
Reservoir Rd
Airport Rd
Phillips Hill Rd
Hill Farm Rd
W View Dr
Wood Cove Dr
Magnolia Ln
Nooseneck Hill Rd
Harkney Hill Rd
Rice Tr
Phillips Rd
Fish Hill Rd
Daniel Dr
Teuba Rd
Colvintown Rd
Highwood Dr
Cynthia Dr
Abbot Crossing
Station St
Main St
S Main St
Knotty Oak Rd
Red Oak Dr
Clarke Rd
Hill St
Howard St
Lincoln St
Pawtuxet River
Glenwood Dr
Gervais St
Violet St
Black Rock Rd
Benoit St
Boston St
Fairview Av
Doolittle St
Read Av
Macarthur Bl
Washington St
Pilgrim Av
Laurel Av
Wesleyan Av
Quidnick St
Windsor Park Dr
Sheltra Av
Tiogue Av
Columbia Av
Mohawk St
Arnold Rd
Tiogue Lake
E Shore Dr
North Rd
York Dr
Johnson Bl
Lydia Rd
Helen Av
Clark Mill St
Hopkins Hill Rd
Bestwick Tr
Larch Dr
Tiffany Rd

AA AB AC AE AG AH AI A B C D E F G H I J K L M N N-1 P Q R S T U V W X Z

Legend

- Coventry, RI
- Planning Areas
- Roads
- Lakes
- Wetlands

3,000 0 3,000
Scale In Feet

FIGURE 3-4

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

WETLAND AREA MAP

September 2015 SCALE: NOTED

Weston&Sampson

3.1.4.b Surface Waters

Over 1,600 acres, or approximately 2.6 square miles, of surface waters lie within the borders of Coventry. Of particular importance in this study is the Pawtuxet River basin, which encompasses most of the eastern two-thirds of Coventry. The major surface water components of this watershed are the Flat River Reservoir (including Quidnick Reservoir, Johnson Pond, Mapleroot Pond and Stump Pond), Tiogue Lake, and the North and South Branches of the Pawtuxet River.

The following is a discussion from the 2008 Draft CCP regarding the Pawtuxet River Sub Watershed:

"This watershed consists of the 8.5 mile segment of the South Branch of the Pawtuxet River from the Flat River Reservoir Dam to the confluence with the North Branch, including 6.2 miles of tributary streams and 263 acres of ponds and reservoirs. The waters are located in Coventry and West Warwick. These waters support fishing, and in those portions designated as Class B, swimming. Public access is provided via a car top boat launch on Mishnock Pond; and a state boat launch ramp, town beach and shoreline access on Tiogue Lake.

RIDEM data collected at the Route 33 bridge, in the segment of the South Branch delineated by Mishnock River and the North Branch confluence indicate exceedances in chronic criteria for lead, naphthalene and fluoranthene, and acute criteria for copper. At the station located on the South Branch just upstream from the confluence with the North Branch, chronic criteria for total cadmium, total copper, total silver, DHP and fluoranthene were exceeded one out of three monitoring events, and chronic criteria for total lead were exceeded three out of three monitoring events.

Tiogue Lake is shallow and nutrient rich. Heavy residential development within the watershed and commercial development on Route 3 contribute runoff and the pond receives little "clean" inflow. It is believed the lake is meeting Class B criteria for bacteria; however, eutrophication has reduced its attraction for swimming. Watershed Watch, a volunteer group is currently monitoring water quality in Tiogue Lake. The information collected by Watershed Watch can be used to determine the water quality in the future.

Based upon the available monitored and evaluated information, it is determined that 7.7 miles and 48 acres of surface waters within the sub-watershed are in full support of their designated uses, but are threatened due to non-point source contributions. The 215 acres making up Tiogue Lake are found to be in partial support of designated uses due to eutrophic conditions aggravated by non-point source inputs of nutrients. The 7.0 mile stretch of the South Branch designated as Class C are found to not support designated uses, due to elevated heavy metals and organic concentrations, with both point and non-point sources contributing to the degradation. Fishable/swimmable conditions are maintained at 7.7 miles and 48 acres, are not supported but are attainable at 215 acres and are not attainable in 7.0 miles.

In the Flat River Reservoir, as well as Quidnick Reservoir, Stump Pond and Maple Root Pond, sources of metals, nutrients and oxygen demanding solids

may be associated with development along the shoreline and within their respective watersheds. No known point sources of pollution contribute to these waters. Septic systems, fertilizer usage and storm water runoff from urbanized areas, (especially from Route 3/Tiogue Avenue), may contribute pollutants. The conversion of summer homes for year-round use and the presence of older, malfunctioning septic systems may contribute to accelerated eutrophication rates. The sandy soils in this area have poor nutrient attenuation capabilities. Under these conditions, even properly functioning OWTS may contribute excessive nutrients and bacteria. The building of walls and other shore line development may potentially have adverse effects upon fisheries habitat, and pollution from motorboat use represents another potential concern.

Based upon current available information, and the criteria established by DEM, the 1,019.5 acres of reservoirs and ponds and 17 miles of rivers in the Flat River Reservoir sub-watershed are determined to be in full support of Class B designated uses, however they are potentially threatened by point and non-point sources of pollution. Based on existing conditions meeting Class B criteria, fishable/swimmable conditions are met."

3.1.4.c Groundwater

Groundwater is an increasingly important resource in the State of Rhode Island. One of the state's 24 major stratified drift groundwater reservoirs, identified by the Rhode Island Water Resource Board and RIDEM, lies mainly in Coventry. This is the Mishnock-Big River Groundwater Reservoir, located south of Nooseneck Hill Road, in the eastern central part of Coventry. RIDEM's "2012 Integrated Water Quality and Assessment Report" states that Rhode Island's groundwater resources are considered vulnerable to contamination due to the generally shallow depth to groundwater, the aquifer permeability and the absence of subsurface confining layers. Groundwater contamination is mainly from petroleum products from Leaking Underground Storage Tanks (LUSTs), but the pollution also is coming from nitrates, bacteria, viruses and toxics from OWTS systems, dump sites, industrial and commercial manufacturers, automotive repair shops, pesticides and fertilizers from agriculture and urban runoff (residential applications) and sodium chloride from road salt applications. The limits of these groundwater reservoirs and several key groundwater contamination sites identified by RIDEM are shown on **Figure 3-5.**

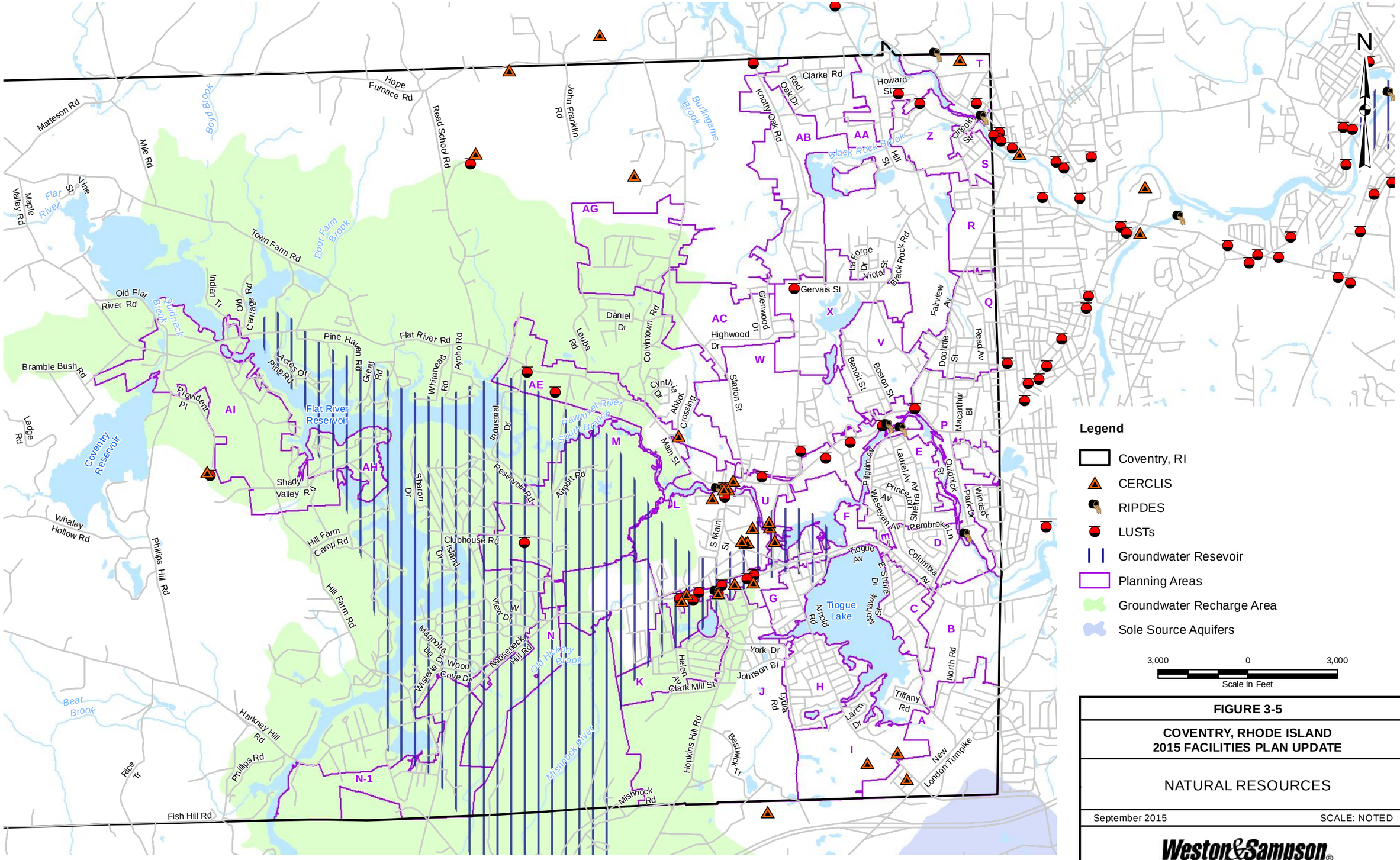


FIGURE 3-5

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

NATURAL RESOURCES

September 2015 SCALE: NOTED

Weston&Sampson

The Kent County Water Authority (KCWA), the public water supplier in the Town of Coventry, currently has four existing wells in the Mishnock Swamp area (Mishnock Aquifer), which are in use. The Spring Lake wells are located adjacent to Huron Pond, west of Hopkins Hill Road (Study Area K), and are currently not in use. Since any or all of these existing drinking water supply wells are either operational or could be opened for use if water demand increases, protection of these supplies is warranted.

Groundwater provides the primary source of drinking water to many of Coventry's residents. The State of Rhode Island, through RIDEM and federal participation, provides regulatory guidance. RIDEM provides primary enforcement of groundwater sources which may negatively impact wetlands. Likewise, the RI Department of Health is responsible for review of applications for installation of new community wells for major developments. Community Wellhead Protection Areas (CWHPA) and Non-Community Wellhead Protection Areas (NCWHPA) are vital to protect this important natural resource.

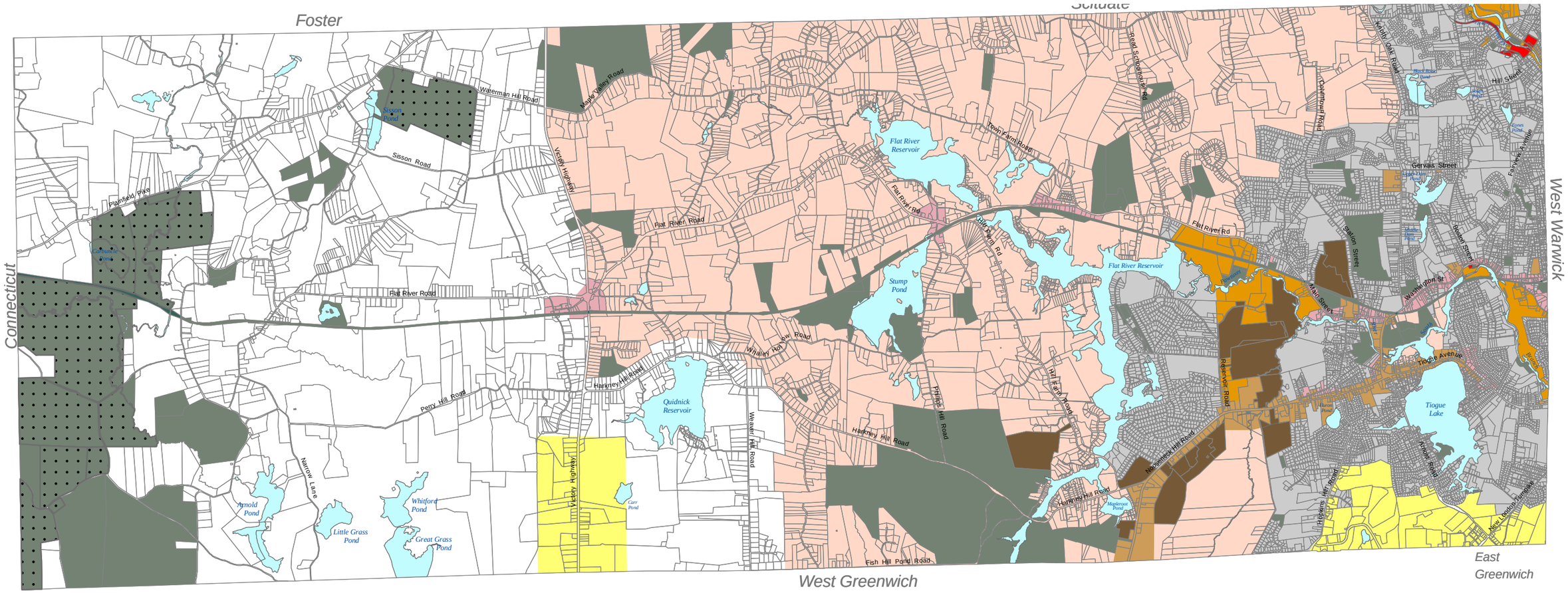
The 2008 CCP (draft) Analysis of Existing Conditions determined that OWTS systems are a significant concern in the groundwater quality of the area. The 2008 CCP (draft) report notes the following:

"The reliance of the community upon OWTS, the high number of systems installed within the heart of the recharge area prior to current regulations and the presence of soils conductive to system failure combine to make septic systems an issue demanding appropriate attention and follow through."

3.2 Land Use

As discussed in the 2008 Community Comprehensive Plan (draft), the eastern end of Coventry has become increasingly more urbanized. The most prevalent land use is residential, with newer commercial development. **Figure 3-6,** excerpted from the Community Comprehensive Plan, shows the existing land uses in the eastern end of Coventry. The uses as shown are further described as follows:

- Residential Uses, including Single Family Residential, Multi-Family Residential and Mobile Homes, are concentrated in the eastern end of town.
- Commercial Uses encompass an array of retail and service-type businesses. The primary commercial areas are located along Tiogue Avenue (Route 3) from Tiogue Lake westward to Woodland Manor, and along Washington Street (Route 117) from West Warwick to Abbotts Crossing Road.
- Industrial Uses are primarily located along the State highways in eastern Coventry and include both manufacturing and non-manufacturing activities, as well as extraction, transportation, communication and utility-type uses.



Comprehensive Community Plan
Town of Coventry, Rhode Island
Land Use Plan

Map D.1-1

Intended For Planning Purposes Only

This map created and maintained pursuant to R.I.G.L. 45-24-29

N W E S

5,300

Feet

1:55,200

Residential

- Very Low Density Residential
- Low Density Residential
- Medium Density Residential

Business / Industrial

- Industrial
- Business
- Business Park
- Village Commercial

Other

- Planned Development
- Coventry Greenway
- Parks and Open Space
- Agriculture
- Mill Conversion Floating District

Data Sources
Parcel Boundaries and Zoning Boundaries
delineated from Town Plat Maps
by Cartographic Associates, Inc. under contract
to the Town of Coventry.

LC November 25 2007
land_use_plan_D_1_1_11x17.mxd

- Public and Semi-Public Uses, including schools, churches, town administrative facilities, Police and Fire Stations and other similar uses. These facilities are also concentrated in the eastern end of town convenient to the largest portion of Coventry's population.
- Parks, Recreation and Open Space Uses, including Agricultural Land, with the majority of open space and agricultural areas in the western and central parts of town.

Land use and development in Coventry is regulated by the town's Zoning Ordinance and Land and Subdivision Regulations. **Figure 3-7**, excerpted from the 2008 CCP (draft), shows the existing zoning districts for eastern Coventry.

3.3 Other Environmental Conditions

In addition to the areas discussed above, several other environmental conditions are relevant to the preparation of this wastewater facilities plan. These conditions include air quality, noise levels, wildlife and plant habitats, and other specific areas of concern as discussed below.

3.3.1 Air Quality

The Town of Coventry, as per the RIDEM Office of Air Resources, complies with the US Clean Air Act.

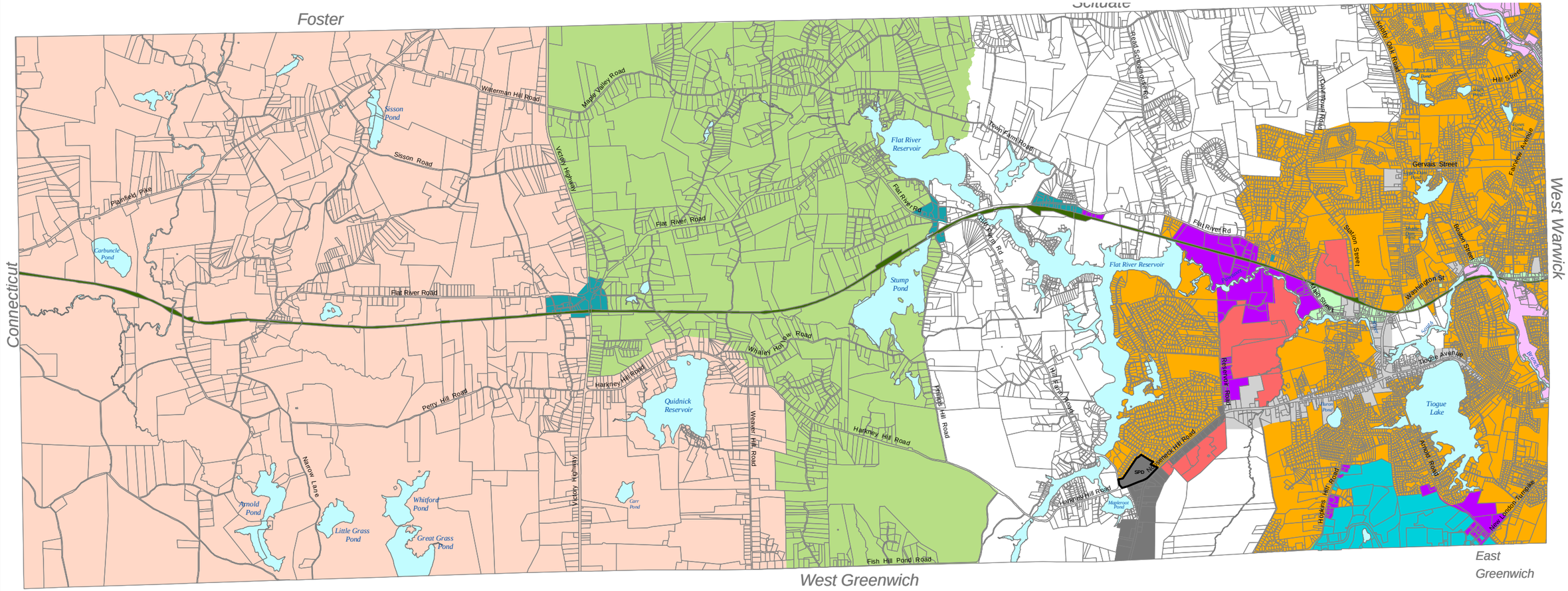
As of EPA's April 2012 Ozone Designations, Coventry is now in "Attainment" for the ground level ozone standards, however, in 2004 the entirety of Kent County was not in "Attainment" per the EPA's ground level ozone standards. The basis of the problem was "smog" created by hydrocarbons, oxygen and nitrogen combining in the presence of sunlight to form an inversion layer.

3.3.2 Noise Pollution

Industry-related stationary noise in Coventry is relatively light. Vehicular activity accounts for most of the Town's noise pollution with Route 3 (Tiogue Avenue) being the biggest offender, followed by Route 117 and, despite its volumes, Interstate 95 creates minimal impact due to its remote location on the fringe of Town. Coventry is located on a flight path to the T. F. Green State Airport and these flight patterns add significant noise impacts and visual disruptions to some areas of Coventry. In addition, some migratory bird patterns have been observed to be adversely affected by flight patterns over Coventry.

3.3.3 Wildlife

Coventry's approximate 62 square miles of land mass is home and habitat for numerous common and rare species of animals and plant life, all contributing to the delicate ecological balance of the area.



Comprehensive Community Plan
Town of Coventry, Rhode Island
Existing Zoning Districts - 2007

Map B.3-2

Intended For Planning Purposes Only

This map created and maintained pursuant to R.I.G.L. 45-24-29

N W E S

4,750

Feet

1:55,200

Legend

- Residential 20,000
- Rural Residential Two Acre
- Rural Residential Three Acre
- Rural Residential Five Acre
- General Business
- General Business One Acre
- Industrial I-1
- Industrial I-2
- Industrial - Mill Conversion Overlay
- Planned Business Park
- Planned Development
- Residential Mobile Home District
- Village Main Street Commercial
- Village Rural Commercial
- Special Planning Overlay District

Data Sources
Parcel Boundaries and Zoning Boundaries
delineated from Town Plat Maps
by Cartographic Associates, Inc. under contract
to the Town of Coventry.

LC August 2007
smallzoning11x17

Table 3-2

Rare & Endangered Plants & Animal Species in Coventry, RI

Genus	Species	Common Name
Ambystoma	opacum	Marbled Salamander
Petasites	frigidus	Northern Sweet Coltsfoot
Erynnis	brizo	Sleepy Duskywing
Zale	submediana	A Noctuid Moth
Corydalis	sempervirens	Pale or Tall Corydalis, Rock-harlequin
Petrochelidon	pyrrhonota	Cliff Swallow
Holomelina	laeta	Joyful Holomelina Moth
Metarranthis	pilosaria	Coastal Swamp Metarranthis
Sagittaria	graminea	Grass-leaved or Grassy Arrowhead
Progomphus	obscurus	Common Sanddragon
Callophrys	henrici	Henry's Elfin
Asclepias	amplexicaulis	Blunt-leaved or Clasping Milkweed
Acronicta	lanceolaria	A Noctuid Moth
Cicindela	formosa	Pine Barrens Tiger Beetle
Petrochelidon	pyrrhonota	Cliff Swallow
Penstemon	digitalis	Tall White or Foxglove Beard-tongue
Enallagma	pictum	Scarlet Bluet
Somatochlora	georgiana	Coppery Emerald
Callophrys	irus	Frosted Elfin
Callophrys	hesseli	Hessel's Hairstreak
Saxifraga	virginiensis	Early Saxifrage
Nepytia		Pine Barrens Nepytia
Oligia	bridghami	A Noctuid Moth
Lupinus	perennis	Wild Lupine, Sundial-lupine
Platanthera	orbiculata	Round-leaved Orchid
Gentianopsis	crinita	Fringed Gentian
Hemileuca	maia	Coastal Barrens Buckmoth
Lupinus	perennis	Wild Lupine, Sundial-lupine
Aralia	racemosa	Wild Spikenard, Life-of-man
Asclepias	amplexicaulis	Blunt-leaved or Clasping Milkweed
Liparis	liliifolia	Lily-leaved or Large Twayblade
Lobelia	dortmanna	Water-lobelia, Water-gladiole
Callophrys	polios	Hoary Elfin
Lupinus	perennis	Wild Lupine, Sundial-lupine
Lygodium	palmatum	Climbing or Hartford Fern
Viola	rotundifolia	Round-leaved or Early Yellow Violet
Enallagma	recurvatum	Pine Barrens Bluet
Storeria	occipitomaculata	Northern Redbelly Snake
Lonicera	dioica	Wild, Mountain-, Glaucous, or Limber Honeysuckle
Tephrosia	virginiana	Goat's-rue, Catgut, Rabbit's-pea
Trillium	erectum	Stinking Benjamin, Purple Trillium, Wake-robin
Osmorhiza	longistylis	Anise-root, Long-styled Sweet Cicely
Platanthera	orbiculata	Round-leaved Orchid
Phegopteris	connectilis	Long or Northern Beech-fern
Lupinus	perennis	Wild Lupine, Sundial-lupine
Botrychium	matricariifolium	Daiseyleaf Grape-fern
Lilium	philadelphicum	Wood-lily, Wild Orange-red Lily
Arethusa	bulbosa	Arethusa, Swamp-pink, Dragon's Mouth
Lycopodiella	alopecuroides	Foxtail-clubmoss
Lupinus	perennis	Wild Lupine, Sundial-lupine
Gymnocarpium	dryopteris	Common Oak Fern
Utricularia	gibba	Humped Bladderwort
Progomphus	obscurus	Common Sanddragon
Arethusa	bulbosa	Arethusa, Swamp-pink, Dragon's Mouth
Platanthera	blephariglottis	White-fringed Orchid
Malaxis	unifolia	Green Adder's Mouth
Zizania	aquatica	Wild Rice
Botrychium	lanceolatum	Lance-leaved Grapefern or Moonwort
Lygodium	palmatum	Climbing or Hartford Fern

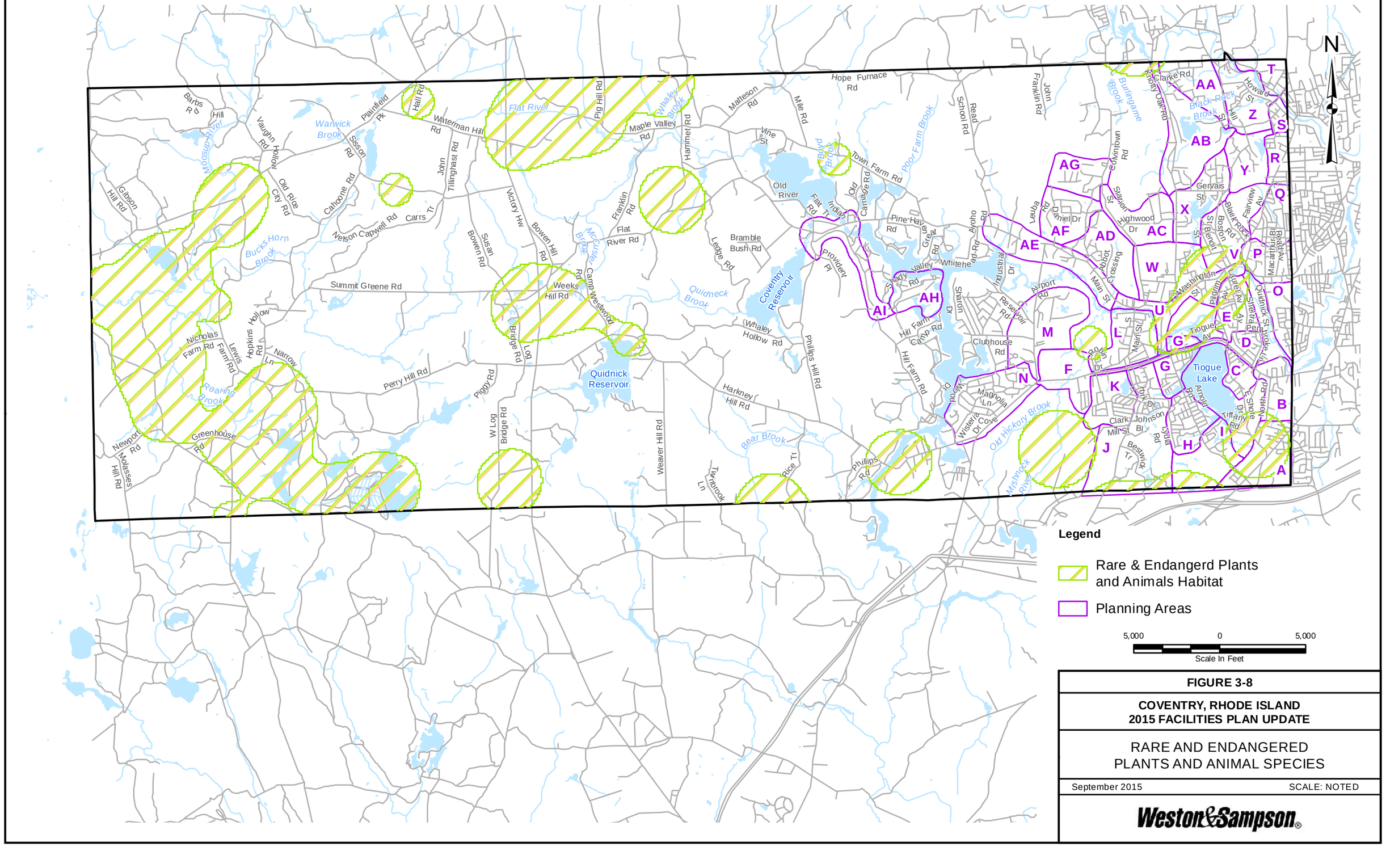


FIGURE 3-8

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

RARE AND ENDANGERED
PLANTS AND ANIMAL SPECIES

September 2015 SCALE: NOTED

Weston&Sampson

Table 3-2 and **Figure 3-8** show the names and general locations of rare and/or endangered plants and animal species, per information obtained from RI-DEM and from Rhode Island's Natural Heritage Program,

The November 1990, RIDEM, *Natural Heritage Program, Rare Species in Coventry* report states specific areas of concern (i.e., Trestle Trail, Nicholas Farm, Parker Woodland and Broadwell Farm) for their potential impact on wildlife habitats.

3.4 Existing Onsite Wastewater Treatment Systems (OWTS)

The existing method of sanitary sewage disposal in the Town of Coventry essentially consists of Onsite Wastewater Treatment Systems (OWTS) and sewer mains transmitting wastewater out of town to the West Warwick Treatment Facility. The 1995 Wastewater Facilities Plan and the subsequent 2003 reaffirmation and 2010 Update, recommended that sanitary sewers be constructed to serve approximately half the total properties in Coventry. The recommendations under this plan are currently being constructed and designed. Coventry prepared an Onsite Wastewater Management (OWM) Plan in 2003; this plan found that over 98% (97% as of 2015) of the residences in Coventry rely on OWTS for treatment and disposal of wastewater. It further found that the Town of Coventry is the largest community in the State of Rhode Island not served by a community sewer system. Therefore, Coventry has more OWTS than any other town in Rhode Island. The 2003 OWM Plan identified the areas in town that are considered priorities for wastewater management. With a few exceptions, these areas are concentrated in the eastern portions of town. Although some of these priority areas are currently serviced by sanitary sewers, the overwhelming majority of properties still rely on OWTS for treatment of wastewater. The 2003 OWM is the most recent version of the Plan.

Many factors impact the performance, deficiency or alteration of OWTS in the priority areas identified in the OWM Plan, including; soil conditions, residential density, age and maintenance of OWTS, and Rhode Island Department of Environmental Management (RIDEM) OWTS Regulations. Malfunctioning OWTS systems typically result from inadequate soil absorption of wastewater flows. This generally results in a health hazard or public nuisance. The upward movement and surfacing of partially treated or untreated wastewater, piping system back-ups into homes and rapid transport of septic tank effluent through the soil into the groundwater often result from system malfunctions or failures. These failures are often attributable to one or more of the following causes:

- The soils in the leaching area will no longer absorb wastewater at a sufficient rate.
- The leaching system is located too close to an underlying or adjacent impervious soil layer (such as clay or bedrock).
- Insufficient depth to groundwater table,
- The soils in the leaching area have too high a permeability to provide sufficient treatment prior to the leachate reaching the groundwater table.
- Harmful substances which could clog the absorption system have been flushed into or added to the system.
- The septic tank, distribution box or system piping is collapsed, broken or clogged.
- The OWTS has not been properly designed and/or constructed.

- A lack of proper maintenance pumping has resulted in excessive solids carryover into the leaching area.
- Excessive or extraneous flows have resulted in hydraulic overloading of the leaching area.

3.4.1 Innovative/Alternative Technologies

There have been great advances in Onsite Wastewater Treatment Technology, also known as Innovative/Alternative Technologies (I/A). In areas where site limitations may make constructing a conventional system unfeasible, an I/A system can work around site limitations and perform as well, or better than a conventional system.

- I/A systems are generally better than conventional septic systems at removing solids and other pollutants from wastewater before it goes to the soil absorption system (SAS).
- The SAS following an I/A technology can be expected to have a longer life.
- I/A technology can also provide advanced treatment to reduce the wastewater's nitrogen content. For this reason, nitrogen reducing systems may be required for new construction, including additions to existing homes, near a private or public water supply well or other nitrogen-sensitive areas.

3.4.2 Cesspool Act of 2007

The Cesspool Act of 2007 is designed to phase out cesspools from environmentally sensitive areas. Per the Cesspool Act of 2007, cesspools within 200 feet of the inland edge of shoreline features bordering tidal water areas (i.e., Coastal Resources Management Council's jurisdiction), cesspools within 200-feet of a public well and cesspools within 200-feet of a water body with an intake for a drinking water supply all need to be abandoned and the home upgraded with a new onsite wastewater treatment system or connected to available municipal sewer lines by January 2014.

Cesspools outside of the 200-foot areas described above are allowed to be utilized per the DEM Septic System Rules as long as they have not failed or are considered a "large capacity" cesspool (i.e. serves multifamily residential or any non-residential building serving 20 or more people per day). Failed cesspools and "large capacity" cesspools must be replaced with a septic system meeting the rules of the State of Rhode Island.

The following is an updated Inspection and Replacement Timetable for the Cesspool Act of 2007:

- All cesspools within the 200-foot areas identified above will have to be inspected upon notice from DEM and no later than January 1, 2012;
- All cesspools within the 200-foot areas identified above and found to be failed will need to be replaced within 1 year of discovery;
- All cesspools within the 200-foot areas identified above that are found in already sewered areas will need to be hooked-up to the sewer no later than January 1, 2014; and

- All other cesspools within the 200-foot areas identified above will need to be replaced by January 1, 2014.

Per RIDEM estimates, there are approximately 50,000 cesspools in Rhode Island. This Cesspool Act is anticipated to remove approximately 5,000 cesspools.

3.4.3 Repair Information

The State of Rhode Island Department of Environmental Management (RIDEM) is responsible for maintaining all records pertaining to the construction, alteration and repair of individual on-site sewage treatment systems (OWTS) in the state. As part of the current facilities planning effort, a review of RIDEM records was conducted to obtain data on recent OWTS repairs. OWTS repair records for the seven year period (2008 through 2014) were examined to locate OWTS failures within the proposed study areas. All repairs recorded for this period are listed in **Appendix A.** This data is summarized in **Table 3-3** on a study sub-area basis. The number of OWTS repairs in itself may not be an indication of poor soil and/or groundwater conditions. Repairs are also an indication of the age of the system and the maintenance history of the system. Representatives of the RIDEM Division of Water Resources have indicated during past investigations that some system repairs and alterations are not reported and consequently are not recorded. Please note that in **Table 3-3** and the remainder of this report Planning Area ZZ represents all other parcels in Coventry located outside of the designated Planning Areas, as described previously.

Table 3-3 RIDEM OWTS File Review Data 2008-2014

PLANNING AREA	Repairs to Existing Systems[(1)]	Number of Existing Parcels 2015[(1)]	Percentage of Systems Repaired	Percentage of Total Repairs
A	17	287	5.92%	2.16%
B	13	198	6.57%	1.65%
C	12	186	6.45%	1.53%
D	35	257	13.62%	4.45%
E	31	335	9.25%	3.94%
F	15	119	12.61%	1.91%
G	12	256	4.69%	1.53%
H	31	372	8.33%	3.94%
I	15	115	13.04%	1.91%
J	37	514	7.20%	4.71%
K	30	285	10.53%	3.82%
L	40	345	11.59%	5.09%
M	14	147	9.52%	1.78%
N	25	405	6.17%	3.18%
N1	12	227	5.29%	1.53%
O	12	192	6.25%	1.53%
P	19	336	5.65%	2.42%
Q	23	348	6.61%	2.93%
R	14	152	9.21%	1.78%
S	6	86	6.98%	0.76%
T	3	107	2.80%	0.38%
U	8	206	3.88%	1.02%
V	21	214	9.81%	2.67%
W	29	250	11.60%	3.69%
X	29	293	9.90%	3.69%
Y	11	125	8.80%	1.40%
Z	26	290	8.97%	3.31%
AA	6	207	2.90%	0.76%
AB	16	259	6.18%	2.04%
AC	8	195	4.10%	1.02%
AD	13	149	8.72%	1.65%
AE	11	137	8.03%	1.40%
AF	13	204	6.37%	1.65%
AG	8	147	5.44%	1.02%
AH	8	95	8.42%	1.02%
AI	8	98	8.16%	1.02%
ZZ	155	12,947	1.20%	19.72%
TOTAL	786	21,085	3.73%	100%

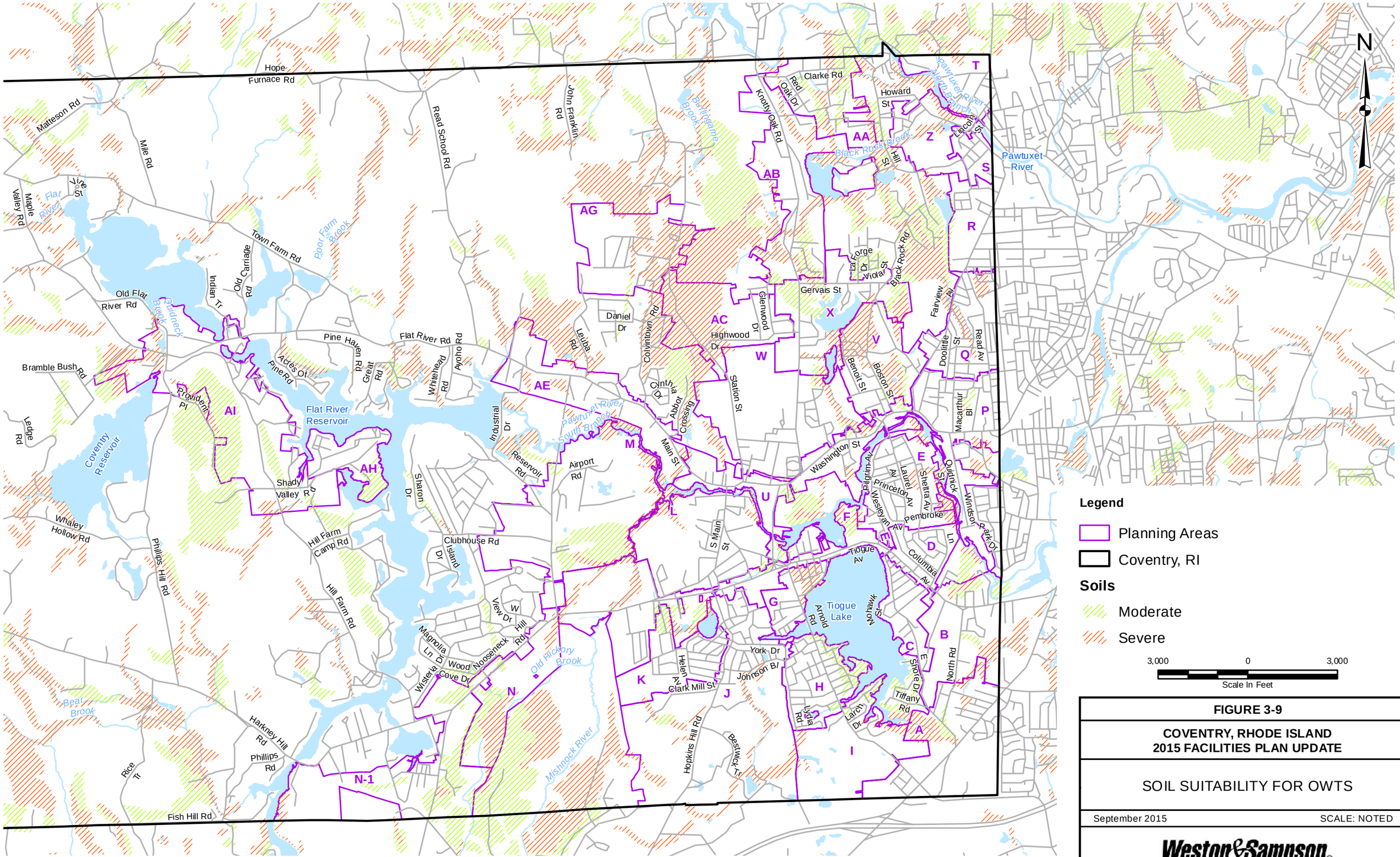
Notes:
1. Includes parcels in "removed" areas from previous facility planning documents.

3.4.4 Soils Suitability for OWTS

In order for individual sewage disposal systems to operate properly, soils on which they are constructed must be suitable for such use. The following sections include information available on soils in the study area, including Soil Conservation Service (SCS) information and information obtained from soil borings and wells in Coventry.

Most soil types in eastern Coventry, where the major OWTS deficiencies occur, are either Canton-Urban land complex or Merrimac-Urban land complex as identified in the *RI Soil Survey.* Both of these soils are characterized as having slight limitations for the construction of OWTS. The SCS requires detailed on-site investigations and evaluation for most land uses on Canton Urban-land complex and Merrimac Urban-land complex soils. Urban land, which consists of areas covered by streets, parking lots and shopping centers and other structures, total 30 to 40 percent of areas with Canton and Merrimac soils. This, combined with the fact that a large percentage of homes are constructed on lots substantially smaller than the lot sizes described in the SCS report, greatly impacts OWTS construction and/or operation in these soils. **Table 3-4** lists soils with severe or moderate limitations, and the primary constraints that limit OWTS construction. **Figure 3-9** maps the areas in Coventry with such types of soil.

Soils classified as 'severe' exhibit properties or site features that are extremely restrictive to proper functioning of OWTS systems. Soils classified as 'moderate' exhibit properties or site features that are unfavorable for proper functioning of OWTS absorption fields that may be overcome through special planning and design. However, when such conditions are combined with small lot sizes, 'special planning and design' may not be able to provide a solution.



Legend

- Planning Areas
- Coventry, RI

Soils

- Moderate
- Severe

3,000 0 3,000

Scale In Feet

FIGURE 3-9

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

SOIL SUITABILITY FOR OWTS

September 2015 SCALE: NOTED

Weston&Sampson

Table 3-4 Coventry Soil Limitations for OWTS

Soil Symbol	Soil Name	Limitation	Primary Constraints
Aa	Adrian Muck	Severe	High water table
Co	Carlisle Muck	Severe	High water table
Dc	Deerfield	Moderate	Seasonal high water table
GhD	Gloucester-Hinckley	Severe	High slope, rockiness
HkD	Hinckley	Severe	High slope
LgC	Lippitt	Severe	Depth to bedrock, rock outcrops
Nt	Ninigret	Moderate	Seasonal high water table
PaA, PaB, PbB, PbC	Paxton	Moderate	Slow permeability
PcC	Paxton	Moderate	Slow permeability, rockiness
Pp	Podunk	Severe	Seasonal high water table
Rc	Raypol	Severe	Seasonal high water table
Re	Ridgebury	Severe	High water table, slow permeability
Rf	Ridgebury, Leicester and Whitman	Severe	High water table
Ru	Rumney	Severe	High water table
Sb	Scarboro	Severe	Seasonal high water table
ScA, ScB	Scio	Moderate	Seasonal high water table
Ss	Sudbury	Moderate	Seasonal high water table
StA, StB, SuB	Sutton	Moderate	Seasonal high water table
SvB	Sutton	Moderate	Seasonal high water table, rockiness
Tb	Tisbury	Moderate	Seasonal high water table
Wa	Walpole	Severe	Seasonal high water table
WbA, WbB, WcB	Wapping	Moderate	Seasonal high water table
WdB	Wapping	Moderate	Seasonal high water table, rockiness
WhA, WhB, WoB	Woodbridge	Moderate	Seasonal high water table, slow permeability
WrA	Woodbridge	Moderate	Seasonal high water table, slow permeability, rockiness

As part of this (and previous) facility planning process, the eastern portion of Coventry has been evaluated to identify problem areas for (OWTS) construction and operation, and to reaffirm the need for corrective action in those areas. This section summarizes the information utilized in delineating problem areas.

3.4.5 OWTS Lot Size Limitations

Even with acceptable soils, the available lot area can be limited to such an extent that construction of on-site systems may be restricted. Current RIDEM Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems (OWTS) state that any new lot that is less than 10,000 square feet and requires more than one variance for construction will be denied. This implies that a 10,000 square feet lot size is the minimum lot size to have a safe and effective OWTS.

Many residential areas of eastern Coventry were developed with average lots covering 10,000 square feet or less. These residential areas, which in some cases were developed with lots of less than 5,000 square feet, create significant difficulties when their substandard OWTS systems begin to malfunction. **Table 3-5** shows the average lot sizes in each of the study areas, as well as the occurrences of lots below 10,000 and 5,000 square feet in area. **Figure 3-10** shows these lots in plan view. In some areas of eastern Coventry, large two-family mill houses have been constructed on lots which could be of acceptable size for smaller single family residences. The large building footprint area minimizes the land available for an on-site system, and combined with the higher wastewater flows from two (or more) families, can preclude construction of an adequate system. The Greene Street/Laurel Avenue area (Area E) and the Washington, Quidnick and Anthony Areas (Areas P, Q, U, V and W) are characterized by such development. In addition, numerous commercial buildings and residences between Washington Street and the South Branch of the Pawtuxet River occupy nearly all of the usable area for the parcels. On these lots, there is essentially no land available for construction of any type of on-site disposal system.

Table 3-5 Lot Size Limitations for OWTS Siting

Planning Area	Number of Existing Parcels	Average Parcel Lot Size (sf)	Percent of Lots under 5,000 sf	Percent of Lots under 10,000 sf
A	295	36,500	3%	29%
B	201	33,800	3%	32%
C	190	17,400	11%	55%
D	259	10,000	1%	69%
E	338	19,700	0%	23%
F	132	86,000	1%	10%
G	258	12,900	14%	60%
H	372	13,200	3%	25%
I	117	50,800	3%	18%
J	531	39,300	1%	32%
K	289	17,200	0%	49%
L	360	29,700	6%	39%
M	142	124,700	1%	1%
N	365	29,900	0%	1%
N-1	49	164,200	6%	6%
O	185	14,400	8%	55%
P	340	14,900	10%	50%
Q	351	15,000	6%	46%
R	155	26,100	10%	29%
S	89	17,100	10%	33%
T	113	29,100	9%	26%
U	214	35,200	9%	25%
V	218	30,900	3%	23%
W	256	53,500	2%	32%
X	293	37,800	2%	12%
Y	119	51,200	1%	2%
Z	286	36,600	3%	30%
AA	208	27,600	0%	12%
AB	264	41,000	4%	15%
AC	195	38,100	1%	1%
AD	148	29,800	1%	11%
AE	137	70,900	0%	13%
AF	204	40,400	0%	0%
AG	149	60,100	1%	1%
AH	97	29,700	5%	33%
AI	109	150,400	3%	16%

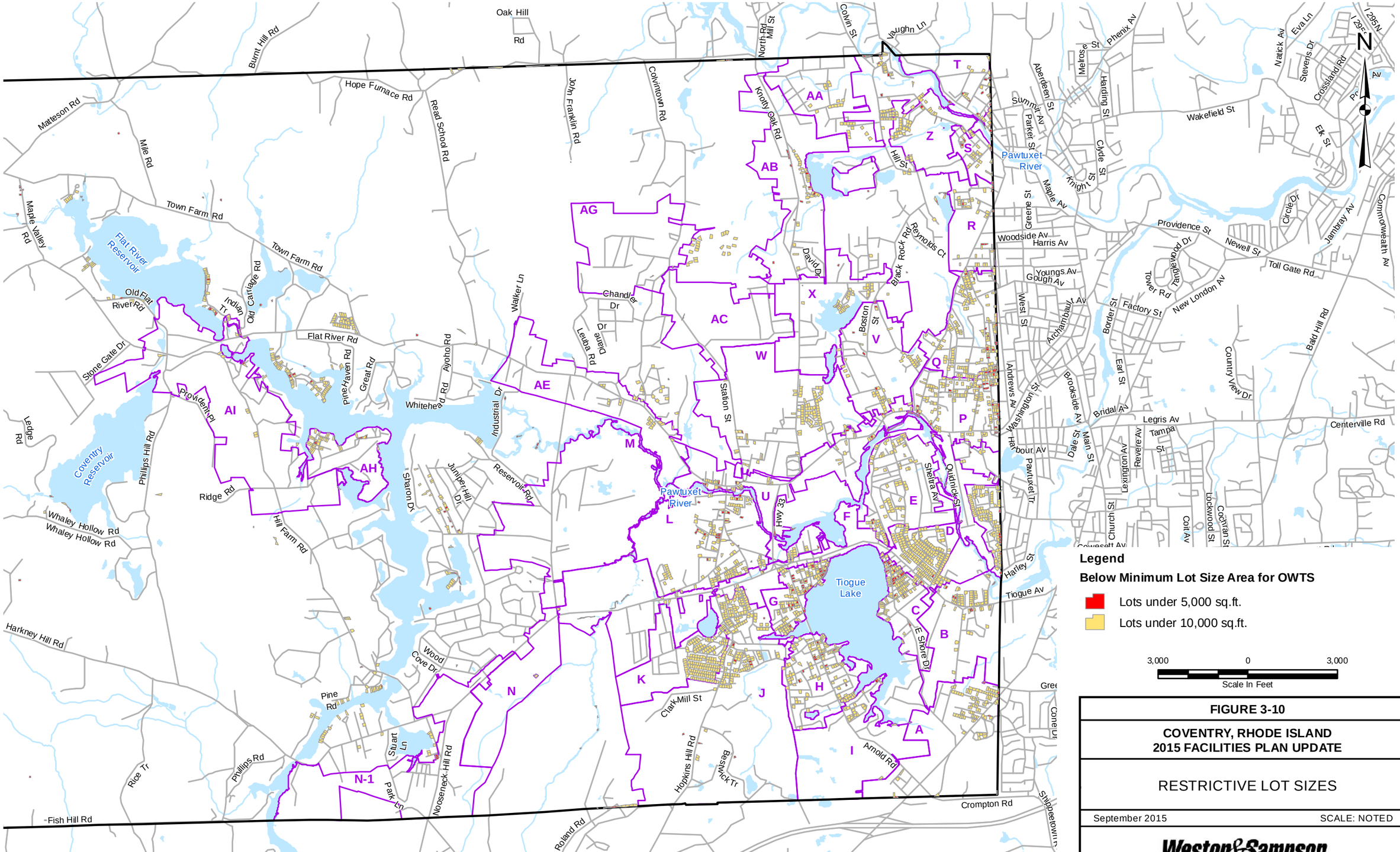


FIGURE 3-10

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

RESTRICTIVE LOT SIZES

September 2015 SCALE: NOTED

Weston&Sampson

3.4.6 Summary of Existing OWTS Conditions

Based on the above discussions, the overall effectiveness of OWTS systems in the study area can be estimated. RIDEM's *Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems* (OWTS), dated December 2009, defines a failed system as any OWTS that does not adequately treat and disperse wastewater so as to create a public or private nuisance or threat to public health or environmental quality, as evidenced by, but not limited to, one or more of the following conditions:

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

From this definition we can estimate that a significant number of the OWTS systems in eastern Coventry are showing evidence of failure. The available soils and groundwater information, OWTS system repair information, existence of substandard systems (i.e. cesspools), occurrence of system problems and limitations on system construction and operation (such as lot size restrictions) were reviewed to identify specific areas where existing conditions preclude the proper operation of individual sewage disposal systems.

3.5 Existing Direct Wastewater Discharges

The unfavorable conditions for OWTS systems, the lack of a "mature" town sewer system and the large surface water areas which exist in eastern Coventry combine to make it a prime area for direct wastewater discharges. These include overflow relief pipes from OWTS systems and direct building sewers to surface waters and storm drains. The North and South Branches of the Pawtuxet River were once known to have a significant number of such direct discharges. However, it seems that in the past twenty years, the number of direct discharges has decreased. This is evidenced by the increased water quality in both the North and South Branches of the Pawtuxet River. At the time of the 1995 Facilities Plan, parts of the Pawtuxet River in Coventry were not

supporting their designated uses due to pollution. At the time of this Facilities Plan Update, all of the Pawtuxet River in Coventry was able to support all designated uses and was deemed fishable/swimmable.

Although there seems to be a significant increase in the water quality in Coventry, there is no way to estimate the actual number of direct wastewater and stormwater discharges in Coventry without a more comprehensive study.

3.6 Existing Wastewater Collection and Treatment System

3.6.1 West Warwick Regional Wastewater Treatment Facilities

As noted in Chapter 2 of this report, the State's 208 Areawide Water Quality Management Plan (WQMP) recommended that wastewater from Coventry be treated at the West Warwick Regional Wastewater Treatment Facility. This contradicted the previous recommendations for an independent Coventry Wastewater Treatment Facility made by earlier reports ("Preliminary Engineering Survey and Report on Sewerage and Sewage Treatment for the Town of Coventry", Fenton G. Keyes Associates, November 1966, and "Facilities Plan for Wastewater Collection and Treatment Facilities", C.E. Maguire, Inc., 1977). The recommendation of the 208 study has since been implemented, and Coventry is now a member community in the West Warwick regional system.

In 1984, the Town of Coventry signed an Inter-Municipal Agreement (IMA) with the Town of West Warwick, which provided 2.25 mgd (average daily flow) of capacity for Coventry in the West Warwick Regional Wastewater Treatment Facility.

In December 2013, the Town of Coventry acquired the Woodland Manor Estates pump station and forcemain. The capacity allocation in the West Warwick system for the Woodland Manor pump station/forcemain is 0.2 mgd. Future IMA revisions will be needed to address allocating the Woodland Manor capacity to the Town, however this additional capacity is not required for projected wastewater flows until 2065, see **Table 4-5** and **Appendix B**.

The West Warwick Regional Wastewater Treatment Facility is located off Pontiac Avenue, in the northeast corner of West Warwick. The treatment facility discharges treated effluent to the Pawtuxet River. The facility can discharge an average daily flow of 10.5 mgd (peak flow of 25.34 mgd). West Warwick's facility consists of an activated sludge treatment process, along with a biological activated filter and UV disinfection.

The West Warwick facility currently has the equipment to properly accept septage for treatment. However, at this time no septage is accepted at the facility. The IMA between West Warwick and Coventry has a stipulation that would allow Coventry to dispose of septage at the facility if it were to be accepted from any other communities (including West Warwick).

Specific information on the existing and proposed West Warwick Regional Wastewater Treatment Facilities is contained in the West Warwick Wastewater Facilities Plan.

The facility is currently undergoing an upgrade to reduce the phosphorus in the facilities effluent. The estimated cost of this upgrade is $12.5 million. Coventry's share of the final total project cost is 23% per the most recent Inter-municipal Agreement.

Additionally, there is a planned $11 million flood mitigation improvements project for the wastewater treatment facility. However, after discussion with West Warwick, it is assumed that the project costs will be covered by grants from the facilities insurance company and though the Federal Emergency Management Agency (FEMA).

3.6.2 Wastewater Collection and Transmission System

The existing portions of the wastewater collection and transmission system are described below and can be seen in **Figure 3-11**.

3.6.2.a Hopkins Hill Road Sewer

Between 1989 and 1991, as part of a Rhode Island Department of Transportation (RIDOT) road reconstruction project, the town constructed the Hopkins Hill Road sewer. The project included approximately 850 feet of 18 and 24 inch sewer in Tiogue Avenue (Route 3) and 4,350 feet of 8, 10, 12 and 18 inch sewer in Hopkins Hill Road. The project included 88 service connections to properties fronting on the sewer. The sewer was installed as a dry line but was activated upon completion of the previously proposed Tiogue Avenue Interceptor (see Contract 03-01) and Pumping Station project.

3.6.2.b Arnold Road Pumping Station and Force Main

The Arnold Road Pumping Station and Force Main were constructed by the town in 1985 to service the Cal Chemical Corporation's industrial complex near the southern end of Arnold Road. The project was funded by a grant from the Federal Department of Housing and Urban Development (HUD). The project included a small (160 gpm) duplex submersible type pump station located on the Cal Chemical Corporation property, approximately 1,200 feet of 4 inch force main, and 300 feet of 8 inch gravity sewer in Arnold Road. In addition to servicing Cal Chemical Corporation, the project provided one service connection to a property fronting on the gravity sewer. This sewer pumping station is currently operating and discharges to the New London Turnpike Sewer at its intersection with Arnold Road.

3.6.2.c North Road Terrace Sewers

The North Road Terrace Sewer was constructed by the town in 1985 to service the Coventry Housing Authority complex near the northern end of Old North Road. The project was funded by a grant from the Federal Department of Housing and Urban Development (HUD). The original project included a small (160 gpm) duplex submersible type pump station required for off peak pumping, as well as approximately 1,250 feet of 8 inch gravity sewers in Tiogue Avenue

North Branch Interceptor Sewer (Partial)

Broad Street Sewer

Industrial Drive Pump Station

Sandy Bottom Rd Pump Station

Woodland Manor Forcemain

Woodland Manor Pump Station

Arnold Road Pump Staion

Hope Furnace Rd
John Franklin Rd
Clarke Rd
Red Oak Dr
Howard St
Burlingame Brook
Black Rock Brook
Hill St
Lincoln St
Pleasant St
Parker St
Capwell Brook
Pawtuxet River - North Branch
Knotty Oak Rd
Knotty Oak Shores
Colvintown Rd
Hillside Av
Maple Av
Woodside Av
Peters Ln
Greene St
Harris Av
South St
Youngs Av
Viola St
Gervais St
Glenwood Dr
Chandler Dr
Daniel Dr
Highwood Dr
Fairview Av
Gough Av
Black Rock Rd
Boston St
Eisenhower St
Read Av
Phillips St
West St
Shippee Av
WEST WARWICK
Morin Av
Benoit St
Doolittle St
Andrews Av
Macarthur Bl
Bates Av
Harbour Av
Dale St
Pilgrim Av
Washington St
Maple St
Main St
Station St
Abbott Crossing
Cynthia Dr
Industrial Dr
Flat River Rd
Walker Ln
Leuba Rd
Pawtuxet River - South Branch
Airport Rd
Pawtuxet River
Hwy 33
Laurel Av
Wesleyan Av
Princeton Av
Sheltra Av
Windsor Park Dr
Quidnick St
Robinson Wy
Pulaski St
Pawtuxet Tr
Harley St
Pembroke Ln
Columbia Av
Tiogue Av
Valiant Rd
Clubhouse Rd
Reservoir Rd
Mishnock River
Barber St
S Main St
Robin Dr
Coventry Dr
Lake Side Dr
Arnold Rd
Tiogue Lake
Mohawk St
Bonney St
Deerfield Rd
Kimberley Ln
E Shore Dr
North Rd
W View Dr
Wisteria Dr
Nooseneck Hill Rd
Hancock Dr
York Dr
Old Hickory Brook
Helen Av
Johnson Bl
Adams Dr
Clark Mill St
Lydia Rd
Shore Dr
Larch Dr
N Glen Dr
Tiffany Rd
Longfellow Dr
Rotary Dr
Cone Dr
Jaycee Dr
Bestwick Tr
Crompton Rd
Hawkinson Brook
Shippeetown

PS Pump Station

Legend

Gravity Main

Contracts 03-01, 04, 05

- Contract 03-01
- Contract 03-03
- Contract 04
- Contract 05
- Contract 6
- Contract 7

Gravity Main - Other Sewer Projects

- North Road Terrace Sewer Project
- Old Port Authority Sewer Interceptor
- Pulaski Street / Robinson Way Sewer Project
- RIDOT Hopkins Hill Reconstruction Project
- Gravity Main - Subdivisions

Force Main

Contracts 03-01, 04, 05, 6

- Contract 03-01
- Contract 03-03
- Contract 04
- Contract 6
- Contract 6A
- Contract 7 (FM)
- Contract 7 (LP)

- Gravity Main Installed by Others
- Forcemain
- Low Pressure Sewer
- Lakes
- Town Boundaries

2,000 0 2,000

Scale In Feet

FIGURE 3-11

2015 FACILITIES PLAN UPDATE

EXISTING SEWER MAP

September 2015 SCALE: NOTED

Weston&Sampson

(Route 3), 300 feet of 8 inch sewer on Old North Road, and 1,550 feet of 6 and 8 inch sewer on the Housing Authority property. The original pump station has since been abandoned, and the system now flows via gravity sewers to Tiogue Avenue and into West Warwick. In addition to servicing the North Road Terrace housing complex, the project provided 23 service connections to properties fronting on the sewer along Old North Road and Tiogue Avenue. This sewer is currently operating and discharges directly to the West Warwick sewer system at the Town Line on Tiogue Avenue.

3.6.2.d North Branch Interceptor Sewer

A portion of the North Branch Interceptor Sewer was constructed in 1985 by the town to service the Victor Corp. industrial complex on North Main Street. Like the Arnold Road and North Road Terrace sewers, the project was funded by a grant from the Federal Department of Housing and Urban Development (HUD). The project included approximately 200 feet of 15 inch sewer in North Main Street, and 130 feet of 8 inch sewer on the Victor Corp. property. In addition to servicing Victor Corp., the sewer provided one service connection to a property fronting on the sewer. This sewer is currently operating and discharges to an 18 inch sewer on North Main Street at the intersection of Broad Street.

3.6.2.e New London Turnpike Sewer

The New London Turnpike Sewer was constructed in the early 1980's by West Warwick to provide service to the West Greenwich Industrial Park development located in north-eastern West Greenwich. The project included approximately 4,500 feet of 15 inch sewer in the New London Turnpike from the West Warwick town line to the East Greenwich town line. Approximately 53 properties in Coventry front on this sewer. The sewer is currently active and flows into the Maisie Quinn Interceptor.

3.6.2.f Broad Street Sewer

The Broad Street sewer extension was constructed by West Warwick as part of their system in the Harris area. The sewer in Coventry was necessary to provide gravity sewer service to portions of Broad Street and Summit Avenue in West Warwick. The sewer installation includes approximately 700 feet of 18 inch sewer in North Main Street, 700 feet of sewer in Broad Street, 400 feet of sewer in Lamphear Street, and 150 feet of sewer on Summit Avenue. Approximately 21 properties in Coventry front on this sewer. These active sewers are directly tributary to the Clyde Interceptor in West Warwick.

3.6.2.g Woodland Manor Pumping Station and Force Main

The Woodland Manor Pumping Station and Force Main were constructed in 1980 by the Mapleroot Development Corporation, developers of the Woodland Manor housing complex on Nooseneck Hill Road. The station is a suction lift type pump station with two sets of pumps operating in a parallel pumping configuration (four pumps total). The pumping station services the housing development, including capacity for future phases, and several adjacent commercial establishments. The pump station has a 10 inch force main that extends approximately 19,360 feet along Nooseneck Hill Road/ Tiogue Avenue (Route 3) to the West Warwick town line, where it discharges to the West Warwick system. In 1978, the Mapleroot

Development Corp. entered into an agreement with West Warwick to allow the discharge of 200,000 gallons per day to the West Warwick system. Since the construction of the Woodland Manor force main, the pipeline owners have allowed several pressure connections along the length of Tiogue Avenue. These connections have typically been to commercial establishments with severe OWTS problems. Such connections were approved by both West Warwick and Coventry (whose plant capacity was utilized for the connections).

Up until December 2013, this was a privately owned and operated sewer system, separate from the Town of Coventry system, and designed to provide sewer service to an area within eastern Coventry. In December 2013, the Town of Coventry acquired the Woodland Manor Estates pump station and forcemain (future IMA revisions will be needed to address allocating this capacity to the Town).

Two assessments had been performed on the pump station and forcemain, and were reviewed by the Town prior to the acquisition of the infrastructure. The assessment performed by DiPrete Engineering can be found in **Appendix K**. The other assessment performed by Fuss & O'Neill is with the Town's Engineer. These assessments outlined recommended repairs and upgrades to the pump station. It is recommended the Town perform the repairs/upgrades as part of their yearly infrastructure maintenance plan.

In addition, Weston & Sampson Services has been contracted by the Town to operate and maintain the system since the acquisition. Flow records from the station can be found in **Appendix L**.

3.6.2.h Contract 03-01

The Contract 03-01 sewer project was constructed in 2004 by the Town of Coventry to service portions of Tiogue Avenue and Washington Street. This contract connected the system to the Sandy Bottom Road pump station, built under Contract 03-02 by the Town of Coventry. The connection to the pump station under the Pawtuxet River was by a depressed sewer made up of a series of ductile iron pipes (3 barrels - one 16-inch and two 12-inch pipes). Two 12-inch ductile iron force mains extend from the pump station to the intersection of Washington Street and Knotty Oak Road (approximately 2,500 feet). A 30-inch PVC gravity sewer pipe extends from the intersection of Washington Street and Knotty Oak Road to the intersection of Washington Street and Pulaski Street (approximately 6,100 feet). A 24-inch PVC gravity sewer extends from the pump station to approximately 3,000 feet west along Tiogue Avenue. This line connected to the previously "dry" sewer line installed in Hopkins Hill Road, and allowed for the activation of that sewer line.

As part of this project a flume/flow meter vault was installed to monitor and track flows from the interceptor into West Warwick. These flow records can be found in **Appendix L**. The existing telephone line communications system to send out the flow meter readings has had issues in the past. It is recommended to perform an evaluation on the communication system to see if a more suitable alternative (i.e. radio, high speed internet) is available.

3.6.2.i Contract 03-02

The Sandy Bottom Road Pump Station was constructed under Contract 03-02 concurrently with the gravity sewers and force main in Contract 03-01. The Sandy Bottom Road Pump Station is a custom designed 3 level pump station with separate dry and wet process areas. The pump station was constructed with 2 pumps initially, but was designed for the addition of two larger pumps such that the future capacity of the upgraded station will be sufficient to handle flows from the majority of the sewered areas in eastern Coventry. The location and elevation of this station was selected to allow gravity sewer service to most of the areas along the South Branch of the Pawtuxet River.

The Sandy Bottom Road pump station includes sewage grinders in the wetwell area, and the station discharges through a dual 12-inch force main to allow for significant variations in design flow rates. The station is equipped with a flow meter and enhanced instrumentation and control (I&C) system.

The Town currently contracts out the operation and maintenance services for the station. The operation and maintenance service contract includes responding to any alarms/emergencies at the station and to repair the equipment as necessary to ensure proper operations.

This station is presently equipped to handle initial design flows from the Coventry system, including flows from the Amgen facility. The station will need to be upgraded with one or more additional or larger pumps as the service areas outlying from Tiogue Avenue, Hopkins Hill Road, and Main Street are sewered.

Flow records from the station have been included in **Appendix L**. These records show that the current pumps are able to handle the flows experienced at the station. At this time a pump capacity upgrade is not recommended. The flows should be monitored, and once flows consistently reach 80% of the station's capacity, an upgrade should be performed to the station.

3.6.2.j Contract 03-03

The Hopkins Hill Road force main was constructed in 2006 by the Town of Coventry to connect the West Greenwich Technology Park with the existing gravity sewer in Hopkins Hill Road. It consists of approximately 2,500 feet of 12-inch ductile iron force main from the Coventry / West Greenwich town line and 971 feet of 8-inch ductile iron force main on Hopkins Hill Road.

3.6.2.k Contract 4

The Tiogue Avenue gravity sewer system was constructed in 2007 by the Town of Coventry to provide service to more of Tiogue Avenue and Ramblewood Estates, a mobile home park in Coventry. It consisted of approximately 2,900 feet of 18-inch PVC pipe along Tiogue Avenue to Ramblewood Estates, 1,200 feet of 18-inch PVC pipe in Morningside Drive, 900 feet of 18-inch PVC pipe in "D" Lane, 500 feet 18-inch PVC pipe in Monroe Drive and 1,000 feet of 18-inch ductile iron pipe along a cross country portion. The project also includes 8-inch PVC lateral pipes in Anthony Street (820 feet) Fairview Avenue (1,270 feet), Ray Street (580 feet) and Wood Street (1,125 feet).

3.6.2.l Contract 5

The Main Street gravity sewer system was constructed in 2008 by the Town of Coventry to provide service to Main St / Route 117 and to connect this to the Sandy Bottom Road pump station. It consisted of 1,100 feet of 12-inch PVC gravity sewer pipe along Sandy Bottom Road, 900 feet of 12-inch PVC cross country pipe between Sandy Bottom Road and Main Street, 2,700 feet of 12-inch PVC pipe along Main St (Route 117), 590 feet of 8-inch PVC pipe along Main Street, 1,050 feet of 18-inch PVC pipe along Tiogue Avenue, and 175 feet of 12-inch PVC pipe along Idaho Street. The contract also included 8-inch PVC lateral pipe along Contentment Drive (2,000 feet), Boston Street (1,675 feet), Whitman Street (75 feet) and Clearview Drive (75 feet). See below for Johnson Boulevard sewer, formerly known as Contract 2008A.

3.6.2.m Contract 2008A

The Johnson Boulevard gravity sewer system was constructed in 2008 by the Town of Coventry to provide service from Johnson Boulevard to Hopkins Hill Road. It consists of approximately 550 feet of 8-inch PVC gravity sewer along Johnson Boulevard. The work was completed by the same contractor who installed the Contract 5 pipeline. This project is no longer known as Contract 2008A, but rather was incorporated in the Contract 5 sewer area.

3.6.2.n Contract 6 and Contract 6A

The Tiogue Lakeside gravity and low pressure sewer system was constructed in 2012 by the Town of Coventry to provide service to the northwestern Tiogue Lake area. This included the installation of approximately 1,850 feet of 12-inch PVC interceptor extending from Sandy Bottom Road east along Tiogue Avenue. Approximately 2,400 feet of 8-inch sewer laterals were installed to sewer parcels that were bordered by Tiogue Avenue to the north, Lakeside Drive to the south, Arnold Road to the west, and the Tiogue Dam to the east in Planning Areas G and F. Approximately 1,100 feet of 2-inch PVC low pressure sewers were also installed as part of Contract 6A to serve properties east of the Tiogue Dam along Tiogue Avenue to approximately the intersection of Pilgrim Avenue.

A portion of this project used American Recovery and Reinvestment Act (ARRA) funding, with the remaining being financed through the State Revolving Fund Program.

3.6.2.o Contract 7 & 7A

The Main Street and Industrial Drive Sewer Extension was constructed in 2013-2014 by the Town of Coventry to provide service farther west on Main Street/Flat River Road from the end of Contract 5 to Walker Lane. The project also serves the Town Hall, Public Library and Town Hall Annex located on Flat River Road. The project consisted of approximately 40-feet of 12-inch interceptor, 450-feet of 8-inch sewer laterals, 9,300-feet of low pressure sewer, 3,500-feet of 4-inch forcemain and one pump station.

This project received funding through the U.S. Department of Commerce, Economic Development Administration (EDA) economic development grant program.

3.6.3 Existing Wastewater Flows

As described above, the Town of Coventry owns approximately 2.25 mgd of total capacity in the West Warwick Wastewater Treatment Facility. This average daily flow capacity was based on the Year 2000 projections in the 1981 Amended Facilities Plan. The current estimated wastewater flow from Coventry to the West Warwick sewer system is approximately 291,000± gallons per day (gpd) average daily flow (including 65,000± gpd related to the Woodland Manor system), as shown in **Table 3-6**. The existing flows are based on of KCWA water use records. This is a conservative value, as it would be expected that sewer flows would typically represent 80% to 90% of the parcels water use. This wastewater flow also does not include flows from the Amgen facility, as they do not count against Coventry's capacity allocation in West Warwick. The present peak flow from Coventry can therefore be estimated as 1,367,000± gpd using a peaking factor of 4.7 (see **Figure 3-12**).

The Town has a total of five wastewater flowmeters located in the sewered areas. Data from these flowmeters is included in **Appendix L**. These flowmeter locations are as follows:

- Pulaski Street Flow Meter: This flowmeter is located on Pulaski Street near the West Warwick Town Line. It measures flow from the Contract 03-01 interceptor that runs east on Washington Street.

- Sandy Bottom Road Pump Station Flow Meter: This flowmeter is located on the discharge piping in the Sandy Bottom Road Pump Station (Contract 03-02). This flowmeter measures all flow pumped from the station.

- Industrial Drive Pump Station Flow Meter: This flowmeter is located on the discharge piping in the Industrial Drive Pump Station (Contract 7 & 7A). This flowmeter measures all flow pumped from the station.

- Woodland Manor Forcemain Flow Meter: This flowmeter is located on the Woodland Manor Forcemain, on Tiogue Avenue near the intersection of Darton Street (near #354 Tiogue Avenue). This flowmeter measures all flow pumped from the station, in addition to any ancillary parcels that are connected to the Woodland Manor Forcemain.

- Highlands at Hopkins Hill Condo Flowmeter: This flowmeter is located on Hopkins Hill Road near the intersections of Dante Drive and Enzo Drive. This flowmeter measures flow from the Highlands at Hopkins Hill Condo Development. This flowmeter was installed for billing purposes, because the detached condos do not have separate water meters. The Town typically bills sewer use charges based on water meter readings from KCWA.

Table 3-6
Current Flows to the West Warwick System[1]

SUBAREA	Woodland Manor Capacity (GPD)	Coventry Capacity[2] (GPD)	Total (GPD)
A	-	66,383	66,383
B	730	15,430	16,159
C	-	-	-
D	-	193	193
E	-	600	600
F	4,636	27,326	31,962
G	-	3,396	3,396
H	-	-	-
I	-	274	274
J	-	14,685	14,685
K	-	143	143
L	-	1,030	1,030
M	-	14,536	14,536
N	-	-	-
N1	59,331	-	59,331
O	-	9,896	9,896
P	-	3,344	3,344
Q	-	870	870
R	-	1,106	1,106
S	-	656	656
T	-	21,885	21,885
U	-	27,612	27,612
V	-	15,514	15,514
W	-	-	-
X	-	-	-
Y	-	-	-
Z	-	-	-
AA	-	-	-
AB	-	-	-
AC	-	-	-
AD	-	-	-
AE	-	19	19
AF	-	-	-
AG	-	1,090	1,090
Total (gpd)	64,697	225,987	290,683

(1) Existing Flows are based on Kent County Water Authority's water use records for 2014.

(2) Coventry's capacity at the West Warwick WWTF is only used by parcels connected to a Town of Coventry Sewer.

(3) Flows do not include any I/I.

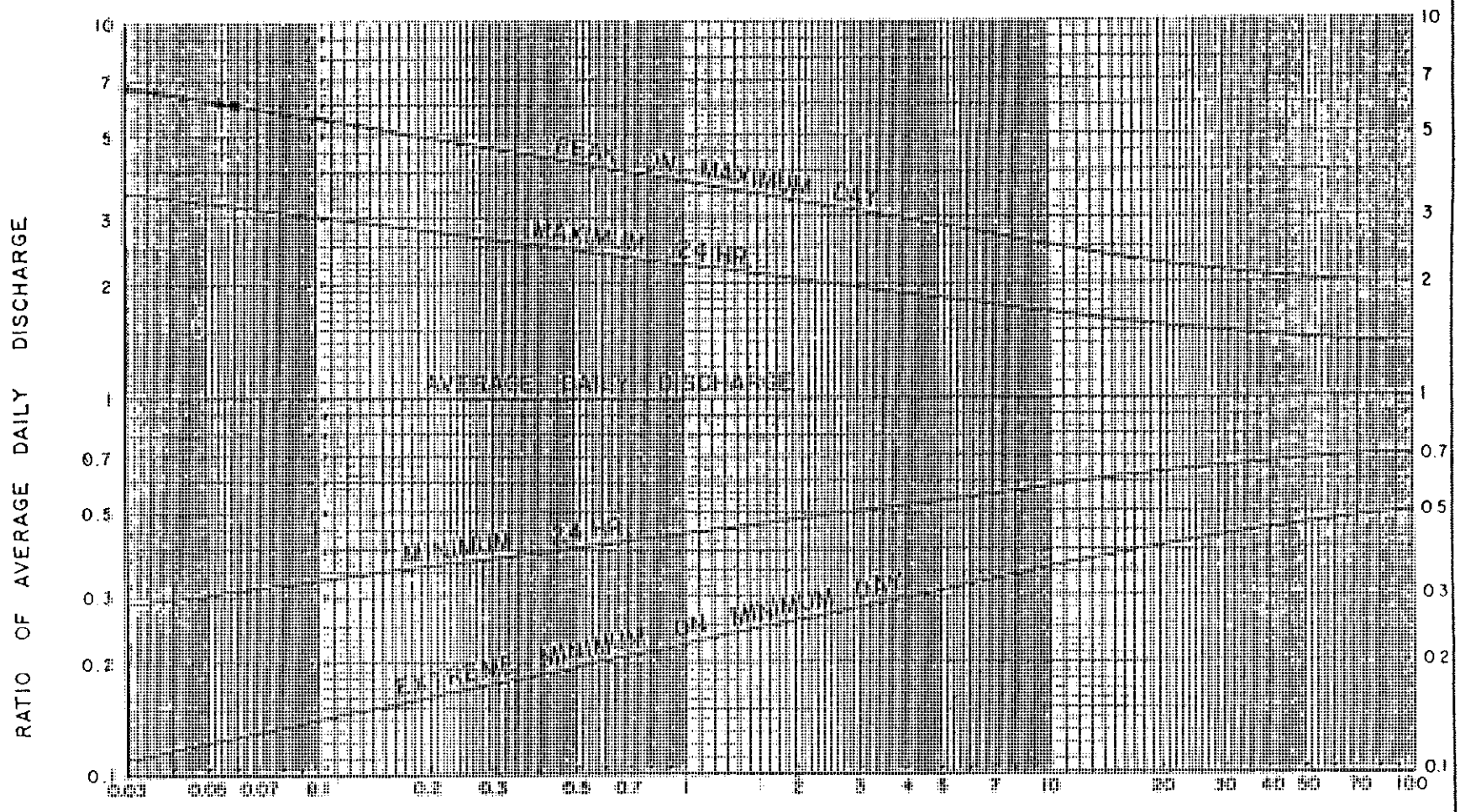


FIG. 6-4 RATIO OF EXTREME DISCHARGES ON MAXIMUM AND MINIMUM DAYS TO THE AVERAGE DAILY DISCHARGES OF DOMESTIC WASTEWATER

SOURCE: ASCE MANUAL OF ENGINEERING PRACTICE NO. 37

WESTON & SAMPSON

Because the flowmeters do not account for all the wastewater flows generated from Coventry, for the purpose of this planning report, water use records were used as an estimate of total wastewater flows. Further studies should be made to correlate the data from the flow meters to the water use data to determine the accuracy of this method.

To date no studies of infiltration/inflow (I/I) problems have been conducted on the sewer pipelines located in Coventry. It is recommended that the Town begin plans for I/I studies/investigations on areas in Town with older sewers constructed in the 1980s (e.g. Hopkins Hill Road, North Branch Sewers, Broad Street, North Road Terrace, New London Turnpike). Any sources of I/I discovered in the I/I investigations should be eliminated.

3.6.4 Climate Change and Resiliency

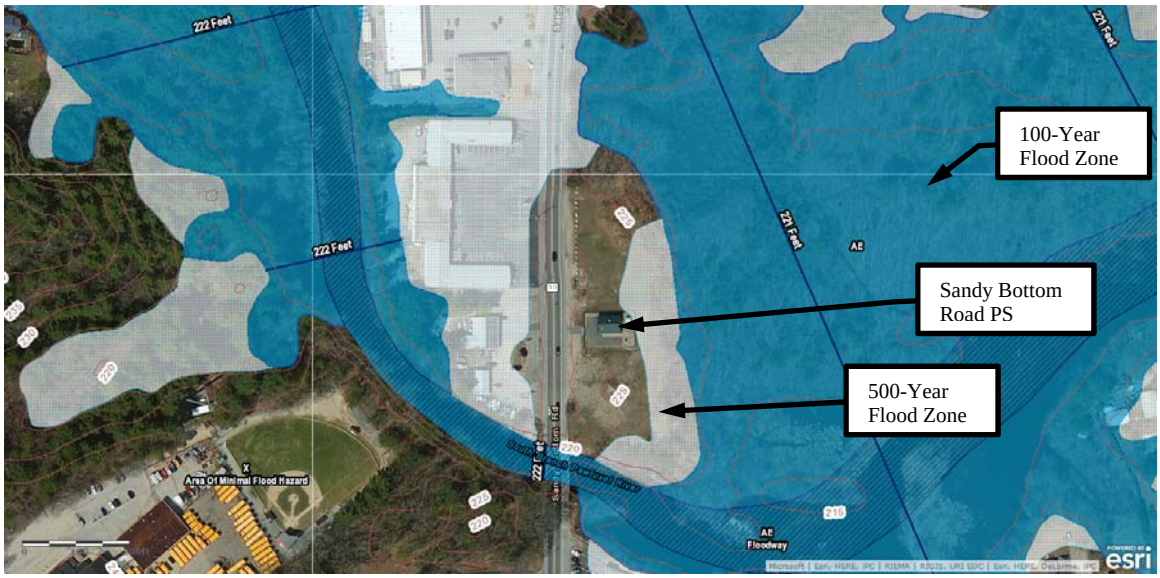
With climate change causing anticipated sea level rises and higher intensity storms becoming more frequent, it is imperative to incorporate these factors into the existing and future wastewater infrastructure planning.

Most of the Town of Coventry is located greater than 200-feet above sea level. Based on current estimates of three to five feet of sea level rise by 2100 (per RI-DEM guidance), Coventry should not be impacted by this change.

With the increase in higher intensity storms (100- & 500-year flood elevations), the Town's existing pump station infrastructure is adequately protected. Flooding occurrences that impact the existing gravity sewer infrastructure are addressed when issues are experienced through the use of watertight covers and/or raising of manholes if located in cross country areas. A description of each station in relation to the flood delineations is provided below. Any future sewer infrastructure should review the FEMA delineated flood zones as part of the design.

3.6.4.a Sandy Bottom Road Pump Station

The mapping below shows the FEMA delineated flood zones for the 100-year and 500-year storm in relation to the Sandy Bottom Road Pump Station.



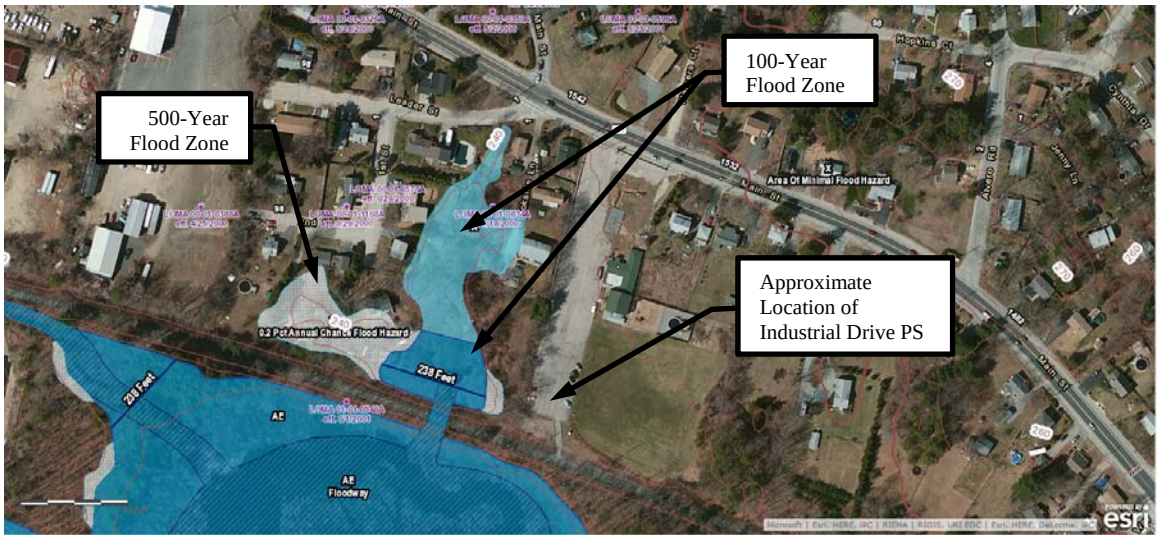
The Sandy Bottom Road Pump Station was designed outside of both the 100-year and 500-year flood elevations. In addition, field observations at the station during the flooding in March 2010, noted that the flood waters only rose to just outside of the chain link fence enclosure.

Sandy Bottom Road Pump Station during
March 2010 Flooding

The station was able to stay online and handle all of the influent wastewater flows throughout the entire event. This storm flooded roadways in Town and also flooded the West Warwick Treatment Plant. The fact that Coventry's main wastewater pump station is able to withstand this high intensity storm and continue to operate throughout is a good indication that it is suited to handle future occurrences like this one. The station is also equipped with a stand-by generator that allows the station to fully function if utility power is lost.

3.6.4.b Industrial Drive Pump Station

The mapping below shows the FEMA delineated flood zones for the 100-year and 500-year storm in relation to the Industrial Drive Pump Station. The station was designed to be outside of both the 100-year and 500-year flood elevations. In addition, the station is also equipped with a stand-by generator that allows the station to fully function if utility power is lost.



3.6.4.c Woodland Manor Pump Station

The Woodland Manor Pump Station is not located near either the 100-year and 500-year FEMA delineated flood zones. The mapping below depicts this. The station was installed well outside of both the 100-year and 500-year flood elevations. In addition, the station is also equipped with a stand-by generator that allows the station to fully function if utility power is lost.

4 FUTURE CONDITIONS IN THE PLANNING AREA

4.0 General

This chapter outlines the expected future conditions in the Town of Coventry, including information on future population, planned land use, economic conditions and wastewater flows and loadings. EPA regulations stipulate that the facilities planning should extend 20 years. Based upon this criteria, the planning period for this wastewater facilities plan is through 2035. EPA also requires that wastewater flow forecasts be projected for a 50 year planning period for the purposes of determining a cost effective design. Therefore, wastewater flow projections through the year 2065 are included in this report.

Wastewater collection and treatment needs and design capacities will be determined by land use patterns (including proposed developments), economic growth and population growth. These factors must be accurately projected for the planning periods to provide a cost-effective long-term wastewater management plan for a community. The principal source of this information is the draft 2008 Comprehensive Community Plan (CCP) and available U.S. Census data.

4.1 Population Projections

Population projections for the Town of Coventry were obtained from the Rhode Island Statewide Planning Program document titled "Technical Paper 162 – Rhode Island Population Projections 2010-2040" (April 2013). These projections use population data from the U.S. Census Bureau and extend the projections for a period of thirty years to 2040. Please note that U.S. Censuses are conducted every 10-years, so the 2010 Census is the most current for this 2015 Facility Plan. The population projections are summarized in the following **Table 4-1**.

Table 4-1 Population & Projections 2000-2040

Year	Projected Population[(1)]
2000	33,668[(2)]
2005	34,590[(2)]
2010	35,014[(2)]
2015	35,419
2020	36,108
2025	37,132
2030	38,037
2035	38,733
2040	39,172

(1) Projected population data obtained from RI-Statewide Planning Program document titled "Technical Paper 162 – Rhode Island Population Projections 2010-2040" (April 2013).

(2) Actual population values from Census, not projections.

Figure 4-1 shows historic population for the Town of Coventry from 1790 to 2010 and the projected populations from 2015 to 2065. Projected populations up to 2040 were obtained from **Table 4-1** and the document referenced above. Using this data through 2030, population projections were made using straight line interpolation from 1790 to 2005 to project populations for 2045 (39,323), 2050 (39,474), 2055 (39,625), 2060 (39,776) and 2065 (39,927), which are also shown in **Figure 4-1**.

Population growth in the planning areas of eastern Coventry up to the planning periods will be limited due to the lack of buildout potential. The build-out analysis in the CCP provides for an ultimate Coventry population of 45,897. Because of the lack of buildout potential in the eastern portions of Coventry, most of the area available for population growth is in the central and western parts of the Town.

Table 4-2 shows the projected population of each of the Planning Areas for the design years, based on a proportionate projection of total Town population to the Planning Area Population, until Ultimate Buildout is achieved.

4.2 Future Land Use

Assessment of the future land use plays a significant part in the wastewater facilities planning process. The Town's CCP Land Use Plan has been utilized to estimate future land use. The CCP Land Use Plan is presented in **Figure 3-6**. This plan provides recommendations for the various types of residential, commercial and industrial development in specific areas, as well as providing significant areas of parks, open space and agricultural use lands (most of which are located in central and western Coventry).

The CCP includes a build-out analysis based on the Land Use Plan. This analysis indicates an ultimate build-out population of 45,897 based on 28,022 acres of residential land that is developable. The plan also indicates 876 acres of buildable commercial land and 446 acres of buildable industrial land.

4.3 Future Wastewater Flows and Loads

Future wastewater flows and loads have been calculated for all of the study areas in eastern Coventry, for the initial planning year of this Facilities Plan (2015 is used for ease in calculations) and for the 20 (year 2035) and 50 (year 2065) year planning periods, as well as for the ultimate build-out of the planning area. These calculations are contained in **Appendix B** and are discussed in the following sub-sections. Wastewater that is generated outside of the planning areas will be in the form of septage pumped out from the properties respective OWTS.

In the prior 2010 FP Update, parcels/proposed developments would either significantly change the projected wastewater flow values, as estimated in the 1995 Facilities Plan or were never included in the calculations due to varying circumstances were reviewed and added into the sewering plan. In order to accommodate the additional capacities, Planning Areas and/or portions of Planning Areas with less need for sewering were removed from the sewering plan. Discussion of these parcels/developments, descriptions and the review of the effects of these planned developments on future wastewater flows and loads can be seen in Chapter 3 of the 2010 FP Update. For developments that have been constructed since that time, actual water use records have

been used. The design flows for these developments, as established in the 2010 FP Update, were used when the parcels/developments have not been constructed.

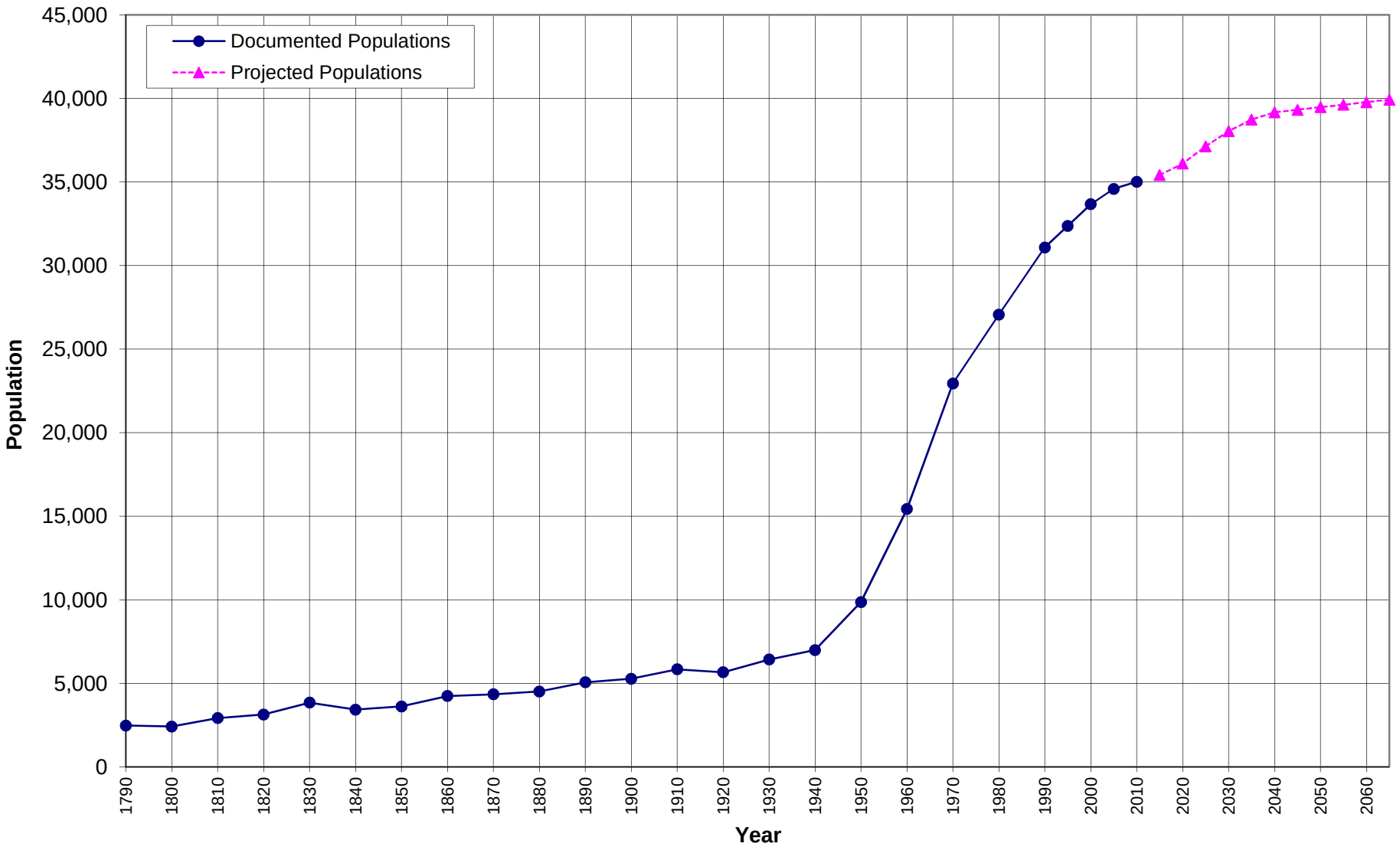
4.3.1 Future Study Area Wastewater Flows and Loads

A calculation of wastewater flows in the eastern Coventry study areas was made for the planning period years 2015, 2035 and 2065. **Tables 4-3, 4-4 and 4-5** respectively show these flow projections by study area including both the existing (**Table 4-3**) and proposed (**Table 4-4 and 4-5**) sewer flows. The complete study area calculations for these wastewater flows are contained in **Appendix B**. These calculations include an independent build-out analysis of the study areas conducted as part of the 1995 Facilities Plan and the 2010 Facilities Plan Update. The 2015, 2035 and 2065 flows are based on GIS information on lot types and estimated flows for each lot type. However, the 2015, 2035 and 2065 flows are limited by the build-out potential of each planning area (i.e. if a study area reaches build-out potential at year 2035, the same build-out sanitary sewer flow will be utilized for year 2065).

As described in Section 4.1 of this report, developments have been proposed that significantly change the land use that was calculated as part of the 1995 Facilities Plan and the 2010 Facilities Plan Update. This change must be accounted for when projecting future flows. Calculations for the developments (using RI-DEM's flow estimation method in their OWTS Rules and Regulations) are included in **Table 4-6** of the 2010 FP Update. Projected flows for the developments as part of this report are and have been added to the flow projections in **Tables 4-2, 4-3 and 4-4** and **Appendix B**.

Please note that in this report any allocations based upon these projections are not made to the singular development. Instead allocations will be made to the Planning Area in general where the development is proposed. Any allocation to a specific entity must be made by the Town, and reference to a specific development in this report shall not guarantee nor grant connection of said development into the system.

Figure 4-1
Town of Coventry Documented and Projected Population 1790-2065



Planning Area	1995 Est. Population	2010 Est Population	2015 Est Population	2020 Est Population	2030 Est Population	2040 Est Population	2050 Est Population	2060 Est Population	2065 Est Population	Max Buildout Population
A	792	857	867	884	931	959	966	974	977	1056
B	495	536	542	553	582	599	604	609	611	669
C	516	559	565	576	612	612	612	612	612	612
D	753	756	756	756	756	756	756	756	756	756
E	1110	1201	1215	1254	1254	1254	1254	1254	1254	1254
F	117	127	128	131	138	142	143	144	145	147
G	630	682	696	696	696	696	696	696	696	696
H	1047	1104	1104	1104	1104	1104	1104	1104	1104	1104
I	327	354	363	363	363	363	363	363	363	363
J	936	1013	1024	1044	1100	1133	1142	1150	1155	1167
K	867	894	894	894	894	894	894	894	894	894
L	1230	1331	1346	1372	1446	1489	1500	1512	1517	1728
M	114	124	125	128	134	138	139	141	141	168
N	894	967	979	998	1051	1082	1090	1099	1103	1254
O	678	720	720	720	720	720	720	720	720	720
P	1077	1107	1107	1107	1107	1107	1107	1107	1107	1107
Q	1107	1161	1161	1161	1161	1161	1161	1161	1161	1161
R	285	306	306	306	306	306	306	306	306	306
S	357	387	387	387	387	387	387	387	387	387
T	450	487	501	501	501	501	501	501	501	501
U	633	633	633	633	633	633	633	633	633	633
V	1008	1091	1103	1125	1221	1220	1221	1221	1221	1221
W	726	786	801	801	801	801	801	801	801	801
X	555	601	608	619	653	672	677	682	685	774
Y	276	299	302	308	325	334	337	340	341	546
Z	651	705	713	727	765	788	794	800	803	912
AA	642	695	703	738	738	738	738	738	738	738
AB	432	468	473	482	508	523	527	531	533	741
AC	354	383	388	395	417	417	417	417	417	417
AD	456	494	499	509	537	537	537	537	537	537
AE	360	390	394	402	423	436	439	443	444	459
AF	438	474	480	489	515	530	535	539	541	633
AG	351	380	384	392	413	425	428	432	433	636
AH	198	198	198	198	198	198	198	198	198	198
AI	354	383	388	395	416	429	432	435	437	777

Population Change (%) from 1995 to 2010 =	8.1%
Population Change (%) from 1995 to 2015 =	9.4%
Population Change (%) from 1995 to 2020 =	11.5%
Population Change (%) from 1995 to 2030 =	17.5%
Population Change (%) from 1995 to 2040 =	21.0%
Population Change (%) from 1995 to 2050 =	21.9%
Population Change (%) from 1995 to 2060 =	22.9%
Population Change (%) from 1995 to 2065 =	23.3%

Table 4-3
Study Area Projected Wastewater Flows
Average Daily Flow - Design Year 2015

Study Area	Domestic (gpd)	Industrial (gpd)	Commercial (gpd)	Institutional (gpd)	Infiltration and Inflow (gpd)	Total ADF (gpd)
A	1,873	922	63,588	0	490	66,873
B	15,430	0	0	0	1,875	17,304
C	0	0	0	0	0	0
D	193	0	0	0	21	213
E	600	0	0	0	60	660
F	10,407	0	15,956	963	3,560	30,886
G	3,396	0	0	0	607	4,002
H	0	0	0	0	0	0
I	0	274	0	0	23	297
J	14,685	0	0	0	1,307	15,992
K	143	0	0	0	24	167
L	743	0	287	0	172	1,202
M	0	0	14,536	0	12	14,548
N	0	0	0	0	0	0
N-1	0	0	0	0	0	0
O	1,578	0	132	0	2,040	3,750
P	3,269	8,186	75	0	592	12,122
Q	870	0	0	0	170	1,039
R	1,099	0	0	6	230	1,335
S	656	0	0	0	110	766
T	4,949	920	16,016	0	527	22,412
U	5,460	3,126	12,840	6,186	2,507	30,119
V	15,493	0	20	0	827	16,341
W	0	0	0	0	0	0
X	0	0	0	0	0	0
Y	Not included in sewer program (2010).					0
Z	0	0	0	0	0	0
AA	Not included in sewer program (2003).					0
AB	Not included in sewer program (2003).					0
AC	Not included in sewer program (1995).					0
AD	Not included in sewer program (2010).					0
AE	0	0	19	0	40	59
AF	Not included in sewer program (2010).					0
AG	1,090	0	0	0	0	1,090
AH	Not included in sewer program (1995).					0
AI	Not included in sewer program (1995).					0
WM	15,751	0	48,741	205	1,496	66,192

TOTAL TOWN	307,372

Note:

This table updates information presented in Table F-1 of the 1995 Facility Plan and Table 4-3 of the 2010 Facilities Plan Update.

Domestic flow based upon 3 people/EDU and 70 gallons per day per capita (gpcd).

Industrial flow based upon 500 gallons per day per acre (gpad).

Commercial/Institutional flow based upon 300 gpad.

Infiltration/Inflow based upon 250 gallons per day per inch diameter mile (gpdim).

O:\Coventry RI\2140605 - 2014 Facilities Plan Update\2014 Update Report\Figures\Section 4\[Table 4-2 to Table 4-5 Sewer Flows & Population per Area 1.xls]Table 4-2 Population per Area

Table 4-4
Study Area Projected Wastewater Flows
Average Daily Flow - Design Year 2035

Study Area	Domestic (gpd)	Industrial (gpd)	Commercial (gpd)	Institutional (gpd)	Infiltration and Inflow (gpd)	Total ADF (gpd)
A	14,586	922	66,744	0	1,103	83,355
B	18,160	0	0	0	2,038	20,198
C	42,000	0	52	2,436	4,165	48,654
D	54,583	0	602	0	7,630	62,814
E	80,820	3,393	307	4,939	11,025	100,485
F	36,023	1,457	56,912	1,359	15,050	110,801
G	58,956	172	721	0	7,070	66,918
H	78,120	0	0	2,461	12,250	92,831
I	22,050	837	12,338	3,384	3,780	42,389
J	279,379	6,124	7,995	3,111	11,480	308,090
K	59,993	0	1,695	0	9,730	71,419
L	78,863	766	1,567	7,609	13,475	102,279
M	1,260	0	15,576	0	109	16,945
N	210	0	1,202	0	630	2,042
N-1	43,470	2,059	17,209	1,010	4,760	68,508
O	1,788	0	217	0	2,267	4,271
P	77,084	80,241	3,425	4,662	10,360	175,771
Q	79,410	283	186	2,147	13,510	95,536
R	29,029	0	123	6	4,235	33,394
S	24,806	0	0	0	3,780	28,586
T	5,999	920	17,428	0	731	25,079
U	64,021	3,126	20,780	13,700	13,230	114,857
V	72,823	0	4,408	2,162	4,585	83,978
W	62,710	0	563	37,845	7,385	108,503
X	1,470	0	0	0	0	1,470
Y	Not included in sewer program (2010).					0
Z	36,374	4,431	36	1,305	3,031	45,177
AA	Not included in sewer program (2003).					0
AB	Not included in sewer program (2003).					0
AC	Not included in sewer program (1995).					0
AD	Not included in sewer program (2010).					0
AE	0	0	2,469	0	121	2,590
AF	Not included in sewer program (2010).					0
AG	1,090	0	0	0	0	1,090
AH	Not included in sewer program (1995).					0
AI	Not included in sewer program (1995).					0
WM	15,751	0	48,741	205	2,094	66,791

TOTAL TOWN	1,984,818

Note:

This table updates information presented in Table F-1 of the 1995 Facility Plan and Table 4-3 of the 2010 Facilities Plan Update.

Domestic flow based upon 3 people/EDU and 70 gallons per day per capita (gpcd).

Industrial flow based upon 500 gallons per day per acre (gpad).

Commercial/Institutional flow based upon 300 gpad.

Infiltration/Inflow based upon 350 gallons per day per inch diameter mile (gpdim).

O:\Coventry RI\2140605 - 2014 Facilities Plan Update\2014 Update Report\Figures\Section 4\[Table 4-2 to Table 4-5 Sewer Flows & Population per Area 1.xls]Table 4-4 Summary of Flows 2035

Table 4-5
Study Area Projected Wastewater Flows
Average Daily Flow - Design Year 2065

Study Area	Domestic (gpd)	Industrial (gpd)	Commercial (gpd)	Institutional (gpd)	Infiltration and Inflow (gpd)	Total ADF (gpd)
A	66,876	2,796	74,333	0	14,800	158,805
B	47,770	0	241	41	6,200	54,253
C	42,630	0	52	2,436	4,760	49,879
D	54,583	0	602	0	8,720	63,904
E	80,820	3,393	307	5,012	12,600	102,133
F	36,023	1,457	56,912	1,511	17,200	113,102
G	60,846	172	721	0	8,080	69,818
H	78,120	0	0	2,461	14,000	94,581
I	22,050	837	12,338	3,384	4,320	42,929
J	279,379	6,124	7,995	3,111	13,120	309,730
K	59,993	0	1,695	0	11,120	72,809
L	78,863	766	1,567	7,609	15,400	104,204
M	17,220	603	24,852	21,623	1,880	66,178
N	420	0	1,802	0	720	2,942
N-1	43,470	2,059	17,209	1,010	5,440	69,188
O	1,998	0	217	0	5,440	7,655
P	77,084	80,241	3,425	4,785	11,840	177,374
Q	82,350	283	186	2,147	15,440	100,406
R	30,289	0	123	6	4,840	35,259
S	25,436	0	0	0	4,320	29,756
T	35,814	7,468	18,323	0	6,200	67,805
U	64,441	3,126	20,780	13,874	15,120	117,341
V	72,823	0	4,408	2,162	5,240	84,633
W	62,710	0	563	37,845	8,440	109,558
X	40,950	0	7,802	2,907	7,300	58,959
Y	Not included in sewer program (2010).					0
Z	36,374	4,431	36	1,305	3,464	45,610
AA	Not included in sewer program (2003).					0
AB	Not included in sewer program (2003).					0
AC	Not included in sewer program (1995).					0
AD	Not included in sewer program (2010).					0
AE	19,740	20,153	4,164	10,925	7,300	62,282
AF	Not included in sewer program (2010).					0
AG	1,090	0	0	0	0	1,090
AH	Not included in sewer program (1995).					0
AI	Not included in sewer program (1995).					0
WM	15,751	0	48,741	205	2,393	67,090

TOTAL TOWN	2,339,270

Note:

This table updates information presented in Table F-1 of the 1995 Facility Plan and Table 4-3 of the 2010 Facilities Plan Update.

Domestic flow based upon 3 people/EDU and 70 gallons per day per capita (gpcd).

Industrial flow based upon 500 gallons per day per acre (gpad).

Commercial/Institutional flow based upon 300 gpad.

Infiltration/Inflow based upon 400 gallons per day per inch diameter mile (gpdim).

O:\Coventry RI\2140605 - 2014 Facilities Plan Update\2014 Update Report\Figures\Section 4\[Table 4-2 to Table 4-5 Sewer Flows & Population per Area 1.xls]Table 4-5 Summary of Flows 2065

4.3.2 Future Septage Volumes and Loads

Estimates of septage volumes generated in Coventry can be made based on assumed pumping frequencies. The projected septage volumes herein assume that an average OWTS will be pumped out once every three (3) years. Based on this assumption, maximum and minimum annual septage volumes have been estimated for Coventry as shown in **Table 4-6**.

Maximum septage volumes are based on the assumption that no further wastewater collection system construction will take place in town. Therefore, all the homes (non-vacant lots) have been accounted for in the above wastewater flow calculations. An additional six percent (6%) has been added to the maximum septage volumes to represent commercial septage. Buildout of vacant lots is assumed in future Design Years.

Minimum septage volumes assume the construction of sewers in all of the study areas included in the wastewater flow calculations. Since the great majority of commercial properties exist in the study areas, no adjustment of the minimum septage volumes was made for commercial septage.

A typical 1,000 gallon load of residential septage contains approximately 50 pounds of BOD and 75 pounds of TSS. In addition, organic pollutants (which have been detected in some septic systems additives) could be present in some residential septage.

4.3.3 Waste Reduction Programs

A principal concern in the operation of a wastewater collection and treatment system is the reduction of waste volumes and pollutant loadings. Reduced waste volumes equate to reduced transmission costs and reduced loads equate to reduced treatment costs, while decreasing the impact on the WWTF receiving water. Major waste volume reductions typically involve the reduction of sanitary flows through water conservation, or the elimination of groundwater infiltration and stormwater inflow (I/I) into the system. The principal waste load reduction method is to control the introduction of wastes stronger than domestic sewage into the system. This waste is typically generated by industrial users and therefore is controlled through an industrial pretreatment program. Reduction of wastewater flows through water conservation and elimination of I/I, as well as the use of an industrial pretreatment program are discussed in the following sections.

4.3.3.a Flow Reduction through Water Conservation

Water use conservation measures can be effective ways to reduce wastewater flows. Potable water service is provided to the project area by the Kent County Water Authority (KCWA). State regulations require KCWA to prepare a Water Supply Management Plan, which must include a water conservation plan. The major benefits of a water conservation plan to wastewater flow reduction include: the retrofitting of homes with water saving devices; full flow metering (which provides economic advantages to water conservation); and public education programs for water conservation.

Table 4-6
Future Septage Volumes

Design Year	Minimum Number of OWTS Systems[1]	Maximum Number of OWTS Systems[2]	Minimum Pumped Septage Volume[3] (gal/year)	(gal/day)	Maximum Pumped Septage Volume[4] (gal/year)	(gal/day)
2015	10,364	10,364	3,454,540	9,464	3,661,812	10,032
2035	5,229	10,939	1,743,067	4,776	3,865,184	10,590
2065	4,533	11,195	1,510,887	4,139	3,955,447	10,837
BO	4,557	11,257	1,519,067	4,162	3,977,544	10,897

1 Minimum number of OWTS systems is based on maximum number of systems minus the projected number of sewered residences. Note for Year 2015, current number of connected parcels is approximately 705. Estimated connected parcels in 2030 is 5,710, 2065 is 6,662 and BO is 6,700.

2 Maximum number of OWTS systems is based on GIS data for Total Non-Vacant Lots minus the sewered parcels as of Desgn Year 2015 (i.e. no additonal lots sewered). An additional 6% has been added to the maximum values to represent commercial septage.

3 Based on minimum number of OWTS and 1,000 gallons per 3-years (assumed average pump out rate). Includes no allowance for commercial septage.

4 Based on maximum number of OWTS and 1,000 gallons per 3-years (assumed average pump out rate). Includes 6% allowance for commercial septage.

Implementation of the water conservation program will help reduce Coventry's wastewater flows, and therefore the costs of transmitting and treating the wastewater.

4.3.3.b Infiltration/Inflow (I/I) Reduction

To date no studies of infiltration/inflow (I/I) problems have been conducted on the sewer pipelines located in Coventry. Since no study has been completed, an accurate estimate of the volume of I/I entering the system cannot be made. Due to the relatively recent age of the Coventry Sewer System, it is assumed that excessive I/I (i.e. more than 120 gpcd infiltration and 275 gpcd inflow) does not exist. However, it is recommended that the Town begin plans for I/I studies/investigations on areas in Town with older sewers constructed in the 1980s (i.e. Hopkins Hill Road, North Road Terrace, New London Turnpike). Any sources of I/I discovered in the I/I investigations should be eliminated.

4.3.3.c Industrial Pretreatment Program

There are several industrial users currently connected to the system. The wastewater discharged by these users is regulated by the West Warwick Industrial Pretreatment Program (IPP). The intent of this program is to achieve the objectives of the U.S. EPA's National Pretreatment Program. The West Warwick IPP was approved by the EPA on September 9, 1983 (most recent Code Ordinance update in 1990), and is currently in compliance with RI-DEM regulations.

As the Coventry wastewater collection system expands in the future, the West Warwick IPP will continue to govern industrial users of the sewer system. The IPP will be modified by West Warwick, as needed, to maintain compliance with state and federal pretreatment requirements.

4.4 Future Planned Sewer Construction Projects

Based on previous recommendations from the 1995 FP, existing sewer construction projects have been built and six additional proposed sewer construction projects are in the preliminary planning phase to be built. These six additional projects (Contracts 8, 9, 10, 11, Hopkins Hill East, and Huron Pond) have been submitted as part of the RI-DEM's Fiscal Year (FY) 2015 Priority Determination System for SRF funding, as described in Chapter 7 of this report. In addition, there is an area of need identified in this report that will be evaluated for sewering in the future (Nooseneck Hill Road Sewer Project). The submittal for this program is attached in **Appendix G.** The existing projects have been described in Chapter 3 and the eight proposed projects are described as follows. Please note that the contract numbering is only for discussion purposes, and does not mandate the order of implementation. A location plan of these projects can be seen in **Figure 4-3**.

N

AB
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AC
AE
AH
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V
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N-1
G

Colvintown Rd
Viola St
Fairview Av
Gervais St
Black Rock Rd
Shippee Av
Read Av
Eisenhower St
Phillips St
West St
Washington St
Andrews Av
Doolittle St
Macarthur Bl
Edward St
Bates Av
Boston St
Benoit St
Watercress Ct
Glenwood Dr
Highwood Dr
Chandler Dr
Daniel Dr
Walker Ln
Leuba Rd
Read School Rd
Cynthia Dr
Gail Ct
Crossing
Station St
Maple St
Tero Dr
Knotty Oak Rd
Quidnick St
Pulaski St
Windsor Park Dr
Laurel Av
Sheltra Av
Princeton Av
Wesleyan Av
Pilgrim Av
Pembroke Ln
Columbia Av
Flat River Rd
Pawtuxet River
Pawtuxet River South Branch
Main St
Hwy 33
Whitehead Rd
Ayoho Rd
Industrial Dr
Airport Rd
S Main St
Lake Side Dr
Mohawk St
Tiogue Lake
E Shore Dr
Tiogue Av
Arnold Rd
Coventry Dr
Reservoir Rd
Silver Maple Dr
Juniper Hill Dr
Sharon Dr
Clubhouse Rd
York Dr
Johnson Bl
Larch Dr
Hancock Dr
Noella Av
Helen Av
Lydia Rd
Adams Dr
Clark Mill St
Bestwick Tr
Island Dr
Osprey Dr
W View Dr
Rectory Dr
Circlewood Dr
Magnolia Ln
Wood Cove Dr
Hill Farm Rd
Wisteria Dr
Pine Rd
Harkney Hill Rd
Flat River Reservoir
Mishnock River
Park Ln
Valley Rd
Old Hickory Brook
Lake Dr
Pine Tree Ln
Lake Shore Dr
I 95S
I 95N
Division St
Bailey Dr
Mishnock Rd
Mohawk Tr
New London Turnpike

Legend

- Nooseneck Hill Road
- Contract 8
- Contract 9
- Contract 10
- Contract 11
- Hopkins Hill East
- Huron Pond
- Water

2,000 0 2,000

Scale In Feet

FIGURE 4-3

TOWN OF COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

PROPOSED SEWER CONTRACTS

September 2015 SCALE: NOTED

Weston&Sampson

\\gisdatasrv\GIS\DataStore\Client\Coventry\Project\2140605.AIFigure 4-3 Contracts.mxd Date Saved: 10/14/2015 12:01:00 PM User Name: Ozereko2

4.4.1 Contract 8 – Quidnick Village

This project involves the design and installation of the 12-inch Read Avenue Interceptor and 8-inch sewer laterals in the Quidnick Village area, located along the northern branch of the Pawtuxet River on the West Warwick town line. The parcels that will be served by this project are bordered by Cecile Avenue to the north, Washington Street to the south, Hazard Street to the west, and the West Warwick town line to the east (with the remaining portion of Fairview Avenue, north to Gadoury Avenue). This sewer project serves all parcels in Planning Area P.

4.4.2 Contract 9 – Wendell Avenue

This project involves the design and installation of 8-inch lateral sewer pipe in the Wendell Avenue neighborhood north of Tiogue Lake and south of the Pawtuxet River. The parcels that will be served by this project are bordered by the Pawtuxet River to the north and east, Tiogue Avenue to the south and Whitman Street to the west. This sewer project will serve parcels in Planning Area G.

4.4.3 Contract 10 – Tiogue School and East Shore Drive

This project involves the design and installation of a portion of the 12-inch Tiogue Avenue East Interceptor and 8-inch lateral sewer pipe in the Tiogue School area including East Shore Drive and adjacent streets, bordering the eastern shore of Tiogue Lake. The parcels that will be served by this project are bordered by Tiogue Avenue by the north and east, Rawlinson Avenue to the south and Tiogue Lake to the west. This sewer project will serve all parcels in Planning Area C. Some of the lower lying areas as part of this project may require pumping of their wastewater flows to reach the gravity portions of the project, however, further field investigations and survey is needed to confirm this.

4.4.4 Contract 11 – Lakeside Area II

This project involves the design and installation of 8-inch lateral sewer pipe in the Lakeside neighborhood west of Arnold Road bordering the northwest shore of Tiogue Lake. The parcels that will be served by this project are bordered by Hazel Street to the north, Twin Lakes Avenue to the south, Ridge Avenue to the west and Arnold Road to the east. This sewer project along with Contracts 6 and 9 will serve all parcels in Planning Area G.

4.4.5 Hopkins Hill Road East Sewer Project

This project involves the design and installation of 8-inch lateral sewer pipe west of Hopkins Hill Road. The parcels that will be served by this project are bordered by Tiogue Avenue by the north, Angelwood Road to the south, Hopkins Hill Road to the west, and York Drive to the east. This area sits between Tiogue Lake and Huron Pond. This sewer project will serve parcels in Planning Area J.

4.4.6 Huron Pond Sewer Project

This project involves the design and installation of 8-inch lateral sewer pipe in the area south of Huron Pond. The parcels that will be served by this project are bordered by Huron Pond to the north, Hopkins Hill Road to the east and Helen Avenue to the south and west. This area sits between Tiogue Lake and Huron Pond. This sewer project will serve parcels in Planning Area K.

4.4.7 Nooseneck Hill Road Sewer Project

This project involves the design and installation of 8-inch lateral sewer pipe and a forcemain/pump station in the areas adjacent to Nooseneck Hill Road (Route 3) southwest of the intersection of Woodthrush Drive. The parcels that will be served by this project are adjacent to Nooseneck Hill Road (Route 3) from Woodthrush Drive to the Town Line. This project will also serve a mobile home park that is off of Nooseneck Hill Road and abuts Maple Root Pond to the south and is tributary to the Pawtuxet River. This sewer project will serve parcels in Planning Area N-1.

4.5 Future Planning Area with "No Build" Alternative

Without the construction of proper wastewater management facilities to meet the existing needs of eastern Coventry and with the continued use of OWTSs as the principal method for wastewater treatment and disposal, the following consequences can result:

1. A continuing high number of septic system failures.
2. Nuisance problems, such as odors, from malfunctioning systems.
3. Health problems due to malfunctioning systems in densely populated areas.
4. Environmental problems due to malfunctioning systems in environmentally sensitive areas.
5. Difficulties in expanding, rehabilitating or constructing septic systems on small lots.
6. Restrictions on industrial and commercial growth in Coventry due to inadequate areas for proper OWTSs, increasing burden on the residential tax base.

Portions of the north and south branches of the Pawtuxet River have been rated as a Class "B1" status in the State of Rhode Island 2014 303(d) List of Impaired Waters (suitable for primary and secondary contact recreation and fishing). However, in previous years these portions of river have been classified as Class "C" status (unsuitable for fishing and swimming). Due to the continued presence of point and non-point sources of pollution in eastern Coventry due to the OWTSs, this river, as well as other surface waters areas in and around Coventry could be impacted, reducing their Class status further. In addition, there is a TMDL for bacteria for portions of the Pawtuxet River in Coventry. Failing OWTSs are a significant concern for bacteria contamination of surface waters.

The significant groundwater reservoir and recharge areas located in Coventry, if not protected from contamination by malfunctioning OWTSs, will be impacted. This will result in a decrease in available and suitable groundwater supplies for drinking water, thereby necessitating the use of impacted surface water and/or groundwater supplies.

If steps are not taken to implement a wastewater management program in Coventry, the existing sources of pollution contributing to the degradation of the Pawtuxet River and groundwater aquifers will continue to prevent the community from attaining the water quality goals of the 208 Water Quality Management Plan. In addition, new commercial and industrial facilities will not be encouraged to develop and the potential for broadening the tax base in Coventry will be curtailed.

The use of OWTSs as a continuing means of wastewater disposal is questionable in many areas of eastern Coventry where soils are found to have "severe septic system limitation" as shown in **Figure 3-8** in the previous section.

In addition to the environmental impacts discussed above, significant financial impacts will be felt by the Town. All monies previously appropriated and paid to West Warwick for participation in their sewer collection system and WWTF will provide limited benefit to many Coventry residents. The additional cost of future treatment upgrades/facilities in West Warwick will be incurred by Coventry (as provided under the inter-municipal agreement) with negligible benefit to the Town.

The current sewer interceptors installed throughout the Town on Tiogue Avenue, Washington Street, Hopkins Hill Road and Main Street, in addition to the pump station on Sandy Bottom Road, were all sized to account for additional flows coming from future planning areas not yet sewered. The capital cost expenditure for the increased capacity in the interceptors and pump station will therefore provide no additional benefit to the Town if no additional flows are added to the existing system.

While a limited benefit from septage disposal at the West Warwick WWTF would be gained from capital costs paid to West Warwick for WWTF upgrades, payment for the disposal of septage generated in Coventry would be required with or without domestic sewage flows from Coventry.

The selection of the 'no action' alternative for wastewater management as described in Section 5 of this report is projected to have a detrimental impact on the Town. Both future environmental conditions and public health concerns will increase due to the continued use of poorly functioning OWTSs. In addition, financial impacts without accompanying benefits will be felt by the Town.

5 EVALUATION OF ALTERNATIVES

5.0 General

The primary objective of this facilities plan is to develop and evaluate wastewater management and disposal alternatives and to select an alternative(s) for each of the designated planning areas.

The wastewater management alternatives for the planning areas were developed and evaluated as part of the 1995 Facilities Plan (FP) and the 2010 Update. The alternatives that were discussed for each planning area are described in detail below. As part of the 1995 FP and the 2010 Update, the alternatives were evaluated and thoroughly investigated in great detail to determine the most appropriate option for the final plan selection. Please note that portions of the alternatives discussed in the previous 1995 FP and the 2010 Update are still currently viable. Reference is made to these alternatives in the sections below and in Chapter 6.

As part of this FP Update, this report will discuss the available alternatives for each area, as described in the 1995 FP and the 2010 Update, and then examine the plan's selected alternative to determine whether it remains the "best" alternative(s). The "best" alternative(s) should provide the most economical means of meeting water quality and public health requirements.

The selection process, however, is not entirely based on monetary considerations. Environmental consequences and the ability to implement and administer an alternative must be thoroughly investigated from a logistical, legal, financial and management standpoint.

5.1 Description of Available Alternatives

There are several alternatives available to parcels within the Town for disposal of wastewater. Prior to the recommendations of the 1995 FP/2010 Update and the construction of sewers in the eastern portion of Coventry, most parcels disposed of their wastewater using on-site systems (OWTSs). This is not always the best alternative, especially in the planning areas of eastern Coventry where lot restrictions and subsurface soil limitations may limit the effectiveness of OWTSs.

Analyzing the need of each of the planning areas is very important in determining the most viable wastewater management alternative to recommend for each area. In general each alternative belongs to one of two major categories, on-site wastewater disposal systems and off-site wastewater disposal systems.

5.1.1 On-Site Systems

On-site systems include individual septic systems that treat and dispose of wastewater on the same parcel from which the wastewater is generated. These systems often consist of a septic tank to separate solids, a distribution box to evenly distribute flow to the field, and a leaching field to treat the wastewater and re-distribute the discharge back to the ground. Some on-site systems require additional treatment components (e.g., Innovative/Alternative) or special construction (e.g., mounds), which will be discussed later in this Section.

A conventional OWTS is not designed to achieve a high level of treatment of biochemical oxygen demand (BOD), total nitrogen removal or phosphorus removal. OWTS septic tanks do not remove a high level of nutrients from the wastewater before it enters the soil absorption system. Properly designed, installed, and maintained systems may still discharge pollutants into the groundwater. Unsaturated soils in a soil absorption system are effective at removing bacteria, viruses, and most nutrients (with the exception of some forms of nitrogen and high levels of phosphorus). Systems with saturated soils, inadequate separation between the soil absorption system and the groundwater, rapidly percolating soils, an inadequately designed soil absorption system, or other limitations will contribute even higher levels of pollutants to the groundwater. Therefore it is sometimes desirable, particularly in sensitive areas, to achieve a higher level of treatment than a conventional OWTS can provide.

Since traditionally the Town has managed wastewater disposal through the use of OWTSs, several on-site system alternatives must be examined when evaluating the wastewater management for Coventry.

5.1.1.a Continued Use of Current OWTS (i.e. "No Build")

For obvious reasons, the least costly method for wastewater management in Coventry is to continue use of the existing OWTSs for treatment and disposal of wastewater on individual parcels. Within this "No Build" alternative there are more specific sub-alternatives as detailed below.

1. Option 1: No Action

The 'no action' option for wastewater management in Coventry includes continuing with OWTS use and septage disposal, as currently occurs in the study areas. Each individual home or business owner is responsible for their OWTS, including protection from unintended uses, determining when it needs pumping, repairs and other maintenance and/or replacement if necessary. This wastewater management option does not provide a mechanism for OWTS management beyond those included in state laws, the 2003 Wastewater Management Plan and the RI-DEM Community Septic System Loan Program. However, since this option requires no implementation steps and no capital investment for the Town, it is more often than not the most cost effective solution.

The 'no action' alternative relies on the capabilities of the existing OWTSs in the project area. The limited capabilities of the existing OWTSs in the project area were discussed in Chapter 3. Basic soils information was utilized to identify specific areas where existing conditions and constraints limit and/or preclude continued long-term reliance on OWTSs.

Based on the findings of this study, the 'no action' alternative is clearly inadequate for several areas of Town. In the past, the 'no action' practice has led to multiple system failures in densely settled areas. Such failures, as discussed in Chapter 3, have

resulted in public nuisances and health concerns, as well as impacts to the surface and groundwater resources. As a consequence of the 'no action' alternative, property owners often neglect routine maintenance of their OWTSs, and/or may not make costly system repairs.

While it is apparent that the 'no action' alternative for wastewater management is not an acceptable option for the entire Town, it may prove to be the best available option for certain areas.

The basic assumption in the 1995 FP and 2010 FP Update was that the current OWTS management practices will continue in the western locations of Coventry. This was due to the limited need for sewer construction in the western areas, non-restrictive lots, and that constructing sewers in the western part of Coventry is not economically feasible.

5.1.1.b Option 2: Optimizing Operation of Existing OWTSs

Optimizing the operation of existing OWTSs in Coventry would encompass a large number of parcels, since many portions of the Town have no access to the municipal sewer system (as of yet) and are currently served by OWTSs. Some management mechanism(s) will need implementation in order to facilitate the optimization of the existing OWTSs. The basic options being examined for OWTS management in Coventry are discussed in detail below.

1. Option 2a: OWTS Wastewater Management District (WWMD)

A consideration of this study, and the previous 1995 FP and 2010 FP Update, has been the implementation of Wastewater Management Districts (WWMD) in Coventry to regulate both wastewater collection systems (sewers) and OWTSs. This section includes a discussion of a WWMD for management and control of OWTS maintenance.

As mentioned in the 1995 FP and 2010 FP Update, in June of 1987, the Rhode Island General Assembly enacted legislation known as the Rhode Island Septic System Maintenance Act (Title 45 of Chapter 24.5). This legislation established the legal basis for communities to establish wastewater management districts (WWMD) to regulate the maintenance of privately owned OWTS systems. Subsequently, the RI Department of Administration, Division of Planning published a 1987 report entitled "Wastewater Management Districts: A Starting Point" (Report No. 62), which describes the potential benefits of a WWMD for septic system maintenance. This helpful publication also included a model ordinance for a wastewater management district.

The main purpose of a WWMD is to regulate the maintenance of privately owned OWTSs which, more often than not, are inadequately maintained. The WWMD is controlled by an administrative body, either specifically created for the WWMD, or

already in place in the community (such as the Sewer Commission or Public Works Department). The WWMD administrative body has full or part-time staff that is responsible for inspecting OWTSs to determine when system maintenance is necessary.

In some cases, the WWMD arranges for necessary maintenance of an individual property owner's OWTS, such as pumping or repairs. In this case, the WWMD often establishes contracts with several licensed septage haulers and/or installers to perform pumping and repair duties. The procurement procedures utilized allow the WWMD to obtain competitive pricing for the necessary services. Obviously, the funds needed to operate a WWMD of this type are significant.

In other cases, the WWMD is empowered to issue citations to the owner of the OWTS in question, who is then responsible for the necessary maintenance. In this case, the powers of the WWMD must include enforcement provisions, which typically includes fines for violations of WWMD regulations. The 1987 legislation allows for fines of up to $500 per day for noncompliance with WWMD regulations.

Some WWMDs participate in the repair or replacement of old or malfunctioning OWTSs. This is often helpful where the cost burden of such repairs may exceed the financial capabilities of individual property owners in the WWMD, whereby others within the WWMD help to fund such repairs through routine assessments. Other functions of the WWMD may include negotiating septage disposal agreements with neighboring wastewater treatment facilities (WWTF) and establishing public education programs for the proper care and maintenance of OWTSs.

Since an OWTS WWMD requires the imposition of the powers of the district over the rights of the landowner, general public acceptance and financial support, of such a program is an absolute necessity for implementation. Under the previous 1995 FP period, Wastewater Management Needs Questionnaire surveys were conducted that included a public opinion question on whether people would support the idea of a WWMD to regulate the pumping and maintenance of OWTSs. The results of this questionnaire survey can be found in 1995 FP and 2010 FP Update. In summary, across the eastern Coventry study area, an average of 48 percent (48%) of respondents stated their opposition to a WWMD, while only 27 percent (27%) were in favor of such a measure (with the remainder stating no opinion). In addition, many of those in support of a WWMD noted their opposition if the costs to homeowners were more than minimal.

It is assumed that implementation of a WWMD for OWTS maintenance would improve the management of OWTSs. However, a Town-wide WWMD program would require multiple full-time staff positions to provide necessary OWTS inspection and administrative services. The costs involved in managing such a WWMD, in addition to the cost of septage pumping and disposal, and potentially OWTS repairs, would be significant. Based on the expected costs, and the evident lack of public support, implementation of a large scale WWMD for OWTS maintenance in Coventry would most likely not meet with voter approval. This option will therefore not be considered further as a Town-wide solution at this time. If state or federal enforcement actions were to be implemented against the Town at some future date, this option may prove more economically feasible, and should be further explored at that time.

This option may be more applicable, however, in isolated areas where other wastewater management measures do not prove acceptable.

2. Option 2b: Implementation of other OWTS management programs for the regulation of OWTS systems

Option 2b includes the implementation of an alternative OWTS management program in order to optimize operation of existing OWTSs in Coventry. Such a program could include one or more of the following features.

OWTS Maintenance Incentive

OWTS maintenance incentives have been used successfully in several communities. One method of implementation is to provide for free or reduced cost disposal of one load (or more) per year of septage from each home in Coventry. The cost for this septage disposal would be included in local taxes or separate wastewater related fees. This would provide incentive for each home to pump its system one or more times per year, as necessary. Implementation of this type of management system would include reimbursement by Coventry to the West Warwick WWTF (or other facility) for the one load (or more) per home.

Another maintenance incentive method that could be implemented is to provide property owners with inspection of their OWTS for free or at a reduced cost. This incentive could be granted to the homeowner once or on a continual basis. This would provide incentive to homeowners to begin and hopefully continue an OWTS inspection routine. These inspections could also be used by the Town to establish a database of OWTSs throughout Coventry. The cost to pay for these inspections would also be included in local taxes or separate wastewater related fees. Systems similar to this are currently being implemented in Block

Island, Charlestown and South Kingstown and seem to work fairly well.

One disadvantage of these incentive options is the cost of additional management and record keeping required for their implementation. Providing free or reduced inspection costs also does not guarantee proper maintenance will be performed by the property owner. In the case of the septage disposal incentive there is also potential for abuse of such a system by septage haulers. Since the septage hauler would not be charged for discharging the one load per home, it would be possible to discharge subsequent loads from the same home (or potentially loads from outside Coventry) at no cost, claiming they originated from homes not pumped during that year. Coventry would have little control over such activities, as West Warwick WWTF staff would be responsible for ensuring that the system is not abused. Property owners have also been adverse to proposed implementation programs if the costs to homeowners are more than minimal as shown in the surveys conducted as part of the 1995 FP (See 1995 FP and 2010 FP Update). This would not be the case if the cost for the septage disposal and/or inspections were paid for through local taxes or separate wastewater fees. Due to these implementation difficulties, this option is not considered feasible in the project area. If the state or federal funding ever became available for these options, implementation feasibility would have to be re-examined.

Local Regulations

The adoption of local regulations which exceed those imposed by the state is utilized in several communities, typically in dealing with new OWTS construction. The aforementioned 1987 Department of Administration Report No. 62, notes the ability of communities to provide more stringent regulations for OWTS installations than those imposed by the state, citing a relevant 1987 RI Supreme Court decision (Gara Realty v. Zoning Board of Review of South Kingstown).

While OWTS installation regulations may be easily imposed through the local Zoning or Building Construction Ordinance, regulations pertaining to maintenance of existing OWTSs must be imposed through local public health or other ordinances. Enforcement of such regulations may be difficult in communities such as Coventry, which do not have the personnel needed to supplement the efforts of the RI Department of Health. Since this option presents significant implementation difficulties, it is not considered feasible in the project area.

Public Education Program

A contributor to several current wastewater management problems in Coventry can be traced to poor public awareness. In

areas served by OWTSs, public knowledge regarding the proper care and maintenance of these systems is critical to their successful operation, but is often lacking. In such areas, public information and education programs are helpful to provide information directly to the persons responsible for the care and maintenance of privately owned OWTSs. In addition, the potential benefit of public education programs typically outweighs the cost involved, and specific programs can be tailored to meet the Town's financial capabilities.

Based on responses to the Coventry Wastewater Management Questionnaire survey that was given to Town residents during the preparation of the 1995 FP (see 1995 FP and 2010 FP Update), a significant number of homeowners in Coventry have very limited knowledge of their own OWTS. A large number of respondents could not identify the type (cesspool, septic tank and leaching field, etc.) of the OWTS which serves their home. Based on the large number of OWTSs in Coventry, and the apparent lack of a good public knowledge base for proper OWTS care, the implementation of a town-wide public education/awareness program is an appropriate option for wastewater management in Coventry and had been a recommendation in the 2003 Onsite Wastewater Management Plan.

5.1.1.c Option 3: Non-Sewer OWTS Options

In areas where OWTS management strategies alone are not enough to alleviate wastewater disposal problems, structural alternatives must be evaluated. Structural options available for the study area fall into two basic categories: sewer options and non-sewer (on-site) options. The following sections discuss non-sewer structural alternatives for wastewater disposal, including area wide OWTS rehabilitation and installation of alternative OWTSs, such as non-conventional leachfield systems, effluent filters or chemical and composting toilets.

1. Option 3a: OWTS Rehabilitation

Several of the OWTS problem areas previously identified in this report require some type of corrective action. The available information on these areas was examined to determine if OWTSs are capable of providing effective long-term disposal of wastewater. OWTS rehabilitation was evaluated as the preferred remedial method due to the low installation cost, low maintenance and operation costs, low energy use and effective treatment of wastes which properly functioning OWTSs can provide. Therefore, problem areas were evaluated to determine if existing OWTSs could be effectively rehabilitated in conformance with the requirements set forth in the Rhode Island OWTS regulations.

OWTS regulations, issued by DEM in July 2014, require the use of leachfields with dispersal trenches or shallow concrete chambers

in trench configurations. The regulations also require a minimum depth from the existing ground surface to groundwater and impervious material of two-feet and four-feet, respectively. A summary of other minimum clearance distances to existing facilities, watercourses, wetlands and other features are listed in the RI-DEM OWTS Regulations in **Appendix D**.

Hypothetical OWTSs were designed as part of the 208 Area-wide Water Quality Management Plan (WQMP). The use of disposal trenches was assumed to maintain sufficient depth to groundwater and/or impervious materials. Standard configurations for on-site system layouts and location as well as minimum setback requirements were used to determine minimum land area requirements. Based on the information presented in the 208 WQMP, the minimum lot size for a single family home with a single leaching field is approximately 8,750 square feet, and the minimum lot size for a single family home with an alternate field location, or for a two family home with a single leaching field location would be 13,750 square feet. Minimum distances to water supplies, watercourses and edge of slopes must also be observed.

Typical lots within each problem area were evaluated to determine if an OWTS designed in accordance with OWTS regulations could be constructed.

Restrictive lot sizes were determined using 5,000 square feet and 10,000 square feet as described in **Section 3** and shown on **Figure 3-9**. Depths to groundwater and/or impervious material, as well as areas with poor soil conditions for OWTS construction were determined based on the information presented in **Figure 3-8**.

Areas where existing conditions significantly limit possible OWTS rehabilitation, and the specific reason for the limitations, are delineated on **Table 5-1**. As shown, the major limiting factors and

Table 5-1
Summary of OWTS Rehabilitation Limitations

Area #	OWTS Rehabilitation Feasible	Reasons for OWTS Rehabilitation Limitations					
		Shallow Groundwater	Shallow Bedrock	Steep Ground Slopes	Poor Soils	Small Lots *>20% under 10,000 sqft*	Distance to Watercourse
A	No	X			X	X	
B	No	X			X	X	
C	No					X	X
D	No					X	
E	No	X			X	X	
F	No	X			X		X
G	No	X			X	X	X
H	No	X			X	X	X
I	No	X			X		X
J	No	X			X	X	
K	No	X			X	X	
L	No	X			X	X	X
M	No	X			X		
N	?	X			X		
N-1	?	X			X		X
O	?	X			X	X	
P	No	X			X	X	
Q	No	X	X	X	X	X	
R	No					X	
S	No					X	
T	?	X				X	
U	No	X				X	X
V	No	X	X		X	X	
W	No	X			X	X	
X	No	X		X	X		X
Y	No	X		X	X		
Z	No	X		X	X	X	
AA	?	X			X		
AB	No	X	X	X	X		
AC	?	X	X	X	X		
AD	No	X	X	X	X		
AE	?	X		X	X		
AF	No	X	X		X		
AG	Yes	X	X	X	X		
AH	No	X			X	X	
AI	Yes	X			X		

Note: OWTS rehabilitation in areas denoted by a ? May be feasible, but some available data makes this appear questionable.

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constraints are primarily: small lots sizes; shallow depth to bedrock or groundwater; poor soil conditions; seasonally high groundwater and required distances to watercourses. Depth to groundwater and impervious material constraints were generally limiting factors as shown on **Figure 3-8**.

Based on the analyses conducted for the project area and relevant available information, area wide OWTS rehabilitation is clearly not a feasible option. However, on a smaller scale the possibility of OWTS rehabilitation appears to be feasible for portions of the study areas.

The State of Rhode Island Clean Water Finance Agency currently has a Community Septic System Loan Program (CSSLP). This program was established to provide financial assistance to towns in developing a program of septic system repair in their community. This program provides towns the ability to grant homeowners low interest loans (currently at 2%) for the repair or replacement of failed or failing septic systems. In areas where OWTS rehabilitation is a viable option, and because there are large amounts of existing OWTSs throughout the Town of Coventry, this program could provide funding to property owners that would help to encourage OWTS repairs and replacements. The policies and procedures for this loan program are included in **Appendix J**.

2. Option 3b: Use of Alternative/Experimental (A/E) Technology

In problem areas where conventional OWTS systems are not operating properly and where the rehabilitation or reconstruction of such systems is generally not feasible, other on-site options must be considered.

RI-DEM allows the use of alternative toilets and A/E OWTSs that can reduce the leach field area requirement needed to construct an OWTS. This would allow an area restrictive lot to install an alternative system, where a conventional OWTS system (septic tank, distribution box and standard leach field) cannot be constructed based on RI-DEM regulations.

Alternative toilets are toilet systems that require little to no water and treat/eliminate sanitary waste through a different method from a conventional toilet. RI-DEM allows composting toilets, and incinerator toilets to be utilized when a conventional OWTS system cannot be constructed.

- Composting Toilet System: Incorporates a waterless toilet connected to a composting reactor. Sanitary waste from the toilet is directed to the reactor, where the waste is biologically decomposed by naturally occurring micro-organisms. Organic bulking agents (typically grass

clippings, leaves or wood chips) may be added depending on the carbon need of the micro-organisms. Remaining solids, after the biological decomposition, are then removed from the reactor and buried on-site or removed by a licensed septage hauler. In colder climates, energy in the form of heat is needed to keep the composting reactor at optimal temperatures for the biological processes and ensure proper functioning.

- Incinerator Toilet System: Incorporates a waterless toilet connected to a gas-fired (propane or natural gas) or electric heated incinerator chamber. Sanitary waste from the toilet is directed to the incinerator chamber where it is burned into a sterile ash. The addition of anti-foaming agents may be required in the incineration chamber to prevent liquid wastes from boiling over during incineration. Gases created during incineration are then vented outside by an exhaust fan. Remaining ash must then be removed and disposed of properly.

The use of an alternative toilet removes the flow from the toilets from the OWTS. When an alternative toilet is utilized, RI-DEM allows a 40% reduction in normal daily flows to be used in the design of the OWTS, provided no flows from any conventional toilets are directed to the leachfield. The remaining 60% of normal daily flow is required to handle any greywater (sinks, laundry, bath/shower…etc.) coming from non-toilet flows in the building. This reduction would reduce the leachfield size requirement and may potentially allow a parcel to rehabilitate or reconstruct a new OWTS.

A/E OWTS do not meet the location, design or construction requirements of a conventional system (septic tank, distribution box and standard leach field), but have demonstrated to provide the same degree (or better) of environmental and public health protection. Installation of an A/E OWTS in most cases provides superior treatment of wastewater and reduces the size requirements of the leaching field. The reduction in leachfield size allows installation on restrictive lots that would normally have difficulty installing a conventional OWTS.

RI-DEM published (February 2013) a listing of recognized types of A/E OWTS, including A/E leachfield systems, effluent filters, and distribution systems. A list of approved alternative/experimental (A/E) technologies for OWTSs has been issued by RI-DEM in a document titled “Alternative/Experimental Onsite Wastewater Treatment Systems Technology Program, February 2013” published on the RI-DEM website and attached in **Appendix D.**

While both alternative toilet systems and A/E OWTSs offer an alternative to conventional OWTSs or sewer collection systems, there are several key disadvantages related to each. All of these systems require periodic specialized maintenance and handling of the wastewater end product. Such system maintenance is always more costly than maintenance for a conventional OWTS, and is often more costly than maintenance for a wastewater collection system.

In addition, if not properly maintained waste products from alternative toilets can cause odors, and may become public nuisances and/or public health concerns. Incinerator toilets and heat assisted composting toilets use energy to provide the end product.

The use of these systems for area-wide installation is not typical. Such alternative systems are selected by individuals seeking to remedy their on-site wastewater disposal problems. Some systems may be better suited to some parcels than to others. The implementation of a large scale installation program would be difficult, and would most likely meet with public opposition. In general, none of these available alternative systems can be recommended for area wide use. They may, however, be used in isolated circumstances where all other feasible options have been eliminated, and could be encouraged to replace failing systems in areas selected for the 'no action' alternative.

5.1.2 Off-site Systems

Off-site systems collect wastewater from a community or neighborhood and treat and dispose of wastewater on a parcel separate from the wastewater generation point(s). Off-site systems include:

5.1.2.a Option 4: Shared/Community OWTSs:

Shared OWTS systems (designed to treat more than 5,000 gpd) require an impact analysis and special approval from RI-DEM, as well as legal agreements and documentation regarding ownership, maintenance, and other issues. Shared systems must be pumped at least once per year. A conventional shared system for a particular area would include a localized collection system, a large septic tank, a dosing (pump) chamber, and a large soil absorption system.

Shared OWTSs would not be viable as a Town wide wastewater management solution as land requirements in the eastern portion of Coventry may prohibit construction of properly sized leaching trenches. However, on a smaller scale the possibility of shared OWTSs appears to be feasible for portions of the study areas.

5.1.2.b Option 5: Small Decentralized Cluster/Neighborhood Treatment Systems (NTS):

This type of off-site system collects wastewater from a localized area that cannot discharge to a large OWTS, as defined in Rule 35 of the OWTS Rules and

Regulations, and requires construction of a small, neighborhood treatment and groundwater disposal system. This type of off-site system is relatively new compared to centralized sewer systems but offers the benefit of groundwater recharge with higher quality effluent than conventional OWTSs. Groundwater recharge is a term used for putting water back into the same general area from which it was taken, in order to replenish the groundwater.

A neighborhood treatment system generally includes below ground tankage and small-scale wastewater treatment components/equipment, which are often enclosed in a small above ground structure. Groundwater disposal systems are similar to leaching fields used in on-site systems, but they generally have a larger footprint designed to process greater flows of higher quality effluent. Groundwater discharges require a State permit to discharge the effluent to the ground.

This wastewater management alternative also allows the groundwater recharge to replenish base flow to area surface waters (lakes, ponds, brooks, streams or rivers), recharge the groundwater supply in drinking water aquifers, and maintain the water balance in sub-watershed basins.

Difficulty remains in recommending this alternative for the Planning Areas due to public acceptance and site concerns in relation to the location of the treatment plant.

Public acceptance of the decentralized treatment plant is, for the most part, very difficult to obtain. Due mainly to the negative connotation associated with wastewater and the idea of having a 'treatment plant' in a neighborhood, there is often great resistance on the part of local residents to allow a municipality to locate a NTS.

Choosing a site that not only appeases the local residents, but also is an adequate size to site the small treatment plant is also challenging. Most parcels located in eastern Coventry are presently developed. Also, areas where a NTS would be recommended are usually areas where the average lot size limits siting even a single household conventional OWTS, which would have a smaller footprint than a full NTS. Combining of adjacent lots may be feasible to site the plant; however problems again occur because of the percentage of parcels in eastern Coventry already developed.

Even after a potential site has passed the public acceptance test, the site must be technically analyzed to confirm that soils are appropriate to adequately filter the NTS effluent, that groundwater is deep enough to not cause a surcharge effect, and that sensitive receptors (like drinking water supplies, surface waters, wetlands, etc.) are not negatively impacted.

For these reasons, the NTS alternative is not an acceptable option for the entire Town, but it may be viable for smaller sections of planning areas where siting concerns are more easily solved.

5.1.2.c Option 6: Centralized Sewer and Large-scale Wastewater Treatment Plant:

Several options are available to the Town of Coventry for the centralized treatment and disposal of wastewater. For the purpose of this FP, the options evaluated were the treatment of the wastewater at either the existing West Warwick WWTF or at a proposed Coventry WWTF. Other area WWTFs, such as Cranston, Warwick and East Greenwich, are located much more remote from Coventry, and do not have capacity reserved for Coventry, and were therefore not considered. The following sections include detailed discussions of each of these options.

1. Coventry Wastewater Treatment Facility

The 1977 FP by C.E. Maguire, and the previous wastewater report by F.G. Keyes, recommended the construction of a separate wastewater treatment facility to treat the wastewater flows from Coventry. This proposed facility was intended to be located along the banks of the South Branch of the Pawtuxet River, just north of Tiogue Avenue near the West Warwick town line. This solution for the treatment and disposal of Coventry's wastewater was primarily recommended for economic reasons, since it appeared at that time to be the most cost effective option.

However, the 208 Areawide Water Quality Management Plan, prepared in 1979, found the following:

> "Tying Coventry into the West Warwick system would eliminate the future discharge of some 3.5 mgd of effluent to the south branch from a Coventry wastewater treatment facility, allowing the water quality of the south branch to be maintained at least at present levels. The potential for fishing in the south branch would be enhanced by the displacement of Coventry's wastewater to the main stem. "

Based on these findings, the 208 WQMP recommended the creation of a regional plant at West Warwick. Based on the recommendations of the 208 WQMP, a separate wastewater treatment facility for Coventry would not be in conformance with state planning goals, would not be cost effective (based on the initial investment already made by Coventry in West Warwick's WWTF), and is therefore not considered further.

In the 2010 FP Update, a discussion on the potential for the Town to purchase an existing private industrial WWTF located off Washington Street to supplement sewer capacity was provided. This industrial WWTF was located on Assessor's Map 56 Lot 113.1, and was owned and operated by Clariant Corporation. At the time of the 2010 FP Update, Clariant had no intentions on selling the WWTF to the Town and the option of the Town purchasing was not considered feasible and is therefore was not considered further in the 2010 FP Update. Since that time, this

industrial facility has connected into Coventry's sewer system and "mothballed" the WWTF. Further discussions on remaining WWTF infrastructure and potential use to the Town of Coventry remain unresolved.

2. West Warwick Regional Wastewater Treatment Facility

As discussed above, treatment of Coventry's wastewater at the West Warwick regional WWTF is a principal recommendation of the 208 WQMP. The 1981 Amended FP and the 1982 FP Supplement also recommended this treatment option.

Based on the previous 1995 FP, 2003 FP Reaffirmation and 2010 FP Update, the Town of Coventry has finished construction on a limited municipal sewer system. This system includes interceptor and lateral piping that collects wastewater flow from portions of the planning areas, including residences, businesses and institutions, and transports this flow to the West Warwick Wastewater Treatment Plant (WWTP).

To allow this discharge into the West Warwick sewer system, and eventually the WWTP, Coventry entered into an intermunicipal agreement (IMA) with West Warwick (originally dated November 28, 1994). The agreement included provisions for Coventry to reimburse West Warwick for capital costs related to the WWTF capacity and collection system expansions required to allow service to Coventry. West Warwick then proceeded with upgrading their WWTF to provide secondary treatment levels, and expanding the treatment plant's capacity to allow connection of the Coventry system. West Warwick also increased the capacity of their interceptors to allow the transmission of Coventry's wastewater to the regional WWTF. The IMA allows a certain amount of flow (2.25 mgd) and pollutant loading to be discharged into the West Warwick system by Coventry. All flow treated by the West Warwick WWTF is discharged into the Pawtuxet River.

In December 2013, the Town of Coventry acquired the Woodland Manor Estates pump station and forcemain. The capacity allocation in the West Warwick system for the Woodland Manor pump station/forcemain is 0.2 mgd. Future IMA revisions will be needed to address allocating the Woodland Manor capacity to the Town, however this additional capacity is not required for projected wastewater flows until 2065.

Since construction of portions of the planned sewer system interceptors has been completed based upon recommendations set forth in the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update, planned extension of this sewer system to serve the planning areas has been evaluated as part of this FP Update. Careful considerations were made so that the current and

projected 20-year planning flows from these areas would not violate the IMA with West Warwick.

Based on the findings of the previous FP documents, and the significant capital expenditures made by both Coventry and West Warwick towards this regional solution, the treatment of Coventry's wastewater at the West Warwick Regional WWTF continues to be the best option currently available for areas in eastern Coventry which can no longer rely on the use of OWTSs for wastewater treatment and disposal.

5.2 Wastewater Service Area Options

In some areas of Coventry, continued long-term reliance on OWTSs for wastewater disposal is not an acceptable option. In those areas, the extension of sewers was considered in the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update. The findings from the previous FPs for Coventry have produced recommendations for sewering a significant portion of eastern Coventry. The more detailed, updated information presented in Chapter 3 supports the past recommendation for a wastewater collection system to serve some parts of eastern Coventry.

Since the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update, several sewer projects have been completed by the Town to provide sewer extensions to portions of eastern Coventry recommended for sewering in the previous FPs. A map showing the existing sewer system, outlining the limits of each sewer construction project, is shown in **Figure 3-10**.

The remaining service area options for sewer installation in eastern Coventry are as follows:

Option A: Limited Sewer Service Area, serving only the areas of greatest need, Planning Areas designated as Phase I,

Option B: Medium Sewer Service Area, serving the areas of great need, Planning Areas designated as Phase II,

Option C: Large Sewer Service Area, serving all areas of significant need, Planning Areas designated as Phase III,

Option D: Town-wide Sewer Program, serving all areas of eastern Coventry.

The proposed sewer construction Contracts 8 through 11 will complete construction of all sewers designated as Phase I. Specific discussions on each service area can be found in the 1995 FP document.

Each of the service area options serves a progressively larger area of eastern Coventry. The need for sewers to serve an area is based on the information presented in Chapter 3, with consideration of the potential for continued service by OWTSs, as discussed previously in this chapter.

5.3 Wastewater Collection System Options

Several options were considered, as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update for the wastewater collection and transmission system to serve the service area options in Section 5.2. The detailed discussion of wastewater collection system options is identical to those discussed in the 1995 FP and was separated into two parts: discussion of sewer interceptor (transmission) options, and discussion of lateral sewer (collection) options. This discussion can be found in the 1995 FP document.

Table 5-2 presents a summary of the wastewater management options identified as viable for each of the study areas.

5.4 Septage Treatment and Disposal Options

The alternatives available to Coventry for treatment and disposal of septage are limited. The previous 1995 FP identified the following alternatives for septage treatment and disposal:

Option A: Treatment and disposal at a site in Coventry

Option B: Treatment and disposal at the West Warwick WWTF

Option C: Treatment and disposal at the Cranston WWTF

Option D: Treatment and disposal at another area WWTF

In addition to treatment and disposal sites, Section 5.1 identifies management alternatives for regulating septage treatment and disposal in Coventry.

Currently Option B (Treatment and disposal at the West Warwick WWTF) is not viable. While the West Warwick facility currently has the equipment to properly accept septage for treatment, at this time no septage from any municipalities (including West Warwick) is accepted at the facility. The Inter-municipal Agreement (IMA) between West Warwick and Coventry has a stipulation that would allow Coventry to dispose of septage at the facility if it were to be accepted from any other communities (including West Warwick).

Based on data from the previous 1995 FP, and confirmed during the creation of this FP, disposing of septage at the Cranston WWTF is clearly the most beneficial option due to the high cost of constructing a septage disposal site in Town. Based on previous discussions with septage haulers performed in previous FPs, the preferred site to dispose of septage from Coventry is the Cranston WWTF. The other septage treatment and disposal options identified above either are not cost effective (Option A), are not feasible at this time (Option B), or are more costly for disposal and/or are a greater distance from Option C, thus making them less feasible for septage treatment and disposal. Option A, Option B and Option D will not be considered further in this study

Table 5-2
Summary of Feasible Wastewater Management Alternatives

Area #	Continued Use of OWTS		Sewer Collection System			
	WWMD	Construction/ Rehabilitation	Conventional	Pressure	STEP	Vacuum
A		Yes	Yes			
B			Yes			
C			Yes	Yes		Yes
D			Yes			
E			Yes			
F			Yes			Yes
G			Yes	Yes		Yes
H			Yes	Yes		Yes
I			Yes	Yes		
J			Yes			
K			Yes			
L			Yes			
M			Yes			
N			Yes	Yes		Yes
N-1			Yes	Yes		Yes
O		Yes	Yes			
P			Yes			
Q			Yes			
R			Yes			
S			Yes			
T		Yes	Yes			
U			Yes			
V			Yes			
W			Yes			
X			Yes			
Y			Yes	Yes		
Z			Yes			
AA			Yes			
AB			Yes	Yes		Yes
AC		Yes	Yes			
AD			Yes			
AE		Yes	Yes			
AF			Yes			
AG		Yes	Yes			
AH	Yes				Yes	
AI		Yes				

5.5 Sludge Treatment and Disposal Options

Based on the previous discussion of wastewater treatment options, there is currently no feasible option for constructing a separate wastewater treatment facility in Coventry. Therefore, all waste sludge produced from Coventry's wastewater will be in the form of septage pumped from OWTSs or waste sludge produced at the West Warwick Regional WWTF.

The septage (from OWTS) treatment and disposal is discussed in the preceding section, and will be handled by either the West Warwick WWTF or the Cranston WWTF.

The West Warwick WWTF has an established solids handling program. The current program includes composting digested sludge. The Town of Coventry has in the past utilized composted sludge from the West Warwick WWTF as a soil additive for Public Works/Recreation Department projects. Coventry plans to consider the beneficial use of composted sludge product from the regional WWTF where it may be deemed appropriate.

Specific details on sludge handling, including options for treatment and disposal, are discussed in the West Warwick and Cranston FP.

5.6 Combined Sewer Overflows

Due to the limited number and relatively young age of the sanitary sewers in Coventry, there are no known combined sewers in Town. No combined sewers or combined sewer overflows (CSO) will be constructed in Coventry, as construction of such systems are no longer allowed by state and federal regulations.

5.7 Environmental Impact of Alternatives

Evaluation of environmental impacts provides comparative data to assist in the selection of the best alternative plan for wastewater management in the study area. Environmental impacts should be addressed during each step of the facilities planning process. The specific procedures for addressing environmental impacts were outlined in the EPA regulations, as required under the National Environmental Policy Act of 1969. In addition, the environmental review requirements suggested by the RI-DEM FP Review Checklist, and all pertinent state and local laws and regulations have been followed.

The environmental evaluation of specific parameters for various wastewater management alternatives in some cases overlaps. The previous 1995 FP discussed in detail the general and specific environmental impacts, both direct and indirect, of the wastewater management options identified in this section. The environmental considerations listed in the 1995 FP were reviewed and determined to be similar for this current document. Detailed descriptions of the environmental impacts can be viewed in the 1995 FP document and a summary is presented in **Table 5-3** of this document. The future conditions in the planning area resulting from the 'No Action' alternative were discussed previously in Chapter 4.

5.7.1 Summary of Environmental Considerations

Each of the identified alternatives can be evaluated by their expected environmental impacts. **Table 5-3** presents a summary of the major environmental impacts, both beneficial and detrimental, for each of the identified feasible options. As shown in the

table, and as discussed in Chapter 4, the 'no action' option is estimated to have the greatest detrimental long-term effect on the area, mostly by way of water quality and quality of life. The probable effect of a public education program, or an OWTS rehabilitation program, alone would be similar to the 'no action' option, though lesser in magnitude, and would likely result in some minor short-term construction related impacts. The effects of a sewer installation program on the project area would have significant short-term construction related impacts. Such a program would, however, result in significant long-term benefits to the community, both in water quality and in quality of life.

5.8 Financial Considerations for Alternatives

The final consideration for selecting an appropriate option for addressing the planning area OWTS problems is project cost. From a public opinion standpoint, this is perhaps the most important consideration. The question of the affordability of a project most often determines whether it is eventually implemented, or falls by the wayside. In Coventry past initiatives based on recommendations from prior FPs have failed, mostly due to real or perceived financial impacts of the proposed sewer construction program. Therefore, financial considerations will continue to play a major role in selecting the best available option.

For the purposes of this analysis, a planning period of 20 years has been used. Analyses include an estimated present worth value for each option discussed.

5.8.1 No Action

The 'no action' alternative is always the most advantageous from an initial cost viewpoint. Since this option requires no initial capital input by the Town, the capital cost associated with it (other than for individual OWTS care and maintenance) is negligible. Actual annual costs associated with this option would be borne by individual property owners, and are difficult to predict. Such costs would include OWTS maintenance pumping, and repair and potential replacement of failing OWTSs. Based on the average system pumping criteria of one pump-out per three years used to estimate septage volumes in Chapter 4, and an average pump-out charge of $200 as determined from previous Septage Hauler Interviews, the minimum cost of this option is approximately $67 per home per year.

In addition, costs already expended by the Town for a sewer system would be wasted if this option was selected. To date these costs include approximately $10.9 million (in addition to the amount paid for the acquisition of the Woodland Manor infrastructure), for capacity in the West Warwick sewer system and WWTF upgrades, and approximately $20.6 million for installation of existing pump station, interceptor and lateral sewers. Unfortunately, selection of the `no action' alternative provides no wastewater management benefit to the Town. Where significant water quality and public health concerns currently exist, this is not an acceptable alternative.

Table 5-3
Summary of Environmental Considerations for Wastewater Management Alternatives

Description of Option		Positive Impacts	Negative Impacts
Continued Use of OWTSs			
No Action	Short Term	(1) None.	(1) None.
	Long Term	(1) None.	(1) Continuing groundwater and surface water quality degradation problems (2) Nuisances and health concerns from failing OWTSs. (3) Indirect adverse effect on commercial and industrial use.
OWTSs Wastewater Management District	Short Term	(1) None.	(1) Minor construction related surface water quality and wetland impacts from soil erosion. (2) Minor construction related noise, air quality and traffic impacts.
	Long Term	(1) Possible decrease in malfunctioning OWTSs.	(1) Potential for surface and groundwater quality degradation problems, nuisances and health concerns from failing OWTSs.
OWTSs Public Education Program	Short Term	(1) None	(1) None.
	Long Term	(1) Increase OWTS owner knowledge that may limit number of serious environmental impacts occurring from malfunctioning OWTSs.	(1) Potential for surface and groundwater quality degradation problems, nuisances and health concerns from failing OWTSs.
OWTSs System Rehabilitation	Short Term	(1) None.	(1) Minor construction related surface water quality and wetland impacts from soil erosion. (2) Minor construction related noise, air quality and traffic impacts.
	Long Term	(1) Possible decrease in malfunctioning OWTSs.	(1) Potential for surface and groundwater quality degradation problems, nuisances and health concerns from failing OWTSs.
Use of Alternative/Experimental (A/E) Technology	Short Term	(1) None.	(1) None.
	Long Term	(1) Possible beneficial impact on surface and groundwater quality.	(1) Potential for surface and groundwater quality degradation problems, nuisances and health concerns from failing OWTSs.
Wastewater Collection and Treatment			
Conventional and Alternative Collection System Options	Short Term	(1) None.	(1) Minor construction related surface water quality and wetland impacts from soil erosion. (2) Minor construction related noise, air quality and traffic impacts.
	Long Term	(1) Beneficial impact on surface and groundwater quality.	(1) None.

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5.8.2 OWTS Wastewater Management District (WWMD)

Where an OWTS Wastewater Management District (WWMD) has been identified as a feasible alternative for wastewater management, the cost of implementing such a district should be evaluated. The 1995 FP and 2010 FP Update evaluated the cost of implementing a WWMD in Area AH (previous Area 34), which is the Shady Valley Road area, adjacent to the Flat River Reservoir. This Planning Area was selected due to the area's size and isolated location. The conditions in the Shady Valley Road area itself would make the usefulness of a WWMD for maintaining existing OWTS systems extremely limited. However, this area was chosen as a suitable example, because it is fairly representative of several such isolated areas located throughout central and western Coventry (areas to which conventional sewers will most likely never be extended). The 1995 FP and 2010 FP Update data has been updated and the approximate capital costs and annual costs estimated for this area are shown in **Table 5-4**.

Table 5-4
ESTIMATED OWTS WASTEWATER MANAGEMENT DISTRICT COSTS
AREA AH - SHADY VALLEY ROAD

Description	Cost
OWTS System Inspection Costs (including 2 annual system inspections per home, based on a total of 80 hours of effort per year for a two person crew, assume $70 per hour for each member)	$11,200 (1)
OWTS System Pumping Costs (including one pump-out per home per 2 years, i.e. 33 pumps per year)	$6,600 (2)
Administrative Costs (20% of above costs)	$3,560
Total Annual Cost	$21,360
Annual Cost per Residence	$325 (2)

(1) Costs for inspection are based on work being performed by a private Contractor or by existing Town personnel.
(2) The estimate is based on an estimated 66 existing homes in the planning area.

While this system appears to be affordable to the homes in the Shady Valley service area, the added benefit over the 'no action' option is difficult to quantify. Also, the above costs for this option do not address replacement of seriously malfunctioning OWTSs in the area. Such replacements would increase costs to area residents significantly. As detailed in **Appendix E**, the cost to replace a failed system ranges from $9,000 to $16,000 (in 2009) per occurrence on average.

If this option were considered for a wider service area in eastern-central Coventry where homes are on larger lots and the population is less dense, the costs per home may not be equivalent. In addition, costs already expended by the Town for a sewer system (approximately $20.6 million to date), as discussed above, should be considered. Unfortunately, selection of this option, like the 'no action' alternative, provides minor benefit to the Shady Valley area. Since significant OWTS failure problems exist in this area, mainly due to high groundwater and poor soils, this option should be combined with some other solution, such as OWTS rehabilitation or a sewer system, to be considered an acceptable alternative.

The conditions in the Shady Valley area would generally favor sewer installation. However, due to the isolated location of the area, sewering to West Warwick would be difficult and very costly. As an option, sewer system combined with a community septic system or packaged wastewater treatment system should be considered. Such a system could be constructed and managed through a wastewater management district, if desired. Costs for this system can vary greatly based on site location/conditions. Should this alternative be considered by the Town further investigation to generate a more accurate cost estimate should be performed.

5.8.3 Public Information for OWTS Management

After the 'no action' alternative, implementing a public education program for wastewater management is the next most advantageous option from a cost viewpoint. The required initial capital input for this option is limited to developing and distributing OWTS maintenance information to the public. Costs would include development of material, printing, mailing or publication costs.

In general, the cost associated with distributing a one page mailing to approximately 6,000 addresses is estimated to be between $3,000 and $6,000, depending on the distribution method selected.

Selection of this alternative could provide a benefit to the entire Town, including western Coventry. In areas where a significant number of failing OWTSs exist, however, a public information program alone is not an adequate solution. This option should be considered for all areas where other structural options, such as sewers, are not feasible and are not recommended.

5.8.4 OWTS Rehabilitation Program

As discussed earlier in this chapter, the rehabilitation of existing OWTSs may be feasible in areas where poor soils and/or high groundwater and small lot size are not the main cause of system malfunctions. In these areas, OWTSs can be assumed to be malfunctioning due to deficiencies in the system construction (i.e. under-designed systems and cesspools), or damage to systems from misuse or lack of maintenance (clogged leaching fields, etc.). In these areas, the reconstruction of the OWTS is a reasonable long-term solution.

For the purposes of this report, we have estimated the cost of reconstructing a typical septic system. This system cost is based on construction of a new system, for a typical three to four bedroom home, to meet the OWTS regulations published by RI-DEM. The cost of constructing such a system is estimated to be between $10,000 and $20,000, depending on lot configuration and soil and groundwater conditions. For areas with

limited OWTS failures, this option is cost effective, but could be considered equivalent to the 'no action' option, since OWTS reconstruction can be left to the individual property owner. For areas where a significant percentage of existing OWTS systems are failing, this option is not as acceptable, since the costs for rehabilitating many systems is significant, and may approach the cost of lateral sewer installation.

5.8.5 Wastewater Collection and Treatment System

In many areas, the installation of a wastewater collection system is the only reasonable alternative for permanently ending the chronic OWTS failure problems.

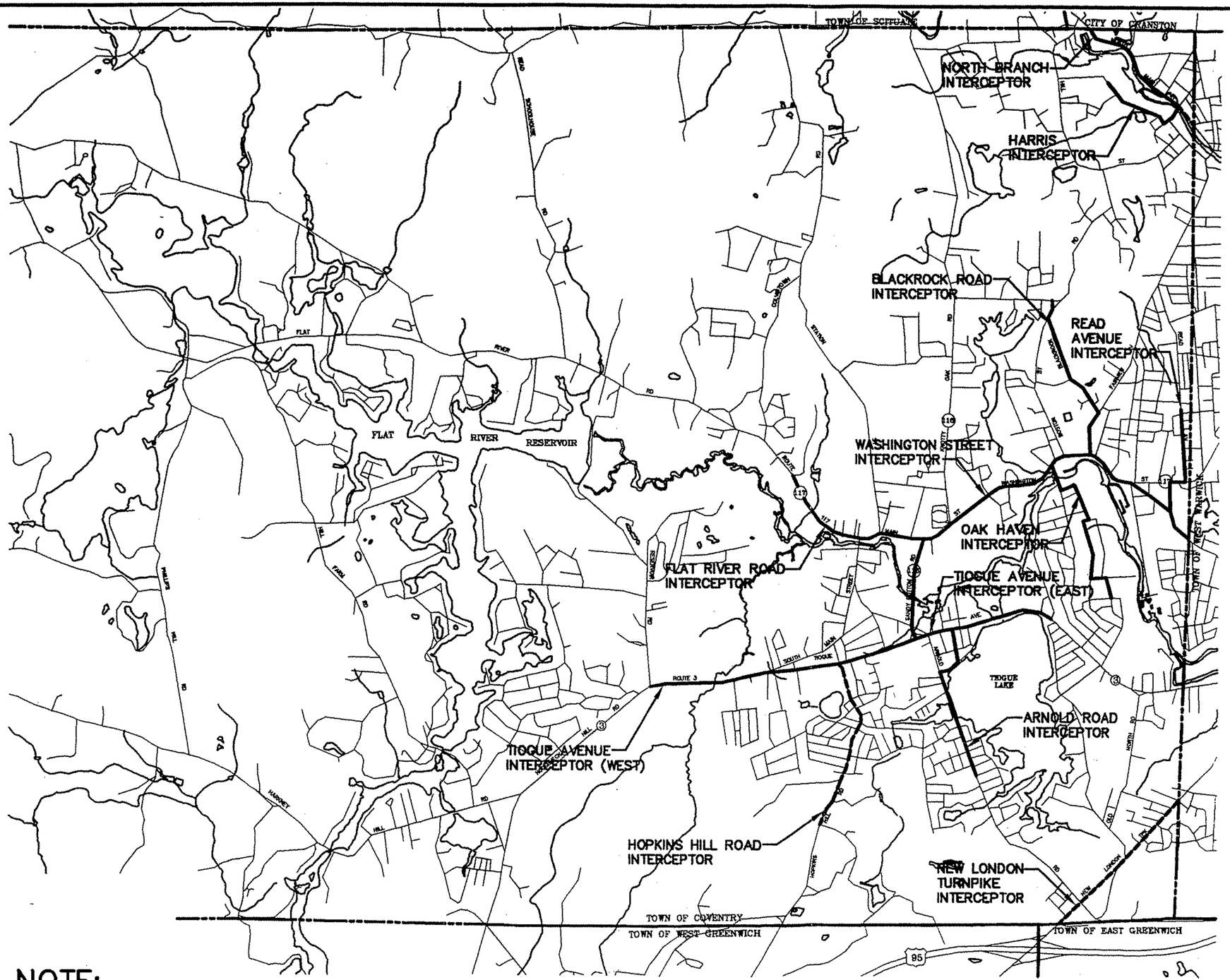
5.8.5.a Sewer Interceptor System

The previous 1995 FP and 2010 FP Update outlined the three most logical options for proposed sewer interceptor systems. The option previously recommended and constructed is briefly described below. The original interceptor plan from the 1995 FP is included in **Figure 5-1** (Note that since the 1995 FP and 2010 FP Update some of the interceptors have been constructed, see **Figure 3-10** for the current existing interceptors):

Central Pumping Station at Tiogue Avenue and Washington Street Interceptor: This option included constructing a pump station on Sandy Bottom Road. A new force main was installed on Sandy Bottom Road that discharges to a gravity interceptor at the approximate intersection of Washington Street and Knotty Oak Road. This gravity interceptor would then travel east along Washington Street to the intersection of Quidnick Avenue where it would then follow an abandoned railroad bed to Whitford Street and down Pulaski Street to the West Warwick Town boundary.

This option was selected in the previous report based on the proposed benefits and the project's cost effectiveness. Based on this recommendation of the 1995 FP, this option, including the Sandy Bottom Road Pump Station, forcemain and Washington Street interceptor to the West Warwick Town boundary were constructed.

In December 2013, the Town of Coventry acquired the Woodland Manor Estates pump station and forcemain. With the existing pump station and forcemain infrastructure already being installed, there is potential to use this pump station/forcemain to sewer adjacent areas previously eliminated or deemed to be not cost effective to sewer due to location (i.e. Planning Area N/N-1). Also, as portions of the forcemain may be flowing under gravity conditions, further investigation should be made to assess the feasibility of using portions of Woodland Manor force main to service parcels along Tiogue Avenue where collection sewers have yet to be constructed. Future IMA revisions will be needed to address allocating the Woodland Manor capacity to the Town prior to any of these potential projects being constructed, however this additional capacity is not required for projected wastewater flows until 2065, see **Table 4-5** and **Appendix B**.



N

LEGEND:

PROPOSED INTERCEPTOR

EXISTING INTERCEPTOR

NOTE:

BASEMAP SOURCE: RIGIS

3000 0 3000

SCALE IN FEET

FIG 5–1

RECOMMENDED INTERCEPTOR SEWER PROGRAM

9187\FIG6-4

6 SELECTED PLAN, PRELIMINARY DESIGN AND COST ESTIMATES

6.0 General

This section is intended to provide a description of the selected plan, including an assessment of environmental impacts, preliminary design information and a cost estimate for the work involved. The present use of OWTSs for wastewater disposal is clearly inadequate in certain portions of eastern Coventry. The information presented in Chapters 3 and 5 of this report (and in previous planning reports prepared by the Town of Coventry) substantiates existing OWTS problems which cannot be corrected by construction of new OWTSs designed in accordance with RI-DEM OWTS Regulations. Therefore, an alternative method of wastewater management must be utilized for wastewater treatment and disposal in those areas where OWTS use is no longer feasible.

6.1 Plan Selection

The wastewater management plan proposed herein was developed based on the discussion of alternatives in Chapter 5. The selection criteria included technical, structural, environmental, economic and political considerations. The selected plan presents the best balance of the importance of these considerations. Because of the plan previously selected in the 1995 Facilities Plan (FP) and amended based upon the 2003 FP Reaffirmation and 2010 FP Update, a portion of sewers in the eastern section of Coventry have already been constructed (**Figure 3-10**). The alternatives listed in Chapter 5 have previously been reviewed and a three phased recommended sewering program was created. This recommended program, due to its inclusion as part of the 1995 FP and due to the completion of portions of the sewer construction make this alternative the most viable due to the selection criteria mentioned above. Therefore, the plan selected as part of the 1995 FP, with modifications made in the 2003 Reaffirmation and 2010 Update, will remain the plan selected for this 2015 FP Update. However, modifications to this plan must be made to incorporate significant changes that affect the overall projection of wastewater needs in Town as discussed in Chapter 4. The selected plan, with modifications, is as follows.

6.1.1 Continue the Wastewater Collection System in the Eastern Portions of Coventry

As discussed in earlier sections, construction of a wastewater collection system with lateral sewers has already commenced based upon past recommendations of planning reports prepared by and/or for the Town of Coventry. These constructed sewers described in Chapter 3 are shown in **Figure 3-10** and have begun to serve the Planning Areas in eastern Coventry with the greatest need for off-site wastewater disposal (Phase I), while also providing the infrastructure (sewer interceptors, pump station, and forcemains) for future sewer system expansion to the remaining Planning Areas. Planned sewer construction Contracts 8 to 11 will complete the recommended Phase I sewering program.

The 1995 FP recognized Planning Areas where there was a strong need for off-site disposal of wastewater and also Planning Areas that should be removed from the sewering program because the utilization of OWTSs would be a more viable wastewater disposal option (Areas AC, AG, AH, AI). Based upon the recommended areas to be sewered, a wastewater collection system was created to serve these Planning Areas.

In the 2003 FP Reaffirmation, additional wastewater treatment capacity was allocated for two proposed developments (Pine Ridge Subdivision and Center of New England) that would significantly change the original assumption for sewer flow for the parcels. Due to this additional wastewater allocation need, Planning Areas (AA and AB) with less need for sewering were removed and instead it was recommended to continue the utilization of the existing OWTSs.

In the 2010 FP Update, additional wastewater treatment capacity was allocated for multiple proposed developments that significantly changed the original assumption for sewer flow for the parcels, and two industrial properties (Clariant Corporation and Rhodes Technologies) that were granted connection to the system, that previously had a private WWTF and were unaccounted for in previous FP's allocated wastewater treatment capacity. As part of the 2010 FP Update, Planning Areas AF, AD, Y and portions of Planning Areas AE, N, O, X and Z with less need for sewering were removed and instead it was recommended to continue the utilization of the existing OWTSs.

The Town's wastewater capacity per their existing IMA with West Warwick, provides the Town with a total wastewater treatment capacity of 2.25 mgd in the West Warwick system. Future IMA revisions will be needed to address officially allocating the 0.2 mgd of the Woodland Manor capacity to the Town, however this additional capacity is not required for projected wastewater flows until 2065, see **Table 4-5** and **Appendix B**.

As part of the selected plan areas adjacent to the Woodland Manor pump station and forcemain that were previously ruled out or eliminated due to conventional sewer construction feasibility were analyzed with regards to this recently acquired infrastructure. Also, a small area to the southwest of Planning Area N that was not included in the original "sewered" area plan was analyzed to determine the potential need for sewering.

6.1.2 Revised Recommended Plan

The revised recommended revisions to the 2010 FP Update sewering plan are described below and include the addition of properties in Planning Area N previously removed in previous FP Update and inclusion of an area to the southwest of Planning Area N that was not originally included in the original "sewered" area plan, but is in a location that was determined to have a need for sewering.

Information collected for each Planning Area to determine sewer needs is summarized in **Table 6-1**. Based upon this information, a new recommended sewer plan can be established. **Figure 6-1** shows this revised sewer plan, and the areas that are recommended for removal. It should be noted that the full or partial removal of an area does not mean that area will never receive municipal sewers. Circumstances could arise that cause a Planning Area to be reinstated to the recommended plan for sewering, such as a sudden increase in need or increased available wastewater treatment capacity obtained by the Town. These circumstances will continue to be monitored in future planning exercises and changes made based upon the findings.

The following sub-sections 6.1.2.a to 6.1.2.ii briefly describe each planning area and based on information presented in this report, either confirm the recommendations of the

1995 FP, 2003 FP Reaffirmation and/or the 2010 FP Update, or provide revised recommendations based upon the current wastewater management needs.

Please note that in this report any allocations or re-allocations of wastewater flows discussed below are not made to the singular development mentioned. All developments discussed below were used only to generate increased flow projections to the planning areas. Instead, recommendations for re-allocations will be made only to the referenced planning area in general, where the development is proposed. Any allocation to a specific entity must be made by the Town, and reference to a specific development in this report is for planning purposes and shall not grant capacity nor connection for the said development into the system.

6.1.2.a Planning Area A

Planning Area A was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area will flow to the existing sewer interceptor installed on the New London Turnpike. This area was proposed to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Based upon updated information obtained for this report, the need to serve this area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase III sewer program is confirmed.

6.1.2.b Planning Area B

Planning Area B was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is proposed to flow north along Old North Road into Tiogue Avenue, then west to the West Warwick town line. This area was proposed to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering them was more economically feasible.

Based upon updated information obtained for this report, the need to serve this area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase III sewer program is confirmed.

6.1.2.c Planning Area C

Planning Area C was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and possible on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area will flow north to the proposed Tiogue Avenue Interceptor (East). This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be in poor condition for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed. The proposed sewer construction under Contract 10 is the installation of lateral sewers in this planning area. The estimated date of commencement for this project is March 2016, based upon the 2015 Priority Determination System's Project Information Sheets submitted to RI-DEM, as described in Chapter 7 of this report.

Additional flows of 8,190 gpd were re-allocated to this planning area in the 2010 FP Update. This re-allocation is due to the increase in wastewater need as a result of a proposed Village at East Shore Drive development, as described in Chapter 4 of the 2010 FP Update.

There have also been discussions with the developer for the Village at East Shore Drive, as to constructing a portion of the sewer interceptor for this area to connect the new homes into the existing sewer system off Old North Road/Tiogue Avenue. However, at this time the developer has not commenced construction on this project.

6.1.2.d Planning Area D

Planning Area D was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is proposed to flow south into Tiogue Avenue, then west to the West Warwick town line. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists.

Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.e Planning Area E

Planning Area E was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). Portions of the wastewater flow from this area flow south into Tiogue Avenue, then west to the West Warwick town line, while the remaining portion flows north to the Washington Street Interceptor. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.f Planning Area F

Planning Area F was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). Based upon this recommendation, portions of the sewer proposed for this area have been constructed (Contract 4, **Figure 3-11**). The wastewater from this area will flow through the Tiogue Avenue Interceptor to the existing Sandy Bottom Road Pump Station, where it is pumped to Washington Street to flow by gravity into West Warwick. This area was proposed to be sewered as part of the Phase I sewer program, meaning the area was deemed to have the greatest need within the Town for sewering and the location was ideal for the installation of larger sewer interceptors required for the system.

Based upon updated information obtained for this report, the need to serve this area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase I sewer program is confirmed.

Additional flows of 21,416 gpd were re-allocated to this planning area in the 2010 FP Update. This re-allocation is due to the increase in wastewater need as a result of a proposed Brookside development, as described in Chapter 4 of the 2010 FP Update.

6.1.2.g Planning Area G

Planning Area G was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). Based upon this recommendation, portions of the sewer proposed for this area have been constructed (**Contract 6, Figure 3-11**). The wastewater from this area will flow through the existing Tiogue Avenue Interceptor (West) to the existing Sandy Bottom Road Pump Station, where it is pumped to Washington Street to flow by gravity into West Warwick. This area was proposed to be sewered as part of the Phase I sewer program, meaning the area was deemed to have the greatest need within the Town for sewering and the location was ideal for the installation of larger sewer interceptors required for the system.

Based upon updated information obtained for this report, the need to serve this area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase I sewer program is confirmed. The completed sewer construction contract 6 and the proposed sewer construction contracts 9 and 11 will serve this area completely. The estimated date of commencement for these projects are March 2019 (Contract 9) and March 2017 (Contract 11), based upon the 2015 Priority Determination System's Project Information Sheets submitted to RI-DEM as described in Chapter 7 of this report.

Additional flows of 11,040 gpd were re-allocated to this planning area in the 2010 FP Update. This re-allocation is due to the increase in wastewater need as a result of a proposed Coventry Housing Authority's Coventry Meadow development, as described in Chapter 4 of the 2010 FP Update.

6.1.2.h Planning Area H

Planning Area H was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is to flow into a proposed pump station which will pump the flow to the Arnold Road Interceptor. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.i Planning Area I

Planning Area I was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTS and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area originates from the Center of New England Development. The remaining flows are to flow into a proposed pump station which will pump the flow to the Arnold Road Interceptor. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.j Planning Area J

Planning Area J was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area originates from the Center of New England Development. Flows from this area are discharged into either the Hopkins Hill Relief Sewer or the Hopkins Hill Road Interceptor. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

The 2003 FP Reaffirmation reallocated 155,700 gpd of additional flows to this planning area in order to accommodate the Pine Ridge Subdivision and the Center of New England Development.

The 2010 FP Update reallocated additional flows of 78,000 gpd to this planning area. This re-allocation is due to the increase in wastewater need as a result of the proposed developments on-going at the Center of New England at that time (see Chapter 4 of the 2010 FP Update for additional description).

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

The proposed Hopkins Hill Road East Sewer Project will serve a portion of this Planning Area. The estimated date of commencement for this project is March 2020, based upon the 2015 Priority Determination System's Project Information Sheets submitted to RI-DEM as described in Chapter 7 of this report.

6.1.2.k Planning Area K

Planning Area K was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). Based upon the previous recommendations for sewering, portions of this area have been sewered as part of the Hopkins Hill Relief Sewer Project (Contract 4). The majority of wastewater from this area flows north to the Tiogue Avenue Interceptor (West). This area was originally proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for the remaining parcels within this area is to remain in the Phase II sewer program is confirmed.

The proposed Huron Pond Sewer Project will serve a portion of this Planning Area. The estimated date of commencement for this project is March 2019, based upon the 2015 Priority Determination System's Project Information Sheets submitted to RI-DEM as described in Chapter 7 of this report.

6.1.2.l Planning Area L

Planning Area L was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). Wastewater from this area is proposed to flow south to the Tiogue Avenue Interceptor (West) installed under Sewer Contract 4 (**Figure 3-11**). This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.m Planning Area M

Planning Area M was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area originates from the mobile home compounds located in the northeast portions of the planning area and is pumped south along Reservoir Road into the Tiogue Avenue Interceptor (West). This area was proposed to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Currently, the mobile home compounds located in this area are connected into the Woodland Manor Forcemain located on Tiogue Avenue. The Town's recent acquisition of the Woodland Manor Pump Station/Forcemain provides potential connection to these parcels into the Town's system. However, prior to this potential connection, future IMA revisions will be needed to address officially allocating Woodland Manor capacity to the Town.

Based upon updated information obtained for this report, the need to serve the remaining parcels in this area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase III sewer program is confirmed.

6.1.2.n Planning Area N

Planning Area N was recommended for sewering as part of the 1995 FP report. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is to flow to the now Town owned Woodland Manor Pump Station, which transmits flow to West Warwick. This area was proposed to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering them was more economically feasible.

Based on information in the 2010 FP Update, it was recommended that all parcels in this area are removed from the sewering plan, in favor of the continued use of existing OWTSs for wastewater disposal, with the exception of those parcels able to be served by gravity sewers from the existing system (see Chapter 6 of the 2010 FP Update for more detailed information).

However, because of the Town's recent acquisition of the Woodland Manor forcemain and pump station, there is the ability for some of the parcels in this area to be sewered by gravity to this pump station. This will allow a portion of the parcels previously recommended to continue the use of OWTS systems, to be

allowed to connect to the municipal sewer system. Prior to allowing this potential connection, IMA revisions will be needed to address officially allocating the Woodland Manor capacity to the Town.

Other parcels located in this planning area that are still in a remote location and would require pump stations or low pressure sewers to be installed based on the topography of this area will continue utilize the existing OWTSs for wastewater disposal. As stated in the 2010 FP Update, drawbacks to the continued removal of these parcels from the sewer plan are its close proximity to Johnson Pond and the possibility that poor soils not conductive to on-site systems may be located in the area. However, due to the increased treatment capabilities of current conventional or A/E OWTS technologies for use where possible site restrictions are a factor, options exist for providing adequate treatment of wastewater by use of OWTSs in this planning area. This factor compiled with the fact that the area has a large concentration of single family homes where a majority of the lot sizes are sufficient for conventional OWTS construction making sewering this area a lower priority.

Therefore, it is recommended that all parcels able to flow by gravity into the Woodland Manor Pump Station be recommended for sewering, while the remaining parcels are recommended for the continued use of existing OWTSs for wastewater disposal.

Due to continued reliance on OWTSs and their possible impact with the environment caused by improperly functioning OWTS, coupled with lack of general knowledge that most homeowners have regarding operation and maintenance (O&M) their septic systems, a public education program (as described in Chapter 5) is recommended in this planning area. This area should continue to be monitored for any future signs of widespread OWTS failure.

Additional flows generated by sewering this area can be reallocated by the use of the additional capacity gained by the Town from the purchase of the Woodland Manor Forcemain/Pump Station. Prior to allowing this potential connection, IMA revisions will be needed to address officially allocating the Woodland Manor capacity to the Town.

6.1.2.n.1 Planning Area N-1

Due to the Town's purchase of the Woodland Manor Forcemain/Pump Station infrastructure and the now Town owned infrastructure in close proximity, there are some additional adjacent areas that can be served by this pump station. This area is southwest of Planning Area N, and included the parcels bordering Nooseneck Hill Road to the Town line. This area includes both residential and commercial properties, including a mobile home park (Maple Root Village), in close proximity to Maple Root Pond, which is tributary to the south branch of the Pawtuxet River. Maple Root Village consists of approximately 187 small mobile home lots located on a large parcel adjacent to Maple Root Pond. This area is also outlined as having poor soils for a properly functioning OWTS system. Also, the mobile homes present economic and on-site restrictions prohibiting properly functioning OWTSs (i.e. small lot sizes and densely populated). These reasons also diminish the feasibility of constructing newer properly functioning system.

Based upon updated information obtained for this report, the need to serve this area by means of an off-site wastewater management solution exists. Therefore, the recommendation for this area to be included in the Phase II sewer program is confirmed. . Prior to allowing this potential connection, IMA revisions will be needed to address officially allocating the Woodland Manor capacity to the Town.

6.1.2.o Planning Area O

Planning Area O was recommended for sewering as part of the 1995 FP report. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is proposed to flow to the Washington Street Interceptor via a pump station to be constructed. This area was proposed to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Based on information in the 2010 FP Update, it was recommended that a portion of the parcels in this area that would require a pump station to reach the Washington Street Interceptor were removed from the sewering plan, in favor of the continued use of existing OWTSs for wastewater disposal (see Chapter 6 of the 2010 FP Update for more detailed information). Upon the review of this area as part of this FP Update, the concerns over economic feasibility for sewer construction, and the relatively low occurrence of OWTS repairs from 2008-2014 (7% of the removed parcels, **Appendix A**) are still present and the recommendation to remove the selected parcels from the sewering plan remains.

6.1.2.p Planning Area P

Planning Area P was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTS and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The wastewater from this area is proposed to flow through the existing Washington Street Interceptor by gravity into West Warwick. This area was proposed to be sewered as part of the Phase I sewer program, meaning the area was deemed to have the greatest need in the Town for an off-site wastewater management solution.

Based upon updated information obtained for this report, the need to serve this area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase I sewer program is confirmed. Sewers have been installed to serve parcels adjacent to Washington Street, and the remaining parcels in this area will be served as part of Sewer Construction Contract No. 8. The estimated date of commencement for the project is March 2018, based upon the 2015 Priority Determination System's Project Information Sheets submitted to RI-DEM.

As per the 2010 FP Update, additional flows were re-allocated to this planning area due to an increase in wastewater need as a result of two industrial facilities (Rhodes Technology and Clariant Corporation) connection to the municipal sewer system, as described in Chapter 4 of the 2010 FP Update. This 2010 FP Update flow re-allocation came from the recommended removal of the Planning Areas from the 2010 FP Update sewer plan.

6.1.2.q Planning Area Q

Planning Area Q was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is proposed to flow south through Area P and into the Washington Street Interceptor, then west to the West Warwick town line. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.r Planning Area R

Planning Area R was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is proposed to flow north to the North Branch Interceptor, then west to the West Warwick town line. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.s Planning Area S

Planning Area S was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is proposed to flow north to the North Branch Interceptor, then west to the West Warwick town line. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.t Planning Area T

Planning Area T was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area flows south to the existing Broad Street sewers then to the North Branch Interceptor. This area was proposed to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Based upon updated information obtained for this report, the need to serve this area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase III sewer program is confirmed.

Additional flows of 9,235 gpd were re-allocated to this planning area in the 2010 FP Update. This re-allocation is due to the increase in wastewater need as a result of a proposed Riverside Landing and Village at Harris Mill developments, as described in Chapter 4 of the 2010 FP Update.

6.1.2.u Planning Area U

Planning Area U was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more

detailed evaluation of this area). The Washington Street Interceptor along with other secondary sewers were proposed and constructed as part of this recommendation. The area was proposed to be sewered as part of both the Phase I and Phase II sewer program, meaning the area was deemed to have the most need within the Town to be sewered in order to provide the necessary off-site wastewater management solution. Phase I was the construction of the Washington Street Interceptor to the West Warwick town line, while Phase II was the construction of gravity sewers north of the Sandy Bottom Road Pump Station and west on Main Street. Based upon the recommendations of the past FP reports, the sewer construction proposed in this area is fully complete. Therefore, no additional investigation is needed into alternative wastewater disposal options for this area.

Additional flows of 19,711 gpd were re-allocated to this planning area in the 2010 FP Update. This re-allocation is due to the increase in wastewater need as a result of a proposed Anthony Mill re-development, as described in Chapter 4 of the 2010 FP Update.

6.1.2.v Planning Area V

Planning Area V was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). Portions of this area flow to the Blackrock Road Interceptor while the remaining wastewater flows south into the Washington Street Interceptor, then west to the West Warwick town line. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based on recommendations from previous FP reports, sewers have been installed, as part of sewer construction Contracts 4 and 5, to serve approximately 48 parcels on Boston Street and Anthony Street (**Figure 3-11**). This represents nearly 50% of the parcels for this planning area. Since nearly half of the parcels in this area are already being served by the municipal sewer system and due to updated information obtained for this report, it is clear that the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

6.1.2.w Planning Area W

Planning Area W was recommended for sewering as part of the 1995 FP, 2003 FP Reaffirmation and 2010 FP Update reports. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is

proposed to flow south into the Washington Street Interceptor, then west to the West Warwick town line. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based on recommendations from previous FP reports, sewers have been installed in this area as part of sewer construction in Contract 5 to serve parcels in the Coventry Housing Authority's Knotty Oak Village on Contentment Drive (**Figure 3-10**). Since sewers have already been constructed in the area and based on updated information obtained for this report, the need to serve this entire area by means of an off-site wastewater management solution still exists. Therefore, the recommendation for this area to remain in the Phase II sewer program is confirmed.

Additional flows of 3,910 gpd were re-allocated to this planning area in the 2010 FP Update. This re-allocation is due to the increase in wastewater need as a result of a proposed Coventry Housing Authority's Contentment Drive development, as described in Chapter 4 of the 2010 FP Update.

6.1.2.x Planning Area X

Planning Area X was recommended for sewering as part of the 1995 FP report. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area would flow to the proposed Blackrock Road Interceptor. This area was to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Based upon updated information obtained in the 2010 FP Update, it was determined the need to serve this area completely by means of an off-site wastewater management solution is not as prevalent as other areas where flow can be better allocated. This condition has been confirmed as part of this FP Update. The parcels located in the northern portion of this planning area (north of Gervais Street) are in a location that, while originally planned for sewering, is not in any of the sewer construction contracts for the foreseeable future. In this area, there is a large concentration of single family homes and the majority of lot sizes are sufficient for conventional OWTSs.

The drawbacks to recommending continued reliance on OWTSs in this location are close proximity to a waterbody (Upper Tiogue Dam) and the possibility of poor soils for on-site systems located in the area. However, due to increased treatment capabilities of current OWTS technologies and the availability of I/A OWTS technologies for use where site restrictions are a factor, options exist for providing adequate treatment of wastewater by use of OWTSs in this planning area.

Therefore, as was recommended in the 2010 FP Update and confirmed as part of this FP Update, all parcels north of Gervais Street, that are located within this planning area, are to be removed in favor of continued use of existing OWTSs for wastewater disposal, thus continuing the use of OWTSs for wastewater disposal for these parcels. Removal of these parcels in the planning area from the sewering program provided additional wastewater capacity that was reallocated to other planning areas with greater need as part of the 2010 FP Update.

As a result of continued reliance on OWTSs, possible impacts to the environment caused by improperly functioning OWTSs and the lack of general knowledge that most homeowners have regarding O&M of their septic systems, a public education program (as described in Chapter 5) is recommended for this area. This area should continue to be monitored for any signs of widespread OWTS failure.

6.1.2.y Planning Area Y

Planning Area Y was recommended for sewering as part of the 1995 FP report. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area would flow north to the proposed North Branch Interceptor. This area was to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Based upon updated information obtained in the 2010 FP Update, the need to serve this area completely by means of an off-site wastewater management solution is not as critical as other areas where flow can be better allocated. This condition has been confirmed as part of this FP Update. The parcels located in this area are in a location that, while originally planned for sewering, is not in any of the sewer construction contracts for the foreseeable future. In this area there is a greater concentration of parcels with lots sizes that are sufficient for conventional OWTS construction.

The drawbacks to recommending continued reliance on OWTSs at this location are close proximity to a waterbody (Fones Pond) and the possibility of poor soils not conductive to on-site systems. However, due to the increased treatment capabilities of current OWTS technologies and the availability of I/A OWTS technologies for use where site restrictions are a factor, options exist for providing adequate treatment of wastewater by use of OWTSs in this planning area.

Therefore, as was recommended in the 2010 FP Update and confirmed as part of this FP Update, all parcels from this area be removed in favor of continuing the use of OWTSs for wastewater disposal. Removal of this planning area from the sewering program provided additional wastewater capacity that was reallocated to other planning areas with greater need as part of the 2010 FP Update.

As a result of the continued reliance on OWTSs, possible impacts to the environment caused by improperly functioning OWTSs and the lack of general knowledge that most homeowners have regarding O&M of their septic systems, a public education program (as described in Chapter 5) is recommended in this planning area. This area should continue to be monitored for any signs of widespread OWTS failure.

6.1.2.z Planning Area Z

Planning Area Z was recommended for sewering as part of the 1995 FP report. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area would flow to the proposed Harris Interceptor. This area was proposed to be sewered as part of the Phase II sewer program, meaning the area was deemed to be poor for OWTS construction, but other areas (Phase I areas) have either greater need and/or would have to be sewered in order to provide the necessary wastewater infrastructure to make installing lateral sewers in this area economically feasible.

Based upon updated information obtained for this report, the need to serve this area completely by means of an off-site wastewater management solution is not as critical as other areas where flow can be better allocated. While the parcels located on the eastern end of the planning area have a higher concentration of commercial properties that have a greater need for sewers, the parcels located on the western side of the area along Hill Street and Howard Avenue are in a more remote location where need is less. The topography of the western area will require construction of a pump station to service the majority of parcels of this area. The area's remote location and the need to pump wastewater flow make construction of sewers within this area less economically feasible. This factor alone is sufficient enough to consider removing this planning area from the sewering plan in favor of continued use of current on-site wastewater disposal methods. Furthermore this area has a greater concentration of single family homes with lot sizes sufficient enough for conventional OWTSs.

The drawbacks to recommending continued reliance on OWTSs at this location are close proximity to a waterbody (Pawtuxet River) and the possibility of poor soils not conducive to on-site systems. However, due to increased treatment capabilities of current OWTS technologies and the availability of I/A OWTS technologies for use where site restrictions are a factor, options exist for providing adequate treatment of wastewater by use of OWTSs in this planning area.

Therefore, as was recommended in the 2010 FP Update and confirmed as part of this FP Update, all parcels in the western part of the planning area (parcels adjacent to Hill Street, Colvin Street and Howard Street to Chestnut Street) be removed from the sewering plan, thus continuing the use of OWTSs for wastewater disposal for these parcels. Removal of these parcels in the planning area from the sewering program provided additional wastewater capacity that

was reallocated to other planning areas with greater need as part of the 2010 FP Update.

As a result of continued reliance on OWTSs, possible impacts to the environment caused by improperly functioning OWTSs and lack of general knowledge that most homeowners have regarding O&M of their septic systems, a public education program (as described in Chapter 5) is recommended. This area should continue to be monitored for any signs of widespread OWTS failure.

Additional flows of 10,124 gpd were re-allocated to this planning area in the 2010 FP Update. This re-allocation is due to the increase in wastewater need as a result of a proposed Riverwalk Commons development, as described in Chapter 4 of the 2010 FP Update.

6.1.2.aa Planning Area AA

Planning Area AA was recommended for sewering as part of the 1995 FP report. However, this area was removed from the sewering plan based upon the recommendation in the 2003 FP Reaffirmation to continue the use of existing OWTSs. This removal was due to increased sewer need in Planning Area J due to the proposed commercial and residential developments (see previous Chapters in this report, the 2003 FP Reaffirmation and the 1995 FP for a more detailed evaluation of this area). .

Based upon updated information obtained for this report, the need for this area to be served by an off-site wastewater management solution remains low and the projected flows for the area are better allocated to areas with greater need. Therefore, the recommendation in the 2003 FP Reaffirmation that this area be excluded from the sewer program is confirmed.

6.1.2.bb Planning Area AB

Planning Area AB was recommended for sewering as part of the 1995 FP report. However, the area was removed from the sewering plan based upon the recommendation in the 2003 FP Reaffirmation to continue the use of existing OWTSs. This removal was due to the increased sewer need associated with commercial and residential developments in Planning Area J (see previous Chapters in this report, the 2003 FP Reaffirmation and the 1995 FP for a more detailed evaluation of this area).

Based upon updated information obtained for this report, the need for this area to be served by an off-site wastewater management solution remains low and the projected flows for the area are better allocated to areas with greater need. Therefore, the recommendation that this area remain excluded from the sewer program is confirmed.

6.1.2.cc Planning Area AC

Planning Area AC was not recommended for sewering as part of the 1995 FP report; it was instead recommended that this area continue to treat their wastewater on-site through the use of OWTSs (see previous Chapters and the

1995 FP for a more detailed evaluation of this area). Removal of this area from the sewering plan was also recommended to allow wastewater flow allocation to areas with greater need for sewers.

Based upon updated information obtained for this report, the need for this area to be served by off-site wastewater management solution remains low and the projected flows for this area are better allocated to areas with greater need. Therefore, the recommendation in the 1995 FP for the area remain excluded from the sewer program is confirmed.

6.1.2.dd Planning Area AD

Planning Area AD was recommended for sewering as part of the 1995 FP report. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area is to flow south to the Flat River Road Interceptor. This area was to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Based upon updated information obtained in the 2010 FP Update, the need to serve this area completely by means of an off-site wastewater management solution is not as critical as other areas where flow can be better allocated. This condition has been confirmed as part of this FP Update. The parcels located in this area are in a location that, while originally planned for sewering, is not in any of the sewer construction contracts for the foreseeable future. In this area there is a greater concentration of parcels with lots sizes that are sufficient for conventional OWTS construction.

The drawbacks to recommending continued reliance on OWTSs at this location are close proximity to a waterbody (Fones Pond) and the possibility of poor soils not conductive to on-site systems. However, due to the increased treatment capabilities of current OWTS technologies and the availability of I/A OWTS technologies for use where site restrictions are a factor, options exist for providing adequate treatment of wastewater by use of OWTSs in this planning area.

Therefore, as was recommended in the 2010 FP Update and confirmed as part of this FP Update, all parcels from this area be removed in favor of continuing the use of OWTSs for wastewater disposal. Removal of this planning area from the sewering program provided additional wastewater capacity that was reallocated to other planning areas with greater need as part of the 2010 FP Update.

As a result of the continued reliance on OWTSs, possible impacts to the environment caused by improperly functioning OWTSs and the lack of general knowledge that most homeowners have regarding O&M of their septic systems, a public education program (as described in Chapter 5) is recommended in this

planning area. This area should continue to be monitored for any signs of widespread OWTS failure.

6.1.2.ee Planning Area AE

Planning Area AE was recommended for sewering as part of the 1995 FP report. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area would flow to the Flat River Road Interceptor. This area was to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Based upon updated information obtained in the 2010 FP Update, the need to serve this area completely by means of an off-site wastewater management solution is not as critical as other areas where flow can be better allocated. This condition has been confirmed as part of this FP Update. The parcels located in this area are in a location that, while originally planned for sewering, is not in any of the sewer construction contracts for the foreseeable future. In this area there is a greater concentration of parcels with lots sizes that are sufficient for conventional OWTS construction.

The drawback to recommending continued reliance on OWTSs in this area is the possibility of poor soils not conducive to on-site systems. However, due to increased treatment capabilities of current OWTS technologies and the availability of I/A OWTS technologies where site restrictions are a factor, the options exist for providing adequate treatment of wastewater by use of OWTSs in this planning area.

Therefore, as was recommended in the 2010 FP Update and confirmed as part of this FP Update, all parcels west of Walker Lane be removed in favor of continuing the use of OWTSs for wastewater disposal. Removal these parcels in this planning area from the sewering program provided additional wastewater capacity that was reallocated to other planning areas with greater need as part of the 2010 FP Update.

As a result of the continued reliance on OWTSs possible impacts to the environment caused by improperly functioning OWTSs and lack of general knowledge that most homeowners have regarding O&M of their septic systems, a public education program (as described in Chapter 5) is recommended. This area should continue to be monitored for any signs of widespread OWTS failure.

6.1.2.ff Planning Area AF

Planning Area AF was recommended for sewering as part of the 1995 FP report. This was due to certain economic and on-site restrictions prohibiting properly functioning OWTSs and justifying the need to provide the parcels with an off-site wastewater management solution (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). The majority of wastewater from this area

would flow south to the Flat River Road Interceptor. This area was to be sewered as part of the Phase III sewer program, meaning the area was deemed to be poor for OWTS construction, but that other areas (Phase I and Phase II areas) were deemed either to have a greater need for sewers or their locations were such that sewering was more economically feasible.

Based upon updated information obtained in the 2010 FP Update, the need to serve this area completely by means of an off-site wastewater management solution is not as critical as other areas where flow can be better allocated. This condition has been confirmed as part of this FP Update. The parcels located in this area are in a location that, while originally planned for sewering, is not in any of the sewer construction contracts for the foreseeable future. In this area there is a greater concentration of parcels with lots sizes that are sufficient for conventional OWTS construction.

The drawbacks to recommending continued reliance on OWTSs at this location are close proximity to a waterbody (Fones Pond) and the possibility of poor soils not conductive to on-site systems. However, due to the increased treatment capabilities of current OWTS technologies and the availability of I/A OWTS technologies for use where site restrictions are a factor, options exist for providing adequate treatment of wastewater by use of OWTSs in this planning area.

Therefore, as was recommended in the 2010 FP Update and confirmed as part of this FP Update, all parcels from this area be removed in favor of continuing the use of OWTSs for wastewater disposal. Removal of this planning area from the sewering program provided additional wastewater capacity that was reallocated to other planning areas with greater need as part of the 2010 FP Update.

As a result of the continued reliance on OWTSs, possible impacts to the environment caused by improperly functioning OWTSs and the lack of general knowledge that most homeowners have regarding O&M of their septic systems, a public education program (as described in Chapter 5) is recommended in this planning area. This area should continue to be monitored for any signs of widespread OWTS failure.

6.1.2.gg Planning Area AG

Planning Area AG was not recommended for sewering as part of the 1995 FP report; it was instead recommended that this area continue to treat their wastewater on-site through the use of OWTSs (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). Removal of this area was also recommended to allow wastewater allocation to areas with a greater need for sewers.

Based upon updated information obtained for this report, the need for this area to be served by off-site wastewater management solution remains low and the projected flows for the area are better allocated to areas with more need. Therefore, the recommendation that this area remain excluded from the sewer program is confirmed.

6.1.2.hh Planning Area AH

Planning Area AH was not recommended for sewering as part of the 1995 FP report, it was instead recommended that this area use a community OWTS to manage their wastewater (see previous Chapters and the 1995 FP for a more detailed evaluation of this area). This alternative was recommended because many lots in this area are undersized for conventional OWTS use; however, the remote location makes sewering this area through connection to the municipal sewer system economically in-feasible. The 1995 report recommended that localized collector sewer systems be installed for restrictive lots and that the systems transmit the wastewater from these parcels to a community OWTS for disposal.

Based upon updated information obtained for this report, the need for this area to be served by an off-site wastewater management solution still remains economically in-feasible option. Therefore, the recommendation for this area to remain excluded from the sewer program is confirmed.

6.1.2.ii Planning Area AI

Planning Area AI was not recommended for sewering as part of the 1995 FP report; it was instead recommended that this area continue to treat their wastewater on-site through the use of OWTSs (see previous and the 1995 FP for a more detailed evaluation of this area). Removal of this area was recommended to allow wastewater allocation to areas with a greater need for sewers.

Based upon updated information obtained for this report, the need for this area to be served by off-site wastewater management solution remains low and the projected flows for the area are better allocated to areas with greater need. Therefore, the recommendation that this area remain excluded from the sewer program is confirmed.

Based upon needs data, including OWTS repair information obtained from RI-DEM, development density and GIS mapping, the Planning Areas that were removed from the recommended sewer plan in previous FPs, FP Reaffirmations and FP Updates were determined to have the least need and greatest sewer construction difficulty and associated cost of the remaining areas to be sewered. OWTS information, presented in Chapter 3, show that these areas experience low to moderate OWTS problems in comparison to the remaining Planning Areas. Also, with the exception of Area Z, these Planning Areas were in the Phase III sewer construction, based on the 1995 Facilities Plan. Phase III construction represented areas with the least amount of sewering need, and areas where either sewer construction may be difficult or where Phase I and Phase II sewers needed to be built before sewer access could be obtained. Since Phase I sewers have yet to be completed, the Phase III sewers are still in the conceptual phase and given the current rate of the sewer installation, it may still be several years away from completion.

6.2 Recommended Sewer Collection System Cost Estimate

The cost of installing conventional sewer collection systems in the study areas for which they have been identified as a feasible option have been generated as part of this study.

The detailed collection system costs are based on a preliminary layout of sewers on town assessor's maps, with the aid of topographic mapping prepared as part of the 1966 Keyes report. The estimated sewering costs for each study area are shown on **Table 6-2**. A detailed street by street breakdown of these costs is included in **Appendix F**. Sewer construction costs were obtained by increasing unit prices from the 2010 FP Update by the increase in the Engineering News Record (ENR) 20 Cities Building and Construction Cost Index through June 2015.

As shown in **Table 6-2**, the cost to serve individual study areas and the cost per dwelling unit served vary widely. Factors affecting the system cost include lot sizes and configurations, soil conditions (i.e. bedrock) and topography. Topography often dictates that some areas require sewer pump stations and force mains to transmit flow to other areas and to interceptors. Other areas may require sections of sewer to be installed in cross-country alignments to facilitate gravity transmission of the wastewater. In both cases, construction of such facilities may come at a high capital cost while not providing direct service to adjacent properties.

Table 6-1
Planning Area Sewer Needs

SubArea Letter	OWTS Rated	Large of Amount of OWTS Repairs?	Sewer Phase	Sewer Contract	Town Property	Commercial	Affordable Housing	Shallow Groundwater	Shallow Bedrock	Steep Ground Slopes	Poor Soils	Distance to Watercourse	Small Lots (>20% under 10,000 sq. ft.)	Waterfront	Low Income	Moderate Income
A	Poor	N	3		N	Y	N						Y	N	Y	Y
B	Very Poor	N	3		N	Y	Y						Y	N	Y	Y
C	Critical	Y	2	10	Y	N	N						Y	Y	Y	Y
D	Very Poor	Y	2		N	N	N	Y			Y		Y	N	N	Y
E	Very Poor	Y	2		Y	N	N	Y			Y	Y	Y	N	N	Y
F	Critical	N	1	1, 2, 4, 5	N	Y	Y	Y			Y			N	Y	Y
G	Critical	Y	1	6, 9, 11	N	N	N	Y			Y		Y	Y	Y	Y
H	Very Poor	N	2	5	Y	N	N	Y			Y	Y	Y	Y	Y	Y
I	Very Poor	Y	2		N	Y	N	Y			Y	Y		Y	Y	Y
J	Critical	N	2	3, 5, Hop. Hill East	Y	Y	Y	Y			Y	Y	Y	N	Y	Y
K	Very Poor	N	2	4, Huron Pd	N	N	N	Y			Y		Y	N	Y	Y
L	Critical	N	2	5	Y	Y	N	Y			Y		Y	N	Y	Y
M	Poor	N	3		Y	Y	N	Y						N	Y	Y
N	Poor	N	3		N	N	N	Y				Y		Y	Y	Y
N-1	Poor	N	2	Nooseneck	N	Y	Y	Y				Y	See Note 1	Y	Y	Y
O	Poor	N	3		N	Y	N	Y	Y		Y		Y	N	N	Y
P	Critical	Y	1	1, 8	N	Y	N					Y	Y	N	Y	Y
Q	Very Poor	N	2		N	N	N	Y			Y	Y	Y	N	Y	Y
R	Very Poor	N	2		N	N	N	Y			Y		Y	N	Y	Y
S	Very Poor	N	2		N	N	N	Y			Y		Y	N	Y	Y
T	Poor	N	3		N	Y	N	Y			Y		Y	N	Y	Y
U	Critical	N	1/2	1, 2, 5	Y	Y	N	Y	Y	Y	Y		Y	Y	Y	Y
V	Critical	N	2	5	N	N	N	Y			Y		Y	N	Y	Y
W	Very Poor	Y	2	4	Y	N	N	Y			Y		Y	N	N	Y
X	Poor	N	3		Y	N	N	Y		Y	Y	Y		Y	Y	Y
Y	Poor	Y	3		N	N	N	Y		Y	Y			N	N	N
Z	Very Poor	Y	2		N	N	N	Y	Y	Y	Y		Y	N	N	N
AA	Poor	N	Removed		N	N	N	Y	Y	Y	Y			N	N	N
AB	Poor	N	Removed		N	N	N	Y		Y	Y			N	N	N
AC	Fair	N	Removed		N	N	N	Y	Y		Y			N	N	N
AD	Poor	Y	3		N	N	N	Y		Y	Y			N	N	N
AE	Fair	Y	3	7	Y	Y	N	Y			Y			N	N	N
AF	Poor	N	3		N	N	N	Y	Y	Y	Y			N	N	N
AG	Good	N	Removed		N	N	N	Y	Y	Y	Y			N	N	N
AH	Very Poor	N	Removed		N	N	N	Y			Y		Y	Y	N	N
AI	Fair	N	Removed		N	Y	N	Y			Y			N	N	N

Notes:
1) The Maple Root Village mobile home park is located in Subarea N-1. It consists of approximatley 187 small mobile home lots located on one single large parcel.

Table 6-2
Summary of Conventional Sewer Collection System Costs

Area	Length of Sewer Interceptor (feet)	Length of Lateral Sewer (feet)	Pump Stations Required	Length of Sewer Force Main (feet)	Approx. No. of Properties Served	Total Estimated Sewer Construction Cost	Approx. Cost per Unit	Comments
A	0	15,800	1	1300	230	$ 4,152,000	$ 18,100	To Existing New London Tpk Sewer
B	0	7,850	1	750	127	$ 2,023,000	$ 16,000	To West Warwick thru Tiogue Avenue
C	11	7,900	0	0	177	$ 2,117,000	$ 12,000	To Tiogue Avenue Interceptor - East
D	1,100	12,900	0	0	264	$ 3,352,000	$ 12,700	To Existing Washington Interceptor
E	3,250	16,100	1	750	306	$ 5,398,500	$ 17,700	To Existing Washington Interceptor
F	0	0	0	0	0	$ -	N/A	To Existing Tiogue Interceptor & Sandy Bottom Rd. PS
G	600	7,125	0	0	143	$ 1,848,800	$ 13,000	To Tiogue Avenue Interceptor - East
H	2,475	19,400	1	750	357	$ 5,598,800	$ 15,700	To Tiogue Avenue Interceptor - East
I	0	7,100	1	1,525	114	$ 1,988,800	$ 17,500	To Tiogue Avenue Interceptor - East
J	0	13,825	1	900	224	$ 3,466,800	$ 15,500	To Existing Hopkins Hill Rd. Sewer
K	0	17,825	0	0	300	$ 4,099,800	$ 13,700	To Existing Hopkins Hill Rd. Sewer
L	0	23,400	0	0	348	$ 5,382,000	$ 15,500	To Tiogue Avenue Interceptor - West
M	0	3,100	0	0	32	$ 713,000	$ 22,300	To Tiogue Avenue Interceptor - West
N	0	400	0	0	3	$ 92,000	$ 30,700	To Tiogue Avenue Interceptor - West. **Portions elim. (2009)**
N-1	0	11,125	1	4,000	222	$ 3,298,800	$ 14,900	To Woodland Manor PS. **Added 2015**
O	0	1,750	0	0	26	$ 402,500	$ 15,500	To Existing Washington Interceptor. **Portions elim. (2009)**
P	2,600	13,000	0	0	275	$ 3,900,000	$ 14,200	To Existing Washington Interceptor
Q	0	23,850	1	800	327	$ 5,956,500	$ 18,300	To Existing Washington Interceptor
R	0	6,750	0	0	100	$ 1,552,500	$ 15,600	To North Branch Interceptor
S	2,250	3,450	0	0	74	$ 1,581,000	$ 21,400	To North Branch Interceptor
T	1,800	4,550	0	0	80	$ 1,676,500	$ 21,000	To North Branch Interceptor
U	0	0	0	0	0	$ -	N/A	To Existing Sandy Bottom Rd. PS
V	3,000	7,550	0	0	150	$ 2,786,500	$ 18,600	To Existing Washington Interceptor
W	0	16,725	1	450	212	$ 4,037,300	$ 19,100	To Existing Washington Interceptor
X	0	11,650	1	750	175	$ 2,897,000	$ 16,600	To Existing Washington Interceptor. **Portions elim. (2009)**
Y	0	0	0	0	0	$ -	N/A	**Eliminated from Sewer Program (2009)**
Z	0	5,725	1	1,200	87	$ 1,574,800	$ 18,200	To North Branch Interceptor. **Portions elim. (2009)**
AA	0	0	0	0	0	$ -	N/A	**Eliminated from Sewer Program (2003)**
AB	0	0	0	0	0	$ -	N/A	**Eliminated from Sewer Program (2003)**
AC	0	0	0	0	0	$ -	N/A	**Eliminated from Sewer Program (1995)**
AD	0	0	0	0	0	$ -	N/A	**Eliminated from Sewer Program (2009)**
AE	0	0	0	0	16	$ 108,000	$ 6,800	To Existing Sandy Bottom Rd. PS. **Portions elim. (2009)**
AF	0	0	0	0	0	$ -	N/A	**Eliminated from Sewer Program (2009)**
AG	0	0	0	0	0	$ -	N/A	**Eliminated from Sewer Program (1995)**
AH	0	0	0	0	0	$ -	N/A	To Community OWTS System
AI	0	0	0	0	0	$ -	N/A	**Eliminated from Sewer Program (1995)**
TOTALS	**17,086**	**258,850**	**11**	**13,175**	**4,369**	**$ 70,003,900**	**$ 16,100**	

NOTES:
1. Costs in this table are based on 20 Cities ENR=10038.80 (June 2015)
2. See Appendix F for a detailed breakdown of pipeline lengths and costs.

O:\Coventry RI\2140605 - 2014 Facilities Plan Update\2014 Update Report\Figures\Section 6\[Table 6-2 - Summary of Sewer Cost.xls]Summary of Areas and Cost

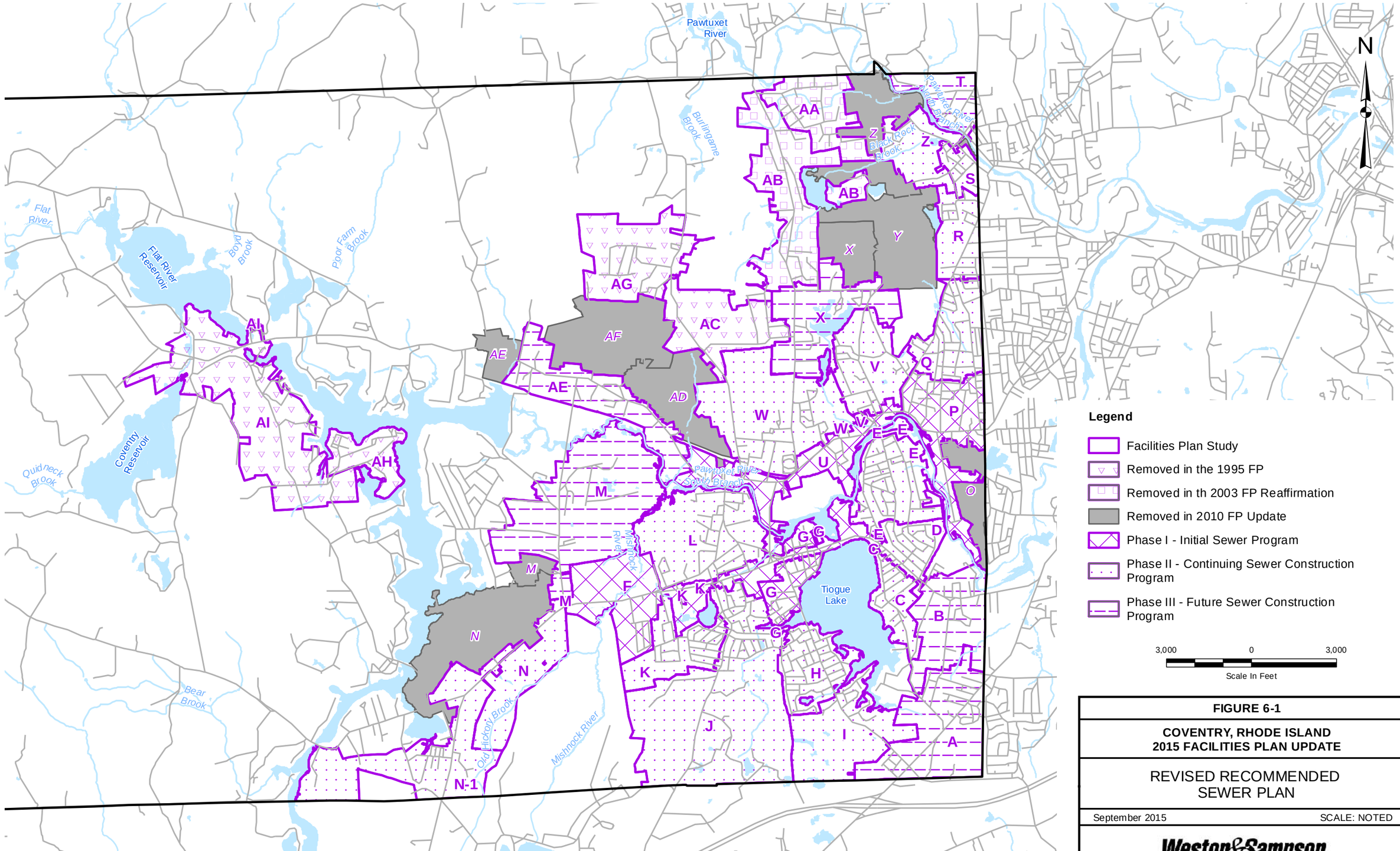


FIGURE 6-1

COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN UPDATE

REVISED RECOMMENDED SEWER PLAN

September 2015 SCALE: NOTED

Weston&Sampson

7 ARRANGEMENTS FOR IMPLEMENTATION

7.0 General

The final step in the facility planning process, after the alternatives have been evaluated and the final plan has been selected, is to begin implementation of the selected wastewater management plan. As part of the 1995 Facilities Plan, 2003 FP Reaffirmation and 2010 FP Update, the selected plan at that time began implementation based on the recommendations of this section. A three phased recommended sewer plan was created. Currently, Area U was completely served by the municipal sewer and Areas A, B, F, G, I, J, K, L, N, O, P, Q, R, S, V, W and AE have been partially served by the municipal sewer based upon that recommended sewer plan. Future sewer construction contracts 8, 9, 10, 11, Hopkins Hill Road East, Huron Pond, and Nooseneck Hill Road Sewer Projects have been proposed to sewer additional Phase I and Phase II sewer areas. Contract 9 and 11 will completely serve Area G, , Contract 8 will complete Area P, Contract 10 will complete Area C, Hopkins Hill Road East will serve approximately 60% of Area K (184 parcels), Huron Pond will serve parcels in the northern portion of Area J and the Nooseneck Hill Road Sewer Project will serve a portion of Area N and all of Area N-1. Once the completion of Contracts 8, 9 and 11 occur all Phase I recommended sewers will be constructed. The remaining proposed sewer contracts serve areas in the Phase II recommended sewer program. As part of this report, the implementation of this revised selected three-phased plan, as discussed in Chapter 6 of this report, will be reviewed.

The major factors which must be addressed to continue the wastewater management plan are: to identify the necessary implementation steps, including institutional responsibilities, system operation and maintenance requirements and an implementation schedule; and to establish a financial plan to fund the recommended improvements. The financial plan identifies methods for financing the costs associated with the project, including system construction financing, administration costs and yearly system operation, maintenance and replacement (OM & R) costs. These items are discussed in detail in the following sections.

7.1 Financial Plan

Previous sewer programs prior to the 1995 Facilities Plan were rejected by voters for various reasons, including the costs involved with the system construction. For this reason, perhaps the most important implementation issue to be addressed is the acceptability of financing of the recommended plan. A financial plan for a wastewater collection system must include a system for financing system construction (capital) costs, as well as annual system operation and maintenance (O&M) costs. Since a phased sewer construction program is selected, considerations for financing capital and annual costs for each phase of the recommended system construction must be considered. The financing of construction and O&M costs are emphasized in the following discussions.

7.1.1 Capital (Construction) Costs

Chapter 6 included a discussion of the estimated capital costs associated with each phase of the recommended sewer construction. Also discussed were Coventry's share of capital costs associated with improvements to the West Warwick Regional

Wastewater Collection and Treatment System and the capital costs already expended for the existing sewer system. The existing and future sewer system capital costs are/will be financed by local funds with the assistance of state and/or federal funding programs, as discussed below.

7.1.2 Available Funding Assistance

The last year of the state/EPA Construction Grants Program for the planning, design and construction of wastewater collection and treatment facilities was 1990. That program allowed for state and federal grant funding of wastewater treatment facilities and major interceptor sewers. The major sources of project funds are now essentially limited to two state programs: the State Revolving Loan Fund (SRF) and the Interceptor Bond Fund (IBF). Other federal funding programs currently in existence include the Farmer's Home (FmHA) program.

7.1.2.a State Revolving Loan Fund Program

The SRF program is the principal program for funding wastewater projects in the State of Rhode Island. The SRF program includes low interest loans covering the full project cost (including engineering), and is administered jointly by the Rhode Island Infrastructure Bank (RIIB), formerly the Rhode Island Clean Water Finance Agency (CWFA), and the Rhode Island Department of Environmental Management (RI-DEM).

7.1.2.b Interceptor Bond Fund (IBF) Program

The Interceptor Bond Fund (IBF) program provides grants equal to 50% of eligible project costs (to a maximum grant of $500,000 per project) for interceptor projects, and is administered by the RI-DEM. The only existing project to receive funding as part of this program was the Tiogue Avenue Interceptor East construction included in Contract 5. Currently the funds that were available for this grant program have been substantially depleted. However, it is recommended that this program be monitored. Should the State ever replenish funding to this program, future sewer projects involving construction that would qualify should apply for this program.

7.1.2.c Other Funding Programs

7.1.2.c.1 Miscellaneous Funding Programs

The federal Farmer's Home (FHA) and/or Rural Development Assistance (RDA) program provides grants and/or loans for projects to rural communities and/or communities with limited financial resources. This program uses census populations and/or maximum community income levels (per household) to dictate the eligibility of a community for funds. Unfortunately, population and income levels in Coventry currently exceed the maximum levels allowable to be eligible for FHA/RDA funding. While Coventry is not currently eligible, the availability of FHA/RDA funding to the town should continue to be monitored for future projects.

Other funding sources which may become available to the town for sewer projects include federal Housing and Urban Development (HUD)

and Community Development Block Grant (CDBG) programs. Coventry has utilized HUD monies in the past to construct the North Road Terrace, Arnold Road, Contentment Drive/Carley Drive and Victor Electric (North Main Street), and the Contact 7 sewer extensions. The availability of these funds should be rigorously pursued by the town. However, sewer construction financing should not be reliant upon such programs.

7.1.3 Priority Determination System – Project Priority List

The town of Coventry is currently on the state's FY 2015 Project Priority List (PPL) for the design and construction of the proposed sewer construction projects outlined in **Table 7-1.** The PPL is part of the RI-DEM's Office of Water Resources Priority Determination System which determines the priority and ranking of all municipal water pollution abatement projects that seek to receive federal and/or state funding assistance. Point values are determined based on certain categories and need. These cumulative point values determine the ranking for each project on the PPL. The rules and regulations for this program are attached in **Appendix G**.

Placement on the project priority list makes projects eligible for funding under all programs listed above. The best probable scenario for project funding is currently as follows:

a) Collection (lateral) sewers and small pumping stations will receive low interest loans under the state's SRF loan program, including construction and engineering costs. The most recent sewer construction project's SRF loan interest rate was slightly lower than 2%.

b) Interceptor sewers and interceptor sewer pumping stations will receive SRF loans for the entire construction cost including engineering costs, as described above for the lateral system. In addition, should the state replenish the IBF program funding, these projects will be eligible for grant funding under the state's Interceptor Bond Fund (IBF) program. For this purpose of this planning report, it will be assumed that the interceptors and pump station costs will be funded strictly through the SRF loan program.

Due to the limited state and/or federal funds available for financing these sewer projects, the majority of funds needed to construct the sewer projects must come from local sources. The following sections discuss allocation of the local project costs. These discussions assume that State Revolving Fund (SRF) loans will be used to finance the Phase I, II and III.

7.1.4 Local Cost Allocation

Perhaps the most significant issue in the development of a municipal sewer program is how the local share of the project costs are to be allocated. Coventry has expended significant funds (approximately $20.6 million dollars) to date on its wastewater collection system (**Table 7-1**) through the SRF/IBF programs. Financing future sewer projects though a general tax is possible, however, because currently all Town parcels are not scheduled to be sewered such a methodology, can be criticized since an unsewered taxpayer would pay the same as a sewered taxpayer. For the purposes of this report, it is assumed the Town will continue the current betterment program (as discussed later in the Chapter) employed for the sewer construction program.

The other significant capital cost needing allocation is the share of the West Warwick improvements to the regional collection and treatment system (currently at $10.8 million). The Town is using funds from the collected sewer betterments to make the payments on the improvements cost. It is the recommendation of this report (and in the previous 1995 FP) that the Town allocate the remaining payments under general taxes. While there may be criticism that the entire tax base is not benefiting from Coventry's share of the West Warwick improvements to the regional collection and treatment system, it would be unreasonable, from a cost perspective, to assess this large sum of monies to the betterments of a small portion of the Town that is/will be sewered. While individual taxpayers may not benefit directly from the West Warwick improvements, the Town as a whole does benefit from the increase in development potential and property values that the sewers bring, and the corresponding increase in tax revenues the Town will receive. Also there can be a case made to the extent that the sewers will increase in environmental quality to public lands (due to the elimination of improperly functioning OWTS and cesspools) that are enjoyed by the entire Town.

7.1.4.a Sewer Betterment Program

Sewer construction costs may be repaid directly through sewer betterment or special assessments, paid by those properties directly benefiting from the improvements. Financing the entire cost of a project through such assessments limits the cost impact to only those properties serviced by the sewers. Sewer assessments can be made based on various methods, including:

a) the total land area and/or length of frontage of sewered properties,
b) the assessed (tax base) value of sewered properties, or
c) the number of equivalent residential dwelling units (EDUs) represented by the sewered property.

The Town has gone through a few different assessment methods for their sewer projects:

- Prior to July 2009 the Town assessed residential properties by the EDU methodology and the commercial/industrial properties by the assessed value of the property. Based upon a rate study commissioned by the Town recommendations to the methodology were made and presented.

- From July 8, 2008 to September 9, 2015 the Town had updated their ordinance/regulations governing the use of public and private sewers. This older ordinance is included in **Appendix H.** In the ordinance it outlines a procedure for assessing parcels that currently have access to the sewer, and a procedure on how to assess parcels that will be served by future sewer construction contracts. The assessment method was as follows:

  Properties that currently have access to an existing sewer line are able to connect to the existing municipal sewer, and have not yet been assessed prior to the adoption of the ordinance, are assessed based on the following guidelines:

Residential Assessments:	
• Single Family Homes	$12,900 per housing unit
• Two Family (Duplex) Homes	$12,900 per housing unit
• Multi-Family Homes, Condos and Apartments	$12,900 per housing unit
• Mobile Homes	$6,600 per housing unit
Non-Residential Assessments:	
• Minimum Assessment	$12,900 per housing unit
• Commercial Properties (includes Condos)	$60 per $1,000 property valuation
• Industrial Properties (includes Condos)	$60 per $1,000 property valuation
• Hospitals, Nursing and Convalescent Homes	$6,600 per bed
• All Other Properties (includes Public and Quasi-Public Properties)	$60 per $1,000 property valuation

There are included provisions in the regulations to examine the assessments annually and increase them based upon the corresponding increase of the Consumer Price Index of the previous year.

For future construction contracts that are completed by the Town sewer districts will be set up to determine the final betterment assessment. Each new sewer project will theoretically represent a new sewer district. The assessment cost is then calculated by taking the final project cost (including construction cost, administration costs, legal services and borrowing fees) and dividing by the corresponding number of EDUs within the district. EDUs will be calculated based on the following criteria:

- 1 EDU for each single family home,
- 0.5 EDUs for each additional attached unit,
- 1 EDU per each condominium unit,
- Commercial and Industrial users EDUs will be calculated by rounding up the average daily water flow divided by the estimated flow for a single family home (345 gpd), with a minimum assessment of 1 EDU.
- Vacant parcels will be assessed as 1 EDU, until the parcel is developed and will be recalculated accordingly.

- Currently, the Town has adopted an updated Sewer Ordinance on September 10, 2015. This proposed ordinance is also included in **Appendix H**. The new ordinance modifies the assessment method to a residential and non-residential unit rate per gallon of flow. Flows are calculated at 115 gallon per day (gpd) per bedroom for residential assessments. Non-residential assessments are based on daily design flow calculations based on RI-DEM regulations for the property use.

These calculated flows are then multiplied by the respective unit rate (to be set by the Town) to establish the assessment for the property.

7.1.5 Phase I Construction Cost Allocation

The Phase I sewer construction program consists of the already completed sewer construction contracts 03-01, 03-02, 03-04, 4 and 5, and the proposed sewer construction contracts 6, 7, 8, 9, 10 and 11. The estimated local share of project costs for construction of the recommended Phase I sewer system (see Chapter 6) are shown in **Table 7-1**. Portions of Phase II have been/will be constructed as part of the sewer contracts listed in **Table 7-1** and the costs associated with this construction is included in the table. Additional costs due to West Warwick for regional projects were also estimated, and are discussed separately later in this chapter.

TABLE 7-1
SUMMARY OF PHASE I CAPITAL COSTS

Project Description	Total Project Construction Cost	Less Grants	Total Local Cost
Completed Projects			
Contract 03-01 & 03-02[1]	$7,271,562	None	$7,271,562
Contract 03-03	$381,867	None	$381,867
Contract 4	$2,668,310	None	$2,668,310
Contract 5	$3,672,320	$500,000[2]	$3,172,320
Contract 6	$1,247,665	$331,480[3]	$916,185
Contract 6A	$146,681	None	$146,681
Contract 7 & 7A	$5,171,175	$3,108,193	$2,062,982
TOTALS	$20,559,580		

1. Contract 03-01 and 03-02 cost includes pump station and force main costs.
2. Interceptor Bond Fund (IBF)
3. American Recovery and Reinvestment Act of 2009 (ARRA)
4. These tables show construction costs only. Engineering and Construction Services costs are not included.

Project Description	Total Project Construction Cost	Less Grants	Total Local Cost
Proposed Future Projects			
Contract 8 – Quidnick Village Area	$3,900,000	None	$3,900,000
Contract 9 – Wendell Avenue Area	$530,000	None	$530,000
Contract 11 – Lakeside Drive Area II	$1,850,000	None	$1,850,000
TOTALS	$6,280,000		

As stated in the previous section recommendation is made for the Town to finance the repayment of SRF loans for the above listed future sewer construction projects through

the current assessment method and through sewer user charges (as discussed later in this chapter).

7.1.6 Future Phase Construction Cost Allocation

The cost of constructing the continuing and future phases of the recommended plan should also be considered in any proposed financing system, since financing used for Phase I will set a precedent for future construction. The estimated costs for construction of the recommended Phase II and Phase III sewer system, as presented in Chapter 6 and **Appendix F**, are summarized in **Table 7-2**. Sewer construction costs were obtained from actual bids by contractors on similar type projects. The costs do not include Phase I sewer construction costs which are included in **Table 7-1**. As noted for Phase I costs, the costs for West Warwick regional projects are not included in this discussion, but are discussed separately later in this chapter.

TABLE 7-2
SUMMARY OF PHASE II & III CAPITAL CONSTRUCTION COSTS

Proposed Sewer Construction Projects			
Phase II			
Project Description	Total Project Construction Cost	Less Grants	Total Local Cost
Contract 10 – East Shore Drive Area	$2,120,000	None	$2,120,000
Hopkins Hill Road East Sewer Project	$2,250,000	None	$2,250,000
Huron Pond Sewer Project	$2,110,000	None	$2,110,000
Nooseneck Hill Road	$3,300,000	None	$3,300,000
Totals	$9,780,000		

Remaining Sewer System			
	Phase II	Phase III	Total
Lateral Sewers	$35,270,000	$9,970,000	$45,240,000
Interceptors	$4,230,000	$630,000	$4,860,000
Pump Stations and Forcemains	$2,400,000	$950,000	$3,350,000
Totals	$41,900,000	$11,550,000	

7.1.7 West Warwick Regional System Costs

Chapter 6 included a summary of Coventry's share of costs of West Warwick regional projects. These costs are for projects completed to date as well as for planned projects. As discussed previously, Coventry has paid over $10.8 million to date to West Warwick for their share of the improvements to the regional facilities that were designed and constructed to serve Coventry. The West Warwick Treatment Plant is currently undergoing an upgrade to reduce the phosphorus in the facilities effluent. The estimated cost of this upgrade is $12.5 million. Coventry's share of the final total project cost is 23% per their IMA agreement.

Additionally, there is a planned $11 million flood mitigation improvements project for the wastewater treatment facility. However, it is assumed that the project costs will be covered by grants from the facilities insurance company and though the Federal Emergency Management Agency (FEMA).

In the past West Warwick costs have been paid through funds from the collected sewer betterments. As stated in Section 7.1.4, it is the recommendation of this report (and in the previous 1995 FP) that the Town allocate the remaining payments under general taxes. The criticism that the entire Town does not benefit from the past improvements can be suppressed by the Town as a whole benefiting from the increase in development potential and property values that the sewers bring, corresponding to an increase in potential tax revenues.

7.1.8 Annual Operation and Maintenance Costs

Certain costs are incurred in the administration, operation and maintenance of a sewer system once it has been constructed. These costs include local sewer system operation, maintenance and replacement (OM & R) costs, as well as similar costs associated with the West Warwick Regional WWTF. If any federal funds are involved in the construction of the proposed sewer system, one condition will be the implementation of an agency approved sewer user charge system. To be approved the annual cost of operating and maintaining the sewer system must be apportioned to the individual users of the system based on actual use, or the benefit derived from such use.

The most common method of assessing sewer user charges is on the basis of sewage flow contributed. This method is currently used by the Town and also by West Warwick, and will continue to be used for charging Coventry for wastewater flows to the West Warwick WWTF. Users of the sewer system are billed based on the wastewater flow (as a percentage of metered water use) to the sewer system. The flow contributed by an individual user is typically estimated based on 80 percent of metered drinking water usage. Billings would therefore be based on water meter readings supplied by Kent County Water Authority (as is currently done in West Warwick and for the limited number of sewer users in Coventry).

Currently sewer users in Coventry get charged $2.02 per hundred cubic feet of eligible water used (80% of actual water use, per Kent County Water Authority) by the Town of Coventry and $4.399 per hundred cubic feet by West Warwick. The Town periodically employs the services of a rate study consultant to examine the user charges in place and determine if they are adequate enough to cover the OM & R costs of the system.

While the wastewater treatment and disposal charges which must be paid to West Warwick are primarily dependent on the amount of flow, the Coventry O&M costs are not. Coventry's operation and maintenance budget is composed principally of personnel and equipment costs related to the maintenance and administration of the sewer system. These costs are generally fixed and do not decrease significantly with a decrease in wastewater flows. Therefore, if significantly lower wastewater flows were experienced by the sewer system than those estimated; the sewer user charge (cost per hundred cubic feet) would need to be increased. For this reason it is advantageous for the sewer system to have as many users as possible to help maintain reasonable costs per user. Many communities address this issue by implementing a mandatory connection ordinance, requiring all properties which can connect into the sewer system to do so

within a certain amount of time. Another option would be to have a phased approach in instituting a user change system financed entirely by users. Recommendations are made to continue the annual examination of user charges to ensure that all OM & R costs associated with the municipal sewer system will be covered by the user charges.

Other considerations should be made to deal with delinquent accounts. Delinquent accounts obviously decrease the total funds collected from the sewer user charges. If there are a great deal of delinquent accounts, the collected funds would not equate to the O&M costs of the sewer system and lead to a deficit. This deficit would have to be factored into the following year's budget and would most likely cause an increase in the sewer user rates.

Inflow/infiltration of storm water/groundwater into the sewer system will lead to increased flows and increased treatment and disposal charges which must be paid to West Warwick. To date no studies of infiltration/inflow (I/I) have been conducted on the sewer pipelines located in Coventry. It is recommended that the Town begin plans for I/I studies/investigations on areas in Town with older sewers (i.e. Hopkins Hill Road, North Main Street, Broad Street, North Road Terrace, New London Turnpike). Any sources of I/I discovered in the I/I investigations should be mitigated.

The current Town flowmeters (as discussed in Section 3) should continue to be calibrated as needed. The telemetry of the meters should be reviewed to ensure the data is being tabulated. These flows can then be used to correlate areas in relation to potential dry and wet weather flows for I/I investigations. Also, the Town can use the flow data to better monitor and review the inter-municipal billings received from West Warwick.

Pump station repair/maintenance should also be budgeted into the sewer user rate for the Town. The Town currently contracts out the operation and maintenance services for the Town owned stations. This contract is included in the calculation for the local sewer user rate. The operation and maintenance service contract includes responding to any alarms/emergencies at the station and to repair the equipment as necessary. The Town should begin a plan of assessing the Town owned stations for potential repairs/upgrades. These preventative maintenance repairs/upgrades should be budgeted for to ensure the station's continued proper operation.

In addition, as part of the acquisition of the Woodland Manor Pump Station, two assessments were performed on the pump station and forcemain. These assessments outlined recommended repairs and upgrades to the pump station. The new operations contractor should also be engaged to recommend improvements. It is recommended the Town review these recommendations and incorporate the repairs/upgrades as part of their yearly infrastructure maintenance plan.

7.1.9 Fiscal Sustainability Plan

Per 2014 amendments and provisions to the Federal Water Pollution Control Act, which includes the administration of the Clean Water State Revolving Fund Program (SRF), recipients receiving a SRF program loan are required to implement a fiscal sustainability plan (FSB). The plan must, at a minimum, contain the following (paraphrased from RI-DEM guidance documents):

1. Inventory of critical assets that are part of the infrastructure project;
2. Evaluation of the condition and performance of inventoried assets or asset groupings;
3. Certification that the recipient has evaluated and will be implementing water and energy conservation efforts as part of the project/plan; and
4. Plan for maintaining, repairing, funding, and as necessary, replacing infrastructure constructed.

The FSP pertains only to the assets/infrastructure being constructed as part of the project receiving SRF funding. However, the FSP's developed should be considered "living documents" that are meant to be reviewed, revised, expanded and implemented as part of the on-going operation and management of the Town's system. It is recommended the Town create and update their FSP prior to the implementation of future sewer projects.

7.2 Implementation Plan

This section discusses the steps necessary to assure proper implementation of the recommended plan. Included is a discussion of the administrative and institutional responsibilities for implementation, as well as a list of specific implementation steps and a preliminary implementation schedule. Several items are discussed in detail, including the recommended plan for administration and O&M of the sewer system.

7.2.1 Implementation Responsibilities

The parties responsible for implementation of the recommended plan include the town of Coventry, acting through its Town Council, Town Manager and with the help support of the Town's Sewer Sub-Committee, and the town of West Warwick, acting through its Town Council. The town of Coventry has jurisdiction over the construction and operation of a sewer system within the town of Coventry. The town of West Warwick has jurisdiction over the Regional Wastewater Collection System and Treatment Facilities located within the town of West Warwick.

The existing intermunicipal agreement between Coventry and West Warwick, included as **Appendix I** to this facilities plan, outlines the responsibilities of Coventry and West Warwick as they relate to the construction and operation of a wastewater collection system in Coventry. The financial acceptability of the wastewater facilities plan is principally the concern of the town of Coventry (acting through its Town Council). A majority of the financial responsibilities of Coventry to West Warwick for the construction of regional system components to date have been met. Payment of Coventry's share of remaining and future costs for the construction of regional system components are the only financial concern of West Warwick. The construction of sewers in Coventry is solely the financial responsibility of the Town of Coventry. Currently the elected Coventry Town Council is the acting deciding body for the Town. The Coventry Town Council currently has responsibility for the planning, constructing, financing, administration, operating and maintaining of all the Coventry wastewater collection system. The financial acceptability of the recommended sewer system will therefore be decided by the Town Council of Coventry.

Per the IMA agreement, the agreement should be reviewed annually by both parties and any necessary revisions should be negotiated. In addition, revisions to the IMA with West Warwick will be needed to address officially allocating the Woodland Manor

capacity to the Town. This allocation of capacity may also change the responsibilities of the cost share for future regional system components.

The Coventry Sewer Sub-Committee (CSSC) was created in previous years as an advisory board that could provide guidance and recommendations to the Town Council to vote on for implementation. Items relating to planning, construction or connection into the municipal system are first heard by the CSSC, and then a recommendation is made to the Town Council to vote on.

While the O&M of the sewer system is the responsibility of the Town Council, the Coventry Department of Public Works (DPW) is designated by the Town Council to provide the necessary O&M to the sewer system.

Current sewer users in Coventry are billed user charges by both the Town of Coventry billing department and also by West Warwick. Users receive two billings from each municipality. This has led to confusion from residents and the unintentional non-payment of the bills. In order to remedy the confusion Coventry has decided to combine the West Warwick user charges, with the Coventry user charges and issue one single bill to the users. Coordination is on-going between both Coventry's and West Warwick's sewer billing entities and implementation of this billing process is expected to take place for the next fiscal year.

The implementation responsibilities of Coventry and West Warwick are summarized as follows:

Town of Coventry:
Following approval of this facilities plan, the Town of Coventry should take action to assure:

- the appropriation of the funds and the completion of design and construction of the recommended plan;
- the continued review and update as needed to the recently adopted sewer ordinance;
- the continued review and update as needed to the existing intermunicipal agreement with West Warwick. This includes the revisions needed to officially allocate the Woodland Manor capacity to the Town;
- the continued administration, operation and maintenance of the sewer system (including an approved system of sewer user charges);
- and review the IMA with West Warwick annually to revise/negotiate changes as necessary and ensure it is fair to both parties.

The completion of these implementation tasks will require appropriate actions by specific town authorities, including the Town Council, the Town Manager, the Director of Public Works, the Director of Planning, the Finance Director and the Tax Assessor.

West Warwick:
The Town of West Warwick should take action to assure the proper administration, operation and maintenance of the regional wastewater facilities.

The final approval of this wastewater facilities plan, should meet no opposition from sources outside of Coventry. The acceptability of this facilities plan to the Town of

Coventry will be the subject of a final public hearing to solicit formal public opinion. Prior to this hearing, the Rhode Island Department of Environmental Management (RI-DEM), and other applicable state agencies, will be sent copies of the draft report for review and comment. All substantial comments received from reviewing agencies and the public will be addressed. The final Wastewater Facilities Plan will be submitted to RI-DEM Division of Water Resources for approval.

Barring significant opposition from Coventry residents or state agencies, this facilities plan should be adopted by the Coventry Town Council. This report will also serve as the wastewater portion of the Coventry Community Comprehensive Plan (CCP) which the current update is being drafted by the Town.

7.2.2 Implementation Steps

The purpose of this section is to identify specific events which must take place in order to implement the recommendations presented in this facilities plan. These implementation steps include:

- Submit the draft Wastewater Facility Plan Update to the RI-DEM Division of Water Resources for review and comment. Respond to or incorporate RI-DEM comments as necessary.
- Conduct a formal public hearing to present the conclusions and recommendations of the Wastewater Facility Plan Update.
- Finalize the report and submit the final Wastewater Facility Plan Update to RI-DEM Division of Water Resources for final review and approval.
- Submit project information to RI-DEM to remain on the state's Project Priority List (PPL) for receipt of future design and construction grants/loans. This has already been completed for the state's FY 2015 PPL, but future submissions should continue to be made.
- Perform necessary steps for the design, permitting and construction of the recommended sewer plan, which include in general:
    - Submit formal funding applications to RI-DEM to receive grant and/or loan funds for the design and construction phases. Funding programs to be used include (State Revolving Loan Fund (SRF), or Interceptor Bond Fund (IBF), if applicable/available),
    - Contract with a qualified engineering firm to design and prepare final plans and specifications for the proposed future projects, as discussed in previous Chapters, including permit applications and regulatory agency.
    - Complete the appropriate construction financing arrangements to coincide with the current regulations.
    - Secure competitive bids for the construction of proposed future construction projects.
    - Award construction. contract(s).
    - Initiate sewer construction and oversee the completion of the construction.
- Continue to review/revise the local sewer use ordinance, including required industrial pretreatment requirements (at least equivalent to those in place in West Warwick), and the user charge and betterment assessment programs.
- Ensure programs and mechanisms are in place for the proper administration and operation and maintenance of the new sewer system.

- Following approval by the appropriate agencies, commence operation by allowing the connection of properties to the completed sewer system, assessing sewer betterments and collecting user charges.

The Town also has over $2 million in funds bonded through the RI-SRF program and RI Infrastructure Bank (formerly CWFA) that remain available for sewer construction. A plan for utilization of these funds is needed immediately.

Following the completion of the above implementation steps, the town of Coventry should continue to administer, operate and maintain the system as required by local ordinance, and state and federal regulations. This Wastewater Facilities Plan should be reviewed, and either reaffirmed or modified every five years to assure future eligibility for state/federal program funding. The applicable steps outlined above should again be followed toward completing the remaining Phase II portions of the recommended sewer plan. Appropriation of funds for completion of remaining Phase II and Phase III areas not included in the proposed future sewer construction contracts would most likely be done on an area by area basis, as needs arise, to maintain affordability of system construction, and thus sewer assessment charges to the property owners.

7.2.3 Coordination with Road and Highway Projects

The town should coordinate the recommended sewer construction program with road and highway projects proposed in the project area. This specifically includes roadway reconstruction projects performed by RI Department of Transportation (RI-DOT) and the town's local road resurfacing program. Close coordination of such projects could result in significant cost savings for pavement replacement work on the sewer projects.

7.2.4 Implementation Schedule

Figure 7-1 presents an implementation schedule for the three phased recommended sewer plan. The schedules presented are estimated and based upon the “Anticipated Start Date” listed in the Project Information Forms submitted as part of the RI-DEM Priority Determination System, as discussed previously in this Chapter. This schedule is preliminary and may require modification should conditions change in the future.

7.2.5 Administration, Operation and Maintenance Plan

The wastewater collection system must be properly administered and include a routine operation and maintenance program. The Town Council is the administrative body in charge of the design, construction, ownership, general administration, operation and maintenance of the recommended wastewater collection system. On behalf of the town, and with assistance/recommendations from both the CSSC and DPW, the Council would undertake to the construction of the wastewater collection system, negotiate contracts (with West Warwick, etc.), prepare sewer assessments, and assure proper operation and maintenance of the system.

The Town Council has the authority to prescribe rules and regulations governing the use of the sewer system and the making of building connections, and will receive and pass on petitions for construction of sewers in particular streets. It will conduct hearings for any party or parties desiring service or requesting adjustment, abatement or postponement of sewer assessments. It will take the necessary steps for acquiring land, easements or rights-of-way required for the sewer system. It will also secure legal advice

and assure the preparation of annual reports for the town. The Town Council will utilize the available resources of the town in carrying out its responsibility for the sewer system, including the Town Manager, Director of Public Works, Planning Director, Finance Director, Tax Assessor, Town Clerk and other departments or personnel as required.

Upon completion of a considerable amount of Phase I and Phase II sewer areas, it is recommended to examine the need for a municipal Sewer Department to be established, and a qualified Wastewater Superintendent appointed who would handle the day-to-day operation of the sewer system. The Superintendent would be under the direction of, and be directly reportable to the Director of Public Works. The Superintendent would be the individual in charge of the daily administration work required for construction, operation and maintenance of the system. The Superintendent should be able to provide general supervision of the sewer construction work, supervise the making of sewer assessment plans, prepare budgets and budget reviews, laying out of lateral sewers and building connections, as well as the actual operation and maintenance of the collection system (including pumping stations). The Sewer Department should be provided with an adequate budget, manpower and equipment necessary to carry out its duties.

Based on the limited initial workload for the Sewer Department, associated with the Phase I sewer system, the initial operation and maintenance of the sewer system should be handled on a contract basis, under the supervision of the Director of Public Works. The Director of Public Works would act as the Wastewater Superintendent until and if that position is filled. A private contracting firm would be retained on an annual (or longer) basis to perform routine operation and maintenance of the sewer pumping station(s) and collection system, and to oversee repairs as necessary.

The preparation and distribution of sewer user bills is performed by the Town's billing department currently. As stated before in this Chapter, the Town is planning on providing residents with a single bill that includes both Coventry and West Warwick's sewer user charges. This will occur during the coming fiscal year.

General site maintenance tasks at the pump station (including lawn mowing and snow plowing/shoveling) should be performed by DPW forces, as is currently done for other town buildings.

As mentioned above, when the sewer system expands (through Phases II and beyond), a dedicated Sewer Department should be considered. **Table 7-3** shows a typical staffing plan for the proposed Sewer Department, based on the completion of each phase of the recommended plan.

Normal operation of the sewer system will include daily visits by O&M personnel to wastewater pump stations for inspection and routine maintenance of equipment. Weekly or more frequent visits to major flow metering devices located along the West Warwick border and periodic inspection and maintenance of other collection system components would also be required.

In addition, O&M personnel would respond to system emergencies, including pipeline clogs, sewer overflows and pump station failures. The O & M personnel would include persons trained in the operation and maintenance of wastewater collection systems and pumping stations, and persons familiar with electrical, mechanical and instrumentation

work, eating, ventilating and air conditioning (HVAC) systems, and general site, building and grounds maintenance.

Additional clerical staff will be required to perform administrative tasks related to the sewer system. Such tasks would include transfer of information and costs with West Warwick, obtaining billing information from Kent County Water Authority, calculating and preparing billings for assessments and user charges, administration of utility and system repair bills, and other general administrative duties.

In addition to personnel costs, additional system administration, operation and maintenance costs would be incurred through power and other utility costs (principally associated with pumping stations), equipment and expendable supplies costs, equipment service calls and other repair costs. The Sewer Department budget should also provide a pool of funds to be used for the replacement of maintenance equipment and/or system components when necessary. All of the costs associated with the administration, operation and maintenance of the sewer system would be paid for through sewer system user charges.

Figure 7-1
Implementation Schedule

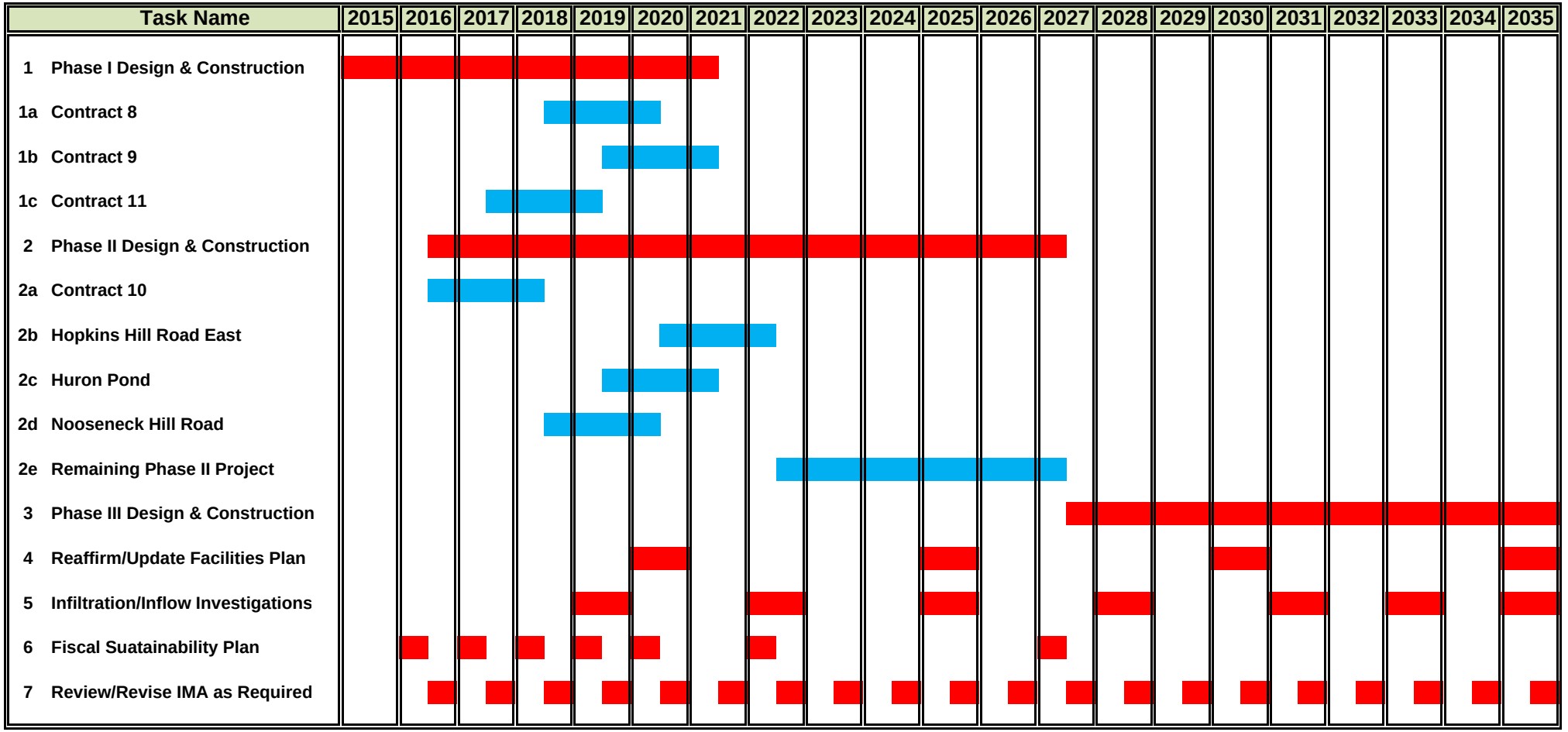


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Table 7-3
Coventry Sewer Department Preliminary Staffing Plan

Position	Phase I Sewer System	Phase II Sewer System	Phase III Sewer System
Supervisory Personnel:			
Wastewater Superintendent	0[1]	1	1
Operation & Maintenance Personnel			
Maintenance Workers	0[1]	2	4
Clerical/Administrative Personnel			
Principal Clerk	0[1]	1[2]	1[2]
Department Assistant	0[1]	1[3]	1
Total Personnel Required	0[1]	3+	6

Note: (1) The Phase I sewer system will be administrated by the current DPW/Billing Staff. O&M tasks will be performed by private contractors.
(2) It is the assumption that future billing of Phase II and III sewer system will be handled by the existing Town Billing Clerk.
(3) This is a part-time personnel requirement, and could be combined with other Town administrative positions.

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Appendix A
OWTS Repair Records (2008 - 2014)

Application #	Address	Approval Date	Assessor's Map/Lot		Planning Area	I/A
1306-0181	18 Nichole Drive	01-Mar-13	Plat 4 Lot 25	0004-025.000	ZZ	Indrain IA
1406-1332	261 Harkney Hill Road	29-Sep-14	Plat 9 Lot 15	0009-015.000	ZZ	
1306-0855	413 Harkney Hill Road	10-Jul-13	Plat 9 Lot 29	0009-029.000	ZZ	Indrain IA
1106-1368	19 Three M Road	18-Nov-11	Plat 9 Lot 43	0009-043.000	ZZ	Indrain IA
1406-0800	6 Three M Road	18-Jun-14	Plat 9 Lot 50	0009-050.000	ZZ	
1106-0468	29 Circle Drive	11-May-11	Plat 9 Lot 61	0009-061.000	ZZ	
1206-1049	28 Redwood Drive	24-Sep-12	Plat 9 Lot 74	0009-074.000	ZZ	Indrain IA
0906-1244	30 Redwood Drive	25-Nov-09	Plat 9 Lot 75	0009-075.000	ZZ	Indrain IA
1406-0626	15 Alexander Street	20-May-14	Plat 9 Lot 94	0009-094.000	ZZ	Indrain IA
1406-0856	5 Alexandre Road	01-Jul-14	Plat 9 Lot 096 Sublot 002	0009-096.002	ZZ	Indrain IA
1006-0626	38 Tiffany Road	08-Jun-10	Plat 15 Lot 86	0015-086.000	ZZ	
1106-0858	57 Isle of Capri Road	26-Jul-11	Plat 17 Lot 4	0017-004.000	ZZ	
1406-1497	73 Isle of Capri	03-Nov-14	Plat 17 Lot 7	0017-007.000	ZZ	
0906-0427	22 Circlewood DRive	12-May-09	Plat 18 Lot 55	0017-055.000	ZZ	
1306-0171	8 Beach Street	28-Feb-13	Plat 22 Lot 105	0022-105.000	ZZ	
0906-0746	2 Patience Lane	24-Jul-09	Plat 32 Lot 8.001	0032-008.001	ZZ	
0806-0805	9 Kingfisher Drive	14-Apr-09	Plat 34 Lot 1	0034-001.000	ZZ	
0806-0838	49 Club House Road	16-Jun-08	Plat 34 Lot 29	0034-029.000	ZZ	
1206-0172	8 Acacia Court	24-Feb-12	Plat 34 Lot 37	0034-034.000	ZZ	Indrain IA
1006-0960	121 Wood Cove Road	18-Aug-10	Plat 34 Lot 49	0034-049.000	ZZ	
1306-0934	119 Wood Cove Drive	23-Jul-13	Plat 34 Lot 50	0034-050.000	ZZ	
1106-1409	132 Wood Cove Drive	07-Dec-11	Plat 34 Lot 67	0034-067.000	ZZ	Indrain IA
1006-0685	6 Kingfisher Drive	17-Jun-10	Plat 34 Lot 94	0034-094.000	ZZ	Indrain IA
1306-0002	15 Island Drive	02-Jan-13	Plat 34 Lot 98	0034-098.000	ZZ	
0806-1615	14 Osprey Drive	02-Jan-09	Plat 34 Lot 102	0034-102.000	ZZ	Indrain IA
1206-0571	4 Eastgate Drive	18-May-12	Plat 35 Lot 17	0035-017.000	ZZ	Indrain IA
1006-1274	5 Sharon Drive	05-Nov-10	Plat 42 Lot 12	0042-012.000	ZZ	Indrain IA
1006-0927	8 Sharon Drive	13-Aug-10	Plat 42 Lot 32	0042-032.000	ZZ	Indrain IA
1306-0628	20 Juniper Hill Drive	30-May-13	Plat 42 Lot 49	0042-049.000	ZZ	
0906-0099	17 Juniper Hill Drive	17-Feb-09	Plat 42 Lot 61	0042-061.000	ZZ	
1306-0413	37 Sharon Drive	24-Apr-13	Plat 50 Lot 2	0050-002.000	ZZ	
1206-0570	47 Sharon Drive	18-May-12	Plat 50 Lot 6	0050-006.000	ZZ	Indrain IA
1306-1398	44 Sharon Drive	30-Oct-13	Plat 50 Lot 14	0050-014.000	ZZ	Indrain IA
1206-1149	135 Reservoir Road	17-Oct-12	Plat 50 Lot 24	0050-024.000	ZZ	
1006-0441	108 Reservoir Road	03-May-10	Plat 51 Lot 1	0051-001.000	ZZ	Indrain IA
0806-0325	11 Industrial Drive	12-Mar-08	Plat 51 Lot 8	0051-008.000	ZZ	
0806-1120	2030 Flat River Road	19-Aug-08	Plat 57 Lot 1	0057-001.000	ZZ	
0806-0927	Raymond's Point Road	07-Jul-08	Plat 57 Lot 4	0057-004.000	ZZ	
0806-1329	Raymonds Point Road	01-Oct-08	Plat 57 Lot 4	0057-004.000	ZZ	
0806-1462	Raymond's Point Road	05-Nov-08	Plat 57 Lot 4	0057-004.000	ZZ	
1106-0324	170 Acres of Pine Road	13-Apr-11	Plat 57 Lot 18	0057-018.000	ZZ	Indrain IA
1106-0951	164 Acres of Pine Road	12-Aug-11	Plat 57 Lot 21	0057-021.000	ZZ	
1106-0951	164 Acres of Pine Road	01-Sep-11	Plat 57 Lot 21	0057-021.000	ZZ	
0806-0481	228 Whitehead Road	21-Mar-13	Plat 58 Lot 29	0058-029.000	ZZ	Indrain IA
1006-0813	2144 Flat River	22-Jul-10	Plat 65 Lot 3	0065-003.000	ZZ	Indrain IA
1206-0933	2146 Flat River Road	27-Aug-12	Plat 65 Lot 4	0065-004.000	ZZ	
0906-0017	1949 Flat River Road	09-Jan-09	Plat 66 Lot 1	0066-001.000	ZZ	
0806-1082	112 Read School House Road	07-Aug-08	Plat 66 Lot 25	0066-025.000	ZZ	Indrain IA
1206-0783	13 Walker Lane	13-Jul-12	Plat 67 Lot 33	0067-033.000	ZZ	Indrain IA
1406-0871	333 Read Schoolhouse Road	03-Jul-14	Plat 74 Lot 5	0074-005.000	ZZ	Indrain IA
1406-1246	11 Wildflower Drive	12-Sep-14	Plat 77 Lot 36 Sublot 21	0077-036.000	ZZ	Indrain IA
1206-1107	3 Remington Farm Drive	09-Oct-12	Plat 77 Lot 43	0077-043.000	ZZ	Indrain IA
0906-1239	68 Field Stone Drive	23-Nov-09	Plat 82 Lot 45 Sublot 38	0082-045.000	ZZ	Indrain IA
1406-1082	115 Colvintown Road	15-Aug-14	Plat 85 Lot 13	0085-013.000	ZZ	Indrain IA
1406-0152	316 John Franklin Road	12-Feb-14	Plat 91 Lot 13	0091-013.000	ZZ	Indrain IA
0906-0227	523 Hope Furnace Road	27-Mar-09	Plat 97 Lot 15	0097-015.000	ZZ	Indrain IA
0806-1280	256 Hope Furnace Road	22-Sep-08	Plat 99 Lot 2	0099-002.000	ZZ	Indrain IA
0606-2432	75 Hope Furance Road	21-Sep-12	Plat 101 Lot 19	0101-019.000	ZZ	
1306-0868	811 Weaver Hill Road	11-Jul-13	Plat 305 Lot 1	0305-001.000	ZZ	
0906-1029	557 Weaver Hill Road (Alpine Rest Home)	30-Sep-09	Plat 305 Lot 15	0305-015.000	ZZ	
1406-0275	934 Weaver Hill Road	14-Mar-14	Plat 305 Lot 42	0305-042.000	ZZ	Indrain IA
1006-0143	579 Fish Hill Road	22-Feb-10	Plat 306 Lot 3	0306-003.000	ZZ	Indrain IA
1206-1243	24 Pine Tree Road	08-Nov-12	Plat 306 Lot 24	0306-024.000	ZZ	Indrain IA
1206-0194	266 Hopkins Hollow Road	29-Feb-12	Plat 308 Lot 29	0308-029.000	ZZ	
0806-1349	900 Hopkins Hollow Road	07-Oct-08	Plat 308 Lot 49.003	0308-049.003	ZZ	
0906-0250	302 Log Bridge Road	01-Apr-09	Plat 310 Lot 36	0310-036.000	ZZ	Indrain IA
0906-1297	2828 Harkney Hill Road	14-Dec-09	Plat 310 Lot 59	0310-059.000	ZZ	Indrain IA
1306-0775	2654 Harkney Hill Road	20-Jun-13	Plat 310 Lot 68	0310-068.000	ZZ	Indrain IA
1106-0331	2576 Harkney Hill Road	13-Apr-11	Plat 310 Lot 74	0310-074.000	ZZ	
1106-0940	2560 Harkney Hill Road	11-Aug-11	Plat 310 Lot 75	0310-075.000	ZZ	Indrain IA
1106-0725	281 Richardson Road	08-Jul-11	Plat 310 Lot 104	0310-104.000	ZZ	Indrain IA
0906-0621	301 Richardson Road	22-Jun-09	Plat 310 Lot 107	0310-107.000	ZZ	Indrain IA
0906-1223	256 Richardson Road	18-Nov-09	Plat 310 Lot 125	0310-125.000	ZZ	
0806-0503	2339 Harkney Hill Road	24-Apr-08	Plat 310 Lot 132	0310-132.000	ZZ	
1206-0279	2525 Harkney Hill Road	22-Mar-12	Plat 310 Lot 139	0310-139.000	ZZ	Indrain IA
1006-0759	2865 Harkney Hill Road	01-Jul-10	Plat 310 Lot 164	0310-164.000	ZZ	
1006-0236	11 Raven Blvd	18-Mar-10	Plat 310 Lot 192	0310-192.000	ZZ	
1306-0925	833 Whaley Hollow Road	22-Jul-13	Plat 311 Lot 51	0311-051.000	ZZ	
1306-1473	1680 Harkney Hill Road	15-Nov-13	Plat 311 Lot 74 Sublot 12	0311-074.012	ZZ	
1006-0291	1545 Harkney Hill Road	30-Mar-10	Plat 311 Lot 93	0311-093.000	ZZ	
1006-0585	685 Twin Brook Lane	28-May-10	Plat 311 Lot 112	0311-112.000	ZZ	
1106-0939	52 Benefit Street	11-Aug-11	Plat 314 Lot 54	0314-054.000	ZZ	Indrain IA
0806-1551	2 Railroad Avenue	24-Nov-08	Plat 314 Lot 76	0314-076.000	ZZ	Indrain IA
0806-0395	872 Carrs Trail	28-Mar-08	Plat 315 Lot 45	0315-045.000	ZZ	

Application #	Address	Approval Date	Assessor's Map/Lot		Planning Area	I/A
1006-1409	5383 Flat River Road	17-Dec-10	Plat 315 Lot 70	0315-070.000	ZZ	Indrain IA
1006-0036	161 Susan Bowen Road	15-Jan-10	Plat 316 Lot 15	0316-015.000	ZZ	Indrain IA
1006-0122	979 Victory Highway	16-Feb-10	Plat 316 Lot 45	0316-045.000	ZZ	Indrain IA
0806-1406	60 Scott Hollow Road	16-Dec-08	Plat 316 Lot 73.012	0316-073.012	ZZ	Indrain IA
1106-0934	30 Camp Westwood Road	10-Aug-11	Plat 316 Lot 80	0316-080.000	ZZ	
1306-0339	4186 Flat River Road	09-Apr-13	Plat 316 Lot 85	0316-085.000	ZZ	Indrain IA
1306-0556	650 Camp Westwood Road	17-May-13	Plat 316 Lot 103	0316-103.000	ZZ	Indrain IA
0806-0073	523 Camp Westwood	03-Jan-08	Plat 316 Lot 105	0316-105.000	ZZ	
0906-0774	4496 Flat River Road	31-Jul-09	Plat 316 Lot 118	0316-118.000	ZZ	Indrain IA
1106-0430	113 Bramble Bush Road	05-May-11	Plat 317 Lot 54	0317-054.000	ZZ	
0906-0415	19 Stone Gate Drive	11-May-09	Plat 317 Lot 61	0317-061.000	ZZ	
1206-0021	37 Acres of Pine Road	10-Jan-12	Plat 318 Lot 17	0318-017.000	ZZ	
1006-0804	92 Acres of Pine Road	14-Jul-10	Plat 318 Lot 31	0318-031.000	ZZ	Indrain IA
0906-1226	44 Acres of Pine Road	19-Nov-09	Plat 318 Lot 45	0318-045.000	ZZ	
1306-0016	71 Chrislyn Drive	09-Jan-13	Plat 318 Lot 78	0318-078.000	ZZ	
1006-0784	236 Philips Hill Road	12-Jul-10	Plat 318 Lot 189	0318-189.000	ZZ	Indrain IA
1006-0601	246 Philip Hill Road	02-Jun-10	Plat 318 Lot 190	0318-190.000	ZZ	Indrain IA
1106-0871	290 Phillips Hill Road	01-Aug-11	Plat 318 Lot 192.002	0318-192.002	ZZ	
1006-0684	77 Vaughn Hollow Road	17-Jun-10	Plat 320 Lot 32	0320-032.000	ZZ	Indrain IA
1006-0399	1688 Plainfield Pike	20-Apr-10	Plat 320 Lot 58	0320-058.000	ZZ	Indrain IA
1406-1361	624 Plainfield Pike	03-Oct-14	Plat 321 Lot 21	0321-021.000	ZZ	Indrain IA
1206-0828	64 Indian Trail	24-Jul-12	Plat 321 Lot 61	0321-061.000	ZZ	Indrain IA
1006-0050	171 Carrs Trail	21-Jan-10	Plat 321 Lot 66	0321-066.000	ZZ	Indrain IA
1006-0780	70 Sisson Road	09-Jul-10	Plat 322 Lot 16	0322-016.000	ZZ	
1306-0990	83 Waterman Hill Road	01-Aug-13	Plat 322 Lot 24	0322-024.000	ZZ	Indrain IA
1006-0121	981 Maple Valley Road	16-Feb-10	Plat 322 Lot 68	0322-068.000	ZZ	Indrain IA
1206-0611	1431 Maple Valley Road	31-May-12	Plat 322 Lot 72	0322-072.000	ZZ	
1306-1499	3445 Flat River Road	20-Nov-13	Plat 323 Lot 17	0323-017.000	ZZ	
1106-0527	275 Hammet Road	23-May-11	Plat 323 Lot 61	0323-061.000	ZZ	Indrain IA
1406-0555	299 Hammet Road	05-May-14	Plat 323 Lot 62.001	0323-062.001	ZZ	
1406-0250	90 Hamburger Road	11-Mar-14	Plat 323 Lot 113	0323-113.000	ZZ	Indrain IA
1006-0843	141 Hamburger Road	26-Jul-10	Plat 323 Lot 117	0323-117.000	ZZ	
0806-1364	1065 Town Farm Road	14-Oct-08	Plat 323 Lot 135	0323-135.000	ZZ	
0806-0807	1185 Town Farm Road	11-Jun-08	Plat 323 Lot 141	0323-141.000	ZZ	
1006-0563	1203 Town Farm Road	26-May-10	Plat 323 Lot 164	0323-164.000	ZZ	
1306-0625	160 Maple Valley Road	30-May-13	Plat 323 Lot 171	0323-171.000	ZZ	
0806-1552	195 Old Flat River Road	24-Nov-08	Plat 324 Lot 13	0324-013.000	ZZ	
1406-0183	32&34 Lori Lane	25-Feb-14	Plat 324 Lot 20.003	0324-020.003	ZZ	Indrain IA
1306-1358	43 Indian Trail	22-Nov-13	Plat 324 Lot 36	0324-036.000	ZZ	
1106-1138	691 Town Farm Road	26-Sep-11	Plat 324 Lot 98	0324-098.000	ZZ	Indrain IA
1406-0105	802 Town Farm Road	29-Jan-14	Plat 324 Lot 108	0324-108.000	ZZ	
1406-0694	748 Town Farm Road	02-Jun-14	Plat 324 Lot 109	0324-109.000	ZZ	
1406-0695	746 Town Farm Road	02-Jun-14	Plat 324 Lot 109	0324-109.000	ZZ	
1406-1238	55 Barbs Hill Road	09-Sep-14	Plat 326 Lot 1	0326-001.000	ZZ	Indrain IA
1006-0026	504 Waterman Hill Road	11-Jan-10	Plat 327 Lot 4	0327-004.000	ZZ	Indrain IA
1406-1061	407 Plainfield Pike	07-Aug-14	Plat 327 Lot 17	0327-017.000	ZZ	Indrain IA
1406-0508	490 Plainfield Pike	06-Oct-14	Plat 327 Lot 24	0327-024.000	ZZ	
1406-0934	1221 Maple Valley Road	15-Jul-14	Plat 328 Lot 29	0328-029.000	ZZ	
1106-1181	140 Mile Road	04-Oct-11	Plat 330 Lot 28	0330-028.000	ZZ	
0806-1075	886 Weaver Hill Road	06-Aug-08	Plat 305 Lot 41	#N/A	ZZ	
0806-1275	3564 Flat River Road	22-Sep-08	Plat 323 Lot 257	#N/A	ZZ	Indrain IA
0806-1520	8 Steere Lane	18-Nov-08	Plat 322 Lot 9.01	#N/A	ZZ	
0806-1525	123 Colvintown Road	18-Nov-08	Plat 85 Lot 12.01	#N/A	ZZ	
0906-0094	5 Arbutus Trail	12-Feb-09	Plat 42 Lot 55	#N/A	ZZ	
1006-0917	105 Bramble Bush Road	11-Aug-10	Plat 317 Lot 58	#N/A	ZZ	
1106-0690	28 Osprey DRive	24-Jun-11	Plat 34 Lot 96.2	#N/A	ZZ	Indrain IA
1106-0755	2155 Nooseneck Hill Road #13 & 15 Lane 6	11-Jul-11	Plat 520 Lot 117	#N/A	N1	Indrain IA
1106-0756	2155 Nooseneck Hill Road #13 & 15 Lane 7	11-Jul-11	Plat 520 Lot 137	#N/A	N1	Indrain IA
1106-1460	49 Indian Trail	20-Dec-11	Plat 324 Lot 38	#N/A	ZZ	
1206-0056	433 Read School House Road	19-Jan-12	Plat 74 Lot 10.1	#N/A	ZZ	Indrain IA
1206-0764	495 Williams Crossing Road	10-Jul-12	Plat 44 Lot 194	#N/A	ZZ	
1206-0952	2 Tamarack Trail	30-Aug-12	Plat 42 Lot 55	#N/A	ZZ	
1206-1077	107 Shippee Avenue	01-Oct-12	Plat 122 Lot 37	#N/A	ZZ	
1206-1260	76,78,80 Peckham Lane	09-Nov-12	Plat 324 Lot 20.03	#N/A	ZZ	Indrain IA
1206-1260	76,78,80 Peckham Lane	22-Jul-14	Plat 324 Lot 20.03	#N/A	ZZ	
1306-0612	777 Hammet Road	08-Jul-13	Plat 329 Lot 7.9	#N/A	ZZ	Indrain IA
1306-1128	1213 Town Farm Road	06-Sep-13	Plat 232 Lot 165	#N/A	ZZ	
1306-1185	10 Paige Drive	20-Sep-13	Plat 85 Lot 39	#N/A	ZZ	
1406-0201	581 Weaver Hill Road	28-Feb-14	Plat 305 Lot 14	#N/A	ZZ	
1406-0554	15 Giblin Lane	05-May-14	Plat 42 Lot 55	#N/A	ZZ	
1406-0574	78 Franklin Road	09-May-14	Plat 316 Lot 76	#N/A	ZZ	
1406-1078	3426 Flat River Road	14-Aug-14	Plat 328 Lot 248	#N/A	ZZ	
1406-1395	98 Reservoir Road	15-Oct-14	Plat 43 Lot 17	#N/A	ZZ	
0906-1277	696 Arnold Road	04-Dec-09	Plat 7 Lot 31	0007-031.000	A	
1106-1195	1 Tiffany Road	05-Oct-11	Plat 16 Lot 17	0016-017.000	A	
0906-0532	15 ReJane Street	29-May-09	Plat 16 Lot 55	0016-055.000	A	Indrain IA
1306-0307	3 Lions Drive	02-Apr-13	Plat 16 Lot 78	0016-078.000	A	Indrain IA
1106-1076	25 Longfellow Drive	13-Sep-11	Plat 16 Lot 89	0016-089.000	A	Indrain IA
1306-1063	27 Longfellow Drive	22-Aug-13	Plat 16 Lot 90	0016-090.000	A	Indrain IA
1106-1451	29 Longfellow Drive	19-Dec-11	Plat 16 Lot 91	0016-091.000	A	Indrain IA
1406-0623	16 Longfellow Drive	20-May-14	Plat 16 Lot 102	0016-102.000	A	
1006-0715	11 Wendy Drive	24-Jun-10	Plat 16 Lot 110	0016-110.000	A	Indrain IA
1406-0362	50 Old North Road	28-Mar-14	Plat 24 Lot 42	0024-042.000	A	Indrain IA
1406-1607	14 Lemis Street	24-Nov-14	Plat 24 Lot 62	0024-062.000	A	Indrain IA
1306-0600	14 Angus Street	23-May-13	Plat 24 Lot 93	0024-093.000	A	
1006-0516	34 Angus Street	14-May-10	Plat 24 Lot 96	0024-096.000	A	
1406-1188	33 Valrene Street	04-Sep-14	Plat 24 Lot 98	0024-098.000	A	
0806-0696	48 Angus Street	20-May-08	Plat 24 Lot 101	0024-101.000	A	

Application #	Address	Approval Date	Assessor's Map/Lot		Planning Area	I/A
1306-1101	52 Angus Street	30-Aug-13	Plat 24 Lot 102	0024-102.000	A	
1106-0722	72 Angus Street	07-Jul-11	Plat 24 Lot 106	0024-106.000	A	Indrain IA
0806-1404	3 Mulberry Street	22-Oct-08	Plat 94 Lot 82	0094-082.000	AA	
1306-0643	6 Birchwood Lane	04-Jun-13	Plat 95 Lot 15	0095-015.000	AA	Indrain IA
0906-0302	10 Birchwood Lane	15-Apr-09	Plat 95 Lot 17	0095-017.000	AA	
1406-0360	1 Crabapple Court	28-Mar-14	Plat 102 Lot 62	0102-062.000	AA	Indrain IA
1106-0205	4 Barberry Court	18-Mar-11	Plat 102 Lot 96	0102-096.000	AA	
1406-0534	4 Labrea Way	01-May-14	Plat 102 Lot 17	#N/A	AA	Indrain IA
1106-0466	6 Hunters Crossing	11-May-11	Plat 78 Lot 1.003	0078-001.003	AB	Indrain IA
0906-1149	568 Knotty Oak Road	30-Oct-09	Plat 78 Lot 7	0078-007.000	AB	Indrain IA
1306-1317	12 Marie Drive	16-Oct-13	Plat 78 Lot 25	0078-025.000	AB	Indrain IA
1306-1363	16 Marie Drive	24-Oct-13	Plat 78 Lot 27	0078-027.000	AB	Indrain IA
1006-0872	18 Maple Drive	29-Jul-10	Plat 78 Lot 28	0078-028.000	AB	
1006-1156	11 Marie Drive	06-Oct-10	Plat 78 Lot 36	0078-036.000	AB	Indrain IA
0806-1415	630 Knotty Oak Road	23-Oct-08	Plat 86 Lot 1	0086-001.000	AB	
1206-1173	38 Knotty Oak Shores Road	19-Oct-12	Plat 86 Lot 28	0086-028.000	AB	Indrain IA
1006-1281	23 Knotty Oak Shores Road	08-Nov-10	Plat 86 Lot 59	0086-059.000	AB	
1206-0602	655 Knotty Oak Road	30-May-12	Plat 86 Lot 70.2	0086-070.002	AB	Indrain IA
0806-0886	645 Knotty Oak Road	25-Jun-08	Plat 86 Lot 75	0086-075.000	AB	Indrain IA
1406-0585	15 South Pond Drive	13-May-14	Plat 87 Lot 111	0087-111.000	AB	Indrain IA
0806-0699	25 South Pond Drive	20-May-08	Plat 87 Lot 116	0087-116.000	AB	
0806-0699	25 South Pond Drive	12-Nov-08	Plat 87 Lot 116	0087-116.000	AB	
1106-0157	863 Knotty Oak Road	09-Mar-11	Plat 94 Lot 17.001	0094-017.001	AB	Indrain IA
1306-0917	3 South Pond Drive	18-Jul-13	Plat 95 Lot 1.001	0095-001.001	AB	
1206-0612	20 Driftwood Drive	31-May-12	Plat 69 Lot 7	0069-007.000	AC	
1006-0156	38 Colvintown Road	25-Feb-10	Plat 69 Lot 23	0069-023.000	AC	
0906-0675	314 Station Street	07-Jul-09	Plat 69 Lot 43	0069-043.000	AC	
1006-0908	3 Driftwood Drive	10-Aug-10	Plat 70 Lot 20	0070-020.000	AC	Indrain IA
0806-1201	6 Glenwood Driv e	08-Sep-08	Plat 70 Lot 24	0070-024.000	AC	Indrain IA
0806-0142	14 Glenwood Drive	23-Jan-08	Plat 70 Lot 26	0070-026.000	AC	
0706-0225	21 Highwood Drive	27-May-08	Plat 70 Lot 44	0070-044.000	AC	
1306-0091	14 Boulder Drive	01-Feb-13	Plat 69 Lot 44.02	#N/A	AC	
1006-0586	15 Cynthia Drive	28-May-10	Plat 52 Lot 36	0052-036.000	AD-ELIM	Indrain IA
0906-0038	11 Cynthia Drive	20-Jan-09	Plat 52 Lot 38	0052-038.000	AD-ELIM	
1106-0859	6 Gail Court	28-Jul-11	Plat 52 Lot 50	0052-050.000	AD-ELIM	Indrain IA
1106-0522	2 Lloyd Drive	23-May-11	Plat 60 Lot 68	0060-068.000	AD-ELIM	Indrain IA
1206-0832	14 Lloyd Drive	26-Jul-12	Plat 60 Lot 74	0060-074.000	AD-ELIM	
1406-1140	36 Cynthia Drive	25-Aug-14	Plat 60 Lot 97	0060-097.000	AD-ELIM	Indrain IA
1206-0915	3 Cynthia Drive	21-Aug-12	Plat 60 Lot 103	0060-103.000	AD-ELIM	Indrain IA
1206-1366	5 Alvero Road	13-Dec-12	Plat 60 Lot 106	0060-106.000	AD-ELIM	
1006-0174	4 Alvero Road	03-Mar-10	Plat 60 Lot 109	0060-109.000	AD-ELIM	
1006-0077	3 Patty Street	01-Feb-10	Plat 60 Lot 124	0060-124.000	AD-ELIM	Indrain IA
1006-0645	4 Patty Street	11-Jun-10	Plat 60 Lot 125	0060-125.000	AD-ELIM	Indrain IA
1306-0957	29 Cynthia Drive	26-Jul-13	Plat 61 Lot 1	0061-001.000	AD-ELIM	
1306-1188	34 Abbotts Crossing Road	20-Sep-13	Plat 53 Lot 5.1	#N/A	AD-ELIM	
0906-0595	1368 Main Street	18-Jun-09	Plat 52 Lot 1	0052-001.000	AE	
1006-1342	1380 Main Street	30-Nov-10	Plat 52 Lot 3	0052-003.000	AE	
0806-0750	4 Collier Way	30-May-08	Plat 52 Lot 10	0052-010.000	AE	
1306-0415	1457 Main Street	24-Apr-13	Plat 52 Lot 46	0052-046.000	AE	
1406-0487	1647 Flat River Road	21-Apr-14	Plat 59 Lot 17	0059-017.000	AE	
1206-0469	1542 Main Street	27-Apr-12	Plat 60 Lot 2	0060-002.000	AE	Indrain IA
0906-1187	6 Leader Street	09-Nov-09	Plat 60 Lot 5	0060-005.000	AE	Indrain IA
1206-1259	1620 Flat River Road	09-Nov-12	Plat 60 Lot 16	0060-016.000	AE	
0806-0077	1710 Flat River Road	27-Oct-08	Plat 58 Lot 012 Sublot 5	0058-012.000	AEELIM	Indrain IA
0906-0140	1706 Flat River Road	23-Feb-09	Plat 59 Lot 10	0059-010.000	AEELIM	
1006-1354	32 Read School House ROad	02-Dec-10	Plat 66 Lot 31	0066-031.000	AEELIM	
1406-1571	12 Leuba Road	17-Nov-14	Plat 60 Lot 18	0060-018.000	AFELIM	Indrain IA
1206-0433	41 Leuba Road	19-Apr-12	Plat 67 Lot 13	0067-013.000	AFELIM	
1006-0098	51 Colvintown	08-Feb-10	Plat 68 Lot 10	0068-010.000	AFELIM	Indrain IA
1306-1258	45 Colvintown Road	03-Oct-13	Plat 68 Lot 11	0068-011.000	AFELIM	Indrain IA
1306-1268	22 Chandler Drive	07-Oct-13	Plat 68 Lot 38	0068-038.000	AFELIM	
1006-0492	28 Chandler Drive	13-May-10	Plat 68 Lot 41	0068-041.000	AFELIM	
1206-0763	15 Daniel Drive	10-Jul-12	Plat 68 Lot 83	0068-083.000	AFELIM	Indrain IA
1106-1075	71 Leuba Road	13-Sep-11	Plat 68 Lot 91	0068-091.000	AFELIM	
1006-1135	31 Chandler Drive	28-Sep-10	Plat 68 Lot 114	0068-114.000	AFELIM	
0906-0456	29 Chandler Drive	19-May-09	Plat 68 Lot 115	0068-115.000	AFELIM	
1206-0135	48 Colvintown Road	15-Feb-12	Plat 68 Lot 130	0068-130.000	AFELIM	
1006-0219	35 Leuba Road	12-Mar-10	Plat 68 Lot 99.01	#N/A	AFELIM	Indrain IA
1206-0435	70 Leuba Road	20-Apr-12	Plat 60 Lot 34	#N/A	AFELIM	
0906-1250	36 Watercress Court	30-Nov-09	Plat 76 Lot 15	0076-015.000	AG	Indrain IA
1106-0478	6 Watercress Court	13-May-11	Plat 76 Lot 30	0076-030.000	AG	Indrain IA
0806-1204	11 Teakwood Drive	09-Sep-08	Plat 76 Lot 42	0076-042.000	AG	Indrain IA
0906-1173	82 Colvintown Road	06-Nov-09	Plat 76 Lot 46	0076-046.000	AG	Indrain IA
0906-1246	12 Teakwood DRive	25-Nov-09	Plat 76 Lot 80	0076-080.000	AG	
1206-0644	28 Teakwood Drive	07-Jun-12	Plat 76 Lot 103	0076-103.000	AG	
1206-1136	5 Laura Court	12-Oct-12	Plat 76 Lot 120	0076-120.000	AG	Indrain IA
1006-1145	77 Colvington Road	04-Oct-10	Plat 77 Lot 19	0077-019.000	AG	
1106-1306	354 Shady Valley Road	02-Nov-11	Plat 49 Lot 6	0049-006.000	AH	
0906-1186	193 Shady Valley Road	09-Nov-09	Plat 49 Lot 17	0049-017.000	AH	
0906-1009	228 Shady Valley Road	25-Sep-09	Plat 49 Lot 40.002	0049-040.002	AH	
1406-0127	242 Shady Valley Road	04-Feb-14	Plat 49 Lot 44	0049-044.000	AH	
0906-1252	272 Shady Valley Road	30-Nov-09	Plat 49 Lot 55	0049-055.000	AH	Indrain IA
0906-0251	4 Hill Farm Camp Road	01-Apr-09	Plat 33 Lot 6.13	#N/A	AH	
1106-0159	40 Hill Farm Camp Road	10-Mar-11	Plat 610 Lot 40	#N/A	AH	
1206-1255	2 Hill Farm Camp Road	09-Nov-12	Plat 33 Lot 270	#N/A	AH	
1006-1352	48 Arabian Drive	01-Dec-10	Plat 318 Lot 71	0318-071.000	AI	
1106-0169	615 Hill Farm Road	15-Mar-11	Plat 318 Lot 133	0318-133.000	AI	
1006-0716	569 Hill Farm Road	24-Jun-10	Plat 318 Lot 137	0318-137.000	AI	Indrain IA

Application #	Address	Approval Date	Assessor's Map/Lot		Planning Area	I/A
1206-0853	61 Peckham Lane	31-Jul-12	Plat 324 Lot 4	0324-004.000	AI	Indrain IA
1206-0854	119 Peckham Lane	31-Jul-12	Plat 324 Lot 6	0324-006.000	AI	Indrain IA
1206-1384	2541 Flat River Road	21-Dec-12	Plat 324 Lot 23	0324-023.000	AI	
0506-1205	8 Hill Farm Road	23-Jun-09	Plat 610 Lot 8	#N/A	AI	
0806-0821	1306 Hill Farm Road	13-Jun-08	Plat 25 Lot 20	#N/A	AI	
1406-1050	48 Old North Road	07-Aug-14	Plat 24 Lot 41	0024-041.000	B	
1206-0090	6 Patience Lane	02-Feb-12	Plat 32 Lot 9	0032-009.000	B	
0906-0463	227 Tiogue Avenue	19-May-09	Plat 32 Lot 21	0032-021.000	B	
1206-1091	14 Gilles Street	03-Oct-12	Plat 32 Lot 26	0032-026.000	B	Indrain IA
0806-0350	4 Bonney Street	17-Mar-08	Plat 32 Lot 34	0032-034.000	B	
1306-0976	16 Bonney Street	31-Jul-13	Plat 32 Lot 37	0032-037.000	B	Indrain IA
1306-0308	13 Kathy Avenue	02-Apr-13	Plat 32 Lot 48	0032-048.000	B	Indrain IA
1206-0346	8 Lantern Lane	03-Apr-12	Plat 32 Lot 64	0032-064.000	B	
1206-0229	2 Kennedy Drive	07-Mar-12	Plat 32 Lot 88	0032-088.000	B	
1306-1126	6 Deerfield Road	06-Sep-13	Plat 32 Lot 116	0032-116.000	B	
0806-0437	6 Cypress Road	04-Apr-08	Plat 32 Lot 122	0032-122.000	B	Indrain IA
1306-0176	3 Kennedy Drive	28-Feb-13	Plat 32 Lot 125	0032-125.000	B	Indrain IA
1206-0149	14 Old North Road	20-Feb-12	Plat 32 Lot 135	0032-135.000	B	
1006-0925	21 seneca Street	13-Aug-10	Plat 31 Lot 4	0031-004.000	C	
1406-1555	59 Mohawk Street	13-Nov-14	Plat 31 Lot 18	0031-018.000	C	Indrain IA
0806-0764	9 Mohawk Street	02-Jun-08	Plat 31 Lot 25	0031-025.000	C	
1406-0915	10 Rawlinson Drive	14-Jul-14	Plat 31 Lot 74	0031-074.000	C	Indrain IA
1006-0261	22 Rowlinson Drive	23-Mar-10	Plat 31 Lot 76	0031-076.000	C	
1206-0239	34 Rawlinson Drive	12-Mar-12	Plat 31 Lot 78	0031-078.000	C	
1306-1223	103 Mohawk Street	26-Sep-13	Plat 31 Lot 109	0031-109.000	C	
1006-1184	83 East Shore Drive	14-Oct-10	Plat 31 Lot 124	0031-124.000	C	
1006-1184	83 East Shore Drive	19-Oct-12	Plat 31 Lot 124	0031-124.000	C	
1406-1402	2 Seneca Street	14-Oct-14	Plat 39 Lot 11	0039-011.000	C	
1106-1220	3 Seneca Street	13-Oct-11	Plat 39 Lot 13	0039-013.000	C	Indrain IA
0606-1536	48 Seneca Street	16-Jul-09	Plat 31 Lot 15	#N/A	C	
1306-0505	5 Pembroke Lane	08-May-13	Plat 31 Lot 67	0031-067.000	D	
1106-0726	14 Columbia Avenue	07-Jul-11	Plat 39 Lot 127	0039-127.000	D	Indrain IA
1406-1095	18 Columbia Avenue	18-Aug-14	Plat 39 Lot 128	0039-128.000	D	Indrain IA
0906-0316	46 Columbia Avenue	17-Apr-09	Plat 39 Lot 133	0039-133.000	D	
1406-1243	132 Columbia Avenue	15-Sep-14	Plat 39 Lot 140	0039-140.000	D	
1206-1183	124 Columbia Avenue	23-Oct-12	Plat 39 Lot 147	0039-147.000	D	
1006-0235	107 Columbia Avenue	16-Mar-10	Plat 39 Lot 160	0039-160.000	D	
0806-0429	89 Columbia Avenue	07-Apr-08	Plat 39 Lot 163	0039-163.000	D	
0906-0236	75 Columbia Avenue	30-Mar-09	Plat 39 Lot 166	0039-166.000	D	
1106-0499	37 Columbia Avenue	16-May-11	Plat 39 Lot 173	0039-173.000	D	Indrain IA
1106-0415	33 Columbia Avenue	03-May-11	Plat 39 Lot 174	0039-174.000	D	Indrain IA
1406-0196	25 Columbia Avenue	27-Feb-14	Plat 39 Lot 176	0039-176.000	D	
1306-0287	21 Colombia Avenue	28-Mar-13	Plat 39 Lot 177	0039-177.000	D	
1406-0528	16 Princeton Avenue	30-Apr-14	Plat 39 Lot 185	0039-185.000	D	
1006-0433	34 Princeton Avenue	03-May-10	Plat 39 Lot 188	0039-188.000	D	Indrain IA
1406-0658	28 Holloway Avenue	23-May-14	Plat 39 Lot 190	0039-190.000	D	
1306-0445	88 Princeton Avenue	30-Apr-13	Plat 39 Lot 197	0039-197.000	D	Indrain IA
1306-0944	122 Princeton Avenue	24-Jul-13	Plat 39 Lot 203	0039-203.000	D	
0906-0392	129 Princeton Avenue	05-May-09	Plat 39 Lot 208	0039-208.000	D	
0806-1014	75 Princeton Avenue	24-Jul-08	Plat 39 Lot 216	0039-216.000	D	
1206-1070	62 Yale Drive	28-Sep-12	Plat 39 Lot 223	0039-223.000	D	
0906-0469	68 Yale Drive	22-May-09	Plat 39 Lot 224	0039-224.000	D	
1006-0694	121 Pembroke Lane	22-Jun-10	Plat 39 Lot 233	0039-233.000	D	
1106-0500	105 Pembroke Lane	13-May-11	Plat 39 Lot 240	0039-240.000	D	Indrain IA
1106-1377	15 Pettine Street	22-Nov-11	Plat 39 Lot 253	0039-253.000	D	Indrain IA
0806-1625	22 Pettine Street	17-Dec-08	Plat 39 Lot 264	0039-264.000	D	
1306-0305	108 Pembroke Lane	02-Apr-13	Plat 39 Lot 276	0039-276.000	D	Indrain IA
0906-0381	53 Yale Avenue	04-May-09	Plat 39 Lot 287	0039-287.000	D	
1306-1355	41 Yale Drive	23-Oct-13	Plat 39 Lot 289	0039-289.000	D	
1406-1546	11 Yale Drive	12-Nov-14	Plat 39 Lot 294	0039-294.000	D	Indrain IA
1406-0754	33 Pembroke Lane	10-Jun-14	Plat 39 Lot 308	0039-308.000	D	Indrain IA
1006-0926	2 Pettine Street	11-Aug-10	Plat 40 Lot 5	0040-005.000	D	
1006-1037	4 Yale Drive	10-Sep-10	Plat 40 Lot 6	0040-006.000	D	
1106-1174	4 Baylor Drive	03-Oct-11	Plat 40 Lot 12	0040-012.000	D	
1106-0388	69 Pembroke Lane	26-Apr-11	Plat 40 Lot 27	0040-027.000	D	Indrain IA
1406-1622	157 Pilgrim Avenue	02-Dec-14	Plat 39 Lot 89	0039-089.000	E	Indrain IA
1006-0243	12 Dexter Street	22-Mar-10	Plat 39 Lot 93	0039-093.000	E	
1406-1596	160 Pilgrim Avenue	20-Nov-14	Plat 39 Lot 100	0039-100.000	E	
0906-0565	7 Dexter Street	11-Jun-09	Plat 47 Lot 2	0047-002.000	E	
1406-1060	149 Pilgram Avenue	08-Aug-14	Plat 47 Lot 3	0047-003.000	E	
0906-0344	60 Laurel Avenue	28-Apr-09	Plat 47 Lot 21	0047-021.000	E	
1006-0877	153 Princeton Avenue	02-Aug-10	Plat 47 Lot 29	0047-029.000	E	
1406-0197	4 Salem Street	27-Feb-14	Plat 47 Lot 39	0047-039.000	E	
1306-0113	1 Cote Court	07-Feb-13	Plat 47 Lot 41	0047-041.000	E	Indrain IA
1206-0407	80 Shelta Avenue	13-Apr-12	Plat 47 Lot 44	0047-044.000	E	Indrain IA
1206-0473	34-36 Sheltra Avenue	30-Apr-12	Plat 47 Lot 51	0047-051.000	E	Indrain IA
1006-0637	158 Princeton Avenue	10-Jun-10	Plat 47 Lot 84	0047-084.000	E	
1206-1082	67 Laurel Avenue	01-Oct-12	Plat 47 Lot 91	0047-091.000	E	
1206-1082	67 Laurel Avenue	04-Oct-12	Plat 47 Lot 91	0047-091.000	E	
1406-1245	55 Laurel Avenue	15-Sep-14	Plat 47 Lot 96	0047-096.000	E	
1006-0776	68 Pilgrim Avenue	08-Jul-10	Plat 47 Lot 103	0047-103.000	E	
1306-0512	7 Reddington Street	10-May-13	Plat 47 Lot 110	0047-110.000	E	
1106-0723	5 Reddington Street	07-Jul-11	Plat 47 Lot 115	0047-115.000	E	Indrain IA
1406-1410	43 Wesleyan Avenue	17-Oct-14	Plat 47 Lot 137	0047-137.000	E	Indrain IA
1006-0439	165 Princeton Avenue	03-May-10	Plat 47 Lot 142	0047-142.000	E	
0906-0345	1 Vanderbilt Terrace	24-Apr-09	Plat 47 Lot 154	0047-154.000	E	
1406-0464	4 Vanderbilt Terrace	15-Apr-14	Plat 47 Lot 156	0047-156.000	E	Indrain IA
1406-0665	15 Wesleyan Street	27-May-14	Plat 47 Lot 174	0047-174.000	E	Indrain IA

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1306-1606	1440 Princeton Avenue	13-Dec-13	Plat 47 Lot 177	0047-177.000	E	
1306-0205	12 Wesleyan Avenue	12-Mar-13	Plat 47 Lot 182	0047-182.000	E	
0906-0696	26 Wesleyan Avenue	15-Jul-09	Plat 47 Lot 189	0047-189.000	E	Indrain IA
1406-0468	28 Wesleyan Avenue	16-Apr-14	Plat 47 Lot 190	0047-190.000	E	Indrain IA
1006-0663	77 Taft Street	16-Jun-10	Plat 55 Lot 96	0055-096.000	E	Indrain IA
1006-0491	21 Centre Street	13-May-10	Plat 55 Lot 99	0055-099.000	E	
1206-0888	42 Laurel Avenue	14-Aug-12	Plat 55 Lot 121	0055-121.000	E	
1306-0835	35 Laurel Avenue	03-Jul-13	Plat 55 Lot 152	0055-152.000	E	
1006-0659	599 Tiogue Avenue	16-Jun-10	Plat 38 Lot 173	0038-173.000	F	
1106-0856	6 & 8 Lane C	26-Jul-11	Plat 530 Lot 6	#N/A	F	Indrain IA
1106-0857	2 Lane F	26-Jul-11	Plat 530 Lot 2	#N/A	F	Indrain IA
1106-0861	23 Lane A	28-Jul-11	Plat 530 Lot 23	#N/A	F	Indrain IA
1106-0949	21 Lane A	11-Aug-11	Plat 530 Lot 21	#N/A	F	Indrain IA
1206-0585	23-25 Lane C	24-May-12	Plat 530 Lot 23.3	#N/A	F	Indrain IA
1206-0586	11-13 Lane C	24-May-12	Plat 530 Lot 11.3	#N/A	F	Indrain IA
1206-0793	24 Lane A	16-Jul-12	Plat 530 Lot 24.001	#N/A	F	
1306-0592	3 Lane B	22-May-13	Plat 530 Lot 3.002	#N/A	F	
1306-0593	5 Lane B	22-May-13	Plat 530 Lot 5.002	#N/A	F	
1306-0626	11 Lane B	30-May-13	Plat 530 Lot 11.002	#N/A	F	
1306-0627	13 Lane B	30-May-13	Plat 530 Lot 13.002	#N/A	F	
1306-0935	22 Lane A	23-Jul-13	Plat 530 Lot 22.001	#N/A	F	
1306-1037	30 Lane A	15-Aug-13	Plat 530 Lot 30.001	#N/A	F	
1306-1086	18 Lane A	27-Aug-13	Plat 530 Lot 18.001	#N/A	F	Indrain IA
1306-0661	16 Henry Road	29-Jul-13	Plat 30 Lot 30	0030-030.000	G	
1406-0949	16 Larchmont Drive	22-Jul-14	Plat 30 Lot 77	0030-077.000	G	
1306-0422	29 Pine Street	25-Apr-13	Plat 30 Lot 92	0030-092.000	G	
0806-0279	46 Overview Drive	26-Feb-08	Plat 30 Lot 103	0030-103.000	G	
0806-0644	45 Overview Drive	08-May-08	Plat 30 Lot 108	0030-108.000	G	
1306-1011	6 Sand Street	07-Aug-13	Plat 30 Lot 117	0030-117.000	G	
1106-0299	6 Hazel Street	07-Apr-11	Plat 38 Lot 89	0038-089.000	G	
1006-1168	12 Whitman Street	12-Oct-10	Plat 38 Lot 139	0038-139.000	G	Indrain IA
1206-0230	13 Whitman Street	07-Mar-12	Plat 38 Lot 143	0038-143.000	G	Indrain IA
1306-0706	50 Wendell Street	12-Jun-13	Plat 38 Lot 168	0038-168.000	G	Indrain IA
1106-0950	18 Hazel Street	12-Aug-11	Plat 112 Lot 58	#N/A	G	Indrain IA
1306-1326	22 Forestdale Drive	18-Oct-13	Plat 68 Lot 162	#N/A	G	Indrain IA
1406-0666	6 Holmes Road	27-May-14	Plat 14 Lot 10	0014-010.000	H	Indrain IA
1406-0576	14 Myra Road	09-May-14	Plat 14 Lot 27	0014-027.000	H	Indrain IA
1406-0696	21 Jade Road	30-May-14	Plat 14 Lot 40	0014-040.000	H	
1406-1255	3 Tulip Road	17-Sep-14	Plat 14 Lot 77	0014-077.000	H	Indrain IA
1006-1211	1 Tulip Road	19-Oct-10	Plat 14 Lot 78	0014-078.000	H	
0806-0402	23 Holmes Road	31-Mar-08	Plat 14 Lot 80	0014-080.000	H	
0906-0114	21 Holmes Road	18-Feb-09	Plat 14 Lot 81	0014-081.000	H	
1106-0480	6 Linda Court	11-May-11	Plat 14 Lot 86	0014-086.000	H	
1106-0481	11 Holmes Road	12-May-11	Plat 14 Lot 86	0014-086.000	H	
1306-1247	116 Johnson Boulevard	01-Oct-13	Plat 22 Lot 33	0022-033.000	H	
1006-1319	11 Dixie Road	16-Nov-10	Plat 22 Lot 52	0022-052.000	H	Indrain IA
1106-0203	113 West Shore Drive	21-Mar-11	Plat 22 Lot 77	0022-077.000	H	Indrain IA
1006-0100	266 Arnold Road	08-Feb-10	Plat 22 Lot 115	0022-115.000	H	Indrain IA
0906-0727	340 Arnold Road	21-Jul-09	Plat 22 Lot 123	0022-123.000	H	Indrain IA
1206-0839	12 Grant Drive	27-Jul-12	Plat 22 Lot 131	0022-131.000	H	
1306-0218	14 Grant Drive	14-Mar-13	Plat 22 Lot 132	0022-132.000	H	
1406-0104	16 Grant Drive	30-Jan-14	Plat 22 Lot 133	0022-133.000	H	
1006-0809	20 Grant Drive	19-Jul-10	Plat 22 Lot 135	0022-135.000	H	
1006-0093	26 Grant Drive	04-Feb-10	Plat 22 Lot 138	0022-138.000	H	
1406-1074	23 Grant Drive	13-Aug-14	Plat 22 Lot 142	0022-142.000	H	
0806-0510	19 Grant Drive	23-Apr-08	Plat 22 Lot 144	0022-144.000	H	
0906-1254	11 Grant Drive	01-Dec-09	Plat 22 Lot 160	0022-160.000	H	
1006-0871	2 Sunset Avenue	29-Jul-10	Plat 22 Lot 183	0022-183.000	H	
1206-0186	6 Sunset Avenue	28-Feb-12	Plat 22 Lot 185	0022-185.000	H	
0806-1222	7 Powhatan Avenue	11-Sep-08	Plat 22 Lot 203	0022-203.000	H	
0906-0354	66 Beechwood	29-Apr-09	Plat 22 Lot 228	0022-228.000	H	
1206-1221	113 Johnson's Boulevard	02-Nov-12	Plat 22 Lot 241	0022-241.000	H	
1106-1286	15 Lydia Road	27-Oct-11	Plat 22 Lot 270	0022-270.000	H	
1206-0692	98 Lydia Road	20-Jun-12	Plat 22 Lot 273	0022-273.000	H	
1206-0274	4 Chandler Drive	21-Mar-12	Plat 30 Lot 7	0030-007.000	H	Indrain IA
9306-4332	21 Dixie Road	06-Sep-12	Plat 30 Lot 159	0030-159.000	H	Indrain IA
1106-0298	34 Larch Drive	07-Apr-11	Plat 15 Lot 14	0015-014.000	I	
1306-0685	57 Larch Drive	10-Jun-13	Plat 15 Lot 23	0015-023.000	I	Indrain IA
1106-0479	33 Larch Drive	13-May-11	Plat 15 Lot 27	0015-027.000	I	Indrain IA
1206-0684	29 Larch Drive	18-Jun-12	Plat 15 Lot 28	0015-028.000	I	
1206-0273	25 Larch Drive	21-Mar-12	Plat 15 Lot 29	0015-029.000	I	
1306-0242	414 Arnold Road	19-Mar-13	Plat 15 Lot 35	0015-035.000	I	Indrain IA
1306-1149	10 Crestwood Drive	12-Sep-13	Plat 15 Lot 37	0015-037.000	I	Indrain IA
0906-0889	6 North Glen	31-Aug-09	Plat 15 Lot 42	0015-042.000	I	
0806-0268	9 No. Glen Drive	22-Feb-08	Plat 15 Lot 49	0015-049.000	I	
1006-1246	30 South Glen Drive	28-Oct-10	Plat 15 Lot 56	0015-056.000	I	
1106-1406	434 Arnold Road	06-Dec-11	Plat 15 Lot 76	0015-076.000	I	Indrain IA
1306-0304	450 Arnold Road	02-Apr-13	Plat 15 Lot 80	0015-080.000	I	
0606-0170	46 Harrington Road	07-Mar-08	Plat 23 Lot 16	0023-016.000	I	Indrain IA
1306-0017	405 Arnold Road	10-Jan-13	Plat 14 Lot 1.001	#N/A	I	
1406-1475	38 S Glen Drive	27-Oct-14	Plat 15 Lot 154	#N/A	I	
0806-0488	441 Hopkins Hill Road	21-Apr-08	Plat 5 Lot 2.1	0005-002.001	J	
0806-0150	23 Edward Street	28-Jan-08	Plat 5 Lot 3 & 4	0005-003.000	J	Indrain IA
0806-1200	5 Bestwick Trail	08-Sep-08	Plat 13 Lot 30	0013-030.000	J	
1206-0962	27 King Street	31-Aug-12	Plat 21 Lot 7	0021-007.000	J	
1206-0545	7 Carolyn Street	15-May-12	Plat 21 Lot 15	0021-015.000	J	
1206-0412	5 Carolyn Street	16-Apr-12	Plat 21 Lot 16	0021-016.000	J	Indrain IA
1306-0830	36 Johnson Blvd.	02-Jul-13	Plat 21 Lot 42	0021-042.000	J	Indrain IA

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1406-1128	7 Edna Street	22-Aug-14	Plat 21 Lot 47	0021-047.000	J	Indrain IA
1406-0486	4 Edna Street	21-Apr-14	Plat 21 Lot 51	0021-051.000	J	Indrain IA
1406-0813	6 Edna Street	19-Jun-14	Plat 21 Lot 52	0021-052.000	J	
1306-0219	6 Marjorie Street	14-Mar-13	Plat 21 Lot 59	0021-059.000	J	
1206-0916	4 Ledo Road	21-Aug-12	Plat 21 Lot 63	0021-063.000	J	Indrain IA
1106-1040	10 Ledo Road	06-Sep-11	Plat 21 Lot 65	0021-065.000	J	
1306-1211	18 Ledo Street	25-Sep-13	Plat 21 Lot 67	0021-067.000	J	
1406-1480	1 Rosemary Street	28-Oct-14	Plat 21 Lot 92	0021-092.000	J	
1206-1164	17 King Street	17-Oct-12	Plat 21 Lot 95	0021-095.000	J	Indrain IA
1006-0294	20 York Drive	26-Mar-10	Plat 22 Lot 20	0022-020.000	J	
0806-0887	26 York Drive	25-Jun-08	Plat 22 Lot 23	0022-023.000	J	Indrain IA
1406-1729	52 Coventry Drive	30-Dec-14	Plat 29 Lot 51	0029-051.000	J	
1106-0446	1 Larchmont Drive	09-May-11	Plat 29 Lot 61	0029-061.000	J	
1406-1020	40 York Drive	31-Jul-14	Plat 29 Lot 73	0029-073.000	J	
1106-1408	76 Coventry Drive	07-Dec-11	Plat 29 Lot 83	0029-083.000	J	Indrain IA
0906-0012	92 Coventry Drive	06-Jan-09	Plat 29 Lot 87	0029-087.000	J	Indrain IA
1206-0207	8 Lawnwood Road	01-Mar-12	Plat 29 Lot 92	0029-092.000	J	
1406-1256	10 Lawnwood Road	17-Sep-14	Plat 29 Lot 93	0029-093.000	J	
1206-0185	6 Angelwood Road	28-Feb-12	Plat 29 Lot 96	0029-096.000	J	
0806-0724	57 Coventry Drive	27-May-08	Plat 29 Lot 159	0029-159.000	J	
1206-0961	3 Audrey Court	31-Aug-12	Plat 29 Lot 169	0029-169.000	J	
1106-0232	25 Coventry Drive	23-Mar-11	Plat 29 Lot 176	0029-176.000	J	
1006-0517	26 Charlotte Street	14-May-10	Plat 29 Lot 185	0029-185.000	J	
1106-1219	65 Lionel Street	13-Oct-11	Plat 29 Lot 197	0029-197.000	J	Indrain IA
0706-0040	43 Lionel Avenue	07-Jul-08	Plat 29 Lot 201	0029-201.000	J	
1006-0915	7 Larchmont Drive	12-Aug-10	Plat 30 Lot 70	0030-070.000	J	
1406-1001	9 Haywood Road	30-Jul-14	Plat 30 Lot 164	0030-164.000	J	
0806-0974	8 West Lake Road	17-Jul-08	Plat 706 Lot 74	#N/A	J	Indrain IA
1306-0754	124 Misanuck Road	19-Jun-13	Plat 4 Lot 14	#N/A	J	
1406-0697	30 Lionel Avenue	30-May-14	Plat 180 Lot 29	#N/A	J	Indrain IA
0906-0796	18 Hancock Drive	05-Aug-09	Plat 20 Lot 25	0020-025.000	K	
1106-1030	11 Garfield Drive	31-Aug-11	Plat 20 Lot 39	0020-039.000	K	Indrain IA
1406-0632	10 Garfield Drive	21-May-14	Plat 20 Lot 43	0020-043.000	K	
1006-0442	14 Helen Avenue	04-May-10	Plat 21 Lot 126	0021-126.000	K	
0906-0540	26 Helen Avenue	08-Jun-09	Plat 21 Lot 129	0021-129.000	K	
0806-1350	34 Helen Avenue	07-Oct-08	Plat 21 Lot 131	0021-131.000	K	
1406-0329	54 Helen Avenue	26-Mar-14	Plat 21 Lot 136	0021-136.000	K	Indrain IA
1006-0375	60 Helen Avenue	16-Apr-10	Plat 21 Lot 139	0021-139.000	K	
0806-0356	64 Helen Avenue	19-Mar-08	Plat 21 Lot 141	0021-141.000	K	
0806-1447	74 Helen Avenue	31-Oct-08	Plat 21 Lot 146	0021-146.000	K	
1406-0982	16 Monroe Drive	25-Jul-14	Plat 21 Lot 156	0021-156.000	K	
1006-0414	24 Monroe Drive	26-Apr-10	Plat 21 Lot 160	0021-160.000	K	
1106-0817	83 Helen Avenue	20-Jul-11	Plat 21 Lot 177	0021-177.000	K	Indrain IA
1406-0622	81 Helen Avenue	20-May-14	Plat 21 Lot 178	0021-178.000	K	
1206-0863	29 Linwood Road	02-Aug-12	Plat 21 Lot 184	0021-184.000	K	Indrain IA
0906-0517	6 Deborah	02-Jun-09	Plat 21 Lot 211	0021-211.000	K	
0906-0789	18 Noella Avenue	04-Aug-09	Plat 21 Lot 222	0021-222.000	K	
1106-0091	57 Lorraine Avenue	10-Feb-11	Plat 21 Lot 232	0021-232.000	K	Indrain IA
0906-1205	21 Lorraine Avenue	13-Nov-09	Plat 21 Lot 239	0021-239.000	K	Indrain IA
1006-0957	18 Lorraine Avenue	23-Aug-10	Plat 21 Lot 247	0021-247.000	K	Indrain IA
1206-1301	55 Maude Avenue	23-Nov-12	Plat 21 Lot 261	0021-261.000	K	
1206-0332	32 Maude Avenue	30-Mar-12	Plat 21 Lot 277	0021-277.000	K	
1306-0513	40 Maude Avenue	10-May-13	Plat 21 Lot 279	0021-279.000	K	
1306-0837	15 Helen Avenue	03-Jul-13	Plat 21 Lot 295	0021-295.000	K	
0806-0389	3 Linwood Drive	26-Mar-08	Plat 21 Lot 310	0021-310.000	K	Indrain IA
1106-0467	96 Jefferson Drive	11-May-11	Plat 28 Lot 27	0028-027.000	K	Indrain IA
0906-0674	4 Hancock Drive	07-Jul-09	Plat 28 Lot 33	0028-033.000	K	
0806-1057	25 Clifton Street	04-Aug-08	Plat 29 Lot 133	0029-133.000	K	Indrain IA
0806-1531	68 Helen Avenue	20-Nov-08	Plat 26 Lot 186	#N/A	K	
0906-0147	42 Lorraine Avenue	26-Feb-09	Plat 26 Lot 193	#N/A	K	
1106-0515	14 Lowell Street	20-May-11	Plat 28 Lot 16	0028-016.000	L	Indrain IA
1206-0712	276 South Main Street	25-Jun-12	Plat 29 Lot 15	0029-015.000	L	Indrain IA
1006-0241	10 Robbins Drive	22-Mar-10	Plat 36 Lot 11	0036-011.000	L	Indrain IA
1006-0244	14 Robbins Drive	22-Mar-10	Plat 36 Lot 12	0036-012.000	L	Indrain IA
0806-0287	22 Robbins Drive	27-Feb-08	Plat 36 Lot 14	0036-014.000	L	
0906-0271	21 Lowell Street	06-Apr-09	Plat 36 Lot 18	0036-018.000	L	
0906-0353	17 Lowell Street	29-Apr-09	Plat 36 Lot 19	0036-019.000	L	
0906-0877	17 Robbins Drive	28-Aug-09	Plat 37 Lot 1	0037-001.000	L	Indrain IA
0906-0865	9 Robbins Drive	24-Aug-09	Plat 37 Lot 2	0037-002.000	L	
0806-0514	33 Barber Street	23-Apr-08	Plat 37 Lot 24	0037-024.000	L	
0806-0945	23 Manor Drive	11-Jul-08	Plat 37 Lot 38	0037-038.000	L	
1406-0669	117 South Main Street	23-May-14	Plat 37 Lot 52	0037-052.000	L	
1206-0465	13 Beaton Street	26-Apr-12	Plat 37 Lot 75	0037-075.000	L	
1306-1248	10 Sunset Avenue	02-Oct-13	Plat 37 Lot 76	0037-076.000	L	
1006-0321	10 Sunapee Court	08-Apr-10	Plat 37 Lot 78 Sublot 3	0037-078.000	L	
0806-0413	109 South Main Street	02-Apr-08	Plat 37 Lot 86	0037-086.000	L	
0706-1360	9395 South Main Street	17-Jul-14	Plat 37 Lot 89	0037-089.000	L	
1006-0443	7 Dell Street	04-May-10	Plat 37 Lot 143	0037-143.000	L	Indrain IA
0906-1080	18 Woodland Avenue	15-Oct-09	Plat 37 Lot 157	0037-157.000	L	Indrain IA
1106-0302	29 Wood Street	07-Apr-11	Plat 37 Lot 168	0037-168.000	L	Indrain IA
0906-0346	148-150 So Main Street	23-Apr-09	Plat 37 Lot 178	0037-178.000	L	
1206-0951	14 Woburn Street	29-Aug-12	Plat 37 Lot 190	0037-190.000	L	
1006-1139	22 Woburn Street	01-Oct-10	Plat 37 Lot 192	0037-192.000	L	Indrain IA
1306-1644	155 Rathbun Street	27-Dec-13	Plat 37 Lot 196	0037-196.000	L	
1406-0897	137 Rathbun Street	11-Jul-14	Plat 37 Lot 198	0037-198.000	L	Indrain IA
1106-1170	113 Rathbun Street	30-Sep-11	Plat 37 Lot 201	0037-201.000	L	Indrain IA
1206-1069	188 South Main Street	27-Sep-12	Plat 37 Lot 204	0037-204.000	L	
1406-0322	10 Brentwood Drive	24-Mar-14	Plat 38 Lot 109	0038-109.000	L	Indrain IA

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1106-0308	25 Brentwood Drive	11-Apr-11	Plat 38 Lot 112	0038-112.000	L	
1306-1165	15 Brentwood Drive	17-Sep-13	Plat 38 Lot 115	0038-115.000	L	Indrain IA
0806-0146	22 South Main Street	23-Jan-08	Plat 45 Lot 69	0045-069.000	L	
1106-0860	38 S Main Street	28-Jul-11	Plat 45 Lot 80	0045-080.000	L	
1106-1236	21 Kilton Lane	17-Oct-11	Plat 45 Lot 88	0045-088.000	L	
1306-0014	62 South Main Street	08-Jan-13	Plat 45 Lot 92	0045-092.000	L	Indrain IA
1206-0976	73 South Main Street	07-Sep-12	Plat 45 Lot 97	0045-097.000	L	Indrain IA
1006-0123	18 Sunapee Court	17-Feb-10	Plat 45 Lot 98	0045-098.000	L	Indrain IA
1006-0611	46 Sunapee court	04-Jun-10	Plat 45 Lot 102	0045-102.000	L	
0806-1436	21 Sunapee Court	27-Oct-08	Plat 45 Lot 109	0045-109.000	L	
1006-0965	67 South Main Street	24-Aug-10	Plat 45 Lot 115	0045-115.000	L	
1406-0542	33 Bank Street	02-May-14	Plat 45 Lot 132	0045-132.000	L	Indrain IA
1006-0318	8 Reservoir Road	08-Apr-10	Plat 27 Lot 100	0027-100.000	M	
0906-1320	10 Reservoir Road	22-Dec-09	Plat 27 Lot 101	0027-101.000	M	
1006-0518	12 Reservoir Road	17-May-10	Plat 27 Lot 102	0027-102.000	M	Indrain IA
1306-0529	84 Reservoir Road	13-May-13	Plat 43 Lot 015 Sublot 112	0043-015.112	M	Indrain IA
0806-1553	26 Poppin John Lane	24-Nov-08	Plat 43 Lot 35	0043-035.000	M	
1106-0510	28 Torch Lane	19-May-11	Plat 43 Lot 35	0043-035.000	M	
1106-0528	9 Milton Lane	23-May-11	Plat 43 Lot 35	0043-035.000	M	
1006-0022	89 Reservoir Road	12-Jan-10	Plat 43 Lot 28.01	#N/A	M	Indrain IA
1006-0464	4 Airport Road	06-May-10	Plat 510 Lot 7	#N/A	M	Indrain IA
1006-1155	2&4 Kitty Hawke Lane	06-Oct-10	Plat 44 Lot 35	#N/A	M	
1306-0542	25 Valiant Drive	15-May-13	Plat 510 Lot 32	#N/A	M	
1006-0466	9 Lynn Drive	06-May-10	Plat 27 Lot 126	0027-126.000	MELIM	
1106-0260	21 Sugar Maple Drive	30-Mar-11	Plat 35 Lot 1.002	0035-001.002	MELIM	
0906-0375	29 Sugar Maple Drive	30-Apr-09	Plat 35 Lot 1.010	0035-001.010	MELIM	
1406-1213	10 Wisteria Drive	08-Sep-14	Plat 27 Lot 5	0027-005.000	N	
0906-0922	4 Cherry Blossom	03-Sep-09	Plat 27 Lot 9 Sublot 31	0027-009.000	N	
1406-1093	1 Steere Lane	18-Aug-14	Plat 10 Lot 15	0010-015.000	N1	Indrain IA
1406-0737	8 Mapleroot Road	05-Jun-14	Plat 10 Lot 16	0010-016.000	N1	
1306-0929	2010 Nooseneck Hill Road	23-Jul-13	Plat 10 Lot 34	0010-034.000	N1	Indrain IA
0906-0470	10 Cherry Blosson Lane	21-May-09	Plat 27 Lot 12	0027-012.000	N1	
1206-0758	20 &22 Park Lane	09-Jul-12	Plat 520 Lot 183	#N/A	N1	Indrain IA
1206-0804	63 Linda Drive	18-Jul-12	Plat 140 Lot 63	#N/A	N1	Indrain IA
1306-1026	9 Park Lane	13-Aug-13	Plat 520 Lot 194	#N/A	N1	Indrain IA
1306-1026	7 Park Lane	13-Aug-13	Plat 520 Lot 196	#N/A	N1	
1406-0981	55-56 Park Lane	25-Jul-14	Plat 520 Lot 152	#N/A	N1	Indrain IA
1406-1141	4 Helen Drive	25-Aug-14	Plat 520 Lot 27	#N/A	N1	Indrain IA
1006-1232	54 Wood Cove Drive	25-Oct-10	Plat 18 Lot 24	0018-024.000	N-ELIM	
1106-0997	51 Wood Cove Drive	19-Aug-11	Plat 18 Lot 25	0018-025.000	N-ELIM	
9706-1713	39 Wood Cove Drive	02-Apr-13	Plat 18 Lot 31	0018-031.000	N-ELIM	
0906-0841	22 Circlewood Drive	18-Aug-09	Plat 18 Lot 55	0018-055.000	N-ELIM	Indrain IA
1006-0076	34 Circlewood Drive	01-Feb-10	Plat 18 Lot 61	0018-061.000	N-ELIM	
0906-1253	21 Magnolia Lane	01-Dec-09	Plat 18 Lot 66	0018-066.000	N-ELIM	Indrain IA
1006-0075	6 Circlewood Drive	29-Jan-10	Plat 18 Lot 78	0018-078.000	N-ELIM	
0306-0496	96 Wisteria Drive	03-May-10	Plat 18 Lot 129	0018-129.000	N-ELIM	Indrain IA
1006-0354	12 Red Maple Street	12-Apr-10	Plat 26 Lot 22	0026-022.000	N-ELIM	Indrain IA
1406-1115	40 Wisteria Drive	20-Aug-14	Plat 26 Lot 26	0026-026.000	N-ELIM	
1106-0414	4 Peach Tree Lane	03-May-11	Plat 26 Lot 59	0026-059.000	N-ELIM	Indrain IA
1006-0758	69 Wood Cove Drive	02-Jul-10	Plat 26 Lot 86	0026-086.000	N-ELIM	
1006-1038	12 Jack Pine Road	10-Sep-10	Plat 26 Lot 96	0026-096.000	N-ELIM	
0806-1469	85 Wood Cove Drive	06-Nov-08	Plat 26 Lot 101	0026-101.000	N-ELIM	
1406-0375	84 Woodcove Drive	01-Apr-14	Plat 26 Lot 120	0026-120.000	N-ELIM	
1306-1121	9 Red Maple	05-Sep-13	Plat 26 Lot 135	0026-135.000	N-ELIM	
1306-0271	7 Cherry Blossom Lane	25-Mar-13	Plat 27 Lot 25	0027-025.000	N-ELIM	
1106-0619	1 Cherry Blossom	13-Jun-11	Plat 27 Lot 26	0027-026.000	N-ELIM	
1106-0204	21 Wisteria Drive	18-Mar-11	Plat 27 Lot 44	0027-044.000	N-ELIM	
1406-0698	13 Wisteria Drive	03-Jun-14	Plat 27 Lot 47	0027-047.000	N-ELIM	
0806-1139	8 Westview Drive	21-Aug-08	Plat 27 Lot 51	0027-051.000	N-ELIM	
0906-1018	3 Blue Spruce Drive	30-Sep-09	Plat 27 Lot 92	0027-092.000	N-ELIM	
1006-1403	20 Lynn drive	15-Dec-10	Plat 27 Lot 143	0027-143.000	N-ELIM	Indrain IA
1406-0621	297 Pulaski Street	20-May-14	Plat 56 Lot 96	0056-096.000	O	Indrain IA
1006-1141	11 Wilshire Way	28-Sep-10	Plat 40 Lot 51	0040-051.000	OELIM	
1406-0788	9 Wilshire Way	18-Jun-14	Plat 40 Lot 52	0040-052.000	OELIM	
0806-0342	6 Sheffield Avenue	12-Mar-08	Plat 40 Lot 69	0040-069.000	OELIM	
1206-0413	6 Wilshire Way	16-Apr-12	Plat 40 Lot 75	0040-075.000	OELIM	Indrain IA
0906-0317	3 Fenland Drive	17-Apr-09	Plat 40 Lot 92	0040-092.000	OELIM	
1206-1207	156 Windsor Park Drive	31-Oct-12	Plat 48 Lot 26	0048-026.000	OELIM	
1306-1375	58 Roundway Drive	28-Oct-13	Plat 48 Lot 28	0048-028.000	OELIM	
1206-1106	14 Kimberly Avenue	09-Oct-12	Plat 48 Lot 38	0048-038.000	OELIM	Indrain IA
0906-0238	18 Kennington Avenue	31-Mar-09	Plat 48 Lot 45	0048-045.000	OELIM	Indrain IA
1306-0886	49 Windsor Park Drive	15-Jul-13	Plat 48 Lot 79	0048-079.000	OELIM	
0906-0614	2 Sophia's Way	22-Jun-09	Plat 48 Lot 84.013	0048-084.013	OELIM	Indrain IA
1406-0667	31 Edward Street	27-May-14	Plat 56 Lot 1	0056-001.000	P	
0906-1331	45 Bates Avenue	29-Dec-09	Plat 56 Lot 28	0056-028.000	P	Indrain IA
1006-0875	6 Ann Court	02-Aug-10	Plat 56 Lot 64	0056-064.000	P	Indrain IA
1206-0444	62 Taft Street	23-Apr-12	Plat 56 Lot 92	0056-092.000	P	
1306-1321	43 Hazard Avenue	17-Oct-13	Plat 63 Lot 116	0063-116.000	P	Indrain IA
0906-0968	36 Edward Street	15-Sep-09	Plat 63 Lot 120	0063-120.000	P	Indrain IA
1106-0909	27 Hazard Street	05-Aug-11	Plat 63 Lot 125	0063-125.000	P	
0806-0476	36 Hazard Street	16-Apr-08	Plat 63 Lot 132	0063-132.000	P	
1406-0106	10 Bassett Street	28-Jan-14	Plat 64 Lot 54	0064-054.000	P	
1106-0673	81 Read Avenue	22-Jun-11	Plat 64 Lot 58	0064-058.000	P	
1306-0302	65 Read Avenue	02-Apr-13	Plat 64 Lot 67	0064-067.000	P	Indrain IA
1006-0242	58 Bates Avenue	22-Mar-10	Plat 64 Lot 137	0064-137.000	P	Indrain IA
1006-0617	36 Raymond Street	07-Jun-10	Plat 64 Lot 144	0064-144.000	P	Indrain IA
1206-1242	27 Gerald Avenue	05-Nov-12	Plat 64 Lot 147	0064-147.000	P	
1306-0956	4 Gerald Avenue	26-Jul-13	Plat 64 Lot 150	0064-150.000	P	Indrain IA

Application #	Address	Approval Date	Assessor's Map/Lot		Planning Area	I/A
1206-1165	20 Gerald Avenue	17-Oct-12	Plat 64 Lot 153	0064-153.000	P	Indrain IA
1206-0173	17 Dion Street	24-Feb-12	Plat 64 Lot 157	0064-157.000	P	Indrain IA
0906-0382	40 Cecile Avenue	04-May-09	Plat 64 Lot 171	0064-171.000	P	
1206-0514	169 MacArthur Boulevard	07-May-12	Plat 64 Lot 212	0064-212.000	P	Indrain IA
1106-1380	8 Gadoury Avenue	25-Nov-11	Plat 64 Lot 4	0064-004.000	Q	Indrain IA
1006-1045	24 Gadoury Avenue	13-Sep-10	Plat 64 Lot 5	0064-005.000	Q	Indrain IA
1106-1378	123 Read Avenue	22-Nov-11	Plat 64 Lot 11	0064-011.000	Q	Indrain IA
0806-0303	41 Phillip Street	29-Feb-08	Plat 64 Lot 18	0064-018.000	Q	
1006-0523	25 Anderson Avenue	19-May-10	Plat 64 Lot 177	0064-177.000	Q	Indrain IA
1306-1553	9 Anderson Avenue	04-Dec-13	Plat 64 Lot 180	0064-180.000	Q	
1406-0841	31 Gadoury Street	27-Jun-14	Plat 64 Lot 196	0064-196.000	Q	Indrain IA
0906-0245	99 MacArther Blvd	01-Apr-09	Plat 64 Lot 222	0064-222.000	Q	Indrain IA
1406-1244	20 Morin Avenue	15-Sep-14	Plat 71 Lot 70	0071-070.000	Q	Indrain IA
1006-0222	274 Fairview Avenue	15-Mar-10	Plat 72 Lot 7	0072-007.000	Q	
0906-0400	376 Fairview Avenue	07-May-09	Plat 72 Lot 18	0072-018.000	Q	Indrain IA
1106-1217	146 Gough Avenue	12-Oct-11	Plat 72 Lot 110	0072-110.000	Q	Indrain IA
1106-1217	146 Gough Avenue	12-Dec-11	Plat 72 Lot 110	0072-110.000	Q	Indrain IA
1306-1478	23 Phillip Street	18-Nov-13	Plat 72 Lot 144	0072-144.000	Q	
1306-1085	309 Read Avenue	27-Aug-13	Plat 80 Lot 108	0080-108.000	Q	Indrain IA
1306-1366	291 Read Avenue	24-Oct-13	Plat 80 Lot 111	0080-111.000	Q	
1306-0402	306 Read Avenue	18-Apr-13	Plat 80 Lot 118	0080-118.000	Q	Indrain IA
1206-0249	310 Read Avenue	14-Mar-12	Plat 80 Lot 119	0080-119.000	Q	Indrain IA
1106-1339	6 Marshall Circle	10-Nov-11	Plat 80 Lot 122	0080-122.000	Q	Indrain IA
0806-1471	254 Fairview Avenue	07-Nov-08	Plat 80 Lot 125	0080-125.000	Q	Indrain IA
1206-1017	5 Alex Street	17-Sep-12	Plat 122 Lot 37	#N/A	Q	Indrain IA
1406-0438	28 Greenwood Avenue	10-Apr-14	Plat 103 Lot 80	#N/A	Q	Indrain IA
1406-1460	166 Read Avenue	24-Oct-14	Plat 72 Lot 51	#N/A	Q	
1106-0840	6 Ray Street	25-Jul-11	Plat 80 Lot 19	0080-019.000	R	
1006-0049	178 Fairview Avenue	21-Jan-10	Plat 80 Lot 40	0080-040.000	R	Indrain IA
1406-1142	37 Cynthia Drive	25-Aug-14	Plat 80 Lot 120	0080-120.000	R	
1406-1411	55 Fairview Avenue	16-Oct-14	Plat 88 Lot 8	0088-008.000	R	Indrain IA
1006-1267	36 Tobin Street	04-Nov-10	Plat 88 Lot 19	0088-019.000	R	Indrain IA
1406-1590	1 Dennis Street	19-Nov-14	Plat 88 Lot 42	0088-042.000	R	Indrain IA
0906-0450	6 Fones Street	18-May-09	Plat 88 Lot 47	0088-047.000	R	
1006-0602	22 Fones Street	02-Jun-10	Plat 88 Lot 50	0088-050.000	R	Indrain IA
1206-0998	53 Hillside Avenue	12-Sep-12	Plat 88 Lot 62	0088-062.000	R	Indrain IA
1006-1112	49 Hillside Avenue	23-Sep-10	Plat 88 Lot 63	0088-063.000	R	
1206-0756	16 Ray Street	09-Jul-12	Plat 80 Lot 21	#N/A	R	
1406-0811	179 Harris Avenue	20-Jun-14	Plat 80 Lot 41.1	#N/A	R	
1406-1083	57 Hillside Avenue	15-Aug-14	Plat 88 Lot 54.2	#N/A	R	Indrain IA
1406-1400	10 Fones Street	14-Oct-14	Plat 99 Lot 48	#N/A	R	Indrain IA
0806-1083	9 Notre Dame Street	07-Aug-08	Plat 88 Lot 73	0088-073.000	S	
1406-0683	48 Mumford Street	29-May-14	Plat 96 Lot 12	0096-012.000	S	Indrain IA
1206-1138	30 Ames Street	12-Oct-12	Plat 96 Lot 64	0096-064.000	S	Indrain IA
1106-1178	46 Ames Street	19-Dec-11	Plat 96 Lot 67	0096-067.000	S	
1206-0544	18 Lincoln Avenue	14-May-12	Plat 96 Lot 79	0096-079.000	S	Indrain IA
1106-1438	7 Notre Dame Street	15-Dec-11	Plat 96 Lot 104	0096-104.000	S	Indrain IA
1206-0094	46 Highland Avenue	03-Feb-12	Plat 104 Lot 15	0104-015.000	T	Indrain IA
1206-0858	1 Elm Street	01-Aug-12	Plat 104 Lot 71	0104-071.000	T	Indrain IA
1006-0171	20 Highland Avenue	02-Mar-10	Plat 104 Lot 77	0104-077.000	T	Indrain IA
1406-1319	10-12 Battey Avenue	25-Sep-14	Plat 46 Lot 4	0046-004.000	U	Indrain IA
1006-0498	5 Whipple Court	17-May-10	Plat 46 Lot 34	0046-034.000	U	Indrain IA
0906-0858	8 Sandy Bottom Road	21-Aug-09	Plat 46 Lot 36	0046-036.000	U	
1006-0099	40 Mapledale Street	08-Feb-10	Plat 54 Lot 134	0054-134.000	U	Indrain IA
1006-1350	20 Capwell Avenue	01-Dec-10	Plat 55 Lot 4	0055-004.000	U	Indrain IA
1006-0139	2 Mapledale Street	19-Feb-10	Plat 55 Lot 166	0055-166.000	U	
1306-0428	26 1/2 Mapledale Street	26-Apr-13	Plat 55 Lot 169	0055-169.000	U	
1306-0471	26 Mapledale Street	30-Apr-13	Plat 55 Lot 169	0055-169.000	U	
1306-0888	30 Meeting Street	15-Jul-13	Plat 63 Lot 21	0063-021.000	V	
1306-1115	14 Benoit Street	04-Sep-13	Plat 63 Lot 28	0063-028.000	V	Indrain IA
1306-0749	13-15 Benoit Street	17-Jun-13	Plat 63 Lot 32	0063-032.000	V	Indrain IA
1006-1275	21/23 Irene Lane	08-Nov-10	Plat 63 Lot 50	0063-050.000	V	Indrain IA
1406-1450	1 Puritan Avenue	22-Oct-14	Plat 63 Lot 60	0063-060.000	V	Indrain IA
1206-0301	3 Congdon Street	27-Mar-12	Plat 63 Lot 63	0063-063.000	V	Indrain IA
1406-1216	10 Nancy Court	10-Sep-14	Plat 63 Lot 75	0063-075.000	V	Indrain IA
1406-1199	18 Nancy Court	05-Sep-14	Plat 63 Lot 76	0063-076.000	V	Indrain IA
1206-0013	26 Benoit Street	06-Jan-12	Plat 63 Lot 79	0063-079.000	V	Indrain IA
0906-1245	20 Park Avenue	25-Nov-09	Plat 63 Lot 80	0063-080.000	V	Indrain IA
1306-1184	25 Nancy Court	20-Sep-13	Plat 63 Lot 80	0063-080.000	V	
1206-0645	5 Nancy Court	07-Jun-12	Plat 63 Lot 83	0063-083.000	V	
1206-0503	173 Blackrock Road	03-May-12	Plat 71 Lot 56	0071-056.000	V	
0906-0426	152 Blackrock Road	12-May-09	Plat 71 Lot 84	0071-084.000	V	
1406-0755	170 Blackrock Road	10-Jun-14	Plat 71 Lot 86	0071-086.000	V	
1406-0979	169 Boston Street	24-Jul-14	Plat 71 Lot 101	0071-101.000	V	
0806-0311	145 Boston Street	06-Mar-08	Plat 71 Lot 105	0071-105.000	V	
0906-1188	9 Kathy Avenue	09-Nov-09	Plat 60 Lot 5	0071-105.000	V	Indrain IA
1006-1389	Lane 6	10-Dec-10	Plat 2 Lot 3 Sublot 9	0071-105.000	V	Indrain IA
1106-1346	218 Shady Valley Road	10-Nov-11	Plat 49 Lot 37	0071-105.000	V	
1206-1227	11 Lemis Street	05-Nov-12	Plat 24 Lot 83	0071-105.000	V	Indrain IA
0706-1343	29-31 Holden Street	14-Sep-09	Plat 45 Lot 34	0045-034.000	W	Indrain IA
1106-0969	15 Holden Street	15-Aug-11	Plat 45 Lot 36	0045-036.000	W	
1006-0233	70 Station Street	16-Mar-10	Plat 53 Lot 33	0053-033.000	W	
1306-1256	10/12 Maple Street	02-Oct-13	Plat 53 Lot 52	0053-052.000	W	Indrain IA
0806-0511	34 Maple Street	23-Apr-08	Plat 53 Lot 55	0053-055.000	W	
1206-0193	81 Station Street	29-Feb-12	Plat 53 Lot 68	0053-068.000	W	
9906-2014	40 Holden Street	25-Feb-08	Plat 53 Lot 73	0053-073.000	W	
0906-1148	6 Francis Street	02-Nov-09	Plat 53 Lot 75	0053-075.000	W	
1206-0801	120 Maple Street	18-Jul-12	Plat 54 Lot 1	0054-001.000	W	

Application #	Address	Approval Date	Assessor's Map/Lot		Planning Area	I/A
0806-0790	76 Knotty Oak Road	06-Jun-08	Plat 54 Lot 11	0054-011.000	W	
1406-0820	30 Meredith Drive	23-Jun-14	Plat 54 Lot 31	0054-031.000	W	
1306-0164	27 Valley Crest Road	26-Feb-13	Plat 54 Lot 45	0054-045.000	W	
0906-0704	8 Valley Crest Drive	13-Jul-09	Plat 54 Lot 51	0054-051.000	W	
0806-1452	11 Meredith Drive	03-Nov-08	Plat 54 Lot 74	0054-074.000	W	Indrain IA
1406-0512	11 Long Pond Road	28-Apr-14	Plat 54 Lot 75	0054-075.000	W	Indrain IA
1206-1379	31 & 33 Capwell Avenue	18-Dec-12	Plat 54 Lot 109	0054-109.000	W	
1106-0206	44 Knotty Oak Road	21-Mar-11	Plat 54 Lot 148	0054-148.000	W	
1206-1182	125 Maple Street	23-Oct-12	Plat 54 Lot 149	0054-149.000	W	Indrain IA
1106-1092	186 Station Street	16-Sep-11	Plat 61 Lot 10	0061-010.000	W	Indrain IA
1306-1532	168 Knotty Oak	15-Nov-13	Plat 62 Lot 3	0062-003.000	W	Indrain IA
1006-0631	192 Knotty Oak Road	09-Jun-10	Plat 62 Lot 9	0062-009.000	W	Indrain IA
1206-0948	238 Knotty Oak Road	29-Aug-12	Plat 62 Lot 16	0062-016.000	W	Indrain IA
0606-1715	171 Knotty Oak Road	07-Jul-10	Plat 62 Lot 45	0062-045.000	W	Indrain IA
1006-1077	24 Long Pond Road	21-Sep-10	Plat 62 Lot 73	0062-073.000	W	Indrain IA
0806-1323	26 Maple Street	30-Sep-08	Plat 53 Lot 54	#N/A	W	
0906-0243	22 Maple Street	01-Apr-09	Plat 53 Lot 54	#N/A	W	
0906-0243	22 Maple Street	22-Sep-10	Plat 53 Lot 54	#N/A	W	
1106-0975	11-15 Mashie Circle	17-Aug-11	Plat 61 Lot 13.1	#N/A	W	Indrain IA
1306-0767	20 Battey Avenue	19-Jun-13	Plat 46 Lot 5	#N/A	W	
1406-0753	274 Knotty Oak Road	10-Jun-14	Plat 62 Lot 21.002	0062-021.002	X	
1306-0494	21 Whiterock Road	07-May-13	Plat 62 Lot 25	0062-025.000	X	
1206-0934	46 Benoit Street	27-Aug-12	Plat 62 Lot 84	0062-084.000	X	Indrain IA
1206-0077	436 Knotty Oak Road	27-Jan-12	Plat 70 Lot 65	0070-065.000	X	
1006-0774	42 Breezy Lake Drive	23-Jul-10	Plat 70 Lot 69	0070-069.000	X	Indrain IA
1306-0392	19 Breezy Lake Drive	16-Apr-13	Plat 70 Lot 82	0070-082.000	X	
1006-0625	17 Breezy Lake Drive	08-Jun-10	Plat 70 Lot 83	0070-083.000	X	
1206-1048	3 Breezy Lake Drive	21-Sep-12	Plat 70 Lot 85	0070-085.000	X	
1006-0639	91 Gervais Street	10-Jun-10	Plat 70 Lot 89	0070-089.000	X	Indrain IA
1106-1172	25 Gervais Street	03-Oct-11	Plat 70 Lot 95	0070-095.000	X	Indrain IA
1406-0011	437 Knotty Oak Road	03-Jan-14	Plat 70 Lot 100	0070-100.000	X	
1006-0646	4 White Rock Drive	11-Jun-10	Plat 70 Lot 113	0070-113.000	X	
1106-1276	8 White Rock Road	27-Oct-11	Plat 70 Lot 115	0070-115.000	X	
1006-1379	361 Knotty Oak Road	09-Dec-10	Plat 70 Lot 126	0070-126.000	X	Indrain IA
0906-0335	8 Pond View Drive	23-Apr-09	Plat 71 Lot 17	0071-017.000	X	Indrain IA
1406-0323	10 Pond View Drive	24-Mar-14	Plat 71 Lot 18	0071-018.000	X	Indrain IA
0806-0492	115 Gervais Street	21-Apr-08	Plat 71 Lot 39	0071-039.000	X	
1006-0714	48 Breezy Lake Drive	24-Jun-10	Plat 71 Lot 47	0071-047.000	X	Indrain IA
0906-0347	2 Breezy Lake Drive	24-Apr-09	Plat 71 Lot 48	0071-048.000	X	
1206-0312	11 David Drive	28-Mar-12	Plat 78 Lot 61	0078-061.000	X	Indrain IA
1406-0729	7 David Drive	05-Jun-14	Plat 78 Lot 62	0078-062.000	X	Indrain IA
0906-0175	434 Knotty Oak Road	13-Mar-09	Plat 70 Lot 64.1	#N/A	X	Indrain IA
0906-1081	34 Breezy lake Drive	13-Oct-09	Plat 5 Lot 28 & 29	#N/A	X	Indrain IA
1406-0439	10 White Rock Drive	10-Apr-14	Plat 116 Lot 70	#N/A	X	
1006-0575	31 Centennial Street	27-May-10	Plat 79 Lot 18.014	0079-018.014	XELIM	
1006-0379	3 Centennial Street	19-Apr-10	Plat 79 Lot 34	0079-034.000	XELIM	Indrain IA
1206-0208	8 Centennial Street	02-Mar-12	Plat 79 Lot 57	0079-057.000	XELIM	Indrain IA
1306-1336	19 LaForge Drive	21-Oct-13	Plat 79 Lot 58	0079-058.000	XELIM	Indrain IA
1206-0600	2 LaForge Drive	29-May-12	Plat 79 Lot 4.1	#N/A	XELIM	Indrain IA
1106-0273	5 Country View Drive	01-Apr-11	Plat 79 Lot 76.02	0079-076.020	YELIM	
1306-0914	19 Manning Court	19-Jul-13	Plat 79 Lot 78	0079-078.000	YELIM	
1206-1318	10 Hickory Road	28-Nov-12	Plat 79 Lot 84	0079-084.000	YELIM	Indrain IA
1406-0361	415 Blackrock Road	28-Mar-14	Plat 79 Lot 93	0079-093.000	YELIM	Indrain IA
1406-0274	16 Hornbeam Road	14-Mar-14	Plat 87 Lot 11	0087-011.000	YELIM	Indrain IA
1306-0924	11 Hornbeam Road	22-Jul-13	Plat 87 Lot 17	0087-017.000	YELIM	Indrain IA
1306-1077	5 Sandalwood Court	26-Aug-13	Plat 87 Lot 75	0087-075.000	YELIM	Indrain IA
0906-0775	4 Country View Drive	31-Jul-09	Plat 79 Lot 76.4	#N/A	YELIM	
1306-0316	10 Hickory Road	03-Apr-13	Plat 74 Lot 84	#N/A	YELIM	Indrain IA
1306-0443	7 Countryview Drive	01-May-13	Plat 79 Lot 76	#N/A	YELIM	
1306-0629	3 Country View Drive	31-May-13	Plat 79 Lot 76.21	#N/A	YELIM	Indrain IA
1006-0440	50 Rebecca Street	03-May-10	Plat 95 Lot 59	0095-059.000	Z	
1406-0883	121 Howard Avenue	07-Jul-14	Plat 95 Lot 72	0095-072.000	Z	
1306-0372	105 Howard Avenue	12-Apr-13	Plat 95 Lot 74	0095-074.000	Z	Indrain IA
1206-0947	48 Cedar Street	29-Aug-12	Plat 95 Lot 87	0095-087.000	Z	
1206-1194	56 Cedar Street	24-Oct-12	Plat 95 Lot 89	0095-089.000	Z	
1106-1104	60 Cedar Street	20-Sep-11	Plat 95 Lot 96	0095-096.000	Z	Indrain IA
1306-1233	64 Cedar Street	27-Sep-13	Plat 95 Lot 97	0095-097.000	Z	Indrain IA
1306-1568	4 Eleanor Drive	09-Dec-13	Plat 95 Lot 99	0095-099.000	Z	Indrain IA
1106-1027	5 Eleanor Drive	30-Aug-11	Plat 95 Lot 100	0095-100.000	Z	Indrain IA
0806-0667	86 Howard Avenue	14-May-08	Plat 95 Lot 82.1	#N/A	Z	Indrain IA
0906-0444	41-47 Howard Avenue	14-May-09	Plat 96 Lot 18.02	#N/A	Z	Indrain IA
1406-0956	41-47 Howard Avenue	21-Jul-14	Plat 96 Lot 18.2	#N/A	Z	
1106-0655	606 Blackrock Road	21-Jun-11	Plat 87 Lot 35	0087-035.000	ZELIM	Indrain IA
0906-0464	137 Hill Street	19-May-09	Plat 95 Lot 42	0095-042.000	ZELIM	
1106-0695	4 Paulette Drive	27-Jun-11	Plat 95 Lot 43	0095-043.000	ZELIM	Indrain IA
1406-1720	12 Paulette Drive	26-Dec-14	Plat 95 Lot 44	0095-044.000	ZELIM	Indrain IA
1006-1039	19 Paulette Drive	10-Sep-10	Plat 95 Lot 53	0095-053.000	ZELIM	
1306-1465	15 Rebbecca Street	14-Nov-13	Plat 95 Lot 108	0095-108.000	ZELIM	
0906-0164	143 Howard Avenue	05-Mar-09	Plat 103 Lot 31	0103-031.000	ZELIM	Indrain IA
1006-0234	230 Howard Avenue	16-Mar-10	Plat 103 Lot 39	0103-039.000	ZELIM	
1106-0872	119 Hill Street	01-Aug-11	Plat 103 Lot 49	0103-049.000	ZELIM	
1106-1173	97 Hill Street	03-Oct-11	Plat 103 Lot 50	0103-050.000	ZELIM	Indrain IA
0806-0683	93 Hill Street	16-May-08	Plat 103 Lot 52	0103-052.000	ZELIM	
0606-2194	33R Hill Street	12-Feb-08	Plat 103 Lot 58	0103-058.000	ZELIM	Indrain IA
1306-1324	2-4 Henry Court	17-Oct-13	Plat 103 Lot 70	0103-070.000	ZELIM	Indrain IA
1006-0567	38 Colvin Street	25-May-10	Plat 103 Lot 72	0103-072.000	ZELIM	Indrain IA

Area #	Design Year[1]	Domestic Flow[2]											Industrial Flows[2]					Commercial Flows[2]							Institutional Flows[2]							Infiltration/Inflow[3]		Total	Peaking Factor[4]		Peak
		SF Units	Multi Family Lots	Multi Family Units	Apartments Lots	Apartments Units	Mobile Home	Seasonal Properties	Vacant Res.	Connected Units	Est. Total Pop.	Flow gpd	Total Lots	Total Acres	Connected Units	Connected Acres	Flow gpd	Total Lots	Total Acres	Vacant Comm.	Total Acres	Connected Units	Connected Acres	Flow gpd	Total Lots	Total Acres	Vacant Lots	Vacant Acres	Connecte Units	Connected Acres	Flow gpd	Pipeline Inch-Miles	Flow gpd	Flow (ADF) gpd	Res. & Comm.	Ind. & Other	Flow gpd
A	2015	241	2	4	1	7	0	0	27	12	756	1,873	7	4.7	1	0.9	922	9	24.2	7	48.9	3	5.8	63,588	0	0.0	0	0.0	0	0.0	0	2.0	490	66,873	3.88	2	255,998
(Note 5)	2020	246	2	4	1	7	0	0	22	17	771	11,856	7	4.7	1	0.9	922	10	31.1	6	41.9	4	12.8	64,650	0	0.0	0	0.0	0	0.0	0	2.7	674	78,102	3.87	2	298,595
	2035	259	2	4	1	7	0	0	9	30	786	14,586	7	4.7	1	0.9	922	11	38.1	5	34.9	5	19.8	66,744	0	0.0	0	0.0	0	0.0	0	4.4	1,103	83,355	3.86	2	317,287
PHASE III	2065	268	2	4	1	7	0	0	0	279	837	66,876	7	4.7	7	4.7	2,796	12	45.1	4	27.9	12	45.1	74,333	0	0.0	0	0.0	0	0.0	0	37.0	14,800	158,805	3.85	2	563,833
	BO	268	2	4	1	7	0	0	0	279	837	66,876	7	4.7	7	4.7	2,796	16	73.0	0	0.0	16	73.0	82,708	0	0.0	0	0.0	0	0.0	0	37.0	18,500	170,880	3.85	2	599,766
B	2015	169	4	12	2	104	0	0	18	149	855	15,430	0	0.0	0	0.0	0	3	0.8	0	0.0	0	0.0	0	2	0.1	0	0.00	0	0.00	0	7.5	1,875	17,304	3.84	2	61,169
	2020	173	4	12	2	104	0	0	14	153	872	16,270	0	0.0	0	0.0	0	3	0.8	0	0.0	0	0.0	0	2	0.1	0	0.0	0	0.0	0	7.7	1,925	18,195	3.84	2	64,361
	2035	182	4	12	2	104	0	0	5	162	889	18,160	0	0.0	0	0.0	0	3	0.8	0	0.0	0	0.0	0	2	0.1	0	0.0	0	0.0	0	8.2	2,038	20,198	3.83	2	71,633
PHASE III	2065	187	4	12	2	104	0	0	0	303	907	47,770	0	0.0	0	0.0	0	3	0.8	0	0.0	3	0.8	241	2	0.1	0	0.0	2	0.1	41	15.5	6,200	54,253	3.83	2	190,018
	BO	187	4	12	2	104	0	0	0	303	909	47,770	0	0.0	0	0.0	0	3	0.8	0	0.0	3	0.8	241	2	0.1	0	0.0	2	0.1	41	15.5	7,750	55,803	3.83	2	191,539
C	2015	159	5	12	0	0	0	6	15	0	531	0	0	0.0	0	0.0	0	0	0.0	1	0.2	0	0.0	0	1	8.1	0	0.00	0	0.00	0	0.0	0	0	3.96	2	0
(Note 6)	2020	163	5	12	0	0	0	6	11	28	542	8,190	0	0.0	0	0.0	0	0	0.0	1	0.2	0	0.0	0	1	8.1	0	0.0	0	0.0	0	1.7	429	8,619	3.96	2	32,829
PHASE II	2035	171	5	12	0	0	0	6	3	189	553	42,000	0	0.0	0	0.0	0	1	0.2	0	0.0	1	0.2	52	1	8.1	0	0.0	1	8.1	2,436	11.9	4,165	48,654	3.95	2	175,200
	2065	174	5	12	0	0	0	6	0	192	576	42,630	0	0.0	0	0.0	0	1	0.2	0	0.0	1	0.2	52	1	8.1	0	0.0	1	8.1	2,436	11.9	4,760	49,879	3.94	2	177,879
	BO	174	5	12	0	0	0	6	0	192	576	42,630	0	0.0	0	0.0	0	1	0.2	0	0.0	1	0.2	52	1	8.1	0	0.0	1	8.1	2,436	11.9	5,950	51,069	3.94	2	179,069
D	2015	251	2	8	0	0	0	0	1	1	777	193	0	0.0	0	0.0	0	3	1.4	2	0.6	0	0.0	0	0	0.0	0	0.00	0	0.00	0	0.1	21	213	3.87	2	766
	2020	252	2	8	0	0	0	0	0	2	780	403	0	0.0	0	0.0	0	4	1.7	1	0.3	1	0.3	95	0	0.0	0	0.0	0	0.0	0	0.2	62	559	3.87	2	1,985
PHASE II	2035	252	2	8	0	0	0	0	0	260	780	54,583	0	0.0	0	0.0	0	5	2.0	0	0.0	5	2.0	602	0	0.0	0	0.0	0	0.0	0	21.8	7,630	62,814	3.87	2	221,027
	2065	252	2	8	0	0	0	0	0	260	780	54,583	0	0.0	0	0.0	0	5	2.0	0	0.0	5	2.0	602	0	0.0	0	0.0	0	0.0	0	21.8	8,720	63,904	3.87	2	222,117
	BO	252	2	8	0	0	0	0	0	260	780	54,583	0	0.0	0	0.0	0	5	2.0	0	0.0	5	2.0	602	0	0.0	0	0.0	0	0.0	0	21.8	10,900	66,084	3.87	2	224,297
E	2015	293	19	45	2	34	0	0	13	3	1116	600	1	6.8	0	0.0	0	2	0.8	1	0.3	0	0.0	0	5	16.5	1	0.24	0	0.00	0	0.2	60	660	3.77	2	2,323
	2020	299	19	45	2	34	0	0	7	9	1138	1,860	1	6.8	0	0.0	0	3	1.0	0	0.0	1	0.3	76	5	16.5	1	0.2	0	0.0	0	0.8	199	2,136	3.76	2	7,486
PHASE II	2035	306	19	45	2	34	0	0	0	385	1155	80,820	1	6.8	1	6.8	3,393	3	1.0	0	0.0	3	1.0	307	5	16.5	1	0.2	5	16.5	4,939	31.5	11,025	100,485	3.76	2	332,630
	2065	306	19	45	2	34	0	0	0	385	1155	80,820	1	6.8	1	6.8	3,393	3	1.0	0	0.0	3	1.0	307	6	16.7	0	0.0	6	16.7	5,012	31.5	12,600	102,133	3.76	2	334,351
	BO	306	19	45	2	34	0	0	0	385	1155	80,820	1	6.8	1	6.8	3,393	3	1.0	0	0.0	3	1.0	307	6	16.7	0	0.0	6	16.7	5,012	31.5	15,750	105,283	3.76	2	337,501
F	2015	7	4	10	3	21	0	0	7	19	114	10,407	2	2.9	0	0.0	0	92	165.6	10	24.3	31	53.4	15,956	4	15.4	1	0.51	1	14.07	963	14.2	3,560	30,886	4.23	2	116,937
(Note 7)	2020	8	4	10	3	21	0	0	6	39	117	36,023	2	2.9	2	2.9	1,457	94	170.5	8	19.4	94	170.5	51,086	4	15.4	1	0.5	4	15.4	1,359	43.0	15,050	104,975	4.22	2	388,657
PHASE I	2035	8	4	10	3	21	0	0	6	39	120	36,023	2	2.9	2	2.9	1,457	102	189.9	0	0.0	102	189.9	56,912	4	15.4	1	0.5	4	15.4	1,359	43.0	15,050	110,801	4.22	2	412,964
	2065	8	4	10	3	21	0	0	6	39	135	36,023	2	2.9	2	2.9	1,457	102	189.9	0	0.0	102	189.9	56,912	5	15.9	0	0.0	5	15.9	1,511	43.0	17,200	113,102	4.21	2	413,977
	BO	14	4	10	3	21	0	0	0	45	135	37,283	2	2.9	2	2.9	1,457	102	189.9	0	0.0	102	189.9	56,912	5	15.9	0	0.0	5	15.9	1,511	43.0	21,500	118,662	4.21	2	423,576
G	2015	222	2	4	0	0	0	0	26	31	678	3,396	1	0.3	0	0.0	0	5	2.4	0	0.0	0	0.0	0	0	0.0	0	0.00	0	0.00	0	2.4	607	4,002	3.90	2	13,858
(Note 8)	2020	227	2	4	0	0	0	0	21	231	692	56,436	1	0.3	1	0.3	172	5	2.4	0	0.0	5	2.4	721	0	0.0	0	0.0	0	0.0	0	20.2	7,070	64,398	3.90	2	230,178
PHASE I	2035	239	2	4	0	0	0	0	9	243	706	58,956	1	0.3	1	0.3	172	5	2.4	0	0.0	5	2.4	721	0	0.0	0	0.0	0	0.0	0	20.2	7,070	66,918	3.89	2	239,700
	2065	248	2	4	0	0	0	0	0	252	756	60,846	1	0.3	1	0.3	172	5	2.4	0	0.0	5	2.4	721	0	0.0	0	0.0	0	0.0	0	20.2	8,080	69,818	3.88	2	246,997
	BO	248	2	4	0	0	0	0	0	252	756	60,846	1	0.3	1	0.3	172	5	2.4	0	0.0	5	2.4	721	0	0.0	0	0.0	0	0.0	0	20.2	10,100	71,838	3.88	2	249,017
H	2015	357	4	8	0	0	0	0	7	0	1095	0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	4	8.2	0	0.00	0	0.00	0	0.0	0	0	3.77	2	0
	2020	364	4	8	0	0	0	0	0	0	1116	0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	4	8.2	0	0.0	0	0.0	0	0.0	0	0	3.77	2	0
PHASE II	2035	364	4	8	0	0	0	0	0	372	1116	78,120	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	4	8.2	0	0.0	4	8.2	2,461	35.0	12,250	92,831	3.77	2	311,587
	2065	364	4	8	0	0	0	0	0	372	1116	78,120	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	4	8.2	0	0.0	4	8.2	2,461	35.0	14,000	94,581	3.77	2	313,337
	BO	364	4	8	0	0	0	0	0	372	1116	78,120	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	4	8.2	0	0.0	4	8.2	2,461	35.0	17,500	98,081	3.77	2	316,837
I	2015	99	1	2	0	0	0	1	3	0	306	0	2	27.9	1	26.8	274	6	41.1	2	23.0	0	0.0	0	3	11.3	0	0.00	0	0.00	0	0.1	23	297	4.07	2	571
(Note 9)	2020	101	1	2	0	0	0	1	1	2	312	420	2	27.9	1	26.8	274	7	52.6	1	11.5	1	11.5	3,444	3	11.3	0	0.0	0	0.0	0	0.4	92	4,229	4.07	2	16,369
PHASE II	2035	102	1	2	0	0	0	1	0	105	315	22,050	2	27.9	2	27.9	837	8	64.1	0	0.0	8	64.1	12,338	3	11.3	0	0.0	3	11.3	3,384	10.8	3,780	42,389	4.07	2	152,158
	2065	102	1	2	0	0	0	1	0	105	315	22,050	2	27.9	2	27.9	837	8	64.1	0	0.0	8	64.1	12,338	3	11.3	0	0.0	3	11.3	3,384	10.8	4,320	42,929	4.07	2	152,698
	BO	102	1	2	0	0	0	1	0	105	315	22,050	2	27.9	2	27.9	837	8	64.1	0	0.0	8	64.1	12,338	3	11.3	0	0.0	3	11.3	3,384	10.8	5,400	44,009	4.07	2	153,778
J	2015	464	3	6	0	0	0	0	29	84	1410	14,685	4	12.2	0	0.0	0	10	26.7	10	75.0	0	0.0	0	4	10.4	0	0.00	0	0.00	0	5.2	1,307	15,992	3.70	2	55,626
(Note 10,11)	2020	474	3	6	0	0	0	0	19	94	1438	194,329	4	12.2	0	0.0	0	11	34.2	9	67.5	1	7.5	2,251	4	10.4	0	0.0	0	0.0	0	5.9	1,478	198,059	3.69	2	727,400
PHASE II	2035	493	3	6	0	0	0	0	0	499	1466	279,379	4	12.2	4	12.2	6,124	20	101.7	0	0.0	20	101.7	7,995	4	10.4	0	0.0	4	10.4	3,111	32.8	11,480	308,090	3.69	2	1,089,424
	2065	493	3	6	0	0	0	0	0	499	1497	279,379	4	12.2	4	12.2	6,124	20	101.7	0	0.0	20	101.7	7,995	4	10.4	0	0.0	4	10.4	3,111	32.8	13,120	309,730	3.68	2	1,089,182
	BO	493	3	6	0	0	0	0	0	499	1497	279,379	4	12.2	4	12.2	6,124	20	101.7	0	0.0	20	101.7	7,995	4	10.4	0	0.0	4	10.4	3,111	32.8	16,400	313,010	3.68	2	1,092,462
K	2015	281	1	3	0	0	0	0	2	1	852	143	0	0.0	0	0.0	0	1	4.1	4	1.6	0	0.0	0	0	0.0	0	0.00	0	0.00	0	0.1	24	167	3.84	2	575
	2020	283	1	3	0	0	0	0	0	3	858	563	0	0.0	0	0.0	0	2	4.5	3	1.2	1	0.4	117	0	0.0	0	0.0	0	0.0	0	0.4	96	775	3.84	2	2,708
PHASE II	2035	283	1	3	0	0	0	0	0	286	858	59,993	0	0.0	0	0.0	0	5	5.7	0	0.0	5	5.7	1,695	0	0.0	0	0.0	0	0.0	0	27.8	9,730	71,419	3.84	2	246,732
	2065	283	1	3	0	0	0	0	0	286	858	59,993	0	0.0	0	0.0	0	5	5.7	0	0.0	5	5.7	1,695	0	0.0	0	0.0	0	0.0	0	27.8	11,120	72,809	3.84	2	248,122
	BO	283	1	3	0	0	0	0	0	286	858	59,993	0	0.0	0	0.0	0	5	5.7	0	0.0	5	5.7	1,695	0	0.0	0	0.0	0	0.0	0	27.8	13,900	75,589	3.84	2	250,902
L	2015	292	25	63	1	8	0	0	14	5	1089	743	2	1.5	0	0.0	0	7	4.4	1	0.8	2	1.0	287	4	25.4	0	0.00	0	0.00	0	0.7	172	1,202	3.78	2	4,060
	2020	298	25	63	1	8	0	0	8	11	1111	2,003	2	1.5	0	0.0	0	8	5.2	0	0.0	3	1.8	539	4	25.4	0	0.0	0	0.0	0	1.4	345	2,886	3.77	2	9,926
PHASE II	2035	306	25	63	1	8	0	0	0	377	1131	78,863	2	1.5	2	1.5	766	8	5.2	0	0.0	8	5.2	1,567	4	25.4	0	0.0	4	25.4	7,609	38.5	13,475	102,279	3.76	2	333,033
	2065	306	25	63	1	8	0	0	0	377	1131	78,863	2	1.5	2	1.5	766	8	5.2	0	0.0	8	5.2	1,567	4	25.4	0	0.0	4	25.4	7,609	38.5	15,400	104,204	3.76	2	334,958
	BO	306	25	63	1	8	0	0	0	377	1131	78,863	2	1.5	2	1.5	766	8	5.2	0	0.0	8	5.2	1,567	4	25.4	0	0.0	4	25.4	7,609	38.5	19,250	108,054	3.76	2	338,808
M	2015	73	0	0	0	0	0	0	9	0	219	0	1	1.2	0	0.0	0	6	106.3	3	5.2	1	77.1	14,536	5	72.1	0	0.00	0	0.00	0	0.0	12	14,548	4.13	2	60,094
	2020	75	0	0	0	0	0	0	7	2	224	420	1	1.2	0	0.0	0	7	108.1	2	3.5	2	78.9	15,056	5	72.1	0	0.0	0	0.0	0	0.2	48	15,524	4.13	2	63,958
PHASE III	2035	79	0	0	0	0	0	0	3	6	229	1,260	1	1.2	0	0.0	0	8	109.8	1	1.7	3	80.6	15,576	5	72.1	0	0.0	0	0.0	0	0.4	109	16,945	4.13	2	69,573
	2065	82	0	0	0	0	0	0	0	82	234	17,220	1	1.2	1	1.2	603	9	111.5	0	0.0	9	111.5	24,852	5	72.1	0	0.0	5	72.1	21,623	4.7	1,880	66,178	4.12	2	219,769
	BO	82	0	0	0	0	0	0	0	82	246	17,220	1	1.2	1	1.2	603	9	111.5	0	0.0	9	111.5	24,852	5	72.1	0	0.0	5	72.1	21,623	4.7	2,350	66,648	4.11	2	219,881

Area #	Design Year[1]	Domestic Flow[2]											Industrial Flows[2]					Commercial Flows[2]							Institutional Flows[2]							Infiltration/Inflow[3]		Total	Peaking Factor[4]		Peak
		SF	Multi Family		Apartments		Mobile	Seasonal	Vacant	Connected	Est. Total	Flow	Total	Total	Connected	Connected	Flow	Total	Total	Vacant	Total	Connected	Connected	Flow	Total	Total	Vacant	Vacant	Connecte	Connected	Flow	Pipeline	Flow	Flow (ADF)	Res. &	Ind. &	Flow
		Units	Lots	Units	Lots	Units	Home	Properties	Res.	Units	Pop.	gpd	Lots	Acres	Units	Acres	gpd	Lots	Acres	Comm.	Acres	Units	Acres	gpd	Lots	Acres	Lots	Acres	Units	Acres	gpd	Inch-Miles	gpd	gpd	Comm.	Other	gpd
N	2015	8	0	0	0	0	0	0	5	0	24	0	0	0.0	0	0.0	0	2	2.4	3	6.0	0	0.0	0	0	0.0	1	1.51	0	0.00	0	0.0	0	0	4.37	2	0
	2020	9	0	0	0	0	0	0	4	1	25	210	0	0.0	0	0.0	0	3	4.4	2	4.0	1	2.0	601	0	0.0	1	1.5	0	0.0	0	0.4	100	911	4.37	2	3,641
PHASE III	2035	9	0	0	0	0	0	0	4	1	26	210	0	0.0	0	0.0	0	4	6.4	1	2.0	2	4.0	1,202	0	0.0	1	1.5	0	0.0	0	1.8	630	2,042	4.36	2	6,791
	2065	10	0	0	0	0	0	0	3	2	27	420	0	0.0	0	0.0	0	5	8.4	0	0.0	3	6.0	1,802	0	0.0	1	1.5	0	0.0	0	1.8	720	2,942	4.36	2	10,414
	BO	13	0	0	0	0	0	0	0	5	39	1,050	0	0.0	0	0.0	0	5	8.4	0	0.0	3	6.0	1,802	1	1.5	0	0.0	1	1.5	452	1.8	900	4,205	4.34	2	14,171
N1	2015	20	0	0	0	0	187	0	0	0	621	0	1	4.1	0	0.0	0	17	41.8	5	15.6	0	0.0	0	2	3.4	0	0.00	0	0.00	0	0.0	0	0	3.92	2	0
	2020	20	0	0	0	0	187	0	0	0	621	0	1	4.1	0	0.0	0	18	44.9	4	12.5	0	0.0	0	2	3.4	0	0.0	0	0.0	0	0.0	0	0	3.92	2	0
PHASE II	2035	20	0	0	0	0	187	0	0	207	621	43,470	1	4.1	1	4.1	2,059	19	57.4	3	0.0	19	57.4	17,209	2	3.4	0	0.0	2	3.4	1,010	13.6	4,760	68,508	3.92	2	248,998
	2065	20	0	0	0	0	187	0	0	207	621	43,470	1	4.1	1	4.1	2,059	20	57.4	3	0.0	20	57.4	17,209	2	3.4	0	0.0	2	3.4	1,010	13.6	5,440	69,188	3.92	2	249,678
	BO	20	0	0	0	0	187	0	0	207	621	43,470	1	4.1	1	4.1	2,059	22	57.4	1	0.0	22	57.4	17,209	2	3.4	0	0.0	2	3.4	1,010	13.6	6,800	70,548	3.92	2	251,038
O	2015	12	10	26	0	0	0	0	10	16	114	1,578	0	0.0	0	0.0	0	3	2.5	1	0.3	2	1.3	132	0	0.0	1	0.20	0	0.00	0	8.2	2,040	3,750	4.23	2	9,269
	2020	13	10	26	0	0	0	0	9	17	117	1,788	0	0.0	0	0.0	0	4	2.8	0	0.0	3	1.5	217	0	0.0	1	0.2	0	0.0	0	9.1	2,267	4,271	4.22	2	10,735
PHASE III	2035	13	10	26	0	0	0	0	9	17	120	1,788	0	0.0	0	0.0	0	4	2.8	0	0.0	3	1.5	217	0	0.0	1	0.2	0	0.0	0	9.1	2,267	4,271	4.22	2	10,728
	2065	14	10	26	0	0	0	0	8	18	123	1,998	0	0.0	0	0.0	0	4	2.8	0	0.0	3	1.5	217	0	0.0	1	0.2	0	0.0	0	13.6	5,440	7,655	4.22	2	14,781
	BO	22	10	26	0	0	0	0	0	26	144	3,678	0	0.0	0	0.0	0	4	2.8	0	0.0	3	1.5	217	1	0.2	0	0.0	1	0.2	59	13.6	6,800	10,754	4.20	2	23,263
P	2015	243	46	108	2	14	0	0	16	29	1093.5	3,269	2	4.3	1	3.8	8,186	17	12.3	0	0.0	3	1.2	75	10	15.5	3	1.23	0	0.00	0	2.4	592	12,122	3.77	2	29,588
(Note 12)	2020	248	46	108	2	14	0	0	11	370	1115	74,774	2	4.3	2	4.3	80,241	17	12.3	0	0.0	17	12.3	3,425	10	15.5	3	1.2	10	15.5	4,662	29.6	10,360	173,461	3.77	2	474,898
PHASE I	2035	259	46	108	2	14	0	0	0	381	1137	77,084	2	4.3	2	4.3	80,241	17	12.3	0	0.0	17	12.3	3,425	10	15.5	3	1.2	10	15.5	4,662	29.6	10,360	175,771	3.76	2	483,148
	2065	259	46	108	2	14	0	0	0	381	1141.5	77,084	2	4.3	2	4.3	80,241	17	12.3	0	0.0	17	12.3	3,425	11	15.9	2	0.8	11	15.9	4,785	29.6	11,840	177,374	3.76	2	484,781
	BO	259	46	108	2	14	0	0	0	381	1141.5	77,084	2	4.3	2	4.3	80,241	17	12.3	0	0.0	17	12.3	3,425	13	16.8	0	0.0	13	16.8	5,031	29.6	14,800	180,580	3.76	2	488,233
Q	2015	285	20	44	4	30	0	0	36	7	1077	870	1	0.6	0	0.0	0	1	0.6	0	0.0	0	0.0	0	1	7.2	0	0.00	0	0.00	0	0.7	170	1,039	3.78	2	3,456
	2020	291	20	44	4	30	0	0	30	13	1098	2,130	1	0.6	0	0.0	0	1	0.6	0	0.0	0	0.0	0	1	7.2	0	0.0	0	0.0	0	1.3	315	2,445	3.77	2	8,352
PHASE II	2035	307	20	44	4	30	0	0	14	381	1120	79,410	1	0.6	1	0.6	283	1	0.6	0	0.0	1	0.6	186	1	7.2	0	0.0	1	7.2	2,147	38.6	13,510	95,536	3.77	2	318,267
	2065	321	20	44	4	30	0	0	0	395	1185	82,350	1	0.6	1	0.6	283	1	0.6	0	0.0	1	0.6	186	1	7.2	0	0.0	1	7.2	2,147	38.6	15,440	100,406	3.75	2	329,915
	BO	321	20	44	4	30	0	0	0	395	1185	82,350	1	0.6	1	0.6	283	1	0.6	0	0.0	1	0.6	186	1	7.2	0	0.0	1	7.2	2,147	38.6	19,300	104,266	3.75	2	333,775
R	2015	124	4	10	0	0	0	0	22	11	402	1,099	0	0.0	0	0.0	0	1	0.4	0	0.0	0	0.0	0	1	2.3	0	0.00	1	2.33	6	0.9	230	1,335	4.02	2	4,663
	2020	127	4	10	0	0	0	0	19	14	410	1,729	0	0.0	0	0.0	0	1	0.4	0	0.0	0	0.0	0	1	2.3	0	0.0	1	2.3	6	1.1	287	2,023	4.02	2	7,247
PHASE II	2035	134	4	10	0	0	0	0	12	144	418	29,029	0	0.0	0	0.0	0	1	0.4	0	0.0	1	0.4	123	1	2.3	0	0.0	1	2.3	6	12.1	4,235	33,394	4.01	2	121,236
	2065	140	4	10	0	0	0	0	6	150	468	30,289	0	0.0	0	0.0	0	1	0.4	0	0.0	1	0.4	123	1	2.3	0	0.0	1	2.3	6	12.1	4,840	35,259	3.99	2	126,162
	BO	146	4	10	0	0	0	0	0	156	468	31,549	0	0.0	0	0.0	0	1	0.4	0	0.0	1	0.4	123	1	2.3	0	0.0	1	2.3	6	12.1	6,050	37,729	3.99	2	132,398
S	2015	59	18	44	1	12	0	0	8	5	345	656	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0	0.0	0	0.00	0	0.00	0	0.4	110	766	4.05	2	2,767
	2020	61	18	44	1	12	0	0	6	7	352	1,076	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0.6	154	1,230	4.05	2	4,509
PHASE II	2035	64	18	44	1	12	0	0	3	120	359	24,806	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	10.8	3,780	28,586	4.04	2	104,096
	2065	67	18	44	1	12	0	0	0	123	369	25,436	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	10.8	4,320	29,756	4.04	2	107,044
	BO	67	18	44	1	12	0	0	0	123	369	25,436	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	10.8	5,400	30,836	4.04	2	108,124
T	2015	62	22	46	0	0	0	0	13	13	324	4,949	4	17.1	1	4.0	920	6	3.9	4	9.4	4	3.3	16,016	0	0.0	0	0.00	0	0.00	0	2.1	527	22,412	4.06	2	87,569
(Note 13)	2020	64	22	46	0	0	0	0	11	15	331	5,369	4	17.1	1	4.0	920	7	6.3	3	7.1	5	5.6	16,722	0	0.0	0	0.0	0	0.0	0	2.5	614	23,626	4.06	2	92,142
PHASE III	2035	67	22	46	0	0	0	0	8	18	338	5,999	4	17.1	1	4.0	920	8	8.6	2	4.7	6	8.0	17,428	0	0.0	0	0.0	0	0.0	0	2.9	731	25,079	4.06	2	97,589
	2065	70	22	46	0	0	0	0	5	116	345	35,814	4	17.1	4	17.1	7,468	9	11.0	1	2.4	9	11.0	18,323	0	0.0	0	0.0	0	0.0	0	15.8	6,200	67,805	4.05	2	240,491
	BO	75	22	46	0	0	0	0	0	121	363	36,864	4	17.1	4	17.1	7,468	10	13.3	0	0.0	10	13.3	19,029	0	0.0	0	0.0	0	0.0	0	15.8	7,750	71,111	4.04	2	248,596
U	2015	59	48	134	5	39	0	0	7	52	696	5,460	1	3.7	1	3.7	3,126	71	56.2	1	0.2	33	30.0	12,840	15	37.2	1	0.58	1	12.14	6,186	10.0	2,507	30,119	3.90	2	92,429
(Note 14)	2020	61	48	134	5	39	0	0	5	234	710	63,391	1	3.7	1	3.7	3,126	72	56.4	0	0.0	72	56.4	20,780	15	37.2	1	0.6	15	37.2	13,700	37.1	9,277	110,274	3.89	2	370,437
PHASE I	2035	64	48	134	5	39	0	0	2	237	717	64,021	1	3.7	1	3.7	3,126	72	56.4	0	0.0	72	56.4	20,780	15	37.2	1	0.6	15	37.2	13,700	37.8	13,230	114,857	3.89	2	376,632
	2065	66	48	134	5	39	0	0	0	239	717	64,441	1	3.7	1	3.7	3,126	72	56.4	0	0.0	72	56.4	20,780	16	37.8	0	0.0	16	37.8	13,874	37.8	15,120	117,341	3.89	2	380,504
	BO	66	48	134	5	39	0	0	0	239	717	64,441	1	3.7	1	3.7	3,126	72	56.4	0	0.0	72	56.4	20,780	16	37.8	0	0.0	16	37.8	13,874	37.8	18,900	121,121	3.89	2	384,284
V	2015	131	58	135	7	91	0	0	10	94	1071	15,493	0	0.0	0	0.0	0	4	13.9	1	0.8	1	0.5	20	4	7.2	0	0.00	0	0.00	0	3.3	827	16,341	3.78	2	59,479
	2020	134	58	135	7	91	0	0	7	97	1092	16,123	0	0.0	0	0.0	0	5	14.7	0	0.0	2	1.3	252	4	7.2	0	0.0	0	0.0	0	3.4	862	17,238	3.78	2	62,680
PHASE II	2035	141	58	135	7	91	0	0	0	367	1101	72,823	0	0.0	0	0.0	0	5	14.7	0	0.0	5	14.7	4,408	4	7.2	0	0.0	4	7.2	2,162	13.1	4,585	83,978	3.77	2	300,279
	2065	141	58	135	7	91	0	0	0	367	1101	72,823	0	0.0	0	0.0	0	5	14.7	0	0.0	5	14.7	4,408	4	7.2	0	0.0	4	7.2	2,162	13.1	5,240	84,633	3.77	2	300,934
	BO	141	58	135	7	91	0	0	0	367	1101	72,823	0	0.0	0	0.0	0	5	14.7	0	0.0	5	14.7	4,408	4	7.2	0	0.0	4	7.2	2,162	13.1	6,550	85,943	3.77	2	302,244
W	2015	204	21	52	1	8	0	0	16	0	792	0	0	0.0	0	0.0	0	3	1.9	0	0.0	0	0.0	0	5	126.1	0	0.00	0	0.00	0	0.0	0	0	3.86	2	0
(Note 15)	2020	208	21	52	1	8	0	0	12	4	808	840	0	0.0	0	0.0	0	3	1.9	0	0.0	0	0.0	0	5	126.1	0	0.0	0	0.0	0	0.3	73	913	3.86	2	3,314
PHASE II	2035	220	21	52	1	8	0	0	0	280	824	62,710	0	0.0	0	0.0	0	3	1.9	0	0.0	3	1.9	563	5	126.1	0	0.0	5	126.1	37,845	21.1	7,385	108,503	3.85	2	326,844
	2065	220	21	52	1	8	0	0	0	280	840	62,710	0	0.0	0	0.0	0	3	1.9	0	0.0	3	1.9	563	5	126.1	0	0.0	5	126.1	37,845	21.1	8,440	109,558	3.85	2	327,577
	BO	220	21	52	1	8	0	0	0	280	840	62,710	0	0.0	0	0.0	0	3	1.9	0	0.0	3	1.9	563	5	126.1	0	0.0	5	126.1	37,845	21.1	10,550	111,668	3.85	2	329,687
X	2015	180	4	8	0	0	0	1	7	0	567	0	0	0.0	0	0.0	0	7	26.0	0	0.0	0	0.0	0	2	9.7	0	0.00	0	0.00	0	0.0	0	0	3.95	2	0
	2020	184	4	8	0	0	0	0	3	4	579	840	0	0.0	0	0.0	0	7	26.0	0	0.0	0	0.0	0	2	9.7	0	0.0	0	0.0	0	0.4	89	929	3.94	2	3,400
PHASE III	2035	187	4	8	0	0	0	0	0	7	591	1,470	0	0.0	0	0.0	0	7	26.0	0	0.0	0	0.0	0	2	9.7	0	0.0	0	0.0	0			1,470	3.94	2	5,786
	2065	187	4	8	0	0	0	0	0	195	603	40,950	0	0.0	0	0.0	0	7	26.0	0	0.0	7	26.0	7,802	2	9.7	0	0.0	2	9.7	2,907	18.3	7,300	58,959	3.93	2	204,757
	BO	187	4	8	0	0	0	0	0	195	585	40,950	0	0.0	0	0.0	0	7	26.0	0	0.0	7	26.0	7,802	2	9.7	0	0.0	2	9.7	2,907	18.3	9,125	60,784	3.94	2	206,932
Y	2015	108	1	2	0	0	0	0	6	0	330	0	0	0.0	0	0.0	0	1	8.8	0	0.0	0	0.0	0	0	0.0	0	0.00	0	0.00	0	0.0	0	0	4.06	2	0
Elim. 2010	~~2020~~	~~108~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~6~~	~~0~~	~~330~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~8.8~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	4.06	2	0
PHASE NA	~~2035~~	~~108~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~6~~	~~0~~	~~330~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~8.8~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	4.06	2	0
	~~2065~~	~~108~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~6~~	~~0~~	~~330~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~8.8~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	4.06	2	0
	~~BO~~	~~108~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~6~~	~~0~~	~~330~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~8.8~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	4.06	2	0
Z	2015	114	1	3	0	0	0	0	8	0	351	0	4	8.9	0	0.0	0	0	0.0	1	0.1	0	0.0	0	4	4.3	0	0.00	0	0.00	0	0.0	0	0	4.05	2	0
(Note 16)	2020	117	1	3	0	0	0	0	5	3	358	630	4	8.9	0	0.0	0	0	0.0	1	0.1	0	0.0	0	4	4.3	0	0.0	0	0.0	0	0.2	48	678	4.04	2	2,597
PHASE II	2035	122	1	3	0	0	0	0	0	125	365	36,374	4	8.9	4	8.9	4,431	1	0.1	0	0.0	1	0.1	36	4	4.3	0	0.0	4	4.3	1,305	8.7	3,031	45,177	4.04	2	161,626
	2065	122	1	3	0	0	0	0	0	125	375	36,374	4	8.9	4	8.9	4,431	1	0.1	0	0.0	1	0.1	36	4	4.3	0	0.0	4	4.3	1,305	8.7	3,464	45,610	4.04	2	161,861
	BO	122	1	3	0	0	0	0	0	125	375	36,374	4	8.9	4	8.9	4,431	1	0.1	0	0.0	1	0.1	36	4	4.3	0	0.0	4	4.3	1,305	8.7	4,330	46,476	4.04	2	162,727

Area #	Design Year[1]	Domestic Flow[2]											Industrial Flows[2]					Commercial Flows[2]							Institutional Flows[2]							Infiltration/Inflow[3]		Total Flow (ADF) gpd	Peaking Factor[4]		Peak Flow gpd
		SF Units	Multi Family Lots	Multi Family Units	Apartments Lots	Apartments Units	Mobile Home	Seasonal Properties	Vacant Res.	Connected Units	Est. Total Pop.	Flow gpd	Total Lots	Total Acres	Connected Units	Connected Acres	Flow gpd	Total Lots	Total Acres	Vacant Comm.	Total Acres	Connected Units	Connected Acres	Flow gpd	Total Lots	Total Acres	Vacant Lots	Vacant Acres	Connecte Units	Connected Acres	Flow gpd	Pipeline Inch-Miles	Flow gpd		Res. & Comm.	Ind. & Other	
AA	2015	196	0	0	0	0	0	0	11	0	588	0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0	0.0	0	0.00	0	0.00	0			0	3.94	2	0
Elim 2003	~~2020~~	~~196~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~11~~	~~0~~	~~588~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.94	2	0
PHASE NA	~~2035~~	~~196~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~11~~	~~0~~	~~588~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.94	2	0
	~~2065~~	~~196~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~11~~	~~0~~	~~588~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.94	2	0
	~~BO~~	~~196~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~11~~	~~0~~	~~588~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.94	2	0
AB	2015	220	6	16	0	0	0	4	28	0	720	0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	1	0.3	0	0.00	0	0.00	0	~~0.0~~	~~0~~	0	3.89	2	0
Elim 2003	~~2020~~	~~220~~	~~6~~	~~16~~	~~0~~	~~0~~	~~0~~	~~4~~	~~28~~	~~0~~	~~720~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.3~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.89	2	0
PHASE NA	~~2035~~	~~220~~	~~6~~	~~16~~	~~0~~	~~0~~	~~0~~	~~4~~	~~28~~	~~0~~	~~720~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.3~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.89	2	0
	~~2065~~	~~220~~	~~6~~	~~16~~	~~0~~	~~0~~	~~0~~	~~4~~	~~28~~	~~0~~	~~720~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.3~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.89	2	0
	~~BO~~	~~220~~	~~6~~	~~16~~	~~0~~	~~0~~	~~0~~	4	~~28~~	~~0~~	~~720~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.3~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.89	2	0
AC	2015	182	1	2	0	0	0	0	11	0	552	0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	1	0.5	0	0.00	0	0.00	0	~~0.0~~	~~0~~	0	3.95	2	0
Elim. 1995	~~2020~~	~~182~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~11~~	~~0~~	~~552~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.95	2	0
PHASE NA	~~2035~~	~~182~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~11~~	~~0~~	~~552~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.95	2	0
	~~2065~~	~~182~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~11~~	~~0~~	~~552~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.95	2	0
	~~BO~~	~~182~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~11~~	~~0~~	~~552~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	3.95	2	0
AD	2015	139	1	2	0	0	0	0	2	0	423	0	1	0.1	0	0.0	0	2	39.5	0	0.0	0	0.0	0	1	0.0	0	0.00	0	0.00	0	~~0.0~~	~~0~~	0	4.01	2	0
Elim. 2010	~~2020~~	~~139~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~2~~	~~0~~	~~423~~	~~0~~	~~1~~	~~0.1~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~39.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	4.01	2	0
PHASE NA	~~2035~~	~~139~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~2~~	~~0~~	~~423~~	~~0~~	~~1~~	~~0.1~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~39.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~4.01~~	~~2~~	0
	~~2065~~	~~139~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~2~~	~~0~~	~~423~~	~~0~~	~~1~~	~~0.1~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~39.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~4.01~~	~~2~~	0
	~~BO~~	~~139~~	~~1~~	~~2~~	~~0~~	~~0~~	~~0~~	~~0~~	~~2~~	~~0~~	~~423~~	~~0~~	~~1~~	~~0.1~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~39.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~4.01~~	~~2~~	0
AE	2015	86	3	8	0	0	0	0	0	0	282	0	8	40.3	0	0.0	0	6	5.9	2	8.2	1	0.2	19	3	36.4	0	0.00	0	0.00	0	0.2	40	59	4.09	2	117
	2020	86	3	8	0	0	0	0	0	0	288	0	8	40.3	0	0.0	0	7	9.9	1	4.1	2	4.3	1,244	3	36.4	0	0.0	0	0.0	0	0.3	81	1,324	4.09	2	5,163
PHASE III	2035	86	3	8	0	0	0	0	0	0	294	0	8	40.3	0	0.0	0	8	14.0	0	0.0	3	8.4	2,469	3	36.4	0	0.0	0	0.0	0	0.5	121	2,590	4.08	2	10,199
	2065	86	3	8	0	0	0	0	0	94	300	19,740	8	40.3	8	40.3	20,153	8	14.0	0	0.0	8	14.0	4,164	3	36.4	0	0.0	3	36.4	10,925	18.3	7,300	62,282	4.08	2	166,946
	BO	86	3	8	0	0	0	0	0	94	282	19,740	8	40.3	8	40.3	20,153	8	14.0	0	0.0	8	14.0	4,164	3	36.4	0	0.0	3	36.4	10,925	18.3	9,125	64,107	4.09	2	169,042
AF	2015	200	0	0	0	0	0	0	1	0	600	0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0	0.0	0	0.00	0	0.00	0	~~0.0~~	~~0~~	0	3.93	2	0
Elim. 2010	~~2020~~	~~200~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~1~~	~~0~~	~~600~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~3.93~~	~~2~~	~~0~~
PHASE NA	~~2035~~	~~200~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~1~~	~~0~~	~~600~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~3.93~~	~~2~~	~~0~~
	~~2065~~	~~200~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~1~~	~~0~~	~~600~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~3.93~~	~~2~~	~~0~~
	~~BO~~	~~200~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~1~~	~~0~~	~~600~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~3.93~~	~~2~~	~~0~~
AG	2015	141	0	0	0	0	0	0	4	1	423	1,090	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	2	0.5	0	0.00	0	0.00	0	~~0.0~~	~~0~~	1,090	4.01	2	4,371
Elim. 1995	~~2020~~	~~141~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	4	~~1~~	~~423~~	~~1090~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~0.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1090~~	~~4.01~~	~~2~~	~~4,371~~
PHASE NA	~~2035~~	~~141~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	4	~~1~~	~~423~~	~~1090~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~0.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1090~~	~~4.01~~	~~2~~	~~4,371~~
	~~2065~~	~~141~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	4	~~1~~	~~423~~	~~1090~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~0.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1090~~	~~4.01~~	~~2~~	~~4,371~~
	~~BO~~	~~141~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~4~~	~~1~~	~~423~~	~~1090~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~0.5~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~1090~~	~~4.01~~	~~2~~	~~4,371~~
AH	2015	82	0	0	0	0	0	7	6	0	267	0	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0	0	0	0.0	0	0.00	0	0.0	0	~~0.0~~	~~0~~	0	4.10	2	0
Elim. 1995	~~2020~~	~~82~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~7~~	~~6~~	~~0~~	~~267~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~4.10~~	~~2~~	~~0~~
PHASE NA	~~2035~~	~~82~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~7~~	~~6~~	~~0~~	~~267~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~4.10~~	~~2~~	~~0~~
	~~2065~~	~~82~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~7~~	~~6~~	~~0~~	~~267~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~4.10~~	~~2~~	~~0~~
	~~BO~~	~~82~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~7~~	~~6~~	~~0~~	~~267~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~0~~	~~4.10~~	~~2~~	~~0~~
AI	~~2015~~	~~74~~	~~5~~	~~11~~	~~0~~	~~0~~	~~0~~	~~1~~	~~9~~	~~0~~	~~258~~	~~0~~	~~3~~	~~9.8~~	~~0~~	~~0.0~~	~~0~~	~~4~~	~~5.8~~	~~1~~	~~0.2~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~2.1~~	~~0~~	~~0.00~~	~~0~~	~~0.0~~	~~0~~	~~N/A~~	~~0~~	~~0~~	~~4.11~~	~~2~~	~~0~~
Elim. 1995	~~2020~~	~~74~~	~~5~~	~~11~~	~~0~~	~~0~~	~~0~~	~~1~~	~~9~~	~~0~~	~~258~~	~~0~~	~~3~~	~~9.8~~	~~0~~	~~0.0~~	~~0~~	4	~~5.8~~	~~1~~	~~0.2~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~2.1~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~N/A~~	~~0~~	~~0~~	~~4.11~~	~~2~~	~~0~~
PHASE NA	~~2035~~	~~74~~	~~5~~	~~11~~	~~0~~	~~0~~	~~0~~	~~1~~	~~9~~	~~0~~	~~258~~	~~0~~	~~3~~	~~9.8~~	~~0~~	~~0.0~~	~~0~~	4	~~5.8~~	~~1~~	~~0.2~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~2.1~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~N/A~~	~~0~~	~~0~~	~~4.11~~	~~2~~	~~0~~
	~~2065~~	~~74~~	~~5~~	~~11~~	~~0~~	~~0~~	~~0~~	~~1~~	~~9~~	~~0~~	~~258~~	~~0~~	~~3~~	~~9.8~~	~~0~~	~~0.0~~	~~0~~	4	~~5.8~~	~~1~~	~~0.2~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~2.1~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~N/A~~	~~0~~	~~0~~	~~4.11~~	~~2~~	~~0~~
	~~BO~~	~~74~~	~~5~~	~~11~~	~~0~~	~~0~~	~~0~~	~~1~~	~~9~~	~~0~~	~~258~~	~~0~~	~~3~~	~~9.8~~	~~0~~	~~0.0~~	~~0~~	4	~~5.8~~	~~1~~	~~0.2~~	~~0~~	~~0.0~~	~~0~~	~~2~~	~~2.1~~	~~0~~	~~0.0~~	~~0~~	~~0.0~~	~~0~~	~~N/A~~	~~0~~	~~0~~	~~4.11~~	~~2~~	~~0~~
WM	2015	0	0	0	3	70	0	0	0	70	210	15,751	0	0.0	0	0.0	0	12	113.3	0	0.0	12	113.3	48,741	1	2.5	0	0.00	1	2.52	205	6.0	1,496	66,192	4.14	2	268,917
(Note 17)	2020	0	0	0	3	70	0	0	0	70	210	15,751	0	0.0	0	0.0	0	12	113.3	0	0.0	12	113.3	48,741	1	2.5	0	0.0	1	2.5	205	6.0	2,094	66,791	4.14	2	269,515
PHASE NA	2035	0	0	0	3	70	0	0	0	70	210	15,751	0	0.0	0	0.0	0	12	113.3	0	0.0	12	113.3	48,741	1	2.5	0	0.0	1	2.5	205	6.0	2,094	66,791	4.14	2	269,515
	2065	0	0	0	3	70	0	0	0	70	210	15,751	0	0.0	0	0.0	0	12	113.3	0	0.0	12	113.3	48,741	1	2.5	0	0.0	1	2.5	205	6.0	2,393	67,090	4.14	2	269,814
	BO	0	0	0	3	70	0	0	0	70	210	15,751	0	0.0	0	0.0	0	12	113.3	0	0.0	12	113.3	48,741	1	2.5	0	0.0	1	2.5	205	6.0	2,992	67,688	4.14	2	270,412
ZZ	2015	3415	26	68	1	8	0	32	422	0	10569	0	4	109.05	0	0	0	40	396.65	25	121.771988	0	0	0	114	0	1	0	0	0	0	0	0	0	NA	NA	0
(Not in	2020	3482	26	68	1	8	0	32	355	0	10775	0	4	109.0	0	0.0	0	41	401.5	24	116.9	0	0.0	0	114	0.0	1	0.0	0	0.0	0	0.0	0	0	NA	NA	0
Selected	2035	3668	26	68	1	8	0	32	169	0	10985	0	4	109.0	0	0.0	0	42	406.4	23	112.0	0	0.0	0	114	0.0	1	0.0	0	0.0	0	0.0	0	0	NA	NA	0
Plan)	2065	3837	26	68	1	8	0	32	0	0	11199	0	4	109.0	0	0.0	0	43	411.3	22	107.2	0	0.0	0	117	0.0	-2	0.0	0	0.0	0	0.0	0	0	NA	NA	0
	BO	3837	26	68	1	8	0	32	0	0	11835	0	4	109.0	0	0.0	0	65	518.4	0	0.0	0	0.0	0	115	0.0	0	0.0	0	0.0	0	0.0	0	0	NA	NA	0
Total	2015	5,817	341	828	29	368	0	20	407	533	21,098	81,934	44	142	5	39	13,428	272	558	55	205	81	174	123,470	84	417	8	4	3	29	7,155	61	15,192	307,372	2.6	2.0	596,405
Selected	2020	5,908	341	828	29	368	0	19	316	1,371	21,415	498,763	44	142	9	43	87,112	288	602	39	161	215	370	181,274	84	417	8	4	30	70	19,726	171	51,996	905,662	2.6	2.0	2,049,202
Plan	2035	6,059	341	828	29	368	0	19	165	5,032	21,675	1,281,607	44	142	22	74	102,671	317	719	10	44	279	581	215,346	84	417	8	4	65	295	87,125	472	162,770	1,984,818	2.6	2.0	4,460,552
	2065	6,118	341	828	29	368	0	19	106	5,917	22,053	1,476,692	44	142	40	132	131,848	321	732	6	30	311	675	243,446	88	419	4	3	81	415	123,143	570	227,864	2,339,270	2.6	2.0	5,227,292
	BO	6,146	341	828	29	368	0	19	78	5,945	22,082	1,482,572	44	142	40	132	131,848	326	763	1	0	316	705	252,527	92	421	0	0	85	418	123,901	570	284,830	2,413,914	2.6	2.0	5,323,831

Area #	Design Year[1]	Domestic Flow[2]									Industrial Flows[2]					Commercial Flows[2]							Institutional Flows[2]							Infiltration/Inflow[3]		Total	Peaking Factor[4]		Peak
		SF	Multi Family		Apartments		Mobile	Seasonal	Vacant	Connected	Est. Total	Flow	Total	Total	Connected	Connected	Flow	Total	Total	Vacant	Total	Connected	Connected	Flow	Total	Total	Vacant	Vacant	Connecte	Connected	Flow	Pipeline	Flow	Flow (ADF)	Res. &	Ind. &	Flow
		Units	Lots	Units	Lots	Units	Home	Properties	Res.	Units	Pop.	gpd	Lots	Acres	Units	Acres	gpd	Lots	Acres	Comm.	Acres	Units	Acres	gpd	Lots	Acres	Lots	Acres	Units	Acres	gpd	Inch-Miles	gpd	gpd	Comm.	Other	gpd

(1) - Assumed 100% Sub-Area connections based on the following schedule: Phase I - Year 2020; Phase II - Year 2030; Phase III - Year 2065.

(2) - Actual water use records from 2014 used for 2015 Flows (gpd). Future flows estimated by taking the future connected units above current existing connected units and using the following assumptions:

Domestic Flow:	3 people/unit x 70 gpcd
Industrial Flows:	Total Connected Acres x 500 gpad
Commercial Flows:	Total Connected Acres x 300 gpad
Institutional Flows:	Total Connected Acres x 300 gpad

(3) - Infiltration/Inflow estimated based on the following assumptions:

Year	GPDIM
2015	250
2020	350
2030	350
2060	400
BO	500

(4) - Residential & Commercial Peaking factor calculated per RI-DEM standards, $\frac{18 + \sqrt{P}}{4 + \sqrt{P}}$ where P = population in thousands

(5) - Based on the needs of the Center of New England (CoNE) development, they have estimated a total need of 69,495 gpd for this Planning Area (including existing flows, see FP Update 2010). Existing flows for the CoNE lots in this planning area are 60,352 gpd. An additional 9,143 gpd were allocated to the Domestic Flows for Design Years 2020 and beyond. Currently there are one vacant domestic lot and 3.44 acres of vacant commercial land are within this development/Planning Area. The vacant parcels have been removed from the future estimated flow calculations (replaced by the remaining allocation amount)

(6) - Additional 8,190 gpd added to Design Year 2020 Domestic Flows for the Village at East Shore Drive subdivision (see FP Update 2010)

(7) - Additional 21,416 gpd added to Design Year 2020 Domestic Flows for the Brookside development (see FP Update 2010)

(8) - Additional 11,040 gpd added to Design Year 2020 Domestic Flows for the Coventry Housing Authority's Coventry Meadow development (see FP Update 2010)

(9) - The Center of New England (CoNE) development has 22.96 acres of vacant commercial land are within this development/Planning Area. The vacant parcels have been removed from the future estimated flow calculations (replaced by the remaining allocation amount).

(10) - Based on the needs of the Center of New England (CoNE) development, they have estimated a total need of 193,225 gpd for this Planning Area (including existing flows (see FP Update 2010). Existing flows for the CoNE lots in this planning area are 17,681 gpd. An additional 175,544 gpd were allocated to the Domestic Flows for Design Years 2020 and beyond. Currently there are three vacant domestic lots and 75.1 acres of vacant commercial land are within this development/Planning Area. The vacant parcels have been removed from the future estimated flow calculations (replaced by the remaining allocation amount)

(11) - As part of the 2003 FP Reaffirmation, the Pine Ridge development was allocated 17,300 gpd in this Planning Area (see 2003 FP Reaffirmation). Currently, existing flows for these parcels are 9,840 gpd, therefore an additional 7,460 gpd was allocated to the Domestic Flows for Design Years 2020 and beyond. Currently there are 19 vacant domestic lots and 4 unconnected parcels within this development/Planning Area. The vacant parcels/non-connected parcels have been removed from the future estimated flow calculations (replaced by the remaining allocation amount).

(12) - As part of the 2010 FP Update, 80,000 gpd were allocated in this Planning Area for Rhodes Tech. and the Clariant Corporation (see 2010 FP Update). Currently, existing flows for these parcels are 8,186 gpd, therefore an additional 71,814 gpd was allocated to the Industrial Flows for Design Years 2020 and beyond.

(13) - As part of the 2010 FP Update, 1,510 gpd and 7,725 gpd were allocated to the Domestic Flows in this Planning Area for the Riverside Landing development and the Village at Harris Mill redevelopment project respectively see 2010 FP Update).

(14) - As part of the 2010 FP Update, 19,711 gpd were allocated to the Domestic Flows in this Planning Area for the Anthony Mill redevelopment project (see 2010 FP Update).

(15) - As part of the 2010 FP Update, 3,910 gpd were allocated to the Domestic Flows in this Planning Area for the additional development on the Coventry Housing Authority's property on Contentment Drive see 2010 FP Update).

(16) - As part of the 2010 FP Update, 10,370 gpd were allocated to the Domestic Flows in this Planning Area for the Riverwalk Commons development (see 2010 FP Update).

(17) - The Town purchased the Woodland Manor sewer system, including the forcemain, pump station & gravity sewers, in 2014.

Town of Coventry, Rhode Island
Wastewater Facilities Plan

Wastewater Management Needs Questionnaire Survey

As part of the Town of Coventry's wastewater facilities planning effort, a needs survey questionnaire was distributed to homes in the densely populated eastern portion of the town. A copy of the needs questionnaire form as sent is attached hereto. The purpose of this questionnaire was to determine the current condition of existing individual sewage disposal systems (ISDS), and obtain information on the probable suitability of ISDS systems as a long term wastewater disposal option in the study area. In addition to ISDS operational information, the questionnaire requested opinions on issues such as the need for sanitary sewers in general, costs of sanitary sewer system construction to homeowners, and the institution of a town-wide ISDS maintenance program.

The wastewater questionnaires were sent to approximately 6,250 homes and businesses in eastern Coventry, in March of 1992. All responses received through August 1992 were incorporated into the Questionnaire Results database. In order to evaluate the wastewater management needs of eastern Coventry, the study area was divided into thirty-five (35) numbered sub-areas. The limits of these sub-areas are shown on the attached Figure C-1 and are generally described in the following Table C-1 ..

TABLE C-1
DESCRIPTION OF NEEDS STUDY AREAS

Area		Description
1995 FP	2009 FP	
1	A	New London Turnpike area, southeast of Tiogue Lake.
2	B	Tiogue Avenue area, east of Oak Haven.
3	C	East Shore Drive area, northeast of Tiogue Lake.
4	D	Oak Haven area, north of Tiogue Avenue.
5	E	Laurel Avenue area, north of Oak Haven School.
6	F	Tiogue Avenue, Pilgrim Avenue to Reservoir Road.
7	G	Arnold Road area (north), northwest of Tiogue Lake.
8	H	Arnold Road area (central), west of Tiogue Lake.
9	I	Arnold Road area (south), southwest of Tiogue Lake.
10	J	Hopkins Hill Road area, east of Hopkins Hill Road.
11	K	Jefferson Drive area, west of Hopkins Hill Road.
12	L	South Main Street area, north of Tiogue Avenue.
13	M	Reservoir Road area, near Coventry High School.
14	N	Wood Estates area, west of Reservoir Road.
15	O	Pulaski Street and Windsor Park Drive area.
16	P	Fairview Avenue area (south), south of Cecile Street.
17	Q	Fairview Avenue area (central), south of Youngs Avenue.
18	R	Fairview Avenue area (north), south of Hillside Avenue.
19	S	Ames Street area, eastern end of Hill Street.
20	T	Harris area, northeast of North Main Street.
21	U	Main Street/Washington Street, west of Fairview Avenue.
22	V	Boston Street area, west of Black Rock Road.
23	W	Maple Street area, east of Station Street.
24	X	Gervais Road area, west of Black Rock Road.

TABLE D-1 (CONTINUED)

Area 1995	Area 2009	Description
25	Y	Black Rock Road area, north of Gervais Road.
26	Z	Hill Street area, west of Brown Street.
27	AA	Black Walnut Drive area, east of Knotty Oak Road.
28	AB	Knotty Oak Road, north of Gervais Road.
29	AC	Highwood Drive area, west of Knotty Oak Road.
30	AD	Alvero Road area, east of Colvintown Road.
31	AE	Flat River Road, east of Read Schoolhouse Road.
32	AF	Chandler Drive area, west of Colvintown Road.
33	AG	Teakwood Drive area, west of Colvintown Road.
34	AH	Shady Valley Road area, east of Hill Farm Road.
35	AI	Coventry Center, Hill Farm Road and Flat River Road.

The results of several key questions were tabulated for each area and are summarized in the attached Table D-2 . The results are also shown individually for each area on the attached Questionnaire Summary pages. The following is a brief description of the data shown in Table D-2 .

Column A (Area No.) indicates the number of the area for which data in that row applies. As described above, the study area includes thirty-five sub-areas.

Column B (No. Records) indicates the number of questionnaire responses which were received for that area. A total of 2,444 questionnaire responses were received.

Column C (No. Homes) indicates the number of developed properties (homes and businesses) which exist in that area. This number is based on a count of the buildings in each area from the town's base maps. A total of 6,227 developed properties exist in the thirty-five areas. Questionnaires were sent to 6,250 properties. The difference between these numbers is mainly due to the distribution of some questionnaires outside the study areas as delineated.

Column D (Percent Response) indicates the percent response for each area, based on the ratio of the number of questionnaires received (Column B) to the number sent (Column C). The overall response to the questionnaire survey for the study area was thirty-nine percent (39%).

Column E (Persons per Building) indicates the average number of people typically occupying a residence, based on the responses to question 6 on the questionnaire. The average number of persons per building from the questionnaires is 3.1. This average does not include the responses from areas 6 and 20, which were significantly higher due to responses from commercial and industrial properties located therein.

Column F (% Aware of a Problem) indicates the percent of respondents (Column B) who indicated that they were aware of a wastewater disposal problem in Coventry, based on question 20 on the questionnaire. Twenty-six percent (26%) of the respondents were aware of a wastewater disposal problem in the Town of Coventry.

Columns G through L (System Problems) are based on the responses to question 13 on the questionnaire, which asked about problems with the property owner's wastewater disposal system (ISDS). Percentages for each column are based on the number of persons responding to question 13, therefore columns G and H add up to 100%, as do columns I through L.

Column G (No) indicates the percent of respondents who stated that they have not experienced any problems with their wastewater disposal system. Approximately seventy-six percent (76%) of those responding to question 13 did not have problems with their system.

Column H (Yes) indicates the percent of respondents who stated that they have experienced problems with their wastewater disposal system. Approximately twenty-four percent (24%) of those responding to question 13 did have problems with their system.

Column I (Weekly) indicates the percent of respondents who noted weekly problems with their system. Column J (Monthly) indicates the percent of respondents who noted monthly problems with their system. Column K (Yearly) indicates the percent of respondents who noted yearly problems with their system. Column L (Unknown) indicates the percent of responses to question 13 for which no problem frequency was stated.

Columns M through Q (Types of Problems) are based on the responses to question 15 on the questionnaire, which asks what types of problems are being experienced by people who responded yes to question 13. Percentages are based on the number of positive responses to question 13.

Column M (Frequent Cleanouts) indicates the percent of respondents to question 13 who cited frequent pumping and cleanouts as common problems with their system. Thirty-eight percent (38%) of respondents cited frequent cleanouts as a problem which they have experienced with their system.

Column N (System Backups) indicates the percent of respondents to question 13 who cited system backups or slow drainage as common problems with their system. Fifty-three percent (53%) of respondents cited system backups as a problem which they have experienced with their system.

Column O (Odors) indicates the percent of respondents to question 13 who cited sewage odors as common problems with their system. Twenty-four percent (24%) of respondents cited sewage odors as a problem which they have experienced with their system.

Column P (Visible on Surface) indicates the percent of respondents to question 13 who cited septage visible or flowing on the ground surface as a common problem with their system. Twenty-three percent (23%) of respondents cited visible sewage on the ground surface as a problem which they have experienced with their system.

Column Q (Limited Use of System) indicates the percent of respondents to question 13 who cited limited use of their system as a common problem. Fifty-two percent (52%) of respondents cited limitations on the use of their systems as a problem which they have experienced.

Columns R, S and T are based on the responses to question 18, which asks if the homeowner has had the wastewater disposal system repaired, replaced or modified. Numbers of responses, instead of percentages, are shown.

Column R (Number Repaired Systems) indicates the total number of yes responses to question 18.

Column S (Pre-1987) indicates the number of systems which were repaired prior to 1987.

Column T (Post-1987) indicates the number of systems which were repaired in and after 1987. A total of 519 system repairs or replacements were indicated on the questionnaires, 195 of these occurred prior to 1987, and 240 occurred after 1987. The remaining 84 repairs had no date cited.

Columns U through Y are based on the responses received to question 21 on the questionnaire. This question asks whether homeowners feel their neighborhood should be sewered if the cost to each sewered homeowner is $2,500, $5,000 or $7,500. The percentages shown are based on the total number of questionnaire responses received.

Column U ($2,500) indicates the percentage of respondents willing to pay $ 2,500 or more to have their neighborhood sewered. In general, forty-nine percent (49%) of the people responding to the questionnaire are willing to pay $ 2,500 or more for sewers in their neighborhood.

Column V ($5,000) indicates the percentage of respondents willing to pay $ 5,000 or more to have their neighborhood sewered. In general, thirteen percent (13%) of the people responding to the questionnaire are willing to pay $ 5,000 or more.

Column W ($7,500) indicates the percentage of respondents willing to pay $ 7,500 or more to have their neighborhood sewered. In general, five percent (5%) of the people responding to the questionnaire are willing to pay $ 7,500 or more.

Column X (Neither) indicates the percentage of respondents (44%) not willing to pay $ 2,500 for the installation of sewers in their neighborhood.

Column Y (No Opinion) indicates the percentage of respondents (7%) not answering question 21 on the questionnaire.

Columns Z, AA and BB are based on the responses to question 23 on the questionnaire, which asks for an opinion on the Town of Coventry taking over the maintenance of all wastewater treatment (ISDS) systems in the Town. The percentages shown are based on the total number of questionnaire responses received.

Column Z (Yes) indicates the percentage of respondents (27%) who would be in favor of the Town assuming responsibility for ISDS maintenance.

Column AA (No) indicates the percentage of respondents (48%) who would not be in favor of the Town assuming responsibility for ISDS maintenance.

Column BB (No Opinion) indicates the percentage of respondents (17%) who showed no opinion on this question.

Columns CC, DD and EE are based on the responses to question 24 on the questionnaire, which asks for an opinion on whether some areas of the Town of Coventry should be sewered. The percentages shown are based on the total number of questionnaire responses received.

Column CC (Yes) indicates the percent of respondents (59% overall) who agreed that some areas of Coventry should be sewered.

Column DD (No) indicates the percent of respondents (10% overall) who do not agree that some areas should be sewered.

Column EE (No Opinion) indicates the percentage of respondents (31% overall) who showed no opinion on this question.

Columns FF through JJ deal with the types of wastewater disposal systems existing in the study area, and are based on the responses to question 9 on the questionnaire.

Column FF (Cesspool) indicates the percentage of respondents (37% overall) who have a cesspool for an ISDS.

Column GG (Holding Tank) indicates the percentage of respondents (1% overall) who have a holding tank for an ISDS.

Column HH (Drywell for Washer) indicates the percentage of respondents (less than 1% overall) who have a separate drywell for their washing machine.

Column II (Septic w/Leach Field) indicates the percentage of respondents (55% overall) who have a septic tank with a leaching field for an ISDS.

Column JJ (Septic w/Leach Pit) indicates the percentage of respondents (4% overall) who have a septic tank with a leaching pit for an ISDS.

Other questions were included on the questionnaire and not summarized on the attached table. The responses to these questions, as well as written comments from respondents, were reviewed as part of the study. The following are some general comments on the information not included above.

- A large number of people cited the Tiogue Lake area, and the eastern end of town in general, as areas of need.
- A majority of persons opposed to sewers in the town commented that the reason for their opposition is cost, not lack of need.
- Many people commented that they needed sewers desperately, but due to the sluggish economy could not afford them at this time.
- Many people voiced a concern over the effect of high sewer assessments and user costs on the elderly.
- Many people commented that sewers should be installed in areas of need, and should be paid for exclusively by those serviced.
- Several people noted that people without ISDS problems should not be forced to pay for sewers in the neighborhood if they do not need them.

- Several people noted that although they personally did not need sewers, sewer installation would improve property values and quality of life.

- Several people noted that they believed sewers would benefit the town by encouraging commercial and industrial development.

- Overall, the cost of sewer installation was the issue most often commented upon.

(c:\kmn\coventry\fpqdescr)

Department of Public Works
Office of the Director/
Town Engineer

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road, Coventry, RI 02816-8911
Tel. (401) 822-9183 • FAX (401) 822-9132

REQUEST FOR SEPTIC SYSTEM INFORMATION AND PUBLIC OPINION

This is a request for information regarding wastewater disposal in the Town of Coventry, which will be used in the preparation of the town's on-going Wastewater Facilities Plan. The information on this form will be kept **strictly confidential. Specific information will not be released to any state or local agency, or for public review.** Please answer the following questions to the best of your ability.

1. Street _____ Number (optional) _____

2. Lot Size _____ square feet

3. Do you: _____ own _____ rent

4. Check the seasons during which your building is occupied:
   _____ winter _____ spring _____ summer _____ fall

5. Is your building a:
   _____ one _____ two _____ three or more family home
   _____ commercial (Describe use: _____)

6. How many people usually occupy your building? _____

7. How long have you owned or rented this building? _____
   How old is the building? _____

8. Your drinking water is: ____ private well ____ Kent County Water

9. What type of wastewater disposal system do you have?
   a. ____ cesspool
   b. ____ holding tank
   c. ____ separate drywell for washing machine
   d. ____ septic tank & leaching field
   e. ____ septic tank & leaching pit
   f. ____ other, please describe _____

10. How old is your wastewater disposal system? _____

11. What appliances are presently connected to your disposal system?
    ____ dishwasher ____ garbage disposal ____ other (describe)
    ____ sump pump ____ washing machine _____

12. How often do you have your septic tank/cesspool pumped?
    _____ two or more times per year _____ once every ____ years
    _____ once per year _____ never
    _____ once every 2 or 3 years _____ other _____

13. Have you had any problems with your wastewater disposal system?
    ___ yes ___ no How often? ___ weekly ___ monthly ___ yearly

<OVER>

14. If yes to question 13, check which season(s) during which you have problems: ___ winter ___ spring ___ summer ___ fall

15. If yes to question 13, what type of problems have you had?
a. _____ disposal system requires many cleanouts/pumping
b. _____ disposal system backs up or drains slowly
c. _____ disposal system has sewage odors
d. _____ disposal system has sewage flowing on ground surface
e. _____ disposal system limits showering, washing, etc.
f. _____ other (describe) _____

16. If yes to question 13, what causes your disposal problems?
a. _____ high groundwater
b. _____ poor soil conditions
c. _____ undersized system
d. _____ steep sloping ground
e. _____ other (describe) _____

17. Do you attempt to prevent wastewater disposal problems by:
a. ____ water conservation
b. ____ chemical addition
c. ____ keep grease out of drains
d. ____ other _____

18. Have you had your disposal system replaced, repaired or modified?
____ yes ____ no What year? _____ What cost? _____

19. How much have you invested in your disposal system over the past five years? ____ 0 - $250 ____ $250 - $500 ____ $ 500 - $1,000
____ $1,000 - $2,500 ____ $2,500 - $5,000 ____ over $5,000

20. Are you aware of any wastewater disposal problems in Coventry?
___ yes ___ no Describe: _____

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be (circle yes or no):
$ 2,500 (yes/no) $ 5,000 (yes/no) $ 7,500 (yes/no)

22. What is the basis for your answer to question 21?
_____ (many/few) wastewater disposal system problems in area
_____ (problems/lack of problems) with your disposal system
_____ recent investment to repair your disposal system
_____ existing problems too minor to justify cost
_____ sewers too costly despite wastewater disposal problems
_____ other (describe) _____

23. How would you feel about the Town assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues (i.e. property taxes, user fees, etc.)? ___ in favor ___ opposed ___ no opinion

24. Do you agree that **some areas** of Coventry should be sewered?
___ yes ___ no ___ no opinion Where? _____

25. Do you have any comments or suggestions? _____
_____
_____
_____
_____
_____

Please return your completed questionnaire in the enclosed pre-paid envelope to ensure that recommendations can be developed which best represent your interests and the most reliable information. Thank you.

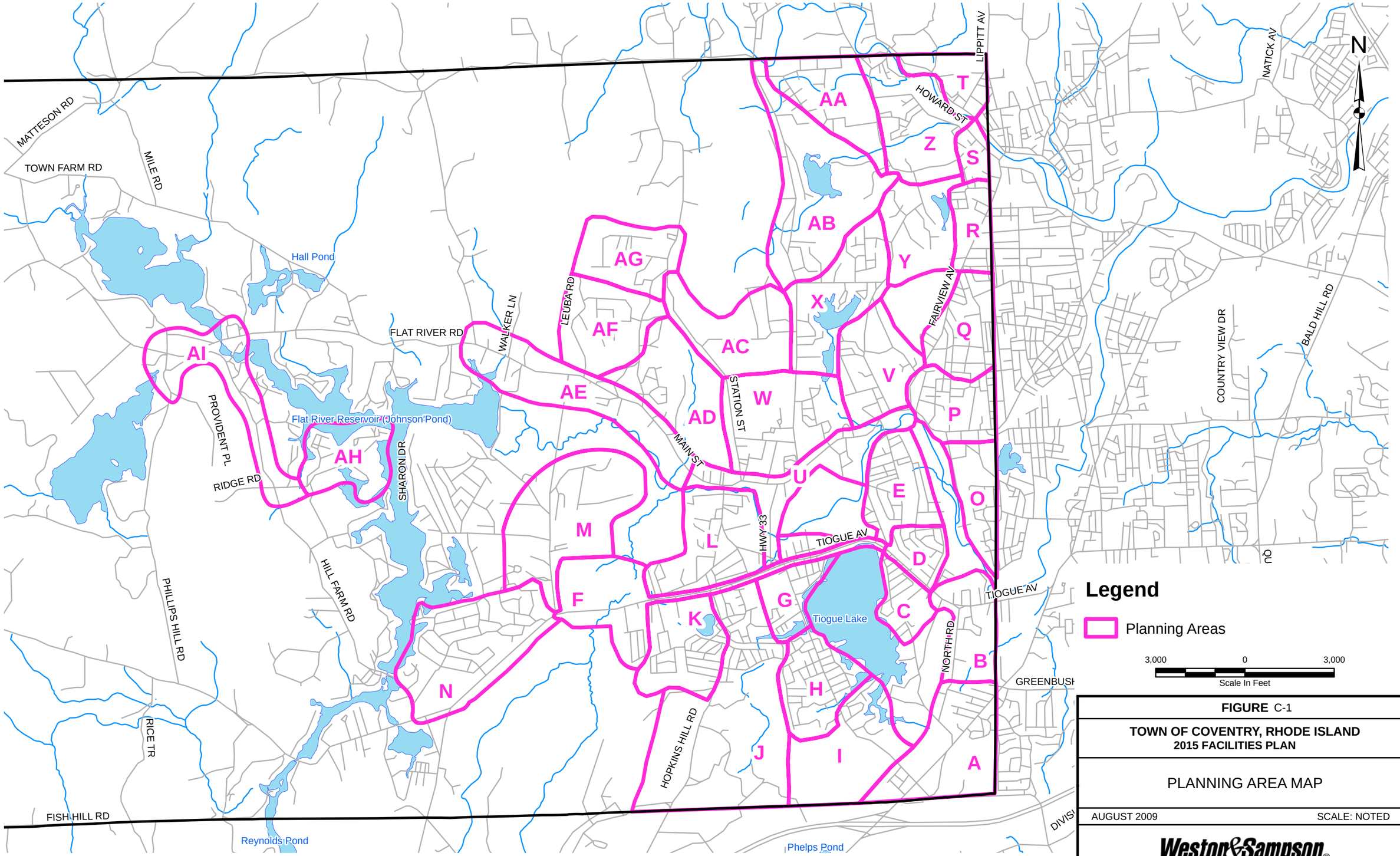

FIGURE C-1

TOWN OF COVENTRY, RHODE ISLAND
2015 FACILITIES PLAN

PLANNING AREA MAP

AUGUST 2009 SCALE: NOTED

Weston&Sampson

9187.1 COVENTRY RI. FACILITIES PLAN - QUESTIONNAIRE RESULTS

A	B	C	D	E	F	G	H	I	J	K	L
AREA NO.	NO. RECORDS	NO. HOMES (1)	PERCENT RESPONSE	PERSONS PER BUILDING	% AWARE OF A PROBLEM	SYSTEM PROBLEMS					
								PROBLEM FREQUENCY			
						NO	YES	WKLY	MONTHLY	YEARLY	UNKNOWN
1 A	103	269	38%	3.7	22%	78%	22%	14%	14%	55%	18%
2 B	60	154	39%	3	43%	64%	36%	5%	0%	62%	33%
3 C	54	167	32%	2.6	17%	78%	22%	17%	0%	67%	17%
4 D	113	245	46%	2.8	37%	82%	18%	6%	24%	12%	59%
5 E	114	297	38%	2.9	25%	70%	30%	6%	9%	71%	15%
6 F	21	99	21%	-	57%	47%	53%	10%	30%	20%	40%
7 G	94	207	45%	2.7	38%	69%	31%	7%	4%	68%	21%
8 H	129	346	37%	3.1	26%	77%	23%	0%	10%	60%	30%
9 I	51	109	47%	2.8	18%	66%	34%	6%	24%	35%	35%
10 J	122	316	39%	3.2	27%	71%	29%	11%	11%	51%	26%
11 K	143	288	50%	3.2	24%	73%	27%	8%	21%	61%	11%
12 L	143	373	38%	2.9	29%	78%	22%	0%	19%	38%	44%
13 M	4	17 (2)	24%	2.8	25%	50%	50%	0%	0%	50%	50%
14 N	43	149 (3)	29%	4.5	21%	77%	23%	10%	10%	50%	30%
15 O	59	194	30%	2.9	25%	73%	27%	0%	6%	56%	38%
16 P	130	290	45%	2.9	30%	69%	31%	5%	5%	75%	15%
17 Q	126	314	40%	2.8	26%	81%	19%	9%	4%	61%	26%
18 R	37	89	42%	2.5	32%	79%	21%	0%	14%	86%	0%
19 S	35	90	39%	2.8	26%	79%	21%	14%	0%	57%	29%
20 T	31	109	28%	-	29%	89%	11%	0%	33%	33%	33%
21 U	51	143	36%	4.3	35%	80%	20%	0%	22%	78%	0%
22 V	53	163	33%	3.6	25%	70%	30%	0%	6%	56%	38%
23 W	90	190	47%	2.9	22%	72%	28%	8%	0%	48%	44%
24 X	93	183	51%	3.3	24%	79%	21%	0%	16%	63%	21%
25 Y	35	91	38%	3.4	26%	71%	29%	10%	10%	50%	30%
26 Z	82	196	42%	3.2	26%	76%	24%	0%	10%	65%	25%
27 AA	66	214	31%	3.5	21%	77%	23%	20%	7%	53%	20%
28 AB	58	137	42%	2.6	22%	89%	11%	17%	33%	17%	33%
29 AC	47	118	40%	3.4	4%	87%	13%	33%	17%	33%	17%
30 AD	69	151	46%	2.7	22%	78%	22%	7%	0%	60%	33%
31 AE	8	74	11%	2.4	13%	88%	13%	0%	0%	100%	0%
32 AF	65	146	45%	3.5	31%	74%	26%	6%	6%	53%	35%
33 AG	52	117	44%	3.4	19%	88%	12%	0%	0%	83%	17%
34 AH	27	66	41%	2.7	22%	81%	19%	0%	0%	100%	0%
35 AI	36	116	31%	3.1	28%	89%	11%	0%	0%	50%	50%
TOTAL	2444	6227	39%	3.1	26%	76%	24%	6%	10%	57%	27%

Notes: (1) Includes commercial and industrial buildings.

(2) This area includes 37 homes, 17 of which were sent questionnaires.

(3) This area includes 303 homes, 149 of which were sent questionnaires.

9187.1 COVENTRY RI. FACILITIES PLAN - QUESTIONNAIRE RESULTS

A	B	C	M	N	O	P	Q	R	S	T
			TYPES OF PROBLEMS					NUMBER REPAIRED SYSTEMS	YEAR REPAIRED	
AREA NO.	NO. RECORDS	NO. HOMES	FREQUENT CLEANOUTS	SYSTEM BACKUPS	ODORS	VISIBLE ON SURFACE	LIMITED USE OF SYSTEM		PRE 1987	POST 1987
1 A	103	269	41%	64%	41%	36%	50%	19	2	16
2 B	60	154	62%	43%	29%	14%	57%	17	5	10
3 C	54	167	42%	58%	25%	25%	50%	10	5	5
4 D	113	245	88%	71%	41%	59%	0%	28	17	7
5 E	114	297	35%	53%	29%	26%	44%	23	6	13
6 F	21	99	80%	30%	20%	10%	70%	4	0	4
7 G	94	207	18%	71%	25%	14%	61%	23	12	6
8 H	129	346	27%	67%	10%	13%	77%	29	8	16
9 I	51	109	29%	59%	29%	35%	35%	16	5	9
10 J	122	316	49%	57%	20%	17%	63%	23	10	9
11 K	143	288	37%	58%	26%	29%	45%	25	11	12
12 L	143	373	53%	41%	19%	9%	72%	33	15	14
13 M	4	17	50%	50%	0%	0%	100%	1	0	1
14 N	43	149	60%	50%	40%	30%	30%	9	3	6
15 O	59	194	50%	44%	19%	31%	50%	10	4	4
16 P	130	290	33%	45%	13%	15%	73%	26	11	10
17 Q	126	314	22%	48%	22%	35%	43%	29	10	10
18 R	37	89	43%	71%	43%	14%	43%	10	7	3
19 S	35	90	43%	43%	14%	29%	57%	9	5	2
20 T	31	109	0%	0%	0%	33%	67%	6	1	3
21 U	51	143	44%	33%	44%	33%	22%	12	6	3
22 V	53	163	38%	69%	19%	25%	56%	12	7	3
23 W	90	190	24%	60%	24%	28%	48%	30	14	14
24 X	93	183	32%	32%	26%	26%	47%	12	4	7
25 Y	35	91	50%	50%	20%	20%	60%	10	1	6
26 Z	82	196	40%	55%	30%	25%	45%	20	7	10
27 AA	66	214	7%	40%	40%	20%	40%	9	1	5
28 AB	58	137	33%	50%	33%	33%	33%	8	3	3
29 AC	47	118	33%	33%	0%	17%	83%	7	1	4
30 AD	69	151	27%	53%	13%	13%	73%	19	3	10
31 AE	8	74	0%	100%	0%	0%	100%	2	2	0
32 AF	65	146	35%	65%	35%	18%	47%	12	1	9
33 AG	52	117	17%	33%	50%	50%	0%	3	1	2
34 AH	27	66	60%	40%	0%	20%	80%	5	2	1
35 AI	36	116	0%	25%	0%	0%	100%	8	5	3
TOTAL	2444	6227	38%	53%	24%	23%	52%	519	195	240

9187.1 COVENTRY RI. FACILITIES PLAN - QUESTIONNAIRE RESULTS

A	B	C	U	V	W	X	Y	Z	AA	BB	CC	DD	EE
AREA NO.	NO. RECORDS	NO. HOMES	% WILLING TO PAY FOR SEWERS SERVICE					TOWN ASSUMING RESPONSIBILITY			SHOULD SOME AREAS BE SEWERED?		
			$2,500	$5,000	$7,500	NEITHER	NO OPINION	YES	NO	NO OPINION	YES	NO	NO OPINION
1 A	103	269	49%	14%	5%	49%	3%	24%	42%	25%	57%	6%	37%
2 B	60	154	65%	18%	7%	28%	7%	32%	43%	15%	68%	8%	23%
3 C	54	167	57%	13%	9%	37%	6%	24%	35%	26%	50%	11%	39%
4 D	113	245	57%	13%	4%	38%	5%	27%	47%	19%	64%	9%	27%
5 E	114	297	49%	17%	7%	42%	9%	29%	46%	19%	61%	7%	32%
6 F	21	99	81%	29%	19%	14%	5%	29%	43%	24%	90%	5%	5%
7 G	94	207	56%	13%	4%	38%	6%	37%	43%	13%	70%	10%	20%
8 H	129	346	54%	12%	3%	43%	3%	26%	52%	19%	57%	12%	31%
9 I	51	109	55%	24%	2%	35%	10%	27%	53%	14%	73%	6%	22%
10 J	122	316	52%	10%	2%	44%	4%	36%	48%	7%	66%	11%	23%
11 K	143	288	52%	14%	5%	43%	5%	26%	50%	17%	57%	11%	32%
12 L	143	373	52%	11%	4%	40%	9%	28%	41%	22%	65%	8%	27%
13 M	4	17	50%	0%	0%	50%	0%	25%	50%	25%	75%	0%	25%
14 N	43	149	48%	29%	12%	43%	10%	28%	53%	12%	58%	12%	30%
15 O	59	194	56%	17%	7%	37%	7%	27%	46%	19%	61%	7%	32%
16 P	130	290	54%	17%	6%	34%	12%	29%	41%	16%	58%	7%	35%
17 Q	126	314	39%	10%	6%	49%	12%	21%	44%	20%	52%	9%	39%
18 R	37	89	51%	20%	3%	34%	14%	19%	51%	14%	65%	3%	32%
19 S	35	90	46%	6%	3%	43%	11%	20%	51%	17%	49%	14%	37%
20 T	31	109	45%	10%	0%	35%	19%	13%	39%	29%	55%	19%	26%
21 U	51	143	53%	18%	12%	39%	8%	16%	53%	12%	65%	8%	27%
22 V	53	163	51%	15%	2%	40%	9%	30%	45%	19%	64%	8%	28%
23 W	90	190	49%	15%	2%	47%	3%	26%	53%	13%	58%	13%	29%
24 X	93	183	46%	8%	1%	51%	3%	29%	51%	17%	49%	13%	38%
25 Y	35	91	46%	9%	6%	46%	9%	23%	63%	11%	51%	11%	37%
26 Z	82	196	52%	20%	7%	41%	6%	32%	46%	15%	65%	7%	28%
27 AA	66	214	46%	15%	5%	52%	2%	29%	53%	12%	50%	11%	39%
28 AB	58	137	26%	2%	2%	63%	11%	10%	69%	14%	50%	3%	47%
29 AC	47	118	32%	9%	2%	64%	4%	30%	57%	11%	53%	17%	30%
30 AD	69	151	36%	14%	7%	54%	10%	32%	41%	14%	54%	6%	41%
31 AE	8	74	50%	13%	0%	38%	13%	25%	63%	0%	75%	13%	13%
32 AF	65	146	42%	11%	5%	57%	2%	22%	54%	17%	51%	15%	34%
33 AG	52	117	33%	10%	4%	60%	8%	35%	48%	15%	40%	15%	44%
34 AH	27	66	38%	15%	4%	46%	15%	30%	37%	26%	56%	19%	26%
35 AI	36	116	42%	6%	0%	58%	0%	17%	53%	22%	72%	11%	17%
TOTAL	2444	6227	49%	13%	5%	44%	7%	27%	48%	17%	59%	10%	31%

9187.1 COVENTRY RI. FACILITIES PLAN - QUESTIONNAIRE RESULTS

A	B	C	FF	GG	HH	II	JJ
			TYPES OF SYSTEMS				
AREA NO.	NO. RECORDS	NO. HOMES	CESSPOOL	HOLDING TANK	DRYWELL FOR WASHER	SEPTIC W/ LEACH FIELD	SEPTIC W/ LEACH PIT
1 A	103	269	25%	1%		67%	5%
2 B	60	154	35%	2%		57%	3%
3 C	54	167	43%		2%	46%	7%
4 D	113	245	23%			70%	7%
5 E	114	297	26%	1%		62%	9%
6 F	21	99	38%			57%	0%
7 G	94	207	37%	4%	1%	44%	5%
8 H	129	346	17%	2%		75%	5%
9 I	51	109	20%	2%	2%	69%	6%
10 J	122	316	36%	1%		57%	3%
11 K	143	288	24%	1%		73%	1%
12 L	143	373	63%	1%		34%	2%
13 M	4	17	100%			0%	0%
14 N	43	149	9%			86%	2%
15 O	59	194	78%			15%	5%
16 P	130	290	66%	1%	1%	23%	4%
17 Q	126	314	54%	1%	3%	33%	4%
18 R	37	89	51%	3%		27%	5%
19 S	35	90	60%			34%	3%
20 T	31	109	55%			16%	10%
21 U	51	143	57%			33%	2%
22 V	53	163	58%	2%		34%	4%
23 W	90	190	39%			57%	3%
24 X	93	183	27%		1%	69%	2%
25 Y	35	91	29%			69%	3%
26 Z	82	196	49%		1%	40%	10%
27 AA	66	214	3%			94%	3%
28 AB	58	137	34%			55%	5%
29 AC	47	118	26%			70%	2%
30 AD	69	151	38%			58%	3%
31 AE	8	74	50%			38%	13%
32 AF	65	146	5%			94%	0%
33 AG	52	117	8%			90%	0%
34 AH	27	66	41%			48%	11%
35 AI	36	116	25%	0%		72%	3%
TOTALS	2444	6227	37%	1%	0%	55%	4%

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA A

No. records 103 No. homes 269 Response 38%

6. Average number of persons occupying a building. 3.7

9. What type of wastewater disposal system do you have?

26 / 26% cesspool	69 / 68% septic tank & leach field
1 / 1% holding tank	5 / 5% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

22 / 21% yes 78 / 76% no

if yes, how often?

3 / 14% weekly 3 / 14% monthly 12 / 55% yearly 4 / 18% unknown

15. What types of problems have you had?

9 / 41%	disposal system needs many cleanouts / pumping
14 / 64%	disposal system backs up or drains slowly
9 / 41%	disposal system has sewage odors
8 / 36%	disposal system has sewage flowing on the ground surface
11 / 50%	disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

19 / 18% YES 16 / 84% pre 1987 2 / 11% post 1987

84 / 82% NO

20. Number of people aware of a disposal problem in Coventry, RI 23 / 22%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

36 / 49% $2,500 9 / 14% $5,000 5 / 5% $7,500 50 / 49% neither

3 / 3% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

25 / 24% in favor 43 / 42% opposed 26 / 25% no opinion

24. Do you agree that some areas of the Town of Coventry shouldbe sewered?

59 / 57% yes 6 / 6% no 38 / 37% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA B

No. records 60 **No. homes** 154 Response 39%

6. Average number of persons occupying a building. 3

9. What type of wastewater disposal system do you have?

21 / 36% cesspool	34 / 59% septic tank & leach field
1 / 2% holding tank	2 / 3% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

21 / 35% yes 38 / 63% no

if yes, how often?

1 / 5% weekly 0 / 0% monthly 13 / 62% yearly 7 / 33% unknown

15. What types of problems have you had?

13 / 62% disposal system needs many cleanouts / pumping
9 / 43% disposal system backs up or drains slowly
6 / 29% disposal system has sewage odors
3 / 14% disposal system has sewage flowing on the ground surface
11 / 52% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

17 / 28% YES 8 / 47% pre 1987 9 / 53% post 1987

43 / 72% NO

20. Number of people aware of a disposal problem in Coventry, RI 26 / 43%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

28 / 65% $2,500 7 / 18% $5,000 4 / 7% $7,500 17 / 28% neither

4 / 7% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

19 / 32% in favor 26 / 43% opposed 9 / 15% no opinion

24. Do you agree that some areas of the Town of Coventry shouldbe sewered?

41 / 68% yes 5 / 8% no 11 / 18% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA C

No. records 54 **No. homes** 167 Response 32%

6. Average number of persons occupying a building. 2.6

9. What type of wastewater disposal system do you have?

23 / 44% cesspool	25 / 48% septic tank & leach field
0 / 0% holding tank	4 / 8% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

12 / 22% yes 42 / 78% no

if yes, how often?

2 / 17% weekly 0 / 0% monthly 8 / 67% yearly 2 / 17% unknown

15. What types of problems have you had?

5 / 42% disposal system needs many cleanouts / pumping
7 / 58% disposal system backs up or drains slowly
3 / 25% disposal system has sewage odors
3 / 25% disposal system has sewage flowing on the ground surface
6 / 50% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

10 / 19% YES 5 / 50% pre 1987 5 / 50% post 1987

44 / 81% NO

20. Number of people aware of a disposal problem in Coventry, RI 9 / 17%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

24 / 57% $2,500 2 / 13% $5,000 5 / 9% $7,500 20 / 37% neither

3 / 6% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

13 / 24% in favor 19 / 35% opposed 14 / 26% no opinion

24. Do you agree that some areas of the Town of Coventry shouldbe sewered?

27 / 50% yes 6 / 11% no 17 / 31% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA D

No. records 113 **No. homes** 245 Response 46%

6. Average number of persons occupying a building. 2.8

9. What type of wastewater disposal system do you have?

26 / 23% cesspool
0 / 0% holding tank
79 / 70% septic tank & leach field
8 / 7% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

17 / 15% yes
78 / 69% no

if yes, how often?

1 / 6% weekly 4 / 24% monthly 2 / 12% yearly 10 / 59% unknown

15. What types of problems have you had?

15 / 88% disposal system needs many cleanouts / pumping
12 / 71% disposal system backs up or drains slowly
7 / 41% disposal system has sewage odors
10 / 59% disposal system has sewage flowing on the ground surface
13 / 76% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

28 / 25% YES 4 / 14% pre 1987 24 / 86% post 1987

85 / 75% NO

20. Number of people aware of a disposal problem in Coventry, RI 42 / 37%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

49 / 57% $2,500 10 / 13% $5,000 5 / 4% $7,500 43 / 38% neither

6 / 5% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

31 / 27% in favor 53 / 47% opposed 21 / 19% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

72 / 64% yes 10 / 9% no 23 / 20% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA E

No. records 114 **No. homes** 297 Response 38%

6. Average number of persons occupying a building. 2.9

9. What type of wastewater disposal system do you have?

30 / 27% cesspool	71 / 63% septic tank & leach field
1 / 1% holding tank	10 / 9% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

34 / 30% yes 80 / 70% no

if yes, how often?

2 / 6% weekly 3 / 9% monthly 24 / 71% yearly 5 / 15% unknown

15. What types of problems have you had?

12 / 35% disposal system needs many cleanouts / pumping
18 / 53% disposal system backs up or drains slowly
10 / 29% disposal system has sewage odors
9 / 26% disposal system has sewage flowing on the ground surface
14 / 41% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

23 / 20% YES 12 / 52% pre 1987 11 / 48% post 1987

91 / 80% NO

20. Number of people aware of a disposal problem in Coventry, RI 28 / 25%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

37 / 49% $2,500 11 / 17% $5,000 8 / 7% $7,500 48 / 42% neither

10 / 9% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

33 / 29% in favor 52 / 46% opposed 22 / 19% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

69 / 61% yes 8 / 7% no 24 / 21% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA F

No. records 21 **No. homes** 99 Response 21%

6. Average number of persons occupying a building. 22.9

9. What type of wastewater disposal system do you have?

8 / 40% cesspool	12 / 60% septic tank & leach field
0 / 0% holding tank	0 / 0% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

10 / 48% yes 9 / 43% no

if yes, how often?

1 / 10% weekly 3 / 30% monthly 2 / 20% yearly 4 / 40% unknown

15. What types of problems have you had?

8 / 80% disposal system needs many cleanouts / pumping
3 / 30% disposal system backs up or drains slowly
2 / 20% disposal system has sewage odors
1 / 10% disposal system has sewage flowing on the ground surface
1 / 10% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

4 / 19% YES 3 / 75% pre 1987 1 / 25% post 1987

17 / 81% NO

20. Number of people aware of a disposal problem in Coventry, RI 12 / 57%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

11 / 81% $2,500 2 / 29% $5,000 4 / 19% $7,500 3 / 14% neither

1 / 5% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

6 / 29% in favor 9 / 43% opposed 5 / 24% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

19 / 90% yes 1 / 5% no 0 / 0% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 6911

Questionnaire Summary

AREA G

No. records 94 No. homes 207 Response 45%

6. Average number of persons occupying a building. 2.7

9. What type of wastewater disposal system do you have?

35 / 41% cesspool
4 / 5% holding tank
41 / 48% septic tank & leach field
5 / 6% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

28 / 30% yes
63 / 67% no

if yes, how often?

2 / 7% weekly
1 / 4% monthly
19 / 68% yearly
6 / 21% unknown

15. What types of problems have you had?

5 / 18% disposal system needs many cleanouts / pumping
20 / 71% disposal system backs up or drains slowly
7 / 25% disposal system has sewage odors
4 / 14% disposal system has sewage flowing on the ground surface
14 / 50% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

23 / 24% YES
5 / 22% pre 1987
18 / 78% post 1987

71 / 76% NO

20. Number of people aware of a disposal problem in Coventry, RI 36 / 38%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

40 / 56% $2,500
8 / 13% $5,000
4 / 4% $7,500
35 / 38% neither
6 / 6% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

35 / 37% in favor
40 / 43% opposed
12 / 13% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

66 / 70% yes
9 / 10% no
13 / 14% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA H

No. records 129 **No. homes** 346 Response 37%

6. Average number of persons occupying a building. 3.1

9. What type of wastewater disposal system do you have?

22 / 17%	cesspool	97 / 76%	septic tank & leach field
2 / 2%	holding tank	7 / 5%	septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

30 / 23% yes 99 / 77% no

if yes, how often?

0 / 0% weekly 3 / 10% monthly 18 / 60% yearly 9 / 30% unknown

15. What types of problems have you had?

8 / 27%	disposal system needs many cleanouts / pumping
20 / 67%	disposal system backs up or drains slowly
3 / 10%	disposal system has sewage odors
4 / 13%	disposal system has sewage flowing on the ground surface
9 / 30%	disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

29 / 22% YES 9 / 31% pre 1987 20 / 69% post 1987.

100 / 78% NO

20. Number of people aware of a disposal problem in Coventry, RI 33 / 26%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

55 / 54% $2,500 11 / 12% $5,000 4 / 3% $7,500 55 / 43% neither

4 / 3% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

33 / 26% in favor 67 / 52% opposed 24 / 19% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

74 / 57% yes 15 / 12% no 33 / 26% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA I

No. records 51 **No. homes** 109 Response 47%

6. Average number of persons occupying a building. 2.8

9. What type of wastewater disposal system do you have?

10 / 20% cesspool	35 / 71% septic tank & leach field
1 / 2% holding tank	3 / 6% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

17 / 33% yes 33 / 65% no

if yes, how often?

1 / 6% weekly 4 / 24% monthly 6 / 35% yearly 6 / 35% unknown

15. What types of problems have you had?

5 / 29% disposal system needs many cleanouts / pumping
10 / 59% disposal system backs up or drains slowly
5 / 29% disposal system has sewage odors
6 / 35% disposal system has sewage flowing on the ground surface
10 / 59% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

16 / 31% YES 7 / 44% pre 1987 9 / 56% post 1987

35 / 69% NO

20. Number of people aware of a disposal problem in Coventry, RI 9 / 18%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

16 / 55% $2,500 11 / 24% $5,000 1 / 2% $7,500 18 / 35% neither

5 / 10% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

14 / 27% in favor 27 / 53% opposed 7 / 14% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

37 / 73% yes 3 / 6% no 9 / 18% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA J

No. records 122 **No. homes** 316 Response 39%

6. Average number of persons occupying a building. 3.2

9. What type of wastewater disposal system do you have?

44 / 37% cesspool	69 / 58% septic tank & leach field
1 / 1% holding tank	4 / 3% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

35 / 29% yes 87 / 71% no

if yes, how often?

4 / 11% weekly 4 / 11% monthly 18 / 51% yearly 9 / 26% unknown

15. What types of problems have you had?

17 / 49% disposal system needs many cleanouts / pumping
20 / 57% disposal system backs up or drains slowly
7 / 20% disposal system has sewage odors
6 / 17% disposal system has sewage flowing on the ground surface
15 / 43% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

23 / 19% YES 6 / 26% pre 1987 17 / 74% post 1987

99 / 81% NO

20. Number of people aware of a disposal problem in Coventry, RI 33 / 27%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

51 / 52% $2,500 9 / 10% $5,000 3 / 2% $7,500 53 / 44% neither

5 / 4% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

44 / 36% in favor 59 / 48% opposed 9 / 7% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

81 / 66% yes 13 / 11% no 24 / 20% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA K

No. records 143 **No. homes** 288 Response 50%

6. Average number of persons occupying a building. 3.2

9. What type of wastewater disposal system do you have?

34 / 24% cesspool	104 / 73% septic tank & leach field
2 / 1% holding tank	2 / 1% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

38 / 27% yes 105 / 73% no

if yes, how often?

3 / 8% weekly 8 / 21% monthly 23 / 61% yearly 4 / 11% unknown

15. What types of problems have you had?

14 / 37% disposal system needs many cleanouts / pumping
22 / 58% disposal system backs up or drains slowly
10 / 26% disposal system has sewage odors
11 / 29% disposal system has sewage flowing on the ground surface
18 / 47% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

25 / 17% YES 8 / 32% pre 1987 17 / 68% post 1987

118 / 83% NO

20. Number of people aware of a disposal problem in Coventry, RI 34 / 24%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

55 / 52% $2,500 13 / 14% $5,000 7 / 5% $7,500 61 / 43% neither

7 / 5% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

37 / 26% in favor 72 / 50% opposed 25 / 17% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

81 / 57% yes 16 / 11% no 36 / 25% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA L

No. records 143 **No. homes** 373 Response 38%

6. Average number of persons occupying a building. 2.9

9. What type of wastewater disposal system do you have?

90 / 63% cesspool
2 / 1% holding tank
48 / 34% septic tank & leach field
3 / 2% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

32 / 22% yes
111 / 78% no

if yes, how often?

0 / 0% weekly 6 / 19% monthly 12 / 38% yearly 14 / 44% unknown

15. What types of problems have you had?

17 / 53% disposal system needs many cleanouts / pumping
13 / 41% disposal system backs up or drains slowly
6 / 19% disposal system has sewage odors
3 / 9% disposal system has sewage flowing on the ground surface
12 / 38% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

33 / 23% YES 11 / 33% pre 1987 22 / 67% post 1987

110 / 77% NO

20. Number of people aware of a disposal problem in Coventry, RI 41 / 29%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

58 / 52% $2,500 10 / 11% $5,000 5 / 4% $7,500 56 / 40% neither

12 / 9% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

40 / 28% in favor 58 / 41% opposed 31 / 22% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

93 / 65% yes 12 / 8% no 31 / 22% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA M

No. records 4 **No. homes** 17 Response 24%

6. Average number of persons occupying a building. 2.8

9. What type of wastewater disposal system do you have?

4 / 100% cesspool
0 / 0% holding tank
0 / 0% septic tank & leach field
0 / 0% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

2 / 50% yes
2 / 50% no

if yes, how often?

0 / 0% weekly 0 / 0% monthly 1 / 50% yearly 1 / 50% unknown

15. What types of problems have you had?

1 / 50% disposal system needs many cleanouts / pumping
1 / 50% disposal system backs up or drains slowly
0 / 0% disposal system has sewage odors
0 / 0% disposal system has sewage flowing on the ground surface
0 / 0% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

1 / 25% YES 1 / 100% pre 1987 0 / 0% post 1987

3 / 75% NO

20. Number of people aware of a disposal problem in Coventry, RI 1 / 25%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

2 / 50% $2,500 0 / 0% $5,000 0 / 0% $7,500 2 / 50% neither

0 / 0% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

1 / 25% in favor 2 / 50% opposed 1 / 25% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

3 / 75% yes 0 / 0% no 1 / 25% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA N

No. records 43 **No. homes** 149 Response 29%

6. Average number of persons occupying a building. 4.5

9. What type of wastewater disposal system do you have?

4 / 10% cesspool	37 / 88% septic tank & leach field
0 / 0% holding tank	1 / 2% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

10 / 23% yes 33 / 77% no

if yes, how often?

1 / 10% weekly 1 / 10% monthly 5 / 50% yearly 3 / 30% unknown

15. What types of problems have you had?

6 / 60% disposal system needs many cleanouts / pumping
5 / 50% disposal system backs up or drains slowly
4 / 40% disposal system has sewage odors
3 / 30% disposal system has sewage flowing on the ground surface
4 / 40% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

9 / 21% YES 5 / 56% pre 1987 4 / 44% post 1987

34 / 79% NO

20. Number of people aware of a disposal problem in Coventry, RI 9 / 21%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

8 / 48% $2,500 7 / 29% $5,000 5 / 12% $7,500 18 / 43% neither

4 / 10% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

12 / 28% in favor 23 / 53% opposed 5 / 12% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

25 / 58% yes 5 / 12% no 11 / 26% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA O

No. records 59 **No. homes** 211 Response 28%

6. Average number of persons occupying a building. 2.9

9. What type of wastewater disposal system do you have?

46 / 79% cesspool	9 / 16% septic tank & leach field
0 / 0% holding tank	3 / 5% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

16 / 27% yes 43 / 73% no

if yes, how often?

0 / 0% weekly 1 / 6% monthly 9 / 56% yearly 6 / 38% unknown

15. What types of problems have you had?

8 / 50% disposal system needs many cleanouts / pumping
7 / 44% disposal system backs up or drains slowly
3 / 19% disposal system has sewage odors
5 / 31% disposal system has sewage flowing on the ground surface
7 / 44% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

10 / 17% YES 2 / 20% pre 1987 8 / 80% post 1987

49 / 83% NO

20. Number of people aware of a disposal problem in Coventry, RI 15 / 25%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

23 / 56% $2,500 6 / 17% $5,000 4 / 7% $7,500 22 / 37% neither

4 / 7% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

16 / 27% in favor 27 / 46% opposed 11 / 19% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

36 / 61% yes 4 / 7% no 15 / 25% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA P

No. records 130 **No. homes** 290 Response 45%

6. Average number of persons occupying a building. 2.9

9. What type of wastewater disposal system do you have?

86 / 70% cesspool
1 / 1% holding tank
30 / 25% septic tank & leach field
5 / 4% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

40 / 31% yes
87 / 67% no

if yes, how often?

2 / 5% weekly 2 / 5% monthly 30 / 75% yearly 6 / 15% unknown

15. What types of problems have you had?

13 / 33% disposal system needs many cleanouts / pumping
18 / 45% disposal system backs up or drains slowly
5 / 13% disposal system has sewage odors
6 / 15% disposal system has sewage flowing on the ground surface
21 / 53% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

26 / 20% YES 8 / 31% pre 1987 18 / 69% post 1987

104 / 80% NO

20. Number of people aware of a disposal problem in Coventry, RI 39 / 30%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

48 / 54% $2,500 14 / 17% $5,000 8 / 6% $7,500 44 / 34% neither

16 / 12% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

38 / 29% in favor 53 / 41% opposed 21 / 16% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

75 / 58% yes 9 / 7% no 31 / 24% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA Q

No. records 126 **No. homes** 314 Response 40%

6. Average number of persons occupying a building. 2.8

9. What type of wastewater disposal system do you have?

68 / 59% cesspool	42 / 36% septic tank & leach field
1 / 1% holding tank	5 / 4% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

23 / 18% yes 98 / 78% no

if yes, how often?

2 / 9% weekly 1 / 4% monthly 14 / 61% yearly 6 / 26% unknown

15. What types of problems have you had?

5 / 22% disposal system needs many cleanouts / pumping
11 / 48% disposal system backs up or drains slowly
5 / 22% disposal system has sewage odors
8 / 35% disposal system has sewage flowing on the ground surface
13 / 57% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

29 / 23% YES 4 / 14% pre 1987 25 / 86% post 1987

97 / 77% NO

20. Number of people aware of a disposal problem in Coventry, RI 33 / 26%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

36 / 39% $2,500 4 / 10% $5,000 8 / 6% $7,500 61 / 49% neither

15 / 12% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

27 / 21% in favor 56 / 44% opposed 25 / 20% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

66 / 52% yes 11 / 9% no 40 / 32% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA R

No. records 37 **No. homes** 89 Response 42%

6. Average number of persons occupying a building. 2.5

9. What type of wastewater disposal system do you have?

19 / 59% cesspool
1 / 3% holding tank
10 / 31% septic tank & leach field
2 / 6% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

7 / 19% yes
27 / 73% no

if yes, how often?

0 / 0% weekly 1 / 14% monthly 6 / 86% yearly 0 / 0% unknown

15. What types of problems have you had?

3 / 43% disposal system needs many cleanouts / pumping
5 / 71% disposal system backs up or drains slowly
3 / 43% disposal system has sewage odors
1 / 14% disposal system has sewage flowing on the ground surface
6 / 86% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

10 / 27% YES 2 / 20% pre 1987 8 / 80% post 1987

27 / 73% NO

20. Number of people aware of a disposal problem in Coventry, RI 12 / 32%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

11 / 51% $2,500 6 / 20% $5,000 1 / 3% $7,500 12 / 34% neither

5 / 14% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

7 / 19% in favor 19 / 51% opposed 5 / 14% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

24 / 65% yes 1 / 3% no 8 / 22% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA S

No. records 35 No. homes 90 Response 39%

6. Average number of persons occupying a building. 2.8

9. What type of wastewater disposal system do you have?

21 / 62% cesspool	12 / 35% septic tank & leach field
0 / 0% holding tank	1 / 3% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

7 / 20% yes 26 / 74% no

if yes, how often?

1 / 14% weekly 0 / 0% monthly 4 / 57% yearly 2 / 29% unknown

15. What types of problems have you had?

3 / 43% disposal system needs many cleanouts / pumping
3 / 43% disposal system backs up or drains slowly
1 / 14% disposal system has sewage odors
2 / 29% disposal system has sewage flowing on the ground surface
3 / 43% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

9 / 26% YES 2 / 22% pre 1987 7 / 78% post 1987

26 / 74% NO

20. Number of people aware of a disposal problem in Coventry, RI 9 / 26%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

14 / 46% $2,500 1 / 6% $5,000 1 / 3% $7,500 15 / 43% neither

4 / 11% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. (i.e. property taxes, user fees, etc.)

7 / 20% in favor 18 / 51% opposed 6 / 17% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

17 / 49% yes 5 / 14% no 12 / 34% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA T

No. records 31 **No. homes** 143 Response 22%

6. Average number of persons occupying a building. 15.5

9. What type of wastewater disposal system do you have?

17 / 68% cesspool
0 / 0% holding tank
5 / 20% septic tank & leach field
3 / 12% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

3 / 10% yes
25 / 81% no

if yes, how often?

0 / 0% weekly 1 / 33% monthly 1 / 33% yearly 1 / 33% unknown

15. What types of problems have you had?

0 / 0% disposal system needs many cleanouts / pumping
0 / 0% disposal system backs up or drains slowly
0 / 0% disposal system has sewage odors
1 / 33% disposal system has sewage flowing on the ground surface
0 / 0% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

6 / 19% YES 2 / 33% pre 1987 4 / 67% post 1987

25 / 81% NO

20. Number of people aware of a disposal problem in Coventry, RI 9 / 29%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

11 / 45% $2,500 3 / 10% $5,000 0 / 0% $7,500 11 / 35% neither

6 / 19% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

4 / 13% in favor 12 / 39% opposed 9 / 29% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

17 / 55% yes 6 / 19% no 3 / 10% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA U

No. records 51 No. homes 106 Response 48%

6. Average number of persons occupying a building. 4.3

9. What type of wastewater disposal system do you have?

29 / 62% cesspool	17 / 36% septic tank & leach field
0 / 0% holding tank	1 / 2% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

9 / 18% yes 37 / 73% no

if yes, how often?

0 / 0% weekly 2 / 22% monthly 7 / 78% yearly 0 / 0% unknown

15. What types of problems have you had?

4 / 44% disposal system needs many cleanouts / pumping
3 / 33% disposal system backs up or drains slowly
4 / 44% disposal system has sewage odors
3 / 33% disposal system has sewage flowing on the ground surface
5 / 56% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

12 / 24% YES 1 / 8% pre 1987 11 / 92% post 1987

39 / 76% NO

20. Number of people aware of a disposal problem in Coventry, RI 18 / 35%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

18 / 53% $2,500 3 / 18% $5,000 6 / 12% $7,500 20 / 39% neither

4 / 8% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. (i.e. property taxes, user fees, etc.)

9 / 18% in favor 27 / 53% opposed 6 / 12% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

33 / 65% yes 4 / 8% no 12 / 24% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA V

No. records 53 No. homes 163 Response 33%

6. Average number of persons occupying a building. 3.6

9. What type of wastewater disposal system do you have?

31 / 60% cesspool
1 / 2% holding tank
18 / 35% septic tank & leach field
2 / 4% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

16 / 30% yes
37 / 70% no

if yes, how often?

0 / 0% weekly 1 / 6% monthly 9 / 56% yearly 6 / 38% unknown

15. What types of problems have you had?

6 / 38% disposal system needs many cleanouts / pumping
11 / 69% disposal system backs up or drains slowly
3 / 19% disposal system has sewage odors
4 / 25% disposal system has sewage flowing on the ground surface
55 / 344% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

12 / 23% YES 2 / 17% pre 1987 10 / 83% post 1987

41 / 77% NO

20. Number of people aware of a disposal problem in Coventry, RI 13 / 25%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

19 / 51% $2,500 7 / 15% $5,000 1 / 2% $7,500 21 / 40% neither

5 / 9% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

16 / 30% in favor 24 / 45% opposed 10 / 19% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

34 / 64% yes 4 / 8% no 10 / 19% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA W

No. records 90 **No. homes** 190 Response 47%

6. Average number of persons occupying a building. 2.9

9. What type of wastewater disposal system do you have?

35 / 39% cesspool	51 / 57% septic tank & leach field
0 / 0% holding tank	3 / 3% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

25 / 28% yes 63 / 70% no

if yes, how often?

2 / 8% weekly 0 / 0% monthly 12 / 48% yearly 11 / 44% unknown

15. What types of problems have you had?

6 / 24% disposal system needs many cleanouts / pumping
15 / 60% disposal system backs up or drains slowly
6 / 24% disposal system has sewage odors
7 / 28% disposal system has sewage flowing on the ground surface
10 / 40% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

30 / 33% YES 11 / 37% pre 1987 19 / 63% post 1987

60 / 67% NO

20. Number of people aware of a disposal problem in Coventry, RI 20 / 22%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

31 / 49% $2,500 11 / 15% $5,000 2 / 2% $7,500 42 / 47% neither

3 / 3% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

23 / 26% in favor 48 / 53% opposed 12 / 13% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

52 / 58% yes 12 / 13% no 21 / 23% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA X

No. records 93 **No. homes** 183 Response 51%

6. Average number of persons occupying a building. 3.3

9. What type of wastewater disposal system do you have?

25 / 27% cesspool	64 / 70% septic tank & leach field
0 / 0% holding tank	2 / 2% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

19 / 20% yes 73 / 78% no

if yes, how often?

0 / 0% weekly 3 / 16% monthly 12 / 63% yearly 4 / 21% unknown

15. What types of problems have you had?

6 / 32% disposal system needs many cleanouts / pumping
6 / 32% disposal system backs up or drains slowly
5 / 26% disposal system has sewage odors
5 / 26% disposal system has sewage flowing on the ground surface
5 / 26% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

12 / 13% YES 5 / 42% pre 1987 7 / 58% post 1987

81 / 87% NO

20. Number of people aware of a disposal problem in Coventry, RI 22 / 24%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

36 / 46% $2,500 6 / 8% $5,000 1 / 1% $7,500 47 / 51% neither

3 / 3% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

27 / 29% in favor 47 / 51% opposed 16 / 17% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

46 / 49% yes 12 / 13% no 32 / 34% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA Y

No. records 35 **No. homes** 91 Response 38%

6. Average number of persons occupying a building. 3.4

9. What type of wastewater disposal system do you have?

10 / 29% cesspool	24 / 69% septic tank & leach field
0 / 0% holding tank	1 / 3% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

10 / 29% yes 25 / 71% no

if yes, how often?

1 / 10% weekly 1 / 10% monthly 5 / 50% yearly 3 / 30% unknown

15. What types of problems have you had?

5 / 50% disposal system needs many cleanouts / pumping
5 / 50% disposal system backs up or drains slowly
2 / 20% disposal system has sewage odors
2 / 20% disposal system has sewage flowing on the ground surface
3 / 30% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

10 / 29% YES 5 / 50% pre 1987 5 / 50% post 1987

25 / 71% NO

20. Number of people aware of a disposal problem in Coventry, RI 9 / 26%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

13 / 46% $2,500 1 / 9% $5,000 2 / 6% $7,500 16 / 46% neither

3 / 9% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

8 / 23% in favor 22 / 63% opposed 4 / 11% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

18 / 51% yes 4 / 11% no 11 / 31% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA Z

No. records 82 **No. homes** 196 Response 42%

6. Average number of persons occupying a building. 3.2

9. What type of wastewater disposal system do you have?

40 / 49% cesspool
0 / 0% holding tank
33 / 41% septic tank & leach field
8 / 10% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

20 / 24% yes
62 / 76% no

if yes, how often?

0 / 0% weekly 2 / 10% monthly 13 / 65% yearly 5 / 25% unknown

15. What types of problems have you had?

8 / 40% disposal system needs many cleanouts / pumping
11 / 55% disposal system backs up or drains slowly
6 / 30% disposal system has sewage odors
5 / 25% disposal system has sewage flowing on the ground surface
8 / 40% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

20 / 24% YES 5 / 25% pre 1987 15 / 75% post 1987

62 / 76% NO

20. Number of people aware of a disposal problem in Coventry, RI 21 / 26%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

27 / 52% $2,500 10 / 20% $5,000 6 / 7% $7,500 34 / 41% neither

5 / 6% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

26 / 32% in favor 38 / 46% opposed 12 / 15% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

53 / 65% yes 6 / 7% no 18 / 22% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AA

No. records 66 **No. homes** 214 Response 31%

6. Average number of persons occupying a building. 3.5

9. What type of wastewater disposal system do you have?

2 / 3%	cesspool	62 / 94%	septic tank & leach field
0 / 0%	holding tank	2 / 3%	septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

15 / 23% yes 51 / 77% no

if yes, how often?

3 / 20% weekly	1 / 7% monthly	8 / 53% yearly	3 / 20% unknown

15. What types of problems have you had?

1 / 7%	disposal system needs many cleanouts / pumping
6 / 40%	disposal system backs up or drains slowly
6 / 40%	disposal system has sewage odors
3 / 20%	disposal system has sewage flowing on the ground surface
6 / 40%	disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

9 / 14% YES	3 / 33% pre 1987	6 / 67% post 1987
57 / 86% NO		

20. Number of people aware of a disposal problem in Coventry, RI 14 / 21%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

20 / 46% $2,500	7 / 15% $5,000	3 / 5% $7,500	34 / 52% neither
	1 / 2% no opinion		

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

19 / 29% in favor	35 / 53% opposed	8 / 12% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

33 / 50% yes	7 / 11% no	21 / 32% no opinion

TOWN OF COVENTRY

Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AB

No. records 58 No. homes 137 Response 42%

6. Average number of persons occupying a building. 2.6

9. What type of wastewater disposal system do you have?

20 / 36% cesspool
0 / 0% holding tank
32 / 58% septic tank & leach field
3 / 5% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

6 / 10% yes
51 / 88% no

if yes, how often?

1 / 17% weekly 2 / 33% monthly 1 / 17% yearly 2 / 33% unknown

15. What types of problems have you had?

2 / 33% disposal system needs many cleanouts / pumping
3 / 50% disposal system backs up or drains slowly
2 / 33% disposal system has sewage odors
2 / 33% disposal system has sewage flowing on the ground surface
2 / 33% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

8 / 14% YES 3 / 38% pre 1987 5 / 63% post 1987

50 / 86% NO

20. Number of people aware of a disposal problem in Coventry, RI 13 / 22%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

14 / 26% $2,500 0 / 2% $5,000 1 / 2% $7,500 36 / 63% neither

6 / 11% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

6 / 10% in favor 40 / 69% opposed 8 / 14% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

29 / 50% yes 2 / 3% no 16 / 28% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AC

No. records 47 **No. homes** 118 Response 40%

6. Average number of persons occupying a building. 3.4

9. What type of wastewater disposal system do you have?

12 / 26% cesspool
0 / 0% holding tank
33 / 72% septic tank & leach field
1 / 2% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

6 / 13% yes
40 / 85% no

if yes, how often?

2 / 33% weekly 1 / 17% monthly 2 / 33% yearly 1 / 17% unknown

15. What types of problems have you had?

2 / 33% disposal system needs many cleanouts / pumping
2 / 33% disposal system backs up or drains slowly
0 / 0% disposal system has sewage odors
1 / 17% disposal system has sewage flowing on the ground surface
0 / 0% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

7 / 15% YES 4 / 57% pre 1987 3 / 43% post 1987

40 / 85% NO

20. Number of people aware of a disposal problem in Coventry, RI 2 / 4%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

11 / 32% $2,500 3 / 9% $5,000 1 / 2% $7,500 30 / 64% neither

2 / 4% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

14 / 30% in favor 27 / 57% opposed 5 / 11% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

25 / 53% yes 8 / 17% no 13 / 28% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AD

No. records 69 No. homes 151 Response 46%

6. Average number of persons occupying a building. 2.7

9. What type of wastewater disposal system do you have?

26 / 38% cesspool
0 / 0% holding tank
40 / 59% septic tank & leach field
2 / 3% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

15 / 22% yes
53 / 77% no

if yes, how often?

1 / 7% weekly 0 / 0% monthly 9 / 60% yearly 5 / 33% unknown

15. What types of problems have you had?

4 / 27% disposal system needs many cleanouts / pumping
8 / 53% disposal system backs up or drains slowly
2 / 13% disposal system has sewage odors
2 / 13% disposal system has sewage flowing on the ground surface
6 / 40% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

19 / 28% YES 6 / 32% pre 1987 13 / 68% post 1987

50 / 72% NO

20. Number of people aware of a disposal problem in Coventry, RI 15 / 22%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

15 / 36% $2,500 5 / 14% $5,000 5 / 7% $7,500 37 / 54% neither

7 / 10% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

22 / 32% in favor 28 / 41% opposed 10 / 14% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

37 / 54% yes 4 / 6% no 24 / 35% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AE

No. records 8 **No. homes** 74 Response 11%

6. Average number of persons occupying a building. 2.4

9. What type of wastewater disposal system do you have?

4 / 50% cesspool
0 / 0% holding tank
3 / 38% septic tank & leach field
1 / 13% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

1 / 13% yes
7 / 88% no

if yes, how often?

0 / 0% weekly 0 / 0% monthly 1 / 100% yearly 0 / 0% unknown

15. What types of problems have you had?

0 / 0% disposal system needs many cleanouts / pumping
1 / 100% disposal system backs up or drains slowly
0 / 0% disposal system has sewage odors
0 / 0% disposal system has sewage flowing on the ground surface
0 / 0% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

2 / 25% YES 0 / 0% pre 1987 2 / 100% post 1987

6 / 75% NO

20. Number of people aware of a disposal problem in Coventry, RI 1 / 13%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

3 / 50% $2,500 1 / 13% $5,000 0 / 0% $7,500 3 / 38% neither

1 / 13% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

2 / 25% in favor 5 / 63% opposed 0 / 0% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

6 / 75% yes 1 / 13% no 0 / 0% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AF

No. records 65 **No. homes** 146 Response 45%

6. Average number of persons occupying a building. 3.5

9. What type of wastewater disposal system do you have?

3 / 5% cesspool
0 / 0% holding tank
61 / 95% septic tank & leach field
0 / 0% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

17 / 26% yes
48 / 74% no

if yes, how often?

1 / 6% weekly 1 / 6% monthly 9 / 53% yearly 6 / 35% unknown

15. What types of problems have you had?

6 / 35% disposal system needs many cleanouts / pumping
11 / 65% disposal system backs up or drains slowly
6 / 35% disposal system has sewage odors
3 / 18% disposal system has sewage flowing on the ground surface
10 / 59% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

12 / 18% YES 9 / 75% pre 1987 3 / 25% post 1987

53 / 82% NO

20. Number of people aware of a disposal problem in Coventry, RI 20 / 31%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

20 / 42% $2,500 4 / 11% $5,000 3 / 5% $7,500 37 / 57% neither

1 / 2% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

14 / 22% in favor 35 / 54% opposed 11 / 17% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

33 / 51% yes 10 / 15% no 17 / 26% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AG

No. records 52 **No. homes** 117 Response 44%

6. Average number of persons occupying a building. 3.4

9. What type of wastewater disposal system do you have?

4 / 8% cesspool		47 / 92% septic tank & leach field	
0 / 0% holding tank		0 / 0% septic tank & leach pit	

13. Have you had any problems with your wastewater disposal system?

6 / 12% yes 46 / 88% no

if yes, how often?

0 / 0% weekly	0 / 0% monthly	5 / 83% yearly	1 / 17% unknown

15. What types of problems have you had?

1 / 17% disposal system needs many cleanouts / pumping
2 / 33% disposal system backs up or drains slowly
3 / 50% disposal system has sewage odors
3 / 50% disposal system has sewage flowing on the ground surface
3 / 50% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

3 / 6% YES	1 / 33% pre 1987	2 / 67% post 1987
49 / 94% NO		

20. Number of people aware of a disposal problem in Coventry, RI 10 / 19%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

12 / 33% $2,500	3 / 10% $5,000	2 / 4% $7,500	31 / 60% neither
	4 / 8% no opinion		

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

18 / 35% in favor	25 / 48% opposed	8 / 15% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

21 / 40% yes	8 / 15% no	20 / 38% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AH

No. records 27 **No. homes** 66 Response 41%

6. Average number of persons occupying a building. 2.7

9. What type of wastewater disposal system do you have?

11 / 41% cesspool	13 / 48% septic tank & leach field
0 / 0% holding tank	3 / 11% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

5 / 19% yes 22 / 81% no

if yes, how often?

0 / 0% weekly 0 / 0% monthly 5 / 100% yearly 0 / 0% unknown

15. What types of problems have you had?

3 / 60% disposal system needs many cleanouts / pumping
2 / 40% disposal system backs up or drains slowly
0 / 0% disposal system has sewage odors
1 / 20% disposal system has sewage flowing on the ground surface
1 / 20% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

5 / 19% YES 1 / 20% pre 1987 4 / 80% post 1987

22 / 81% NO

20. Number of people aware of a disposal problem in Coventry, RI 6 / 22%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

6 / 38% $2,500 3 / 15% $5,000 1 / 4% $7,500 12 / 46% neither

4 / 15% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

8 / 30% in favor 10 / 37% opposed 7 / 26% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

15 / 56% yes 5 / 19% no 4 / 15% no opinion

TOWN OF COVENTRY
Town Hall, 1670 Flat River Road Coventry, RI 02816 - 8911

Questionnaire Summary

AREA AI

No. records 36 **No. homes** 116 Response 31%

6. Average number of persons occupying a building. 3.1

9. What type of wastewater disposal system do you have?

9 / 25% cesspool	26 / 72% septic tank & leach field
0 / 0% holding tank	1 / 3% septic tank & leach pit

13. Have you had any problems with your wastewater disposal system?

4 / 11% yes 31 / 86% no

if yes, how often?

0 / 0% weekly 0 / 0% monthly 2 / 50% yearly 2 / 50% unknown

15. What types of problems have you had?

0 / 0% disposal system needs many cleanouts / pumping
1 / 25% disposal system backs up or drains slowly
0 / 0% disposal system has sewage odors
0 / 0% disposal system has sewage flowing on the ground surface
0 / 0% disposal systemlimits showering, washing, etc.

18. Have you had your disposal system replaced, repaired or modified?

8 / 22% YES 3 / 38% pre 1987 5 / 63% post 1987

28 / 78% NO

20. Number of people aware of a disposal problem in Coventry, RI 10 / 28%

21. Do you feel that your neighborhood should be sewered even if the installation cost to the homeowner could be:

13 / 42% $2,500 2 / 6% $5,000 0 / 0% $7,500 21 / 58% neither

0 / 0% no opinion

23. How would you feel aboput the Town of Coventry assuming responsibility for pumping, maintenance and repair of all wastewater disposal systems as a municipal service funded from special revenues. {i.e. property taxes, user fees, etc. }

6 / 17% in favor 19 / 53% opposed 8 / 22% no opinion

24. Do you agree that some areas of the Town of Coventry should be sewered?

26 / 72% yes 4 / 11% no 5 / 14% no opinion

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Office of Water Resources

Rules Establishing Minimum Standards Relating to

Location, Design, Construction and Maintenance of Onsite Wastewater

Treatment Systems

July 16, 2014

AUTHORITY: These rules are adopted in accordance with Chapter 42-35 pursuant to Chapters 42-17.1, 5-56, 5-56.1, 23-19.5, 23-24.3, 46-13.2, and 23-19.15 of the Rhode Island General Laws of 1956, as amended.

APPENDIX D

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STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Office of Water Resources

RULES ESTABLISHING MINIMUM STANDARDS RELATING TO LOCATION, DESIGN, CONSTRUCTION, AND MAINTENANCE OF ONSITE WASTEWATER TREATMENT SYSTEMS (OWTSs)

RULE 1. PURPOSE

The purpose of these Rules is to protect public health and the environment by establishing minimum standards for the proper location, design, construction and maintenance of onsite wastewater treatment systems (OWTSs) used for the treatment and dispersal of wastewater.

RULE 2. AUTHORITY

These Rules are promulgated pursuant to Chapter 42-17.1 Environmental Management; Chapter 5-56 Installers of Individual Sewage Disposal Systems; Chapter 5-56.1 Designers of Individual Sewage Disposal Systems; Chapter 23-19.5 Percolation Tests and Water Table Elevations; Chapter 23-24.3 Substances or Compounds Used as Sewerage System Cleaners; Chapter 46-13.2 Drilling of Drinking Water Wells, and Chapter 23-19.15 Rhode Island Cesspool Act of 2007; in accordance with Chapter 42-35 Administrative Procedures, of the Rhode Island General Laws of 1956, as amended.

RULE 3. LIBERAL APPLICATION

The terms and provisions of these Rules shall be liberally construed to allow the Department to effectuate the purposes of state laws, goals, and policies.

RULE 4. SEVERABILITY

If any provision of these Rules, or application thereof to any person or circumstances, is held invalid by a court of competent jurisdiction, the validity of the remainder of the Rules shall not be affected thereby.

RULE 5. APPLICABILITY

5.1 These Rules apply to the discharge of wastewater to an OWTS. Other wastewater that does not meet the definition in Rule 7 discharged to the subsurface must be done in accordance with the Department's "Underground Injection Program Rules and Regulations." Where an OWTS is approved for discharge of wastewater from commercial or industrial uses, the Director may require the applicant to obtain an approval

from the Underground Injection Control Program if, in the opinion of the Director, there is a reasonable risk that materials used in commercial or industrial processing may be discharged to the system.

5.2 These Rules provide minimum requirements for the design of an OWTS and its components. In addition, the Rules provide for the approval of alternative or experimental technologies (Rule 37) that may be used in conjunction with, or as an alternative to, the OWTSs and components specified herein.

5.3 No provision of these Rules nor permit granted hereunder shall be construed to prevent enforcement of any other state, federal or local laws and regulations duly adopted for the purpose of protecting the public health or environmental quality.

5.4 Nothing in these Rules shall affect the Director's power and duty to issue an immediate compliance order or take any other action pursuant to the General Laws of Rhode Island, 1956, as amended.

5.5 These Rules shall apply to all applications submitted to the Department after the effective date of these Rules established in Rule 56. Applications submitted to the Department prior to the effective date of these Rules shall be governed by the Rules in effect at that time.

RULE 6. ADMINISTRATIVE FINDINGS

6.1 OWTSs are an integral part of our total wastewater infrastructure representing the decentralized systems on the Rhode Island landscape. The people of the State should be assured that adequate OWTSs have been and are being provided and maintained for all dwellings and buildings not served by public wastewater systems.

6.2 OWTSs must be viewed as wastewater treatment and dispersal systems, not merely as disposal systems. OWTSs must be located, designed, constructed, operated, and maintained in a manner to produce an effluent that, when released into the environment, will not cause adverse public health or environmental impacts.

6.3 The improper location, design, construction, operation and maintenance of OWTSs may have the following harmful effects:

6.3.1 Public health may be imperiled by diseases and other health hazards relating to inadequately treated wastewater;

6.3.2 The public health and interest may be harmed by contamination of groundwater resources that are now used or which may be used in the future as sources of public or private drinking water supply;

6.3.3 The public health and interest may be harmed by contamination of public or private drinking water wells and other water supplies or tributaries thereto;

6.3.4 Freshwater and coastal waters of the State may be imperiled by high nutrient and bacteriological contamination;

6.3.5 The people of the State may be inconvenienced or harmed by nuisance conditions such as odors and OWTS overflows; and

6.3.6 The public use and enjoyment of the water resources of the State for recreational endeavors may be disrupted or imperiled by contamination of those resources.

6.4 The science and technology for onsite wastewater treatment and disposal is rapidly advancing, necessitating that licensed professionals and the Department continue to evaluate and share information and knowledge in order to more effectively protect the public health and the environment.

6.5 Properly functioning OWTS, other than those employing nitrogen reducing technologies, remove only a small percent of nitrogen in the wastewater. Excess nitrogen is a contaminant in drinking water. Excess nitrogen in estuarine environments causes eutrophication, which results in depleted dissolved oxygen conditions and habitat loss.

6.6 Phosphorus in OWTS wastewater is a contaminant that can cause eutrophication in fresh water environments, which results in habitat loss.

6.7 Cesspools are not an approved method of wastewater disposal under these Rules, and all existing cesspools are considered to be substandard.

6.7.1 There exists within certain portions of the state the need to abate pollution and threats to public health caused by cesspools, particularly high-risk cesspools that pose direct threats to public health and the environment;

6.7.2 Many cesspools contribute directly to groundwater and surface water contamination;

6.7.3 Wastewater disposed from cesspools can pose significant health threats to people who come into contact with, or consume, contaminated surface waters or groundwaters;

6.7.4 Appropriate treatment of wastewater 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;

6.7.5 Replacement of cesspools with modern OWTS technology reduces risks to public health and the environment;

6.7.6 In areas served by public wastewater systems, connection to said system offers a readily available, low-cost means of mitigating problems and threats caused by cesspools; and

6.7.7 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 Rhode Island General Laws Chapter 24.5 of Title 45.

6.8 OWTSs must be properly maintained to prevent their malfunction or failure in order to help avoid both contamination of state waters and the associated risks to the public health and to help preserve natural ecosystems.

RULE 7. DEFINITIONS

As used in these Rules, the following terms shall, where the context permits, be construed as follows:

"Alternative OWTS Component" means any part of an OWTS that does not meet the design or construction requirements as provided by these Rules, but has been demonstrated through field testing, calculations and other engineering evaluations to be equal to, or provide the equivalent performance of any part of an OWTS within these Rules or to enhance or facilitate treatment, maintenance, longevity or efficiency of an OWTS, and for which a certification from DEM has been issued.

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

"Applicant" means the owner or owners of the property or easement that is the subject of the application, or it must be the person who holds a valid purchase and sales agreement for said property.

"Area Subject to Storm Flowage" means drainage swales and channels which lead into, out of, pass through, or connect other watercourses, and which carry flows resulting from storm events but may remain relatively dry at other times.

"Bedrock" means rock, commonly called ledge, that forms the earth's crust. Bedrock includes rotten rock.

"Bedroom" means any room in a residential structure which is greater than seventy (70) square feet in area, which is susceptible to present or future use as a private sleeping area and which satisfies all of the following requirements:

(1) Has at least one (1) window that meets the four point four (4.4) square foot minimum size and all other requirements of the "Rhode Island State Building Code SBC-1 or SBC-2";

(2) Has at least one (1) interior method of entry and egress, excluding closets and bathrooms, allowing the room to be closed off from the remainder of the residence for privacy; and

(3) Is a heated living space that is unrestricted for year-round use.

Rooms located below grade that are not recognized as bedrooms by the "Rhode Island State Building Code SBC-1 or SBC-2" are not recognized as bedrooms under these Rules.

"Blackwater" means liquid and solid human body waste and the carriage waters generated through toilet usage.

"Building Sewer" means the pipe that begins outside the building foundation wall and extends to the septic tank, the pipe that begins outside the building foundation wall and extends to the grease tank, the pipe from a grease tank to a septic tank, or the pipe carrying laundry wastes directly to a leachfield.

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

"Change of Use" means any change in use or occupancy of any structure or part thereof which would violate any provision of the Rhode Island State Building Code, R.I. General Laws Chapter 23-27.3, as amended, or any regulation promulgated thereto without first obtaining a certificate of occupancy indicating that the structure complies with the provisions of the state building code for the proposed new use. Change of use shall also be held to mean a conversion of a seasonally used structure to a structure for year-round use.

"Coastal Shoreline Feature" means a part of the shore as categorized by the State of Rhode Island Coastal Resources Management Program using the following categories: coastal beaches; barrier islands and spits; coastal wetlands; coastal headlands, bluffs and cliffs; rocky shores; manmade shorelines; and dunes.

"Compost Toilet" means any self-contained toilet from which no liquid or solid waste materials are regularly discharged and from which a humus-like end product is produced.

"Department" or "DEM" means the Rhode Island Department of Environmental Management.

"Director" means the Director of the Rhode Island Department of Environmental Management or any subordinate(s) to whom the Director has delegated the powers and duties vested in him/her pursuant to Rhode Island General Laws Chapters 46-12 and 42-17.1, as amended, or any other duly authorized Agent.

"Dispersal Trench" means a shallow ditch with vertical sides, filled with stone, in which a single perforated distribution line or other suitable distribution device is laid and over which a cover of earth is placed.

"Distribution Box" means a watertight compartment that receives effluent and distributes it in approximately equal portions to two (2) or more distribution lines leading to some type of leachfield.

"Distribution Line" means the imperforated and perforated pipe or other suitable distribution device used to disperse effluent that extends from the distribution box.

"Dosing" means the pumped or regulated flow of wastewater.

"Experimental Technology" means any OWTS technology that does not meet the location, design or construction requirements as provided by these Rules, but has been demonstrated in theory to meet the requirements of these Rules and may not be in use in Rhode Island or elsewhere as an approved technology for wastewater treatment.

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

(1) Failure to accept wastewater into the building sewer;

(2) Discharge of wastewater to a basement; subsurface drain; stormwater collection, conveyance, or treatment device; or watercourse unless expressly permitted by the Department;

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

(4) The top of the inlet or the top of the outlet for a septic tank, distribution box, or pump tank is submerged;

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

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

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

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

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

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

"Financial Surety" means a general obligation bond, revenue bond, performance bond, or any other type of financial guaranty, in fully marketable form, as evidence to the commitment of the construction of a public wastewater project.

"Floodplain" means that land area adjacent to a river or stream or other body of flowing water which is, on the average, likely to be covered with flood waters resulting from a one hundred (100) year frequency storm. A one hundred (100) year frequency storm is one that is to be expected to be equaled or exceeded once in one hundred (100) years; or may be said to have a one percent (1%) probability of being equaled or exceeded in any given year. Rainfall intensity data for a one hundred (100) year frequency storm are those established for New England locations by the National Weather Service.

"Foundation Drain" means any mechanical or gravity drainage system, including all porous media installed to facilitate drainage, that lowers the groundwater elevation beneath a building foundation and which has an outlet for the collected groundwater.

"Freshwater Wetland" is defined as set forth in Rhode Island General Laws Section 2-1-20(4), as amended, and as further defined by the Department's "Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act." The term shall further be held to include those wetland types defined by the remainder of section 2-1-20 and the wetland regulations, including, but not limited to: marshes, swamps, bogs, ponds, rivers, river and stream floodplains and banks, areas subject to flooding or stream water, including rivers and streams, and that area of land within fifty (50) feet of the edge of any bog, marsh, swamp or pond or that area within one hundred (100) feet of a flowing body of water less than ten (10) feet wide or that area within two hundred (200) feet of a flowing body of water greater than ten (10) feet in width.

"Graywater" means wastewater drained from sinks, tubs, showers, dishwashers, clothes washers, and other non-toilet sources.

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

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

"Human Transported Material" means any materials, other than those emplaced pursuant to these Rules, including but not limited to artifacts, organic materials, soil, rock, or sediment moved horizontally by directed human activity.

"Invert" means the lowest portion of the interior of a pipe or fitting.

"Large Onsite Wastewater Treatment System" means an OWTS that meets any of the following:

(1) Any single OWTS designed to treat five thousand (5,000) gallons or more per day;

(2) Multiple OWTSs for any project on one or more parcels of land, excluding residential subdivisions, where the total design flow for the project is five thousand (5,000) gallons or more per day;

(3) All OWTSs serving more than one (1) unit in a residential subdivision, provided that the total design flow of these OWTSs, each serving more than one unit, is five thousand (5000) gallons or more per day; or

(4) Proposed OWTSs and existing OWTSs on the parcel that will result in a total design flow for the parcel exceeding five thousand (5,000) gallons per day.

"Large Capacity Cesspool" means a cesspool that serves any non-residential facility that has the capacity to serve more than twenty (20) people per day or serves any multi-family residence or apartment building.

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

"Linear Loading Rate" means the loading rate per linear foot of leachfield (gallons per day per linear foot) along the land's contour.

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

"Nitrogen reducing technology" means a wastewater treatment technology that is accepted by the Department as capable of reducing the total nitrogen concentrations by at least fifty percent (50%) and meeting an effluent concentration of less than or equal to nineteen (19) mg/l.

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

"Original Ground" means those soils that have been deposited or developed by natural processes, excluding storm deposited sand in the backdune environment.

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

"Person" means any individual, group of individuals, firm, corporation, association, partnership or any federal, state or municipal governmental entity.

"Private Drinking Water Well" means any manmade opening into the ground developed for the purpose of meeting a person's current potable drinking water needs provided said well does not supply a public water system. This definition shall include proposed private drinking water wells on an applicant's property and on other properties with an approved OWTS permit. Wells serving non-potable or non-drinking water needs are not considered private drinking water wells under these Rules. A well on a property that is connected to a public water system is not considered a private drinking water well under these Rules.

"Probe" means any exploratory test employing a driving rod, tool or other device to establish the depth of bedrock.

"Public Drinking Water Supply Well" or "Public Well" means any manmade opening into the ground developed for the purpose of meeting all or part of a public water system needs.

"Public Water System" means any water system that provides piped water to the public for human consumption, provided that such system has at least fifteen (15) service connections or serves an average of twenty-five (25) individuals daily at least sixty (60) days out of the year. A public water system shall include all sources and facilities involved in collecting, treating, storing and distributing the water.

"Pump Tank" means a watertight structure equipped with one (1) or more pumps designed to discharge wastewater intermittently into a leachfield.

"Residence" means any structure used for housing purposes, including, but not limited to, single or multiple family dwellings, duplexes, tenements, apartment buildings, residential condominiums, mobile homes, recreational vehicles or trailers.

"Restrictive Layer" means a soil horizon that is assigned to a soil category 10 as defined in Rule 15.11.

"Rotten Rock" means any decomposed but still coherent rock. Rotten Rock is greater than fifty percent (50%) coherent rock and lies above equal or more coherent rock.

"Seasonal High Groundwater Table" means the elevation of the groundwater table during that time of the year at which it is highest as determined in accordance with Rule 15.12.

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

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

"Septic Tank Effluent Pipe" means the pipe that begins at the outlet of the septic tank or other treatment tank and extends to the next treatment component or distribution box.

"Single-service articles" means tableware, carry-out utensils, and other items such as bags, containers, placemats, stirrers, straws, toothpicks, and wrappers that are designed and constructed for use one time by one individual.

"Storm Drain" means any pipe or structure designed to collect, carry and divert surface water runoff.

"Structure" means any residence (as defined herein), building, garage, shack, trailer or other permanent or semi-permanent facility, whether commercial or non-commercial in use, which is proposed to be placed or has been built or otherwise placed on a parcel of real property.

"Subdivision" means the division or re-division of a lot, tract, or parcel of land into two (2) or more lots, tracts, or parcels. For the purpose of these Rules, subdivisions will also include two (2) or more contiguous lots of record under common ownership when located on a public right of way or roadway, including paper streets, or where property line changes are proposed.

"Subdivision Layout" means any proposed design or arrangement of lots, roads, structures, easements, utilities or other features to be incorporated into a subdivision.

"Substantial Improvement" means any construction, renovation, or improvements made within any twelve (12) month period and costing in excess of fifty percent (50%) of the physical value of the building prior to the start of construction.

"Subsurface Drains" means any system of below surface piping or highly permeable material intended to lower the groundwater table of an area, and which has an outlet to the surface for the collected groundwater.

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

"Test Hole" means any excavation in the area of the proposed leachfield to collect information on the soil profile, depth to a restrictive layer or bedrock, depth to seasonal high groundwater table or any other applicable field information.

"Tributary" means any flowing body of water or watercourse that provides intermittent or perennial flow to down-gradient watercourses that eventually discharge to the waters of concern (e.g., reservoir impoundment or salt pond).

"Tributary Wetland" means freshwater wetlands within a watershed that are connected via a watercourse to the waters of concern (e.g., drinking water supply impoundment or coastal wetland or tidal waters).

"Vendor" means the person seeking an alternative or experimental technology approval.

"Wastewater" means human or animal excremental liquid or substance, putrescible animal or vegetable matter or garbage and filth, including, but not limited to, water discharged from toilets, bath tubs, showers, laundry tubs, washing machines, sinks, and dishwashers. Both blackwater and graywater are considered wastewater under these Rules.

"Watercourse" means any river, stream, brook, pond, lake, swamp, marsh, bog, fen, wet meadow, area subject to storm flowage, or any other standing or flowing body of water, including such watercourses that may be affected by the tides.

"Wellhead Protection Area" means the area as designated by the Director in the DEM "Rules and Regulations for Groundwater Quality" surrounding a public well or wellfield through which water will move toward and reach such well or wellfield.

RULE 8. PROHIBITIONS

8.1 No individual shall prepare plans, applications, certifications or specifications for the design of an OWTS that is to be submitted to the Department pursuant to these Rules, unless such individual has a valid license in accordance with the provisions of these Rules to conduct such activity.

8.2 No individual shall install, construct, alter, or repair an OWTS pursuant to these Rules unless such individual has a valid license in accordance with the provisions of these Rules to conduct such activity. This prohibition does not apply to a property owner installing, constructing, altering, or repairing an OWTS to serve a building the owner occupies or will occupy as the owner's intended permanent domicile, provided that the owner has obtained written permission for that work and has obtained the Director's approval of the plans and specifications for that work prior to the start of any construction.

8.3 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. OWTS repairs in accordance with Rule 17.7.4 are exempt from this prohibition.

8.4 No person shall utilize an OWTS permitted under these Rules:

8.4.1 In a manner that causes wastewater flow to exceed the OWTS's design capacity;

8.4.2 For other wastewater that doesn't meet the definition in Rule 7; or

8.4.3 In a manner that does not conform with the terms of the Department issued permit.

8.5 Use of a failed OWTS is prohibited except in accordance with the requirements of an enforcement notice or order issued by the Director.

8.6 No person shall install an OWTS leachfield in an area designated as a freshwater wetland unless approved by the DEM Freshwater Wetlands Program or specifically exempted by regulation or are otherwise allowed by rule.

8.7 No person shall discharge or allow the entrance of wastewater, treated or untreated, into any watercourse, nor shall they discharge or permit the entrance of such wastewater into any open or covered drain tributary to such watercourse, without the approval of the Director.

8.8 No person shall discharge any treated or untreated wastewater to the surface of the ground without the approval of the Director. However, this shall not interfere with the spreading of animal manure or compost containing wastewater biosolids originating from a DEM-approved municipal composting facility on the surface of the ground in accordance with normal agricultural practices.

8.9 The use of acid and organic chemical solvents in any OWTS is hereby prohibited. The Department does not recognize any additive product as being beneficial to the operation of an OWTS.

8.10 No person shall engage in the business of pumping, cleaning or transporting septage unless such person has obtained a Hazardous Waste Transporter Permit from the Director in accordance with the Rhode Island Rules and Regulations for Hazardous Waste Management, as amended.

8.11 Commercial laundromat(s) shall not be permitted to discharge to an OWTS. Self-service laundry facilities operating in compliance with R.I.G.L. 46-29-3, "Phosphate Reduction," are exempt from this prohibition.

8.12 Deep concrete chambers (galleys) as described in Rule 34 are prohibited for OWTS Applications for New Building Construction and OWTS Applications for Alterations to a Structure (Rule 17).

8.13 Roof drains, surface drains, and subsurface drains shall not be permitted to discharge to an OWTS.

8.14 Floor drains that receive wastewater that does not meet the definition in Rule 7 shall not be permitted to discharge to an OWTS. The Department may prohibit any floor drain from discharging to an OWTS where there is a reasonable likelihood that such wastewater may enter such floor drain.

8.15 Holding tanks for wastewater are prohibited for Applications for New Building Construction and Applications for Alteration to a Structure.

8.16 Siphons are prohibited for OWTS with a design flow less than five thousand (5000) gallons per day unless used as part of an approved Alternative or Experimental Technology approved pursuant to Rule 37.

8.17 The use of large capacity cesspools is prohibited in accordance with US Environmental Protection Agency "Revisions to the Underground Injection Control Regulations for Class V Injection Wells", December 7, 1999, 40 CFR Parts 9, 144, 145 and 146. Any such large capacity cesspool shall cease to be used and shall be properly removed or abandoned in accordance with Rule 52.

8.18 Marine pumpout facilities are prohibited from discharging wastewater to an OWTS other than a holding tank installed pursuant to Rule 28.

RULE 9. CLASS I, II, III, AND IV LICENSES

9.1 Class I Designer's License- A Class I License authorizes the design of a repair to an OWTS, or any component thereof, provided that the repaired OWTS meets one of the criteria below:

9.1.1 OWTS, other than alternative or experimental systems, permitted under these Rules for residential use with a design flow of less than or equal to nine hundred (900) gallons per day; or

9.1.2 Alternative or experimental OWTS for residential use designated by the Director as suitable for a Class I Licensed Designer with a design flow of less than or equal to nine hundred (900) gallons per day.

9.2 Class II Designer's License- A Class II License authorizes the design of the following:

9.2.1 The design of an OWTS Repair or OWTS for an Alteration to a Structure as defined in Rule 17, provided that the OWTS meets one of the criteria below:

(A) OWTS, other than alternative or experimental systems, permitted under these Rules for residential use with a design flow of less than or equal to two thousand (2000) gallons per day;

(B) Alternative or experimental OWTS for residential use designated by the Director as suitable for a Class II Licensed Designer with a design flow of less than or equal to two thousand (2000) gallons per day;

(C) OWTS, other than alternative or experimental systems, permitted under these Rules for commercial use with a design flow of less than or equal to nine hundred (900) gallons per day; or

(D) Alternative or experimental OWTS for commercial use designated by the Director as suitable for a Class II Licensed Designer with a design flow of less than or equal to nine hundred (900) gallons per day.

9.2.2 The design of an OWTS for New Building Construction as defined in Rule 17, provided that the OWTS meets one of the criteria in Rule 9.2.1 (A)-(D) and the OWTS is on a lot that does not require a variance from any of the following provisions of the Rules:

(A) Rule 32- in regards to OWTS installation in areas where there is a shallow depth to the seasonal high groundwater table or to a restrictive layer or bedrock from the original ground surface;

(B) Setbacks in Table 22.2 and Table 22.4 for drinking water supplies; or

(C) Setbacks in Table 22.3 for the Salt Pond and Narrow River Critical Resource Areas.

9.3 Class III Designer's License- A Class III license authorizes the design of any OWTS provided for under these Rules.

9.4 Class IV Soil Evaluator's License- A Class IV license authorizes the performance of soil evaluations described in Rule 15. Individuals holding a Class IV license will be referred to herein as soil evaluators.

9.5 Class I, II, III, and IV licenses shall be in effect for a period not to exceed three (3) years following the date of issuance.

RULE 10. OBTAINING A CLASS I, II, III OR IV LICENSE

10.1 Examination- Any individual seeking a license under these Rules will be required to pass the appropriate examination administered or sanctioned by the Department. An examination shall be given for each class at least once per year. Each applicant for an examination shall submit a completed application to the Director, which shall include the non-refundable examination and new license application fee. In the event that an individual fails an examination given pursuant to these Rules, the individual shall pay the examination and new license fee for each subsequent time an examination is taken.

10.2 Minimum Qualifications- In order to qualify for an examination, the applicant must demonstrate to the Department with appropriate documentation that the minimum qualifications below are met for the respective examination:

10.2.1 Class I- A valid Installer's License authorizing the installation of OWTSs pursuant to Rule 13, or registration as a Professional Land Surveyor with the Rhode Island State Board of Registration for Professional Land Surveyors, or Registration as a Professional Engineer with the Rhode Island State

Board of Registration for Professional Engineers. Professional Engineers registered in Rhode Island after December 31, 1994 must be registered as a Civil Engineer or Environmental Engineer.

10.2.2 Class II- Registration as a Professional Land Surveyor with the Rhode Island State Board of Registration for Professional Land Surveyors or Registration as a Professional Engineer with the Rhode Island State Board of Registration for Professional Engineers. Professional Engineers registered in Rhode Island after December 31, 1994 must be registered as a Civil Engineer or Environmental Engineer.

10.2.3 Class III- Registration as a Professional Engineer with the Rhode Island State Board of Registration for Professional Engineers. Professional Engineers registered in Rhode Island after December 31, 1994 must be registered as a Civil Engineer or Environmental Engineer.

10.2.4 Class IV-

(A) The minimum qualifications for the Class IV exam shall be satisfied by meeting any one of the following:

(i) Registration as a professional soil scientist by the Society of Soil Scientists of Southern New England or the American Registry of Certified Professionals in Agronomy, Crops and Soils;

(ii) Four (4) years professional experience in soil studies for OWTS design in Rhode Island or in soil classification, mapping, interpretation or a combination thereof; and successful completion of nine (9) semester hours in soil science from an accredited college or university; or

(iii) Two (2) years professional experience in soil studies for OWTS design in Rhode Island or in soil classification, mapping, interpretation or a combination thereof; and a bachelor's degree or graduate degree from an accredited college or university in soil science, geology, engineering or similar discipline with successful completion of nine (9) semester hours in soil science.

(B) The Director reserves the right to determine which courses are acceptable in meeting the requirement for nine (9) semester hours in soil science in (A)(ii) and (iii) above. The Director may determine that certain courses or training other than those from an accredited college or university are an equivalent and acceptable alternative to all or part of the requirement in (A)(ii) and (iii) above for nine (9) semester hours in soil science.

10.3 Examination Descriptions

10.3.1 The examination for a Class I Designer's License shall be a written examination that, at minimum, addresses the following:

(A) Principles of onsite wastewater treatment and dispersal;

(B) Understanding of the applicable state rules;

(C) Analysis of OWTS failures; and

(D) Design and construction of OWTS repairs, with consideration given to soil types and related constraints.

10.3.2 The examination for a Class II Designer's License shall, at minimum, address the following:

(A) Principles of onsite wastewater treatment and dispersal;

(B) Analysis of OWTS failures;

(C) Design and construction of OWTS repairs, with consideration given to soil types and related constraints;

(D) Advanced principles of onsite wastewater treatment and dispersal;

(E) Understanding of the applicable state rules; and

(F) Design and construction of new OWTSs, including constraints to design imposed by soils.

10.3.3 The examination for a Class III Designer's License shall be a two (2) part written examination, each of which will be graded separately. The first part shall consist of the test given for the Class II License. Passage of the first part makes the applicant eligible for the Class II Designer's License. Active Class II Licensed Designers in good standing need only take the Class III portion of the exam. The two parts of the Class III examination do not have to be passed concurrently. However, if more than three (3) years elapse after the applicant passes one of the components of the examination, the applicant must retake that portion of the examination originally passed more than three (3) years earlier, unless a Class II License has been issued and is in good standing. In addition to including the Class II examination, the Class III examination shall address the following:

(A) Understanding of additional applicable state rules;

(B) Groundwater hydrology;

(C) Commercial wastewater treatment;

(D) Advanced wastewater treatment technologies; and

(E) Operation of electrical and mechanical components of OWTSs.

10.3.4 The examination for a Class IV License shall have a written and field component, each of which shall be graded separately. The written and field examinations for Class IV do not have to be passed concurrently. However, if more than three (3) years elapse after the applicant passes one of the components of the examination, the applicant must retake that portion of the examination originally passed more than three (3) years earlier. The Class IV License examination shall at minimum address the following:

(A) Principles of onsite wastewater treatment and dispersal;

(B) Understanding of the applicable state rules;

(C) Geology and soils of Rhode Island;

(D) Soil textural analysis and profile descriptions;

(E) Estimating mean seasonal high groundwater elevations using soil morphology; and

(F) Soil moisture and drainage characteristics of soils.

10.4 Examination Application Submission- Completed applications for examinations, fees and evidence that the applicant meets the minimum qualifications specified in Rule 10.2 shall be received by the DEM at least forty-five (45) days prior to the date of the applicable examination. Within thirty (30) days of receipt of an application for an examination, the applicant shall be notified as to whether the minimum qualifications in Rule 10.2 have been met, if more information is needed, or if the applicant is eligible for the examination. If the applicant is determined ineligible, the Department shall provide the applicant with reasons for the determination. The applicant may appeal the Director's decision of ineligibility with the Administrative Adjudication Division.

10.5 Examination Results- The Department shall notify the applicant of examination results no later than sixty (60) days after the examination date. Minimum passing score for an examination shall be a seventy percent (70%) correct response for all questions comprising the examination. For those applicants that pass the examination, the notification will include a license application form.

10.6 The license shall be issued to natural persons only and is not transferable or assignable.

RULE 11. EXPIRATION AND RENEWAL OF A CLASS I, II, III OR IV LICENSE

11.1 Expiration- Once a license issued pursuant to this Rule has expired, the individual that held such license is prohibited to practice as a Licensed Designer or Soil Evaluator.

11.2 Renewal Prior to Expiration- A license issued pursuant to this Rule may be renewed provided that:

11.2.1 The applicant pays the renewal fee;

11.2.2 The applicant certifies that the professional license(s) required as a minimum qualification for the respective exam is valid;

11.2.3 The applicant demonstrates satisfactory completion of a minimum of four (4) continuing education units of appropriate professional development per year since the applicant's license was issued or renewed. Events eligible for this continuing education shall be rated by the Director with consideration of their value and applicability to the relevant design class. Eligible events will be assigned “continuing education units.” The Director shall maintain a list of approved continuing education events and the units assigned to each; and

11.2.4 The applicant demonstrates satisfactory compliance with any unresolved OWTS regulatory requirements, including submission of properly completed Certificates of Construction.

11.3 Renewal After Expiration- If the license has expired, the license may be renewed provided the request is made within three years of the license expiration, the applicant pays a late fee, and the applicant demonstrates compliance with Rule 11.2. The licensing exam may not be taken in lieu of satisfying the renewal provisions herein. If the license is not renewed within the three (3) year period after expiration, the applicant must retake and pass the appropriate examination, then reapply for the license.

RULE 12. DISCIPLINARY ACTION FOR CLASS I, II, III AND IV LICENSEES

12.1 Where the Director has identified negligence, incompetence or misconduct on the part of a licensee in fulfilling the requirements of these Rules, the Director may issue a notification letter to the licensee documenting the transgression. A copy of the notification shall be placed in the licensee's file, and a copy shall be provided to the Review Panel established pursuant to Rule 12.5.

12.2 Denial, Suspension, or Revocation of License- The Director may deny, suspend or revoke a license if the individual has failed to comply with the requirements in these Rules or where the individual:

12.2.1 Provided incorrect, incomplete or misleading information in obtaining the license;

12.2.2 Demonstrated gross or repeated negligence, incompetence or misconduct in representation of site conditions; design of an OWTS; preparation of any plans, certifications or applications submitted to the Department; in the inspection of an installation of an OWTS; in the supervision of subordinates performing work covered under these rules; or by lack of responsiveness to inquiry by the Department pursuant to a complaint being investigated by the Department;

12.2.3 Committed a felony involving moral turpitude; or

12.2.4 Has a professional license that is a minimum qualification to obtain the designer's license in Rule 10.2 which has expired, is suspended or is revoked.

12.3 Penalties- The Director may assess penalties in association with any suspension or revocation of a license or where a licensee has failed to comply with the requirements in these Rules. Penalties shall be assessed in accordance with the Department's "Rules and Regulations for the Assessment of Administrative Penalties."

12.4 Denial of License Renewal- The Director may deny the renewal of a license if the individual has failed to comply with the requirements in these Rules or where the individual:

12.4.1 Provided incorrect, incomplete or misleading information in obtaining the license;

12.4.2 Demonstrated gross or repeated negligence, incompetence or misconduct in representation of site conditions; design of an OWTS; preparation of any plans, certifications or applications submitted to the Department; in the inspection of an installation of an OWTS; or in the supervision of subordinates performing work covered under these rules;

12.4.3 Committed a felony involving moral turpitude;

12.4.4 Failed or neglected to comply with the professional development continuing education requirements;

12.4.5 Failed to comply with a quality control plan submission or requirements as required by the Department to address deficiencies in application submittals; or

12.4.6 Has a professional license that is a minimum qualification to obtain the designer's license in Rule 10.2 which has expired, is suspended or is revoked.

12.5 Review Panel- The Director shall appoint a Review Panel which shall consist of five (5) members, at least three (3) of whom shall be licensed under this Rule and not be employed by the Director. Members of the Review Panel shall be appointed for a two (2) to five (5) year term. The Director may appoint new members to serve out the remaining time of those members who leave the Review Panel before the end of their term. The Director may also limit the number of terms an individual can serve. The Review Panel shall conduct regular meetings as needed, but shall meet not less than once every six (6) months. The Review Panel shall have the authority to:

12.5.1 Review complaints against Licensed Designers and Soil Evaluators, including requesting information to aid such review;

12.5.2 Review the performance related deficiencies identified pursuant to Rule 12.1; and

12.5.3 Recommend to the Director to suspend or revoke a license, including the time period for the suspension or revocation, and other remedial action that may be appropriate, which would depend on the characterization of the severity of the violations involved.

12.6 The Director shall be responsible for all final decisions regarding denial, suspension and revocation of licenses issued pursuant to these Rules as well as any other disciplinary actions to be brought against a licensee. Nothing herein shall prevent or restrict the Director from initiating any disciplinary action regarding denial, suspension or revocation of a license without the recommendation of the Review Panel.

12.7 Complaint Review- The procedure for Departmental review of complaints regarding Licensed Designers or Soil Evaluators is described below. At any time during the review of the complaint, the Director may request an informal meeting with the licensee to discuss the complaint.

12.7.1 Upon receipt of a written complaint regarding a Licensed Designer or Soil Evaluator, the Director shall contact the licensee and all relevant parties to the complaint as part of the Director's preliminary review.

12.7.2 If as a result of the preliminary review, the Director concludes that the complaint lacks merit or is not within the Department's jurisdiction under these Rules, the Director shall dismiss the complaint and no record of the complaint shall be placed in the licensee's file.

12.7.3 If as a result of the preliminary review, the Director concludes that the complaint may have merit, the Director shall forward the complaint and a report of any findings to the Review Panel.

12.7.4 The Review Panel shall review the complaint and make recommendations appropriate to its authority to the Director.

12.8 Notice of Intent- In accordance with R.I.G.L. Section 42-35-14, before the Director denies renewal of, suspends or revokes a license, the Director will issue a Notice of Intent by certified mail or hand delivery to the licensee notifying the licensee of the Director's intention to deny renewal of, revoke or suspend the license and the reasons why the Director intends to take such action. The licensee receiving the Notice of Intent may request a preliminary hearing before the Director or his or her designee to show cause why the Director should not deny, revoke or suspend the license. Such hearing shall be held within thirty (30) days of the Director’s receipt of a written request by the licensee or an attorney representing the licensee for such preliminary hearing. If the licensee fails to request a preliminary hearing within twenty (20) days of receipt of the Notice of Intent, fails to make himself or herself reasonably available to attend a preliminary hearing, or fails to show cause to the Director or his or her designee why the Director should not deny renewal, revoke or suspend the license, the Director may deny renewal, revoke or suspend the license in accordance

with these Rules and other applicable statutes or regulations. If the Director finds that public health, safety, or welfare imperatively requires emergency action, and incorporates a finding to that effect in its order, summary suspension may be ordered pending proceedings for revocation or other action.

12.9 Request for Hearing- Requests for a hearing on the denial of examination eligibility, denial of renewal, suspension, or revocation of a license must be filed with a the clerk of the Department of Environmental Management, Administrative Adjudication Division within thirty (30) days of the date of the licensee's receipt of such notice by certified mail or hand delivery.

12.10 Censure- The Director may publicly censure any Licensed Designer or Soil Evaluator whose license has been subject to an official enforcement action.

12.11 Suspension- Any individual with a suspended license is prohibited from practicing any work allowed under the license, renewing the license, or applying for a new license for the period of the suspension.

12.12 Revocation- Any individual who has a license revoked pursuant to this Rule shall not petition the Director for reinstatement for a period of time to be determined by the Director.

RULE 13. INSTALLER'S LICENSE

13.1 Installer's License- An Installer's License authorizes an individual to install, construct, alter or repair an OWTS. A Licensed Installer shall install an OWTS in accordance with Rule 43.

13.2 Obtaining an Installer's License

13.2.1 Each applicant for an Installer's License shall submit a completed application to the Director along with a non-refundable application fee.

13.2.2 Applicants for an Installer's License will be required to demonstrate possession of and ability to properly use a level or transit and to obtain a passing grade on a written examination given by the Director. The examination shall be intended to demonstrate an applicant's understanding of the Rules and the ability to read and interpret approved plans and specifications for OWTSs.

13.2.3 Installer's Licenses are not transferable or assignable and shall automatically become invalid upon suspension or revocation.

13.2.4 Installer's Licenses shall be in effect for a period not to exceed three (3) years following the date of issuance.

13.3 Expiration, Renewal, and Reinstatement of Installer's Licenses

13.3.1 Once an Installer's License issued pursuant to this Rule has expired, the individual that held such license is prohibited to practice as a Licensed Installer.

13.3.2 An Installer's License shall be renewed upon payment of a renewal fee and the submittal of proof of completion of any professional development continuing education required by the Director.

13.3.3 If an installer's license has expired for less than one (1) year, the license may be reinstated in accordance with 13.3.2. If the license has expired for greater than one (1) year, the license may be

reinstated provided the request is made within three (3) years of the license expiration; the applicant pays a reinstatement fee; and the applicant demonstrates completion of any professional development continuing education as required by the Director. If the license is not reinstated within the three (3) year period after expiration, the applicant must reapply for the license and take the installer's examination.

13.4 Denial, Suspension and Revocation of Installer's Licenses

13.4.1 The Director may deny, suspend or revoke an Installer's License if the individual has failed to comply with the requirements in these Rules or where the individual:

(A) Provided incorrect, incomplete or misleading information in obtaining the license; or

(B) Demonstrated gross or repeated negligence, incompetence or misconduct in installing OWTSs.

13.4.2 In accordance with R.I.G.L. Section 42-35-14, before the Director suspends or revokes a license, the Director will issue a Notice of Intent to Revoke/Suspend a license by certified mail or hand delivery to the licensee notifying the licensee of the Director's intention to revoke or suspend the license and the reasons why the Director intends to take such action. The licensee receiving the Notice of Intent to Revoke/Suspend may request a preliminary hearing before the Director or his or her designee to show cause why the Director should not revoke or suspend the license. Such hearing shall be held within thirty (30) days of the Director's receipt of a written request by the licensee or an attorney representing the licensee for such preliminary hearing. If the licensee fails to request a preliminary hearing within twenty (20) days of receipt of the Notice of Intent to Revoke/Suspend, fails to make himself or herself reasonably available to attend a preliminary hearing, or fails to show cause to the Director or his or her designee why the Director should not revoke or suspend the license, the Director may revoke or suspend the license in accordance with these Rules. If the Director finds that public health, safety, or welfare imperatively requires emergency action, and incorporates a finding to that effect in its order, summary suspension may be ordered pending proceedings for revocation or other action.

13.4.3 The licensee may request a hearing on the denial, suspension, or revocation of a license with the Department of Environmental Management, Administrative Adjudication Division within thirty (30) days of the date of receipt of such notice.

13.4.4 The Director may publicly censure any Licensed Installer whose license has been suspended or revoked.

13.4.5 Any individual with a suspended Installer's License is prohibited from practicing any work allowed under the license, renewing the license, or applying for a new license for the period of the suspension.

13.4.6 Any individual who has an Installer's License revoked pursuant to this Rule shall not petition the Director for reinstatement for a period of time to be determined by the Director.

RULE 14. ONSITE WASTEWATER TREATMENT SYSTEMS -- GENERAL

14.1 Any dwelling or other building having plumbing fixtures from which wastewater is produced, in a location where no public wastewater system is available or accessible, shall be provided with an OWTS of type and design approved by the Director.

14.2 All of the components of an OWTS shall be located within the boundary of the property upon which the building or dwelling served by the OWTS is located. Exemption to this requirement may be granted for OWTSs serving more than one (1) unit in a proposed subdivision or for any OWTS repair.

14.3 Household Laundry Systems- For an OWTS designed to receive household laundry waste only, a leachfield sized to accept twenty percent (20%) of the design flow may be used without the installation of a septic tank.

14.4 Issuance of Building Permits For Activities Requiring Approval Under These Rules- A municipality shall not issue a building permit pursuant to Rhode Island General Laws Chapter 23-27.3, as amended, unless all written approvals by the Director required by these Rules have been presented to the municipality and said approvals are valid at the time of the issuance of the building permit.

14.5 Connection to a Public Wastewater System- An OWTS application shall not be approved if such OWTS is proposed to serve a premises for which a public wastewater system is reasonably accessible as determined by the Director, and for which permission to enter the public wastewater system can be obtained from the authority having jurisdiction. The Director shall require the owner or occupant to connect the structure to a public wastewater system within a specified period of time if the following occur:

14.5.1 The OWTS is failing;

14.5.2 Public wastewater system is reasonably accessible as determined by the Director; and

14.5.3 Permission to connect to the public wastewater system can be obtained from the authority having jurisdiction over it.

14.6 Component Substitution- For an OWTS approved, but not yet installed, with a septic tank, grease tank, pump tank, or distribution box that does not meet the updated construction standards in these Rules, a substitution of components complying with these Rules may be made provided as-built plans are submitted to the Department upon completion of construction. No substitution of leachfields or leachfield components may be made under this Rule 14.6.

14.7 Data Quality- Effluent samples and water quality samples shall be collected, stored, transported, and analyzed in accordance with the United States Environmental Protection Agency approved procedures.

RULE 15. SOIL EVALUATION

15.1 Soil Evaluation Required- Except as provided for in Rule 15.1.1 and 15.1.2, a soil evaluation shall be required for an OWTS Application for New Building Construction and for an OWTS Application for Alteration of a Structure in accordance with Rule 17. A soil evaluation will not be required for the following, provided the applicant has groundwater table elevations compiled prior to January 31, 2001 that have been approved by the Department.

15.1.1 Applications submitted to the Director for lots within a subdivision that have a valid Subdivision Site Suitability Certification issued pursuant to Rule 20, provided that groundwater table elevations were compiled after July 20, 1987;

15.1.2 Applications submitted to the Director for lots not within a subdivision where the following criteria are met:

(A) The groundwater table elevations were compiled after December 31, 1992;

(B) The approved groundwater table is at a depth of four (4) feet or greater from the original grade; and

(C) The test hole where the groundwater table elevations were collected is not located in any of the following areas:

(i) Within one hundred (100) feet of any watercourse;

(ii) Within two hundred (200) feet of the shoreline of the Narrow River or the shoreline of one of the South Shore Salt Ponds as specified in Rule 38.3.1; or

(iii) Within two hundred (200) feet of a surface water drinking water supply impoundment and adjacent wetlands.

15.2 Validity of Field Data- Field data shall be considered valid for a period of five (5) years from the time of initial certification by the Department or five (5) years from the date of initial approval of any OWTS application, design, or subdivision suitability where the data were used, whichever occurred most recently. Field data older than five (5) years may be used provided that 15.2.1 – 15.2.3 are met. Field data can not be renewed independent of an OWTS application or subdivision site suitability certification application.

15.2.1 The field conditions are essentially unchanged;

15.2.2 The field data was initially compiled and certified after July 20, 1987 for subdivisions or after December 31, 1992 for individual lots; and

15.2.3 Its continuing validity is properly certified on the OWTS application or Application for Subdivision Site Suitability Certification.

15.3 Soil Evaluation Requirements- The soil evaluation shall be prepared on forms approved by the Director. The soil evaluation shall contain a site sketch and the information in 15.3.1 – 15.3.6. The information in 15.3.1 and 15.3.2 shall be completed by a Soil Evaluator, and may be required to be witnessed by the Director in accordance with Rule 15.5. The information in items 15.3.3 –15.3.6 shall be determined by a Class II or III Licensed Designer or a Soil Evaluator. The test holes excavated for the soil evaluation shall be within the area of the proposed leachfield as described in Rule 15.9.

15.3.1 Comprehensive soil profile description and textural analysis identifying the characteristics of the soil and using the terminology in the DEM Soil Evaluation Guidance Document;

15.3.2 Identification of the seasonal high groundwater table in accordance with Rule 15.12;

15.3.3 General description of slope;

15.3.4 Presence of any watercourse, wetlands, or surface water bodies within two hundred (200) feet of the proposed leachfield;

15.3.5 Presence of any drains that may influence the seasonal high groundwater table; and

15.3.6 Approximate location of property lines.

15.4 Soil Evaluation Application- An application form shall be submitted to the Director by the Soil Evaluator prior to conducting the soil evaluation field work on the site. Such application will be on forms approved by the Director and will require at minimum a locus map and photocopy of the relevant page or section thereof from the US Department of Agriculture Soil Survey with the site location marked. The Director shall determine if the soil evaluation must be witnessed by the Department. The Director shall notify the applicant within ten (10) business days of receipt of the application as to whether or not the soil evaluation must be witnessed by the Department.

15.5 Soil Evaluation Witnessed by the Department

15.5.1 At the time of the notification in Rule 15.4, an appointment will be scheduled for the Department to witness the soil evaluation. This appointment shall be within fifteen (15) business days of the Director's notification in Rule 15.4.

15.5.2 Requests for cancellation of the soil evaluation appointment will be accepted by the Director a minimum of twenty-four (24) hours in advance of the scheduled appointment, and if requested, will be rescheduled for the next available date. All other cancellations, including instances where the Director is onsite and the Licensed Designer or Soil Evaluator is not present, will require reapplication to the Director. If the Director is not onsite for the scheduled appointment, the completed soil evaluation shall be submitted to the Director prior to the submission of the application for an OWTS permit.

15.5.3 The Soil Evaluator shall complete the soil evaluation form prior to the arrival of the Director onsite for the scheduled appointment with the Department. While in the field, the Director shall determine which of the following apply:

(A) The Director concurs with the determination of the soil evaluation. The soil evaluation form shall be submitted to the Department within ninety (90) days of the scheduled appointment and may be submitted concurrently with the OWTS Application;

(B) The Director and the Soil Evaluator concur that results of the seasonal high groundwater table determination are inconclusive, and a determination will have to be made during the wet season in accordance with Rule 15.12.4; or

(C) The Director does not concur with the soil evaluation. If soil conditions are in dispute, the Department, upon request of the Soil Evaluator, shall provide an additional field review in an effort to resolve the dispute.

(i) If the determination of the seasonal high groundwater table remains in dispute after the additional field review and all other elements of the soil evaluation are agreed upon, the Soil Evaluator has the option to conduct a wet season determination of the seasonal high groundwater table in accordance with Rule 15.12.4.

(ii) If elements of the soil evaluation other than the seasonal high groundwater table remain in dispute after the additional field review, the Department shall disclaim the determinations of the soil evaluation and provide an explanation for not accepting it.

15.6 Soil Evaluation Not Witnessed by the Department- If the Director determines that the Department need not witness the soil evaluation, the Licensed Designer or Soil Evaluator shall notify the Department during normal business hours by telephone of the date and time of the soil evaluation at least twenty-four (24) hours prior to conducting the soil evaluation. The Department, at its discretion, may make

unannounced inspections of any soil evaluation. The soil evaluation form shall be submitted to the Director prior to the submission of the application for an OWTS permit and within ninety (90) days of the day the soil evaluation was conducted.

15.6.1 If bedrock is encountered within a test hole during a soil evaluation not witnessed by the Department, the Licensed Designer shall apply to the Department for bedrock testing.

15.6.2 After review of the soil evaluation, the Director shall either:

(A) Accept the determination of the soil evaluation;

(B) Determine that the soil evaluation is not in compliance with these Rules or that more information must be collected, in which case a revised soil evaluation must be submitted to the Director; or

(C) Disclaim the determinations of the soil evaluation, and provide an explanation for not accepting it.

15.7 Soil Evaluation Certification- Individuals conducting a soil evaluation shall certify that the soil evaluation was conducted in a manner consistent with these Rules and that it is an accurate portrayal of site conditions on the day and time it was conducted. If more than one individual licensed under these Rules participated in the development of the soil evaluation it must be specified who prepared which part and include a certification from each licensee.

15.8 Department Acceptance- Acceptance of a soil evaluation indicates only that the Department accepts the data for design of an OWTS, however, the Department reserves the right to question the data. This acceptance is not an indication of the correctness or quality of the soil evaluation.

15.9 Test Hole Requirements

15.9.1 A minimum of two (2) test holes within twenty-five (25) feet of the proposed leachfield, shall be excavated at least twenty-five (25) feet apart with one pit on the up-gradient side and one on the down-gradient side of the proposed leachfield. The Director may waive the requirement for a second test hole where the conditions indicate that such test hole is not necessary.

15.9.2 The test holes shall be excavated to a depth of five (5) feet, unless site conditions prevent doing so (e.g., a flooded pit due to a high water table) in order to allow detailed examination by the Soil Evaluator. The Soil Evaluator shall complete the soil evaluation form provided by the Director using the terminology in the DEM Soil Evaluation Guidance Document.

15.9.3 From the depth excavated for Rule 15.9.2 to a minimum of ten (10) feet, to the extent possible, the Soil Evaluator shall provide the information requested on the soil evaluation form from material removed from the test hole without entering the test hole. This information shall include at minimum the soil texture, structure and consistence for each soil horizon observed. This can be done in an additional test hole, or in the test hole used to complete work for Rule 15.9.2 after such work has been witnessed by the Department, if required.

15.9.4 If a restrictive layer or bedrock is encountered or the test hole becomes unstable due to lack of soil cohesion or the presence of groundwater, the test hole may be terminated at a depth of less than ten (10) feet. Sites with test holes which have been terminated at less than ten (10) feet may require additional testing as determined by the Director.

15.9.5 It is recommended that individuals performing the soil evaluation not enter into portions of a test hole that have been excavated to depths greater than five (5) feet below the surrounding ground surface. It is the responsibility of individuals performing or witnessing the soil evaluation to comply with all applicable federal, state and local laws and regulations governing occupational safety.

15.10 Soil Class- The information collected from the test hole shall be used to assign the soil to one of the soil classes below, except for Class G soils in which case the soil class for the substratum shall also be indicated. (Additional information about each soil class is located in the DEM Soil Evaluation Guidance Document.)

15.10.1 Class A– Glacial Lodgement Till: Silt loam to loamy sand texture. Lower profiles tend to have a platy structure and are dense to very dense. Excavation is difficult. High probability of hydraulically restrictive lower layers. Angular rock fragments and occasional cobbles and stones.

15.10.2 Class B – Glacial Ablation Till: Silt loam to loamy sand throughout the profile. Lower horizons tend to be more sandy. These soils tend to be looser than lodgement tills and typically do not have hydraulically restrictive layers. Lower horizons may be firm. Angular rock fragments and occasional cobbles and stones.

15.10.3 Class C – Proglacial Outwash: Also referred to as stratified drift, soil textures range from silt loam to loamy sand (in the upper horizons) to a sandy/gravely substratum. Stratified layers of water sorted materials may be present. Entire profile tends to be loose and easy to dig except saturated horizons may be firm or cemented or both. Horizons of rounded rock fragments are common.

15.10.4 Class D – Glacial Ice Contact Deposit: Outwash deposits of well to poorly sorted sands and gravel. Texture can be highly variable over short distances and may include pockets or lenses of silt or silt loam. Stratification may be irregular or absent. Sub-rounded to rounded stones and cobbles are possible.

15.10.5 Class E – Coastal Dune: Fine to coarse sands, well sorted, often finely stratified. Little or no silt and clay. Typically no sediment larger than coarse sand. Deposited by wind action or storm overwash.

15.10.6 Class F – Alluvial Deposits: Material transported and deposited by streams and rivers. Typically well sorted, stratified, fine textured sediment that may have dark layers in the substratum which were at one time surface layers. Subject to seasonal flooding.

15.10.7 Class G – Eolian Deposits: Wind blown silts deposited after the retreat of the Wisconsin glaciation ranging in thickness of several inches to several feet. Underlain by outwash, ablation till, or lodgement till.

15.11 Soil Category- Each observed soil horizon shall be assigned to one of the soil categories from Table 15.11 below. Soil category will be used to determine the minimum leaching area by the Class II or III Licensed Designer in accordance with Rule 32.

Table 15.11 Soil Category

Soil Category	Loading Rate (gals/sq ft/day) Pursuant to Rule 32.2 Starred items (*) are for soils with coarse fragment modifiers	Soil Texture	Soil Structure	Soil Consistence		Typical Soil Class
				Consistence In-Hand Using Soil Clods	Excavation Difficulty	
1	.70 .61*	cos, s, lcos, ls, cosl, fs	structureless- single grain subangular blocky	loose friable	N/A	Outwash (Class C), ice contact (Class D) and coarse ablation till (Class B) deposits
2	.61	vfs, lvfs	structureless- single grain	loose	N/A	Outwash (Class C) and ice contact (Class D) deposits
3	.70	ls, sl, l	granular, subangular blocky	very friable to friable	low	Lodgement Till (Class A), Ablation Till (Class B), Outwash (Class C), or Ice Contact (Class D)
4	.61 .70*	lfs, lvfs, fsl, vfs	granular, subangular blocky	very friable to friable	low	Lodgement Till (Class A), Ablation Till (Class B), Outwash (Class C), or Ice Contact (Class D)
5	.52	sil, si, vfsl	subangular blocky	very friable to friable	low	Typically Eolian deposits (Class G)
6	.61 .70*	lcos, cosl, lfs, ls, sl, l,	structureless massive	very friable to friable	low	Ablation till (Class B)
7	.52 .61*	fsl, vfsl, sil, si, vfs	structureless- massive	very friable to friable	low to moderate	Ablation till (Class B)
8	.46 .48*	all textures	structureless-massive	firm to very firm	moderate	Lodgement till (Class A)
9	.40 .43*	all textures	platy, structureless-massive	firm to very firm	high	Lodgement till (Class A)
10	Not Allowed (Impervious)	all textures	platy, structureless-massive	extremely firm	very high to extremely high	Lodgement till (Class A)

Note 1: Refer to the DEM Soil Evaluation Guidance Document for explanation of soil texture, soil structure, soil consistence and excavation difficulty.

15.12 Determination of Seasonal High Groundwater Table-

15.12.1 The Soil Evaluator shall use the depth to, type, location and abundance of hydromorphic features and other characteristics to determine the depth to the seasonal high groundwater table. The depth to the seasonal high groundwater table shall be measured from the original ground surface. The criteria to use in evaluating hydromorphic features include, but are not limited to the following:

(A) Redox depletions and redox concentrations occupy two percent (2%) or more of the exposed horizon surface;

(B) Soil matrix and redox concentrations or depletions vary two (2) or more units in chroma; or

(C) Presence of a depleted horizon, which is a soil layer that has a chroma of two (2) or less and a value of four (4) or more that develops or maintains gleyed colors because of substantial saturation.

15.12.2 In cases where the soil is class C or D as determined in Rule 15.10 and there are no observable hydromorphic features to use to make a determination in accordance with Rule 15.12.1, an adjustment factor may be applied to the observed groundwater table in order to correct to the seasonal high groundwater table. This adjustment factor shall be determined by the Director. When groundwater is not encountered in a test hole at least ten (10) feet deep, the adjustment factor may be applied as measured from the bottom of the test hole.

15.12.3 A perforated pipe at least four (4) inches in diameter shall be installed to the full depth of the excavation in each test hole at the conclusion of the soil evaluation, unless such requirement is waived by the Director. The pipe shall be wrapped in filter fabric that meets the requirements of Rule 32.11, capped at the top and mounded to prevent the accumulation of surface water.

15.12.4 Wet Season Determinations- Determination of the seasonal high groundwater table during the wet season shall be made by a Class II or III Licensed Designer, or a Soil Evaluator January 1 through April 1.

(A) The groundwater table observations shall be made using the pipe placed in the test holes in accordance with Rule 15.12.3 or using a pipe that meets these requirements placed in a minimum of two (2) excavations to a depth of ten (10) feet within the area in Rule 15.9.1. Such pipe should remain in place until a permit has been issued by the Director.

(B) Groundwater table observations shall be made no sooner than forty-eight (48) hours after excavation and shall be verified by the Director unless otherwise waived. At least three (3) groundwater table observations shall be made and the observations shall be a minimum of five (5) days apart. The groundwater table observations shall be submitted for review by April 1 on forms approved by the Director.

(C) Wet season determinations are intended to measure the groundwater table at its annual highest level. Yearly fluctuations in the groundwater table may necessitate that the Department add adjustment factors to compensate for periods of low groundwater recharge that results in the seasonal high groundwater table to be lower than normal.

15.12.5 The soil evaluation that is submitted to the Director by the Soil Evaluator shall include wet season data, if applicable, along with the final determination of the seasonal high groundwater table.

RULE 16. ADDITIONAL SITE TESTING

16.1 Determination of depth to bedrock and the presence of storm deposited sand in the backdune environment or human transported material, as required in Rule 16.2 and Rule 16.3, shall be made by a Class II or III Licensed Designer or a Soil Evaluator on forms approved by the Director.

16.2 Determination of Depth to Bedrock

16.2.1 Bedrock test holes, conducted in accordance with Rule 16.2.2, shall be required when any of the following occur:

(A) Bedrock is encountered within eight (8) feet of original ground surface in the excavation of any of the test holes for the soil evaluation;

(B) Bedrock outcrops are visible in the surrounding area; or

(C) Landscape conditions warrant bedrock test holes.

16.2.2 Bedrock test holes

(A) Bedrock test holes shall be excavated to a depth of ten (10) feet in the center and four corners of the proposed leachfield. Additional test holes or probe tests shall be required within twenty-five (25) feet of the proposed leachfield, the number and location depending on the site. Bedrock depth shall be determined on all sides of the proposed leachfield. In order for DEM approval, testing must demonstrate that:

(i) Bedrock is at least five (5) feet below the bottom elevation of the stone in the leachfield in the area of the proposed leachfield and within twenty-five (25) feet of the proposed leachfield. The five (5) foot vertical separation requirement may be waived on the up-gradient side as long as bedrock is no higher than the bottom of the stone in the leachfield within twenty-five (25) feet of the proposed leachfield (Figure 1); and

(ii) Depth to Bedrock from original ground surface must be a minimum of four (4) feet within twenty-five (25) feet on all sides of the leachfield, including the upgradient side.

(B) A bedrock test hole shall be witnessed by the Director unless the Director waives this requirement.

(C) If during the bedrock exploration work the Director determines that additional bedrock test holes or probe tests are not warranted, then the Director may waive such additional testing.

16.3 Human Transported Material and Storm Deposited Sand- If human transported material or storm deposited sand in the backdune environment is encountered in the excavation of any test hole or is evident within twenty-five (25) feet of any test hole, an adequate number of additional test holes shall be excavated to a sufficient depth to determine the lateral and vertical extent of this material within twenty-five (25) feet of the leachfield. Limitations for OWTS design regarding depth to groundwater and depth to bedrock shall be determined from original ground surface. The Director may require that this material existing in the area

of the proposed leachfield be removed. Test holes in human transported material or storm deposited sand in the backdune environment shall be witnessed by the Director unless the Director waives this requirement.

16.4 Percolation Test

16.4.1 Percolation test data can be used to determine the minimum leaching area for the OWTS if the applicant has valid seasonal high groundwater table determinations, as defined by Rule 15.2, collected prior to January 31, 2001. The percolation test shall be conducted in accordance with (A) - (F) below:

(A) Dig two or more test holes within the area of the proposed leachfield, not less than ten (10) feet apart. One of the holes should be at the depth of the bottom elevation of the proposed leachfield, and the second hole should be at a depth of three (3) feet below the bottom elevation of the proposed leachfield. This is to evaluate the consistency with depth of the seepage qualities of the soil. The size of the leachfield must be based on the slowest percolation rate obtained. The holes shall not be less than six (6) inches in diameter or six (6) inches square, nor should they be greater than eight (8) inches in diameter or eight (8) inches square.

(B) Scarify the bottom and sides of the test holes and remove all loose material. Place about two (2) inches of coarse sand or fine gravel in the holes to prevent bottom scouring.

(C) Fill the holes with clear water to a minimum depth of twelve (12) inches above the coarse sand or fine gravel. Keep water in each hole for at least four (4) hours and preferably overnight by refilling. If necessary to maintain water in each hole for this period, provide a reservoir of water and an automatic siphon to deliver it to the holes intermittently, or the percolation test holes should be soaked and maintained full for not less than four (4) hours before the percolation test is made. In uncompacted sandy soils containing no clay or silt, the above saturation procedure is not necessary, the test can be made as soon as the water from one filling has seeped away.

(D) The percolation test should be made following the saturation process. When the saturation process is complete, the water depth should be adjusted to six (6) inches over the coarse sand or fine gravel before the test is begun. The drop in water level should be measured from a fixed reference place, such as a board laid across the hole, over thirty (30) minute intervals, refilling the holes to a depth of six (6) inches as necessary.

(E) When three consecutive readings at thirty (30) minute intervals read the same rate, the test may be considered complete. If no stability is reached between three (3) thirty (30) minute readings, not less than four (4) hours of readings must be followed. The drop in water level which occurs during the final thirty (30) minute period is used to calculate the percolation rate. This rate is expressed in minutes per inch.

(F) Soils in which the first six (6) inches of water seeps away in less than thirty (30) minutes, after the saturation period, the time interval between measurements should be reduced to ten (10) minutes and the test run over a period of one hour. The drop in water level which occurs during the final ten (10) minute period is used to calculate the percolation rate. This rate is expressed in minutes per inch.

16.4.2 If an unanticipated cut in topography is made, the results of any percolation test made prior to the cut is invalid. A new percolation test shall be made under the changed conditions.

16.4.3 In no case shall a percolation test be made in filled or frozen ground. If a leachfield is to be located in filled ground, a percolation test must be made in the original ground.

16.4.4 Additional testing may be required if the soil is highly variable or if a large OWTS (greater than five thousand (5,000) gallons per day) is required.

16.4.5 Percolation tests shall be carried out by a Class II or III Licensed Designer or a Soil Evaluator, Rhode Island Registered Professional Land Surveyor, or Rhode Island Registered Professional Engineer.

RULE 17. OWTS APPLICATIONS

17.1 Applicant's Responsibilities- The applicant shall be responsible for providing all information required by these Rules in a complete, accurate, clear and legible manner. The applicant for an OWTS must be the owner or owners of the property or easement that is the subject of the application, or it must be the person who holds a valid purchase and sales agreement for said property.

17.2 Designer's Responsibility- Class I, II and III Licensed Designers shall design an OWTS for a site that is in compliance with these Rules. The design shall be based on the information provided in the soil evaluation report. This design shall be submitted to the Director in accordance with Rules 17 and 18.

17.3 Local Ordinances- It is the applicant's responsibility to ensure that the OWTS application to the Department is in compliance with local ordinances regarding the location, design, construction and maintenance of an OWTS prior to submission to the Department. City or Town Councils may petition the Department to require municipal review for compliance with local ordinances prior to DEM initiating its review. The petition must state the local standard(s), as embodied in local ordinance, that is more stringent than the standard(s) in these Rules and the municipal official responsible for local review. In municipalities where the petition has been approved, applicants must submit documentation to DEM on forms approved by DEM that the municipality has certified that the application is in compliance with all local ordinances.

17.4 OWTS Suitability Determination- An OWTS Suitability Determination is a determination as to whether or not an existing OWTS is suitable for a proposed building construction, renovation or change of use so as to protect public health and the environment. An OWTS Suitability Determination Application may be submitted to the Department in order to determine the applicability of this Rule. OWTS suitability is determined by the following:

17.4.1 Excluding holding tanks, for OWTSs where all components have been installed with state approval on or after April 9, 1968:

(A) The OWTS is suitable and no application to the Department is necessary for any building construction, renovation or change in use, that, for residential uses, does not result in an increase in the number of bedrooms in a residential structure beyond the number in the original state approval; or, for all other uses, an increase in the wastewater flow greater than the OWTS approved design flow for any OWTS. However, the OWTS is unsuitable and an OWTS Application for New Building Construction or an OWTS Application for Alteration to a Structure, whichever is applicable, must be submitted when any of the following in (i)-(iii) apply, even if there is no increase in number of bedrooms or increase in flow:

(i) Whenever the proposed construction or renovation changes the structure's footprint such that the OWTS is not in compliance with these Rules;

(ii) If the proposed change of use is from a facility that does not prepare food to a restaurant or other facility that prepares food; or

(iii) For a change in use, if the OWTS for the new use meets the definition of a large OWTS pursuant to Rule 35.1.

(B) Prior to January 1, 2016, the OWTS is unsuitable if the OWTS is located within the Salt Pond or Narrow River Critical Resource Areas, includes any existing components permitted and installed prior to February 6, 2002, and does not utilize nitrogen reducing technology in accordance with Rule 39.2 at the time of application and the applicant proposes construction or renovation meeting any of the conditions listed below in Rule 17.4.1(B)(i)-(ii). In-kind (i.e. same number of bedrooms) replacement of mobile homes in a licensed mobile and manufactured home park is exempt from this provision (B).

(i) Increasing the total enclosed area of the structure by more than six hundred (600) square feet. All construction on each floor shall be counted towards the six hundred (600) square foot total for the structure. Any change to the building footprint shall not encroach on the setback distances established in Rule 22 so as to require physical modification of the OWTS. Garages are exempt from this provision (i) provided they do not encroach on the setback distances established in Rule 22; or

(ii) Involving a substantial improvement to a structure located within a Federal Emergency Management Agency-designated Special Flood Hazard Area subject to inundation by the one percent (1%) annual chance flood (100-year flood). Substantial improvement to a structure is defined in RIGL § 23-27.3-106.1 to mean any construction, renovation, or improvements made within any twelve (12) month period and costing in excess of fifty percent (50%) of the physical value of the building prior to the start of construction. Determination of substantial improvement shall be made by the appropriate municipal or state building official.

(C) On or after January 1, 2016, the OWTS is unsuitable if the OWTS is located within the Salt Pond or Narrow River Critical Resource Areas and does not utilize nitrogen reducing technology in accordance with Rule 39.2 at the time of application and the applicant proposes construction or renovation meeting any of the conditions listed below in Rule 17.4.1(C)(i)-(iii). In-kind (i.e. same number of bedrooms) replacement of mobile homes in a licensed mobile and manufactured home park is exempt from this provision (C).

(i) Adding an additional floor level or portion of floor level to the structure;

(ii) Increasing the footprint of enclosed space of the structure. Garages are exempt from this provision (ii) provided they do not encroach on the setback distances established in Rule 22; or

(iii) Involving a substantial improvement to a structure located within a Federal Emergency Management Agency-designated Special Flood Hazard Area subject to inundation by the one percent (1%) annual chance flood (100-year flood). Substantial improvement to a structure is defined in RIGL § 23-27.3-106.1 to mean any construction, renovation, or improvements made within any twelve (12) month period and costing in excess of fifty percent (50%) of the physical value of the building prior to the start of construction. Determination of substantial improvement shall be made by the appropriate municipal or state building official.

(D) The OWTS is unsuitable for any building construction, renovation or change of use, that results in an increase in the number of bedrooms in a residential structure beyond the number in the

original state approval; or an increase in the wastewater flow greater than the OWTS approved design flow for any OWTS. An OWTS Application for New Building Construction or an OWTS Application for Alteration to a Structure shall be required in accordance with Rule 17.5 or Rule 17.6, respectively, whichever is applicable, before the proposed building construction, renovation or change of use may be allowed.

17.4.2 For OWTSs where any existing components have been installed without state approval, holding tanks, cesspools, and OWTSs installed prior to April 9, 1968: Whenever a person proposes any building construction, renovation, or change of use (as defined in Rule 7) of a structure served by such an OWTS, the OWTS is unsuitable and shall be upgraded to the standards herein. An OWTS Application for New Building Construction or an OWTS Application for Alteration to a Structure shall be required in accordance with Rule 17.5 or Rule 17.6, respectively, whichever is applicable. For the purposes of this Rule, the terms "building construction" and "building renovation" shall be defined as any addition, replacement, demolition and reconstruction, or modification of a structure on the subject property which:

(A) 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;

(B) 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 fifty percent (50%) or more of the living area of the existing structure. In-kind (i.e. same number of bedrooms) replacement of mobile homes in a licensed mobile and manufactured home park is exempt from this provision (B);

(C) Involves adding an additional floor level or portion of floor level to the structure; or

(D) Increases the footprint of enclosed space of the structure. Garages are exempt from this provision (D) provided they do not encroach on the setback distances established in Rule 22. In-kind (i.e. same number of bedrooms) replacement of mobile homes in a licensed mobile and manufactured home park is exempt from this provision (D).

17.4.3 Imminent Sewer Exemption- An owner subject to the requirements of Rule 17.4.1(A)i-iii, Rule 17.4.1(B), Rule 17.4.1(C), or Rule 17.4.2 whose property is proposed to be served by a public wastewater system in the future shall be exempt from those requirements, provided an OWTS Suitability Determination Form is submitted to the local building official demonstrating that all of the conditions in Rule 17.4.3(A) and (B) are met. A copy of the completed form shall be provided to the Department. In order to claim exemption, the owner must:

(A) Provide a letter demonstrating that the municipality holds a form of financial surety for expansion of a public wastewater system to the area of the structure served by the OWTS within five (5) years of the date of the submission of the OWTS Suitability Determination Form; and

(B) Certify that:

(i) The OWTS is not failed;

(ii) For a residential structure, any increase in wastewater flow to the OWTS is limited to that equivalent to one bedroom. For all other uses, no increase in wastewater flow to the OWTS is allowed; and

(iii) The structure will be connected within sixty (60) days of the public wastewater system becoming available.

17.5 OWTS Application for New Building Construction- All OWTS Applications for New Building Construction shall be made in conformance with all requirements under these Rules. Applications not in conformance with these Rules may be approved only through the variance procedures set forth in Rule 47.

17.5.1 An OWTS Application for New Building Construction shall be made whenever an applicant proposes to:

(A) Construct a new structure from which wastewater will be disposed of by means of an OWTS;

(B) Modify a structure, not previously permitted to dispose of wastewater, to require the disposal of wastewater to an OWTS;

(C) Increase wastewater flow to an OWTS by an amount greater than twenty-five percent (25%) of the original design flow with all flows adjusted using the design flows in Rule 21, provided that using the design flows and loading rates in these Rules would result in a leachfield larger than that previously approved by the Department; or

(D) Add more than one bedroom.

17.5.2 All plans and specifications for an OWTS Application for New Building Construction shall be prepared by a Class II or Class III Licensed Designer in accordance with Rules 9 and 10.

17.5.3 No person shall submit applications, plans and specifications to the Director for an OWTS for New Building Construction without first obtaining the Director's acceptance of a soil evaluation or field concurrence with the soil evaluation in accordance with Rule 15. If the Director concurs with the determination of the soil evaluation in accordance with Rule 15.5.3(A) and the soil conditions meet the minimum requirements of these Rules, the soil evaluation may be submitted with the application for an OWTS permit.

17.6 OWTS Application for Alteration to a Structure

17.6.1 An OWTS Application for Alteration to a Structure shall be made whenever an applicant proposes any physical alteration to a structure that meets any of the following:

(A) In the case of a residence, the addition of not more than one bedroom;

(B) In all other cases, an increased flow of wastewater in an amount less than or equal to twenty-five percent (25%) of the original design flow adjusted using the design flows in Rule 21 provided that using the design flows and loading rates in these Rules would result in a leachfield larger than that previously approved by the Department; or

(C) If the OWTS is determined to be unsuitable pursuant to Rule 17.4 with no increase in flow.

17.6.2 All plans and specifications for an OWTS Application for Alteration to a Structure shall be prepared by a Class II or Class III Licensed Designer in accordance with Rules 9 and 10. The Director reserves the right to require that the plans and specifications for an OWTS Application for Alteration to a Structure be prepared by a Class III Licensed Designer.

17.6.3 No person shall submit applications, plans and specifications to the Director for an OWTS for an Alteration to a Structure without first obtaining the Director's acceptance of a soil evaluation or field concurrence with the soil evaluation in accordance with Rule 15. If the Director concurs with the determination of the soil evaluation in accordance with Rule 15.5.3(A) and the soil conditions meet the minimum requirements of these Rules, the soil evaluation may be submitted with the application for an OWTS permit.

17.6.4 Applicants shall meet the requirements of these Rules to the greatest extent possible. The applicant shall identify which Rules, if any, the proposed OWTS fails to meet. If necessary, certain requirements under these Rules may be relaxed at the discretion of the Director, provided that the applicant considers the Department approved alternative or experimental technology in accordance with Rule 37 that may allow the applicant to meet most of the requirements of these Rules. The protection of the public health and the environment shall be given priority over all other considerations. Nothing herein shall prevent the Director from requesting additional information or imposing any requirement under these Rules. Variance application procedures will only apply to OWTS Applications for Alteration to a Structure that propose an increase in wastewater flow. OWTS Applications for Alteration to a Structure that include a request for a variance from the provisions of these Rules are exempt from the notification requirements in Rule 47.6.1.

17.7 OWTS Application for Repair- An application for a repair of any OWTS, or any component thereof, shall be made when an OWTS or component has failed, as defined by Rule 7. An application for repair shall not propose any change of use, building renovation pursuant to Rule 17.4.2(A)-(D) or any increased flow to the OWTS. The Department may allow an OWTS Application for Repair to be submitted when, after the effective date of these Rules, a fire or other catastrophic occurrence necessitates that a structure served by an OWTS be replaced. The applicant may also submit an OWTS Application for Repair when the property owner desires to upgrade or modernize the OWTS (e.g., replacement of cesspool).

17.7.1 All plans and specifications for an OWTS application for Repair shall be prepared by a Class I, II or III Licensed Designer in accordance with Rules 9 and 10. The applicant is not required to have a soil evaluation pursuant to Rule 15 prepared unless the Department specifies otherwise. The Director reserves the right to require that the plans and specifications for a repair be prepared by a Class II or Class III Licensed Designer.

17.7.2 Applicants shall meet the requirements of these Rules to the greatest extent possible. If necessary, certain requirements under these Rules may be relaxed at the discretion of the Director, provided that such modification is consistent with the protection of the public health and the environment. In reviewing any request for relaxation of these Rules, the protection of the public health and the environment shall be given priority over all other considerations.

17.7.3 Deep concrete chambers will not be permitted for OWTS Applications for Repair where another type of leachfield designed in accordance with Rules 32, 33, and 34 can be sited and is deemed acceptable by the Department. The Licensed Designer must demonstrate that the repair alternatives to a deep concrete chamber, other than a bottomless sand filter or pressurized shallow narrow drainfield, are not feasible.

17.7.4 Exemptions for OWTS Application for Repair- Under the limited circumstances in Rule 17.7.4 (A)–(E), an OWTS Application for Repair will not be necessary prior to repairing the OWTS. Any repair or installation work done in accordance with Rule 17.7.4(A) – (E) that is found not to be in compliance with these Rules, will have to be corrected and will be considered a violation of these Rules.

(A) Septic Tank Replacement- When a crushed tank or other failure necessitates replacement to maintain wastewater handling capacity at a facility and averting a public health threat, the installer must receive verbal authorization from the Department prior to septic tank installation and the owner must submit a proper and complete repair application by the end of the next business day.

(B) Building Sewer- Replacing a crushed or otherwise repairing a faulty building sewer between the building and the septic tank does not require prior authorization of the Department or notification to the Department once the work is completed.

(C) Access openings- The following work on access openings does not require prior authorization of the Department or notification to the Department once the work is completed:

(i) Installation of access openings to finished grade; and

(ii) Compliance with the requirements to upgrade the cover of existing tanks that have access openings to finished grade in accordance with Rule 25.11 (grease tank), Rule 26.14 (septic tank), Rule 28.7 (holding tank), Rule 29.8 (pump tank), and Rule 34.6.2(D) (concrete chambers).

(D) Retrofitting for a septic tank effluent screen- Such work does not require prior authorization of the Department or notification to the Department once the work is completed.

(E) In-kind emergency replacement of a failed mechanical or electrical device does not require prior authorization of the Department or notification to the Department once the work is completed.

17.8 Unacceptable Application- When the Department determines that an application is unacceptable for any reason, the applicant has one (1) year from the date of the unacceptable notice to correct all deficiencies identified by the Department. However, if any of the deficiencies are related to an application to the DEM Freshwater Wetlands Program or a Rhode Island Department of Health Public Drinking Water New Source Approval Application, the applicant has two (2) years from the date of the unacceptable notice to correct all deficiencies identified by the Department. If all of the deficiencies are not corrected in the time specified above, the applicant must submit a new application and application fee.

17.9 Suspension of Application Process- The Department may, at its discretion, suspend the processing of an application if the property that is the subject of the OWTS Application is the subject of any unresolved violation of these Rules, or which is the subject of any non-compliance with a Department, administrative, or judicial consent agreement, order, or judgment. The Department shall notify the applicant in writing of the suspension.

17.10 Public Records- All applications received by the Department of Environmental Management are subject to the Public Records Act, R.I. General Laws Chapter 38-2, and are available in accordance with the Act for public inspection and copying at the OWTS Program of DEM between the hours of 8:30 AM and 4:00 PM; a prior appointment may be required. A fee for such copying shall be charged in accordance with Rhode Island General Laws Section 38-2-4, as amended.

RULE 18. REQUIRED CONTENT OF OWTS SUBMISSIONS

18.1 Application- All applications for the approval of plans and specifications for OWTS permits shall be made on forms approved by the Director. Nothing in these Rules shall prevent the Director from requiring any additional information deemed necessary to carry out obligations in enforcing these Rules.

18.2 Plan- All applications for New Building Construction and Alterations to a Structure except those submitted under Rule 19.1.1(C) shall be accompanied by four (4) sets of plans that include a plan view of the entire property drawn to scale, a plan view of the pertinent portion of the property at a minimum scale of one (1) inch equals forty (40) feet, a profile of the system from the building foundation to the limits of the leachfield with invert elevations shown, and a cross-section of the leachfield. The plans shall include the items below. The Director reserves the right to require any additional information that is deemed necessary. For applications submitted under Rule 19.1.1(C), six (6) sets of plans must be included.

18.2.1 Location map;

18.2.2 Rhode Island Coastal Resources Management Council jurisdictional line, if applicable;

18.2.3 The size and location of the OWTS;

18.2.4 A fixed benchmark within one hundred fifty (150) feet of the OWTS that will not be disturbed during construction;

18.2.5 The location of all test holes;

18.2.6 The existing and proposed finished grades in the vicinity of the OWTS;

18.2.7 The size and location of all existing and proposed buildings and the number of bedrooms and other building features used to determine the maximum daily flow contained therein;

18.2.8 The location of any public wastewater system line within two hundred (200) feet of the property lines;

18.2.9 The location of any drinking water line within fifty (50) feet of the proposed OWTS;

18.2.10 Wells:

(A) The location of existing and proposed private drinking water wells within the setback distance from the leachfield specified in Table 22.4 plus one hundred (100) feet;

(B) The location of all existing and proposed wells serving non-potable uses within one hundred (100) feet of the leachfield;

(C) The location of existing and proposed public drinking water supply wells within five hundred (500) feet of the proposed OWTS and a determination as to whether the public well is a bedrock well or a gravel packed, gravel developed or driven well; and

(D) The location of any existing or proposed drinking water well, public or private, serving the structure that the proposed OWTS will serve;

18.2.11 The location of all watercourses, wetlands, and drains within two hundred (200) feet of the proposed OWTS;

18.2.12 The location of all stormwater management structures and subsurface drains within two hundred (200) feet of the proposed OWTS and a determination and whether said drain discharges, directly or indirectly, into a critical resource area as identified in Rule 38;

18.2.13 Plans must indicate if the proposed OWTS is within a Critical Resource Area as identified in Rule 38 and must specify the distance to the nearest critical resource of concern. If the Critical Resource Area boundary crosses the parcel that is the subject of the application, the boundary line shall be shown.

18.2.14 The location and design flow of all existing OWTSs within two hundred (200) feet of any private well and four hundred (400) feet of any public well shown in accordance with Rule 18.2.10 on the subject property. Plans must also show the location and design flow of any existing OWTS with a design flow of greater than one thousand (1000) gallons per day within four hundred (400) feet of any well to be installed on the subject property. Records and data on file with the Department may be used to obtain information on proposed OWTSs and wells;

18.2.15 Areas on the subject property where soil has been excavated and where storm deposited sand in the backdune environment or human transported material has been deposited;

18.2.16 Details of all system components;

18.2.17 Erosion controls;

18.2.18 Plat and lot boundaries and numbers;

18.2.19 Title block, legend and north arrow;

18.2.20 Signature and stamp where applicable of the Licensed Designer;

18.2.21 The location of driveway access from the roadway to the proposed dwelling; and

18.2.22 The location of all structures, existing OWTSs, and water supplies within one hundred (100) feet of all adjacent property lines.

18.3 Additional Information- Other information to be provided by the applicant shall include, but not be limited to, the items listed below:

18.3.1 Soil evaluation for OWTS Applications for New Building Construction and for OWTS Applications for an Alteration to a Structure and those that were required by the Director for OWTS Applications for Repair;

18.3.2 Results of seasonal high groundwater table determinations and percolation tests for lots not required to conduct a soil evaluation;

18.3.3 Determination of the potential for flooding on the subject property;

18.3.4 Statement as to whether or not any proposed well on the applicant's property requires a variance from the Department's "Rules and Regulations Governing the Enforcement of Chapter 46-13.2 Relating to the Drilling of Drinking Water Wells;" and

18.3.5 Copy of the municipal property tax card for all OWTS Applications for Alterations to a Structure and OWTS Applications for Repair.

18.4 Applications for Repair- Applications for repair shall at a minimum include information specified on the Department's "OWTS Repair Submission Requirements" document.

RULE 19. APPLICATIONS INVOLVING THE DEM FRESHWATER WETLANDS PROGRAM AND THE COASTAL RESOURCES MANAGEMENT COUNCIL

19.1 Applications Involving the DEM Freshwater Wetlands Program

19.1.1 All applications pursuant to these Rules associated with a construction project which may affect a freshwater wetlands regulated by the Department shall be submitted in accordance with 19.1.1(A), (B) or (C):

(A) The OWTS application may be accompanied by the appropriate determination or permit required by the DEM Freshwater Wetlands Program. Accordingly, where an applicant proposes to construct OWTS, the applicant must apply for and receive the appropriate determination or permit from the Freshwater Wetlands Program prior to submission to the OWTS Program; or

(B) The applicant may submit applications to the Freshwater Wetlands Program and the OWTS Program at the same time. No OWTS Application for a construction project which may affect a freshwater wetlands will be approved without the appropriate determination or permit from the Freshwater Wetlands Program.

(C) For Applications for New Building Construction or Applications for Alteration to a Structure on a single family house lot in proximity to DEM's Freshwater wetlands permitting jurisdiction, the applicant may submit a joint OWTS/Freshwater Wetlands application on a form approved by the Director for this purpose. Approval of a joint OWTS/Freshwater Wetlands application will be held to satisfy both sets of regulations and include conditions as may be needed. Permits issued under this process may not be renewed.

19.1.2 If the Department determines that there is a reasonable doubt as to the location of a freshwater wetlands boundary or applicability of the DEM Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act to a proposed new construction or new installation of an OWTS, the Department may require that the applicant obtain a separate determination or permit from the Department pursuant to said Wetlands regulations.

19.1.3 Erosion and sedimentation controls shall be designed, shown on plans, installed, operated and maintained to protect any wetland or watercourse from potential adverse effects of the construction project associated with an approved OWTS application.

19.2 Applications Involving the Rhode Island Coastal Resources Management Council

19.2.1 The Rhode Island Coastal Resources Management Council has authority over construction proposed in certain coastal regions of the state. The coastal region includes: All coastal features and all land within two hundred (200) feet of tidal waters, salt water ponds, salt water marshes, salt water wetlands or other land subject to Coastal Resources Management Council jurisdiction. Review of impacts to "freshwater wetlands in the vicinity of the coast" is under the sole jurisdiction of the Coastal Resources Management Council in accordance with the "Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast."

19.2.2 The Director reserves the right to request the applicant to obtain a Preliminary Determination from the Rhode Island Coastal Resources Management Council. For OWTS Applications for New Building Construction and OWTS Applications for Alteration to a Structure proposing an OWTS that has a design flow greater than two thousand (2000) gallons per day for any single system or design flow greater than two thousand (2000) gallons per day for any combination of systems owned or controlled by a common owner, applicants must receive a Preliminary Determination from the Coastal Resources Management Council before submitting an application for an OWTS to the DEM unless the OWTS Application provides sufficient information to determine the location of the coastal shoreline feature. After receiving a permit for an OWTS from the Director, the applicant should consult with the Coastal Resources Management Council before undertaking any construction on the property. It is the applicant's responsibility to obtain a Coastal Resources Management Council permit if necessary.

RULE 20. SUBDIVISIONS

20.1 Administrative

20.1.1 No person shall begin construction in any subdivision requiring a Subdivision Site Suitability Certification in accordance with this Rule until the Director has approved such certification.

20.1.2 Any subdivision of five (5) lots or less that does not have frontage on an existing road and all subdivisions of six (6) lots or more shall apply for a Subdivision Site Suitability Certification in accordance with Rule 20.2.

20.1.3 Subdivisions of five (5) lots or less that have frontage on an existing road have the option to apply for a Subdivision Site Suitability Certification pursuant to Rule 20.2 or submit OWTS applications for individual lots in accordance with Rule 17. If applications for individual lots are submitted, the submittal shall be in accordance with the following:

(A) The applications must be submitted together;

(B) Each application shall clearly state that the lot is part of a subdivision of five (5) lots or less with existing road frontage; and

(C) Each lot must meet all requirements of these Rules in order for an OWTS permit to be issued by the Department for any of the lots.

20.1.4 Subdivision Soil Evaluation- A soil evaluation shall be conducted for each lot in accordance with Rule 15. Soil evaluations for subdivisions are exempt from the requirement in Rule 15.9.1 that the test holes be within twenty-five (25) feet of the proposed leachfield, unless the Director determines that

soil conditions justify that the test holes must be placed within twenty-five (25) feet of the proposed leachfield. Soil evaluations must be accepted by the Director prior to submission of an application for Subdivision Site Suitability Certification.

20.1.5 An approved Subdivision Site Suitability Certification shall not operate as an approval for the construction of any OWTS as required by Rule 17.

20.1.6 Land within the original property boundaries that is designated for future development will not be part of the review for Subdivision Site Suitability Certification. However, it must be shown that one (1) unit can be built on the land designated for future development.

20.1.7 OWTSs installed without state approval, OWTSs installed prior to April 9, 1968 and cesspools on existing lots in a proposed subdivision shall be upgraded to the current standards, to the extent possible, in accordance with these Rules as part of a Subdivision Site Suitability Certification within one (1) year of the recording of the subdivision.

20.1.8 The applicant for a Subdivision Site Suitability Certification must demonstrate that the OWTS for the proposed use on each proposed lot in a subdivision meets all the requirements of these Rules in order for a Subdivision Site Suitability Certification to be issued by the Department.

20.1.9 Nothing in this Rule 20 shall prevent the Director from requesting any or all of the procedures established in these Rules for a single lot if the Director determines it is necessary for the protection of the public health and environment.

20.1.10 Easement Filing- Where subdivision lots will require filling beyond lot lines, an easement for that human transported material must be submitted with the application for the individual lots.

20.2 Subdivision Site Suitability Certification- Application for Subdivision Site Suitability Certification shall be prepared by a Class II or Class III Licensed Designer, as appropriate, on forms approved by the Director and shall include the information in Rule 20.2.1 – 20.2.5 and any other information the Director may require. The application for Subdivision Site Suitability Certification will be reviewed for all information necessary to determine the suitability of a parcel of land to be divided as shown on the application.

20.2.1 Location Map- A location map or sketch showing existing highways, streets and/or other identifiable landmarks or distances thereto, shall be furnished to facilitate an inspection of the site. This may be incorporated on the topographic map.

20.2.2 Soil Survey- A copy of the page or pages of the latest Soil Survey published by the Natural Resource Conservation Service of the U.S. Department of Agriculture illustrating the location of the subdivision.

20.2.3 Topographic Map

(A) The topographic map shall show ground elevations on the tract as follows:

(i) For land that slopes less than approximately two (2) percent, show spot elevations at all breaks in grade, along all drainage channels or swales, and at selected points not more than one hundred (100) feet apart in all directions; and

(ii) For land that slopes more than approximately two (2) percent show broken line contours with an interval of not more than two (2) feet.

(B) The datum on which the elevations or contours are based shall be reported including a permanent reference benchmark. Where cut or fill of more than one (1) foot can be anticipated and estimated, it should be indicated by solid line contours showing approximate finished grade. Plan and profile showing existing and proposed finished grades of proposed roads must be provided.

(C) The topographic map shall show the following for the entire area of the subdivision:

(i) Proposed house locations;

(ii) Existing structures, public and private water supplies and OWTSs;

(iii) Rights of way or easements;

(iv) Watercourses, drainageways, and drainage basins;

(v) Rock outcrops and wooded areas;

(vi) Stone walls;

(vii) Location of proposed water supplies and OWTSs on lots within the subdivision conforming with requirements of Rule 22;

(viii) Location of test holes used for the soil evaluation; and

(ix) Location of any critical resource area as defined in Rule 38 within the property.

20.2.4 For lands immediately adjacent to the subdivision, the items below shall be shown, designated or reported. Distances below shall be determined from the subdivision property boundary.

(A) Watercourses within two hundred (200) feet;

(B) Private drinking water wells (existing and those proposed on an approved OWTS permit) within two hundred (200) feet;

(C) Public wells (existing and proposed) approved by the Rhode Island Department of Health within five hundred (500) feet; and

(D) Location of any existing OWTS or drain within one hundred (100) feet of the property.

20.2.5 Water Quality Assessment- Where in the opinion of the Director, a substantial question exists regarding the cumulative impact of the operation of OWTSs within the subdivision on surface water or groundwater quality, the Director may require an assessment of such potential cumulative impacts, including appropriate studies, to be submitted by the applicant. This assessment may include, but not be limited to, a determination of whether the operation of the OWTSs will result in a loss of a use or violation of a surface water or groundwater quality standard assigned to that body of groundwater or surface water in question as designated by the Department.

20.2.6 Certification- The Subdivision Site Suitability Certification shall be accompanied by a certification, on a form approved by the Director, that the work was conducted in a manner consistent with these Rules and that it is an accurate portrayal of site conditions. If more than one individual licensed under these Rules participated in the development of the subdivision site suitability report, the report must specify who prepared which part and include a certification from each licensee.

20.3 Expiration of Subdivision Site Suitability Certification-

20.3.1 Except for permits eligible for tolling pursuant to R.I. Gen. Laws §42-17.1-2.5 as provided in Rule 20.3.2, a Subdivision Site Suitability Certification shall expire five (5) years from the date of issuance unless the subdivision has been platted or recorded as evidenced by the submission of a copy of the recorded subdivision plat map. After expiration, certification may be obtained only by reapplying under the Rules in effect at the time of re-application. Once a subdivision has been platted or recorded, no further certification shall be required and all lots may proceed with the application process for their OWTS in accordance with these Rules.

(A) In the event that there is any change in the configuration of any lot or road depicted in an approved Subdivision Site Suitability Certification, the applicant shall submit revised subdivision layout plans to the Department for its review. If the changes to the subdivision are found to be substantial, the Director may order the applicant to apply for a new Subdivision Site Suitability Certification based on the new plans.

(B) Whenever the configuration of any lot or road in a subdivision depicted in an approved Subdivision Site Suitability Certification is altered so as to affect twenty-five percent (25%) or more of the original lots, a new Application for Subdivision Site Suitability Certification shall be submitted.

20.3.2 Subdivision Site Suitability Certifications that were valid on, or issued after November 9, 2009 that are subject to tolling pursuant to R.I. Gen. Laws §42-17.1-2.5 shall be tolled for the period provided by R.I. Gen. Laws §42-17.1-2.5 and expire on the date five (5) years after approval plus the tolling period in accordance with said statute, unless the subdivision has been platted or recorded as evidenced by the submission of a copy of the recorded subdivision plat map.

RULE 21. WASTEWATER FLOW

21.1 Determination of Wastewater Flow

21.1.1 An OWTS must be designed to dispose of the estimated maximum daily flow from the building(s) it serves. The maximum daily flow is estimated by multiplying flow per unit from Table 21.1 by the maximum design capacity of the building. For facilities with more than one use listed in Table 21.1 (e.g., a retail store with a restaurant), the maximum daily flow for the facility shall be the total of the flows from the separate uses using Table 21.1. The employee contribution to the design flow shall be included for non-residential uses other than restaurants by estimating the maximum number of employees who may be present during a single day of operation multiplied by a design flow of 15 gallons per person per day.

21.1.2 For establishments not listed in Table 21.1, the maximum daily flow shall be determined by either of the following:

(A) Two (2) times the average daily meter reading taken from a minimum of two (2) comparable establishments for one (1) month during the period of the year that represents the greatest water use for the establishment; or

(B) If six (6) months of daily meter readings are available for a minimum of two (2) comparable establishments that includes the period of the year that represents the greatest water use for the establishment, the OWTS shall be designed using the highest daily flow without the use of a peaking factor.

Table 21.1 Wastewater Design Flows

TYPE OF USE	UNIT	GALLONS PER DAY
RESIDENTIAL		
[Minimum design flow for residential use shall be three hundred forty-five (345) gallons per day (three (3) bedrooms), unless otherwise permitted in accordance with Rule 21.2.5.]		
Single family residence	per bedroom (2 persons per bedroom)	115
Multiple family residence	per bedroom (2 persons per bedroom)	115
INSTITUTIONAL		
Assisted living facility	per bedroom (2 persons per bedroom)	115
Church	per seat	1
Church hall (fellowship hall)	per seat	5
Hospital	per bed	150
Library	per visitor	5
Nursing home/rest home	per bed	125
Group home	per bed	200
Correctional, rehabilitation facility	per bed	100
Gymnasium	per seat	3
Gymnasium	per participant	15
Highway rest stop	per person	5
Public park with toilets	per person	5
add for showers	per person	10
CAMPS AND CAMPGROUNDS		
Day camp	per person	15
add for mess hall	per person/meal	3
Camp - overnight	per person	25
add for mess hall	per person/meal	3
Campground with washroom and toilets	per site	50
Recreational vehicle park with water service	per site	100
Add for central dining facilities	per seat	35
Recreational vehicle park without water service	per site	50
Add for central dining facilities	per seat	35

Add for central washroom and toilet facilities	per site	50

SCHOOLS

School	per person	10
add for cafeteria	per person	5
add for gymnasium and showers	per person	10
Boarding school, college	per person	50
Day care center	per person	10

RESTAURANTS

[Minimum design flow for restaurants shall be 500 gallons per day.]

Restaurant	per seat	40
Restaurant – with single-service articles		
with public restrooms	per seat	25
without public restrooms	per seat	20
add for drive-up window		500
Lounge, bar (no food service at that seat)	per seat	10
Banquet hall	per seat	5
Ice cream parlor, take out service only	per store	500

COMMERCIAL

[Minimum design flow for commercial use shall be 100 gallons per day]

Auto service station	per pump	25
	per repair bay	100
Barber shop/Beauty salon	per chair	50
add for sink	per hair care sink	200
Bed & Breakfast	per bedroom	110
Bowling alley	per alley	100
Catering kitchen, no food service on-site	per meal prepared	3
Country club		
dining room	per seat	40
snack bar/lounge	per seat	20
lockers and showers	per locker	20
Doctors /Chiropractor/ Therapist office	per doctor/chiropractor/therapist	250
Dog/Pet grooming	per station	500
Dentist office	per chair	200
Drive-in theater	per vehicle stall	5
Factory/Industrial plant	per person	15
add for cafeteria	per person	5
Food store < 5,000 square feet (See Note 1)	per store	350
add for deli flow	per store	100
add for bakery flow	per store	100
add for meat dept. flow	per store	150
add for fish market flow	per store	150

add for public restrooms	per store	200
Food store > 5,000 square feet (See Note 1)	per store	700
add	per square foot >5,000 sq ft	0.05
add for deli flow	per store	200
add for bakery flow	per store	200
add for meat dept. flow	per store	300
add for fish market flow	per store	300
add for public restrooms	per store	400
Funeral home	per parlor	500
Hotel, motel	per unit	100
With efficiency units	per unit	150
Health club	per participant	15
Kennel	per kennel	10
Marina (shore-side facilities)	per slip	10
add for showers	per slip	10
Mobile home park/Manufactured home park	per site	230
Office building	per employee	15
Retail store	per employee	15
Rooming house/Boarding house	per bedroom	80
Self-Service Laundry (See Note 2)	per machine	500
Shopping center/Strip mall/Multi-use retail		
Calculate on the largest of either:		
a) the total flow for the uses within as determined from this table, or		
b) per square foot	per square foot	0.1
Skating rink	per seat	3
Swimming pool	per person	15
Tennis court - outdoor	per court	100
Tennis court - indoor	per court	400
Theater, auditorium	per seat	3
Veterinary office	per veterinarian	200

NOTES:

(1) The design flow for a stand alone deli, bakery, meat store or fish market will be three hundred fifty (350) gallons per day if the facility is less than five thousand (5,000) square feet or seven hundred (700) gallons per day if the facility is five thousand (5,000) square feet or more.

(2) Self-Service laundry OWTS designs must include pretreatment to remove lint from the wastewater.

21.2 Determining the Number of Bedrooms in a Single Family Residential Dwelling- For purposes of aiding the planning, designing, building, renovation, remodeling or expansion of residential dwellings, the following guidelines shall be used in determining the number of bedrooms. These guidelines are presented in acknowledgement that, in many cases, houses contain rooms meeting the strict definition of bedroom as defined in these Rules, but which are not intended to be nor will be used as bedrooms.

21.2.1 No residence served by an OWTS shall be allowed to have more bedrooms than is permitted under the Department issued permit for the OWTS serving the dwelling. A dwelling exceeding the number of bedrooms provided for in the permit shall be in violation of these Rules.

21.2.2 In determining the number of bedrooms contained in any residence, it shall be presumed that all residences contain a living room, a kitchen, a bathroom and at least one (1) bedroom.

21.2.3 For OWTSs installed without state approval, OWTSs installed prior to April 9, 1968 and cesspools, the determination on number of bedrooms shall be based on the consideration of municipal records, floor plans and the guidelines herein. In the case of a one (1) bedroom residence, the determination shall be based on municipal records.

21.2.4 When a determination of the number of bedrooms shall be based on total number of rooms, Table 21.2 shall be used. Foyers, closets, bathrooms and rooms without windows are not counted as rooms in Table 21.2. Functionally combined kitchens/dining rooms and living/dining rooms greater than three hundred (300) square feet shall be counted as two (2) rooms. Table 21.2 may be used by applicants for any OWTS application to the Department.

Table 21.2 Determination of Number of Bedrooms

Total Number of Rooms	Assumed Number of Bedrooms
5 or less	2
6-7	3
8-10	4
11-12	5
13 or more	6

21.2.5 The Director may permit the filing of a deed restriction by which an applicant may self-restrict the use of a residence to one less bedroom than may be determined in accordance with Table 21.2. In no case shall the deed restriction be for less than two bedrooms. The Director may consider the gross square footage of a residence as a factor against granting a bedroom restriction by deed.

21.3 Separate OWTSs- Where residential uses need to install separate OWTSs, the following proportions of the total flow shall be used unless there is definite data available as to the exact distribution of flow: blackwater forty percent (40%) and graywater sixty percent (60%). If a separate system is used for laundry wastes, it shall be designed on twenty percent (20%) of the total flow.

21.4 Misrepresented Applications- An OWTS Application that has been approved but later shown to contain faulty or misrepresented information shall not, in and of itself, be used to determine the number of bedrooms in a residential dwelling or the design flow for a non-residential structure.

RULE 22. MINIMUM SETBACK DISTANCES

22.1 The horizontal distances between the parts of an OWTS and the items listed in Table 22.1 - Table 22.4 shall not be less than those shown.

Table 22.1 Minimum Setback Distances – General

	Building Sewer, Grease Tank, Distribution Box, Pump Tank, Septic Tank, Septic Tank Effluent Pipe (ft)		Leachfield (ft)	
Well Serving Non-potable Uses	25		50	
Water Supply Line	10 (Note 1)		25	
Property Line	10 Note 2		Design Flow (gpd)	(ft)
			0-2000	10
			>2000-5000 Note (3)	50
			> 5000 Note (4)	min. 50 (Note 5)
Foundation	5 (Not applicable to building sewer)		25 (Note 6)	
Subsurface drains, foundation drains , or storm drains (see also Tables 22.2 and 22.3): -- Upgradient of the OWTS:	25 (Note 7)		25 (Note 8)	
-- Downgradient and side gradient of the OWTS:	25 (Note 7)		50 (Note 9)	
Edge of any land at a level lower than the invert of the distribution line	10		10	
Stormwater Infiltration System	25 (Note 10)		25 (Note 10)	
Swimming Pools: In-ground:	10		25	
Above ground:	10		10	
	Design Flow <5000 gpd	Design Flow ≥5000 gpd (Note 4)	Design Flow <5000 gpd	Design Flow ≥5000 gpd (Note 4)
Coastal Shoreline Feature (Note 11) not in a Critical Resource Area, Flowing Water (Rivers and Streams), Open Bodies of Water (Lakes and Ponds), Other Watercourses Not Mentioned Above, and Any Stormwater Management Structure That Potentially Intercepts Groundwater	25	50	50	100

Notes:

The reductions in setback distances allowed below in Notes (1) through (5) will not be granted if the setback distances in Table 22.1 can be met.

(1) The distance between the building sewer or septic tank effluent pipe and a water supply line may be reduced and the lines may cross provided that either the building sewer or septic tank effluent pipe or water supply line is sleeved whenever the lines are within ten (10) feet of each other. The sleeve shall be seamless or schedule 40 PVC or equivalent with watertight joints and it shall have a watertight seal that is fastened to the pipes with a stainless steel retractable clamp. Whenever possible, the building sewer and septic tank effluent pipe should be laid below water supply lines at crossings. Pressurized building sewers or pressurized septic tank effluent pipes shall be laid below water supply lines at crossings. If the setbacks to a water supply line for a public water system cannot be met, the applicant must obtain, and submit to the Department, written permission from the water supplier.

(2) Not applicable to building sewer and septic tank effluent pipe. Setback distance of 10' applies for all OWTS components not specifically listed.

(3) Any single leachfield designed to treat more than two thousand (2000) but less than five thousand (5000) gallons per day.

(4) As defined in Rule 35.1.1.

(5) Distance shown is the minimum for upgradient and side gradient directions. Downgradient separation distance will be based on nitrate modeling undertaken pursuant to Rule 35 and shall be a minimum of fifty (50) feet.

(6) Distance may be reduced to fifteen (15) feet with no foundation drain. Full foundation details must be shown on the plan. Distance may be reduced to eight (8) feet where a foundation slab elevation or the basement floor elevation is higher than the invert of the distribution lines in the leachfield.

(7) The distance between the building sewer or septic tank effluent pipe and a drain may be reduced and the building sewer or effluent pipe may cross the drain provided that the building sewer or septic tank effluent pipe is sleeved whenever they are within twenty-five (25) feet of the drain. The sleeve shall be seamless or schedule 40 PVC or equivalent with watertight joints, and it shall have a watertight seal that is fastened to the pipes with a stainless steel retractable clamp.

(8) If the slope of the original land surface over the area of the leachfield and fifty (50) feet in all directions from the edge of the leachfield is less than three (3) percent, the minimum setback distance between the leachfield and the drain must be fifty (50) feet in all directions. If the applicant conducts a groundwater flow study that conclusively demonstrates the drain is upgradient of the leachfield, the Director may allow a twenty-five (25) foot separation distance on the upgradient side.

(9) If a drain is watertight and bedded in sand or bank run gravel, or laid at an elevation above the seasonal high groundwater table, this setback distance may be reduced to twenty-five (25) feet. Applications shall include a detail drawing of the drain pipe joints and bedding material.

(10) On a residential property with both an OWTS and a stormwater infiltration system, the distance between any OWTS component and the stormwater infiltration system may be reduced to fifteen (15) feet if the stormwater infiltration system has been designed in accordance with the *Rhode Island Stormwater*

Design and Installation Standards Manual or the *State of Rhode Island Stormwater Management Guidance for Individual Single-Family Residential Lot Development.*

(11) The minimum setback distance from the inland edge of the coastal shoreline feature of the ocean or Narragansett Bay is either fifty (50) feet or twenty five (25) feet plus the CRMC calculated shoreline change setback pursuant to the CRMP Section 140, whichever is greater. Shoreline change rates and maps are available on CRMC's web site. This setback distance is doubled for OWTSs with design flow greater than five thousand (5000) gallons per day.

Table 22.2 Minimum Setback Distances from Drinking Water Supply Watershed Critical Resource Area Features (distances in feet from all OWTS components). See also Figure 2. If it is shown to the Department's satisfaction by clear and convincing evidence that the feature of concern in this table is upgradient (for both groundwater and surface water flow) of the OWTS, the minimum setback distance will be determined from Table 22.1. Subsurface drains to lower the seasonal high groundwater table are not permitted in accordance with Rule 40.2.

Feature	**OWTS Design Flow < 5000 gpd**	**OWTS Design Flow ≥5000 gpd** (Note 1)
Impoundment with Intake for Drinking Water Supply and Adjacent Wetlands (Note 2)	200	400
Subsurface Drains and Foundation Drains that Discharge Directly to the Impoundment	200	400
Subsurface Drains and Foundation Drains that Discharge to a Drainage Swale that Subsequently Discharges to the Impoundment: Paved Swale Unpaved Swale <200 feet long Unpaved Swale ≥200 feet long	 200 200 100	 400 400 200
Tributaries, Tributary Wetlands, Swales, and Storm Drains that Discharge Directly to the Impoundment	100 (Note 3)	200 (Note 3)
Subsurface Drains, Foundation Drains, and Storm Drains that Discharge to Tributaries and Tributary Wetlands	100 (Note 3)	200 (Note 3)
Any other Watercourse in the Drinking Water Supply Watershed (Not Connected to the Impoundment) or Areas Subject to Storm Flowage	50	100

Notes:

(1) As defined in Rule 35.1.1.

(2) Distances measured from the yearly high water mark.

(3) The distance between the building sewer or septic tank effluent pipe and a drain may be reduced and the building sewer or effluent pipe may cross the drain provided that the building sewer or septic tank effluent pipe is sleeved whenever they are within twenty-five (25) feet of the drain. The sleeve shall be seamless or schedule 40 PVC or equivalent with watertight joints, and it shall have a watertight seal that is fastened to the pipes with a stainless steel retractable clamp.

Table 22.3 Minimum Setback Distances from Features in the Salt Pond and Narrow River Critical Resource Area (distances in feet from all OWTS components). See also Figure 3. If it is shown to the Department's satisfaction by clear and convincing evidence that the feature of concern in this table is upgradient (for both groundwater and surface water flow) of the OWTS, the minimum setback distance will be determined from Table 22.1. Applications for an OWTS permit that are approved by DEM are subject to the requirements of CRMC.

Feature	**OWTS Design Flow < 5000 gpd**	**OWTS Design Flow ≥5000 gpd** (Note 1)
Salt Pond/Narrow River Coastal Shoreline Features, excluding the ocean	200	400
Subsurface Drains and Foundation Drains that Discharge Directly to the Salt Pond/Narrow River	200	400
Subsurface Drains and Foundation Drains that Discharge to an open Drainage Swale that Subsequently Discharges to the Salt Pond/Narrow River:		
Paved Swale	200	400
Unpaved Swale <200 feet long	200	400
Unpaved Swale ≥200 feet long	150	300
Tributaries, Tributary Wetlands, Swales, and Storm Drains that Discharge Directly to the Salt Pond/Narrow River	150 (Note 2)	300 (Note 2)
Subsurface Drains, Foundation Drains, and Storm Drains that Discharge to Tributaries and Tributary Wetlands	150	300
Any Other Watercourse in Salt Pond/Narrow River Critical Resource Area (Not Connected to Salt Pond/Narrow River), Areas Subject to Storm Flowage, or the inland edge of the coastal shoreline feature of the ocean. (Note 3)	50	100

Notes:

(1) As defined in Rule 35.1.1.

(2) The distance between the building sewer or septic tank effluent pipe and a drain may be reduced and the building sewer or effluent pipe may cross the drain provided that the building sewer or septic tank effluent pipe is sleeved whenever they are within twenty-five (25) feet of the drain. The sleeve shall be seamless or schedule 40 PVC or equivalent with watertight joints, and it shall have a watertight seal that is fastened to the pipes with a stainless steel retractable clamp.

(3) The minimum setback distance from the inland edge of the coastal shoreline feature of the ocean is either fifty (50) feet or twenty-five (25) feet plus the CRMC calculated shoreline change setback pursuant to CRMP Section 140, whichever is greater. Shoreline change rates and maps are available on CRMC's web site. This minimum setback distance is doubled for OWTSs with design flow greater than five thousand (5000) gallons per day.

Table 22.4 Minimum Setback Distances from Drinking Water Wells

OWTS Design Flow (gpd)	Distance in Feet from Leachfield/Septic Tank Effluent Pipe, Tanks/Building Sewer(Notes 1,5)	Distance in Feet From All OWTS Components (Notes 1,5)	
	Private Drinking Water Well (Note 2)	Public Well – Drilled (rock), Driven, or Dug	Public Well- Gravel Packed, Gravel Developed
<1000	100/75/50 (Note 3,4)	200	400
1000-<2000	150/75/50	200	400
2000 - <5000	200/75/50	200	400
5000- <10000	300/75/50	300	400
≥10000	400/75/50	400	400

Notes:
(1) Large Systems- These distances are minimum distances for large systems as defined in Rule 35.1.1. Greater distances may be required based on the Impact Analysis in Rule 35.3.
(2) Distance from the building sewer may be reduced when the building sewer is constructed of Schedule 40 PVC or equivalent.
(3) The minimum setback distances to wells on the subject property may be reduced to 80/60/40 (leachfield/tank/building sewer) feet for residential OWTSs on lots ten-thousand (10,000) square feet and larger under the following conditions:

(A) The design flow is less than five hundred (500) gallons per day;
(B) The OWTS utilizes a Department-approved nitrogen reducing technology;
(C) The OWTS discharges to a pressurized shallow narrow drainfield designed in accordance with DEM guidelines; and
(D) The OWTS separation distance between the infiltration surface and groundwater is three (3) feet or greater.

(4) The minimum setback distances shall be increased to 150/75/50(leachfield/tank/building sewer) for OWTSs with a design flow of less than one thousand (1000) gallons per day if the OWTS is designed for Category 1 soils per Rule 32. For such OWTSs utilizing a Department approved nitrogen reducing technology discharging to a bottomless sand filter or pressurized shallow narrow drainfield constructed in accordance with DEM guidelines, the minimum setback distances may be 100/75/50 (leachfield/tank/building sewer).
(5) In addition to the required setbacks between wells and the proposed OWTS, well setbacks shall also apply between any existing well serving the building for which the OWTS is proposed and any other existing OWTS. Such existing OWTS may require upgrade to meet these Rules.

RULE 23. SUBSURFACE DRAINS

23.1 Prior to seeking a permit for an OWTS that includes a subsurface drain, the applicant shall have all other relevant state or local approvals or permits for construction of the subdrain and discharge of the drainage effluent. Such approvals may include, but are not limited to, DEM Wetlands Program, the Rhode Island Coastal Resources Management Council Preliminary Determination, the municipality or the Rhode Island Department of Transportation.

23.2 Construction- A subsurface drain constructed to lower the groundwater table shall consist of not less than six (6) inches of washed stone three-quarter (¾) inch to two (2) inches in diameter, over which is laid a perforated-pipe at least four (4) inches in diameter. The stone shall extend above the pipe to within two (2) feet of the ground surface. A layer of filter fabric meeting the requirements of Rule 32.11 shall be placed above, below and along the sides of the stone for the entire length of the drain. Changes in direction shall not exceed ninety (90) degrees. Where a change in direction is greater than forty-five (45) degrees, a manhole is required, unless the change in direction is achieved through the use of a thirty-six (36) inch radius sweep.

23.3 Monitoring- The effectiveness of subsurface drains used to lower the groundwater table must be demonstrated through one complete wet season, January 1 through April 15, before consideration can be given to an application for an OWTS permit. The Department may allow lesser periods of monitoring if site conditions and wet season conditions warrant.

23.3.1 Groundwater table test holes shall be located within the area of the proposed leachfield with one (1) on the upgradient side and one (1) on the downgradient side. The test holes shall not be located within twenty-five (25) feet of the upgradient subsurface drain or within fifty (50) feet of the downgradient subsurface drain.

23.3.2 Groundwater table initial readings shall be submitted on forms approved by the Director by January 30 in order to effectively allow the Department and the Licensed Designer to monitor the effects of the subsurface drain through the wet season.

23.4 Hydraulic Gradient- If the subsurface drain causes the natural hydraulic gradient to be reversed, such drain shall be treated as a downgradient drain for the purpose of establishing appropriate minimum setbacks in accordance with Rule 22. Where only an upgradient drain is installed, the applicant must demonstrate that the hydraulic gradient will not be reversed or treat the upgradient drain as a downgradient drain for the purpose of establishing appropriate minimum setbacks in accordance with Rule 22.

RULE 24. BUILDING SEWERS

24.1 Size- The building sewer shall be designed with a capacity, when running full, of not less than twice the peak rate of flow of the connected fixtures. In no case shall the building sewer be less than three (3) inches in diameter.

24.2 Material- The building sewer shall be constructed of PVC pipe SDR 35 minimum or equivalent. When any portion of the building sewer will be subject to vehicular traffic, it shall be constructed of Schedule 40 PVC or equivalent.

24.3 Joints- All pipe joints for the building sewer shall be made watertight and be firmly connected.

24.4 Base- The building sewer shall be laid on a compacted, firm base.

24.5 Horizontal Alignment

24.1.1 The building sewer should be laid in a straight line wherever possible. Changes in direction shall not exceed ninety (90) degrees.

24.1.2 Where a change in direction is greater than forty-five (45) degrees, a manhole is required, unless the change in direction is achieved through the use of a thirty-six (36) inch radius sweep.

24.6 Vertical Alignment

24.6.1 The slope of the building sewer from the dwelling to the septic tank shall be not less than one percent (1%) and not greater than five percent (5%).

24.6.2 A manhole is required at changes of grade requiring a drop box in order to maintain the maximum five percent (5%) slope.

24.7 Manholes and Cleanouts- A manhole with a removable cover of concrete, cast iron, or other durable material shall be provided at the junction of two (2) or more building sewer lines and at all sharp changes in direction greater than forty-five (45) degrees, unless the alignment complies with Rule 24.6. A cleanout shall be provided at intervals not greater than seventy-five (75) feet.

24.8 Ventilation- The building sewer shall be vented through the stack or main vent of the building it serves. No trap shall be installed in the building sewer.

RULE 25. GREASE TANKS
(See Figure 4)

25.1 Required Use- Grease tanks shall be installed in accordance with the following:

25.1.1 OWTS Applications for New Building Construction for restaurants and other facilities that prepare food shall have kitchen wastes separately plumbed to an external grease tank;

25.1.2 OWTS Applications for Alterations to a Structure and OWTS Applications for Repair for restaurants and other facilities that prepare food with a total design flow equal to or exceeding two thousand (2000) gallons per day shall have kitchen wastes separately plumbed to an external grease tank; and

25.1.3 OWTS Applications for Alterations to a Structure and OWTS Applications for Repair for restaurants and other facilities that prepare food with a total design flow less than two thousand (2000) gallons per day shall have kitchen wastes separately plumbed to an external grease tank or have an internal grease removal unit installed.

25.2 Capacity- Grease tanks shall have a minimum capacity of one thousand (1,000) gallons, and shall have sufficient capacity to provide at least a twenty-four (24) hour detention period for fifty percent (50%) of the design flow for the OWTS.

25.3 Construction- Grease tanks shall be watertight, meet the construction and material standards required for septic tanks in Rule 26.2, and be shaped as required for septic tanks in Rule 26.3.

25.4 Inlet and Outlet- The inlet and outlet shall be as required for septic tanks in Rule 26.5. Grease tanks shall be provided with inlet tees and outlet tees. Baffles may be provided as necessary in conjunction with tees to maximize the separation of grease from the wastewater.

25.4.1 Tees shall be minimum SDR 35 PVC solvent welded and properly supported by a hanger, strap or other device.

25.4.2 The inlet tee shall extend to the mid-depth of the tank. The outlet tee shall extend to twelve (12) inches from the bottom of the tank.

25.4.3 The tops of the tees shall extend a minimum of six (6) inches above the flow line, and shall be left open to provide ventilation. There shall be an air space of at least three (3) inches between the tops of the tees and the top interior of the grease tank.

25.5 Access Openings- Grease tank access openings shall be as required for septic tanks in Rule 26.7. In addition, the lid shall specify that it is for a grease tank.

25.6 Location- Grease tanks shall be installed on a separate building sewer serving that part of the plumbing system into which the grease shall be discharged. The discharge from the grease tank shall flow to a properly designed septic tank.

25.7 Installation- Grease tank installation shall be as required for septic tank installation in Rule 26.9.

25.8 Grease Tanks in Series- Grease tanks may be placed in series provided that the combined volume meets the requirements of Rule 25.2 and that each grease tank meets all other requirements of Rule 25. In no case shall more than two (2) grease tanks be placed in series.

25.9 Performance Testing- Grease tanks shall be certified watertight in accordance with Rule 26.11.

25.10 Maintenance- Grease tanks shall be cleaned by a licensed permitted septage hauler when twenty-five percent (25%) of the liquid volume is filled with grease.

25.11 Existing Grease Tanks- Grease tanks in place as of January 1, 2008 that have access openings to finished grade shall be in compliance with Rule 26.7.2 no later than January 1, 2013.

RULE 26. SEPTIC TANKS
(See Figure 5)

26.1 Septic Tank Capacity

26.1.1 Residential Dwellings- The required minimum liquid capacity of a septic tank, below the flow line, shall be based on the number of bedrooms in the dwelling. For three (3) bedrooms or less the minimum capacity shall be one thousand (1000) gallons. For each additional bedroom, add two hundred fifty (250) gallons. A garbage grinder or a one hundred (100) gallon or greater tub will each require the septic tank capacity be increased by two hundred fifty (250) gallons.

26.1.2 Non-Residential Buildings- The required minimum liquid capacity of the septic tank shall be one thousand (1000) gallons or two (2) times the design flow as determined from Table 21.1, whichever is greater.

26.2 Construction and Materials- Septic tanks shall be watertight. They shall be constructed of sound and durable materials not subject to excessive corrosion, decay or frost damage or to cracking or buckling due to settlement or soil pressures. Septic tanks shall be constructed of precast reinforced concrete, fiberglass,

polyethylene or other material approved by the Director. In addition to the construction and material standards in Rules 26.2.1-26.2.3, all septic tanks shall meet the physical design standards in the remainder of Rule 26.

26.2.1 Precast reinforced concrete septic tanks shall conform to the American Society for Testing and Materials "Standard Specification for Precast Concrete Septic Tanks C-1227-10a" and any updates thereto. Any weep holes in the precast reinforced concrete septic tank shall be placed on the side of the tank bottom to allow for safe inspection and assurance that the weep hole has been plugged.

26.2.2 Fiberglass septic tanks and polyethylene septic tanks shall conform to the International Association of Plumbing and Mechanical Officials "American National Standard for Prefabricated Septic Tanks IAPMO/ANSI Z1000-2007" and any updates thereto.

26.2.3 Each septic tank shall be clearly and permanently marked at the inlet end of the tank with:

(A) Date of manufacture;

(B) Name or trademark of the manufacturer;

(C) Septic tank capacity; and

(D) Indication of external loads for which the septic tank is designed to resist.

26.3 Shape- There shall be no less than twenty-five (25) square feet of surface liquid area. The distance between the inlet wall of the tank and the outlet wall shall be no less than six (6) feet. The depth of the tank below the flow line shall be not less than thirty-nine (39) inches or more than eight (8) feet. There shall be at least nine (9) inches of air space between the surface of the liquid and the interior roof of the septic tank.

26.4 Compartments- All septic tanks shall have two (2) compartments with adequate connection at mid-depth, and all tanks shall meet the following requirements:

26.4.1 The first compartment shall have a liquid volume of approximately two-thirds (⅔) of the required liquid volume for the entire tank.

26.4.2 The interior compartment wall shall not extend to the interior roof without providing for venting equivalent to the cross sectional area of at least a four (4) inch diameter pipe.

26.5 Inlet and Outlet

26.5.1 One (1) inlet and one (1) outlet shall be provided through the appropriate end or side wall of each tank. Where more than one (1) inlet is required for multiple building sewers, the tank shall be manufactured with the appropriate number of inlets.

26.5.2 Inlet and Outlet Elevations- The invert elevation of the outlet shall be at least three (3) inches below the invert elevation of the inlet, and above the seasonal high groundwater table, unless special construction approved by the Director is provided.

26.5.3 The inlet and outlet pipes shall be connected to the tank with a watertight sealed flexible joint. The pipe gasket shall be an integral part of all tanks and the pipe gasket shall be fastened to the pipe with a stainless steel retractable clamp.

26.6 Inlet and Outlet Tees- Septic tanks shall be provided with an inlet sanitary tee and outlet tees or other non-corroding equivalent device approved by the Director. The inlet and outlet tees shall be minimum SDR 35 PVC solvent welded. The tops of the tees shall extend a minimum of six (6) inches above the flow line, and shall be left open to provide ventilation. There shall be an air space of at least three (3) inches between the tops of the tees and the top interior of the tank.

26.6.1 The inlet sanitary tee shall extend downward at least one (1) foot below the flow line.

26.6.2 The outlet tee shall extend downward one-third (⅓) of the depth below the flow line. All outlet tees or other approved outlet devices shall be equipped with an effluent screen approved by the Department pursuant to Rule 37.

26.6.3 Specifications for inlet tees and outlet tees are for normal, low-flow conditions. High-flow conditions, created when liquid is pumped from another tank, may require other dimensions and considerations.

26.7 Access Openings- A minimum twenty (20) inch inside diameter access opening shall be located over both the inlet tee and outlet tee. All septic tank openings shall meet the following requirements:

26.7.1 The access opening over the outlet tee shall be brought to finished grade. Other access openings shall either be brought to finished grade or within twelve (12) inches of the finished grade. Where a riser is required, it shall be watertight;

26.7.2 Lids on the top of the septic tank (Figure 6) should remain in place where practical. Lids for the openings at finished grade shall prevent unauthorized entry by meeting either of the following:

(A) Lid shall weigh a minimum of fifty-nine (59) pounds and fit tightly onto the riser as shown in Figure 6; or

(B) Lid shall be tamper resistant and mechanically fastened;

26.7.3 The septic tank manufacturers shall provide and the Licensed OWTS Installers shall attach a label of noncorrosive material in a prominent location at each access opening to warn that “Entrance Into the Tank Could Be Fatal”; and

26.7.4 Surface water shall be diverted away from the septic tank openings.

26.8 Accessibility- Septic tanks shall be so located on the lot as to be accessible for servicing and cleaning.

26.9 Installation- All septic tanks shall be installed in accordance with the manufacturer’s minimum requirements. In addition, all septic tanks must meet the installation requirements specified in the remainder of these Rules.

26.9.1 Foundation- The septic tank shall be installed on a level, stable base that will not settle.

26.9.2 Backfill- Backfill shall be placed around the septic tank in such a manner as to avoid damage to it. All backfill placed around the septic tank shall be free of large stones, stumps, waste, construction material and rubbish.

26.9.3 Floatation- Where any portion of a septic tank is installed below the seasonal high groundwater table, the tank's susceptibility to floatation shall be determined, and provisions shall be made to prevent floatation where necessary as determined by the floatation calculations.

26.9.4 Septic Tanks in Coastal Velocity Zones- All fiberglass and polyethylene septic tanks larger than one thousand (1000) gallons installed in a Federal Emergency Management Agency designated V-Zone shall be anchored to prevent floatation.

26.10 Septic Tanks in Series- Septic tanks placed in series are allowed provided they meet the following requirements:

26.10.1 Each tank shall be of single compartment design and the volume of the first tank shall be at least two-thirds (⅔) the required tank size;

26.10.2 The outlet tee on the first tank shall extend down to the mid-depth of the liquid volume; and

26.10.3 An effluent screen that meets the requirements of Rule 26.6.2 shall be provided on the outlet tee of the second tank.

26.11 Performance Testing- All septic tanks and their risers must be certified watertight by the manufacturer or by onsite testing. Onsite testing for septic tank leakage shall be conducted for tanks assembled at the installation site. The Director may require onsite testing on a case-by-case basis. The testing shall be conducted using either:

26.11.1 Vacuum Test- Seal the empty tank and risers and apply a vacuum to two (2) inches (50 mm) of mercury. The tank is approved if ninety percent (90%) of the vacuum is held for two (2) minutes; or

26.11.2 Water-Pressure Test- Seal the tank and risers, fill with water to the top of the risers, and let stand for twenty-four (24) hours. Refill the tank. The tank is approved if the water level is held for one (1) hour.

26.12 Pumping to Septic Tanks- Whenever more than twenty-five percent (25%) of the daily design flow is pumped into a septic tank, the tank capacity shall be increased by fifty percent (50%) beyond the minimum capacities specified in Rule 26.1.

26.13 Depth of Cover- The minimum cover over the invert of the outlet shall be one and one-half (1½) feet. If the depth of cover exceeds three and one-half (3½) feet, the OWTS application shall include documentation of the tank's ability to structurally withstand the loading, and the tank's design shall allow for proper maintenance and access.

26.14 Existing Septic Tanks- Septic tanks in place as of January 1, 2008 shall be in compliance with the provisions of Rule 26.7.2 no later than January 1, 2013.

RULE 27. SEPTIC TANK EFFLUENT PIPE

27.1 Size- In no case shall the septic tank effluent pipe be less than four (4) inches in diameter.

27.2 Material- The septic tank effluent pipe shall be constructed of PVC pipe SDR 35 minimum or equivalent. When any portion of the septic tank effluent pipe will be subject to vehicular traffic, it shall be constructed of Schedule 40 PVC or equivalent.

27.3 Joints- All pipe joints for the septic tank effluent pipe shall be made watertight and be firmly connected.

27.4 Slope or Grade- The septic tank effluent pipe shall have a minimum slope of one percent (1%).

27.5 Base- The septic tank effluent pipe shall be laid on a compacted, firm base.

27.6 Alignment- The septic tank effluent pipe should be laid in a straight line wherever possible. Changes in direction shall not exceed ninety (90) degrees. Where a change in direction is greater than forty-five (45) degrees, a manhole is required, unless the change in direction is achieved through the use of a thirty-six (36) inch radius sweep.

27.7 Manholes and Cleanouts- A manhole with a removable cover of concrete, cast iron, or other durable material shall be provided at the junction of two (2) or more septic tank effluent pipes and at all sharp changes in direction greater than forty-five (45) degrees, unless the alignment complies with Rule 27.6. A cleanout shall be provided at intervals not greater than seventy-five (75) feet.

27.8 Pressurized Septic Tank Effluent Pipe- The Licensed Designer shall specify pressurized septic tank effluent pipe sizing and provide backup calculations to support specification. The pressurized septic tank effluent pipe shall be PVC Class 200 minimum.

RULE 28. HOLDING TANKS

28.1 Use

28.1.1 Holding tanks for wastewater are prohibited for Applications for New Building Construction and Applications for Alteration to a Structure.

28.1.2 A holding tank may be allowed only to repair or replace a failed OWTS at the Director's discretion.

28.1.3 Holding tanks will not be allowed if a public wastewater system is available for connection. When a public wastewater system becomes available, any person owning a holding tank shall connect to said system within thirty (30) days and the holding tank shall be abandoned in accordance with Rule 52.

28.1.4 Holding tanks are allowed at marine pumpout facilities provided that direct connection to an existing public wastewater system is not possible and such tanks are constructed, installed and operated in accordance with appropriate Department Guidelines and Regulations.

28.2 Construction- Each holding tank shall:

28.2.1 Have a minimum capacity of five hundred percent (500%) of the daily design flow or portion thereof that the holding tank will serve, or two thousand (2000) gallons, whichever is larger;

28.2.2 Be watertight and meet the construction and material standards required for septic tanks in Rule 26.2;

28.2.3 Be equipped with an audio-visual alarm set to activate when the tank reaches sixty percent (60%) of its capacity;

28.2.4 Have a minimum twenty (20) inch inside diameter opening that meets the requirements for septic tank access openings in Rules 26.7.1, 26.7.2(B), 26.7.3 and 26.7.4; and

28.2.5 Be vented such that the vent is at an elevation higher than the elevation of the highest fixture served.

28.3 Installation- Holding tank installation shall be as required for septic tanks in Rule 26.9.

28.4 Depth of Cover- The minimum cover over the invert of the inlet shall be one and one-half (1½) feet.

28.5 Pumping- Prior to approval of the installation of a holding tank the applicant shall provide to the Department a copy of a contract with a licensed permitted septage transporter to regularly pump the tank.

28.6 Performance Testing- All holding tanks shall be tested on site for leakage in the manner specified for septic tanks in Rule 26.11.1 or 26.11.2.

28.7 Existing Holding Tanks- Holding tanks in place as of January 1, 2008 that have access openings to finished grade shall be in compliance with Rule 26.7.2(B) no later than January 1, 2013.

RULE 29. PUMP TANKS

29.1 An OWTS that requires a pump shall have a separate pump tank to house the pump, unless the pump is placed in the second compartment of the septic tank within a screened vault approved by the Director. Pump tanks shall be located following a septic tank unless otherwise approved by the Director.

29.2 Capacity- Pump tanks shall have an emergency storage capacity above the working level equal to the daily design flow of the system. Emergency capacity is not required if there is less than two (2) inches difference in elevation between the invert of the outlet of the septic tank and the invert of the inlet of the pump tank. All pump tanks shall be equipped with sensors and alarms to protect against high water due to failure of the pump or pump controls. The volume below the working level shall include an allowance for the volume of all drainage which may flow back to the tank when pumping has ceased. The volume of the pump tank between operating levels shall be adequate to assure the entire leachfield is dosed each cycle in accordance with the required number of cycles per day.

29.3 Construction- Each pump tank shall:

29.3.1 Be watertight and meet the construction and material standards for septic tanks in Rule 26.2; and

29.3.2 Each pump tank or compartment thereof shall be provided with a minimum twenty (20) inch inside diameter access opening located so as to facilitate repair or adjustment of the pump. The access opening shall meet the requirements for septic tank access openings in Rule 26.7.1-26.7.4.

29.4 Inlet and Outlet- The invert elevation of the inlet and the outlet pipe to the pump tank shall be located above the maximum water elevation in the pump tank, and above the seasonal high groundwater table, unless special construction, approved by the Director is provided.

29.5 Ventilation- Pump tanks shall be constructed in a manner that will permit venting through the building sewer or other suitable outlet.

29.6 Installation- Pump tank installation shall be as required for septic tanks in Rule 26.9.

29.7 Performance Testing- Pump tanks shall be certified watertight in accordance with Rule 26.11.

29.8 Existing Pump Tanks- Pump tanks in place as of January 1, 2008 that have access openings to finished grade shall be in compliance with Rule 26.7.2 no later than January 1, 2013.

RULE 30. PUMPS

30.1 Required Use- Pumps are required for OWTSs that meet any of the following conditions:

30.1.1 The OWTS is designed for intermittent discharge;

30.1.2 The OWTS is designed for pressure dosing;

30.1.3 Pump is required for an approved Alternative or Experimental Technology;

30.1.4 The maximum length of a dispersal trench in the leachfield is between seventy-six (76) feet and one hundred (100) feet; or

30.1.5 The total length of the distribution lines in the leachfield exceeds five hundred (500) feet.

30.2 Dual Alternating Pumps

30.2.1 When a pump is required, dual alternating pumps are required for the following (otherwise a single pump is sufficient):

(A) The total length of the distribution lines in the system exceeds one thousand (1000) feet;

(B) The OWTS serves a use other than single family residential, the design flow is less than two thousand (2000) gallons per day, and there is no storage capacity for one day's design flow; and

(C) The OWTS serves a use other than single family residential and the design flow is greater than two thousand (2000) gallons per day.

30.2.2 Dual alternating pumps shall operate in the following sequence: pumps off; primary (lead) pump on; backup (lag) pump on and alarm on; pumps must alternate.

30.2.3 When dual alternating pumps are discharging to separate leachfields, the pump discharge lines shall be inter-connected and provisions made to permit dosage of both leachfields with one pump when the other is being serviced.

30.3 Size- The pump must be sized to accommodate the proposed use. All system head curves and associated calculations shall be submitted with the design. Centrifugal pumps must be capable of passing three-quarter (¾) inch diameter solids.

30.4 Piping- The Licensed Designer shall specify pump discharge pipe sizing and provide backup calculations to support specification. The pump discharge pipe shall be PVC Class 200 minimum.

30.5 Controls and Power Supply- Pump controls shall be moisture proof if located above the liquid level. Watertight controls shall be used when the contents are submerged. All controls and junction boxes on the power supply shall meet appropriate electrical codes. Standby power shall be provided at all uses other than single family residential, unless otherwise approved by the Director.

30.6 Alarms- All pumps shall be equipped with a high water level, visible and audible alarm powered by a circuit separate from the pump power.

30.7 Installation- Pumps shall be installed in strict conformance with the manufacturer's specifications. Provisions should be made to easily remove the pumps for servicing.

RULE 31. DISTRIBUTION BOXES

31.1 A distribution box shall be installed immediately preceding the leachfield unless otherwise approved by the Director.

31.2 Construction- The distribution box shall be constructed of concrete or other durable material. It shall have a top load carrying capacity of three hundred (300) pounds per square foot and minimal sidewall deflection. Minimum bottom area shall be three (3) square feet.

31.3 Inlet- The distribution box shall be provided with an inlet tee or a suitable baffle. The invert elevation of the inlet pipe shall be not less than two (2) inches above the invert elevation of the outlet pipe.

31.4 Outlets

31.4.1 Outlet Elevations- The invert elevation of all the outlet pipes shall be a minimum of four (4) inches above the floor of the distribution box. All outlet inverts shall be at the same elevation.

31.4.2 Number of Outlets- If there is no pump tank, there shall be a separate outlet for each distribution line. When a pump tank is installed, there should be either a separate outlet for each distribution line, or a separate outlet of at least six (6) inches in diameter for every two (2) distribution lines. In all cases following a pump tank, the outlets shall be of sufficient size to accept the wastewater flow at the rate wastewater is delivered to the distribution box.

31.5 Distribution Pipes Into the Distribution Box

31.5.1 The distribution pipes shall extend into the distribution box one (1) inch.

31.5.2 Jointing of the distribution piping with a distribution box shall be made with non-shrinking gasket materials which shall maintain a watertight seal.

31.5.3 All inverts shall be set level after the leachfield is installed. Leveling devices may be installed on the distribution pipes.

31.6 Cover- The distribution box shall be provided with a readily removable, fitted cover of durable material. Distribution boxes are not required to have access openings at finished grade except as follows. When a tipping distribution box is used, the distribution boxes shall have a minimum ten (10) inch diameter access opening brought to finished grade. OWTSs with a design flow over two thousand (2,000) gallons per day shall have a minimum eighteen (18) inch manhole over each distribution box with extra heavy duty metal frames and covers to finished grade. When manholes to grade are not provided, it is recommended that a marker over the cover be provided at grade.

31.7 Foundation- The distribution box shall be installed on a level stable base that will not settle.

RULE 32. LEACHFIELDS

32.1 Applicability- This rule applies to leachfields with dispersal trenches (Rule 33), leachfields with concrete chambers in a trench configuration (Rule 34), and to Alternative or Experimental leachfield systems approved pursuant to Rule 37 except for specifically approved design elements that are not consistent with this Rule 32.

32.2 Minimum Leaching Area- The minimum leachfield area necessary for dispersal trench and concrete chamber leachfields shall be determined by dividing the maximum daily wastewater flow (design flow) for the facility, as determined from Rule 21, by the loading rate established in Rule 32.2.1 for applications without a soil evaluation or by the loading rate established in Rule 32.2.2 for applications with a soil evaluation. Applications without soil evaluations are those applications that have valid field data that pre-dates the soil evaluation requirements of these Rules.

32.2.1 The maximum leachfield loading rate for applications without a soil evaluation shall be determined from Table 32.2.1 below:

Table 32.2.1: Loading Rates Determined by Percolation Rate

Percolation Rate (minutes per inch)	Loading Rate (gals/sq ft/day)
Notes (1) and (2)	
≤5	.93
10	.70
15	.61
20	.52
25	.48
30	.46
40	.40

Notes:
(1) Rates not listed may be interpolated from this table to reflect actual readings.
(2) Soil with a percolation rate of over forty (40) minutes per inch is unsuitable for disposal of wastewater by any means of subsurface leaching.

(3) The fastest percolation rate allowed for applications for OWTSs for New Building Construction pursuant to Rule 17.5 shall be ten (10) minutes per inch.

32.2.2 The maximum leachfield loading rate for applications with a soil evaluation, shall be determined from Table 32.2.2. Use the lowest loading rate obtained in the manner described below:

(A) If the bottom of the stone is above the original grade, use the soil horizon with the lowest loading rate within five (5) feet of the original ground surface, excluding any A horizons;

(B) If the bottom of the stone is below the original grade, use the soil horizon with the lowest loading rate within five (5) feet below the elevation of the distribution pipe invert, including the soil horizons receiving side wall effluent;

(C) If no natural soil exists within the five (5) feet referenced in Rule 32.2.2 (A) and (B) above because of gravel fill, use the loading rate of the first naturally occurring soil horizon below that depth.

Table 32.2.2. Loading Rates Determined by Soil Category

Soil Category	**Loading Rate (gals/sq ft/day)**
1	.70
1m	.61
2	.61
3	*.70*
4	*.61*
4m	*.70*
5	.52
6	.61
6m	.70
7	.52
7m	.61
8	.46
8m	.48
9	.40
9m	.43
10	Not Allowed (Impervious)

Note: "m" means soil has gravelly or channery coarse fragment modifiers.

32.3 Effective Leaching Area- The effective leaching area of OWTSs shall be determined in accordance with Rule 33 for dispersal trench OWTSs and Rule 34 for concrete chamber OWTSs.

32.4 Depth to Groundwater From Original Ground Surface- Using the test holes required in Rule 15.9, the seasonal high groundwater table determination that is closest to the original ground surface shall be used for OWTS design. The leachfield shall be located in an area where the seasonal high groundwater table is a minimum of two (2) feet below the original ground surface. All test holes within twenty-five (25) feet of the leachfield shall meet the minimum depth to groundwater from original ground surface. Where the seasonal high groundwater table is less than four (4) feet below the original ground surface, the Department shall require additional soil testing to ensure the minimum depth to groundwater meets the minimum standards within twenty-five (25) feet of the leachfield. On lots twenty thousand (20,000) square feet or larger that are not located in the Salt Pond or Narrow River Critical Resource Areas as defined in Rule 38, the leachfield

may be located in an area where the seasonal high groundwater table is less than twenty-four (24) inches but greater than or equal to eighteen (18) inches from the original ground surface if the OWTS utilizes a bottomless sand filter in accordance with DEM guidelines, the applicant has no variance requests pursuant to Rule 47, and the design flow is less than or equal to six hundred ninety (690) gallons per day of residential strength wastewater.

32.5 Depth to Restrictive Layer or Bedrock From Original Ground Surface- The leachfield shall be located in an area where a restrictive layer or bedrock is a minimum of four (4) feet below the original ground surface. The minimum depth to a restrictive layer or bedrock shall be met within twenty-five (25) feet of all sides of the leachfield.

32.6 Leachfield Design Point- Where the seasonal high groundwater table is greater than or equal to four (4) feet below the original ground surface, the leachfield shall be designed using the original ground surface elevation at the center of the leachfield. Where the seasonal high groundwater table is less than four (4) feet below the original ground surface, the leachfield shall be designed using the highest original ground surface elevation within the leachfield.

32.7 OWTS Separation Distance to Groundwater- The bottom of the stone underlying the leachfield (or surface upon which the biomat develops) shall be at least three (3) feet above the seasonal high groundwater table.

32.8 OWTS Separation Distance to a Restrictive Layer or Bedrock- The bottom of the stone underlying the leachfield (or surface upon which the biomat develops) shall be at least five (5) feet above a restrictive layer or bedrock. This five (5) foot vertical separation shall be maintained to a distance of twenty-five (25) feet from the side wall of the leachfield. In the upgradient direction, the five (5) foot vertical separation requirement may be waived as long as a restrictive layer or bedrock is no higher than the bottom of the stone within twenty-five (25) feet of the leachfield (Figure 1). Excavating into a restrictive layer or bedrock is not permitted unless otherwise approved by the Director.

32.9 Excavation- All trees, brush and stumps within the area of the leachfield and within ten (10) feet of the leachfield shall be removed. Care must be taken to assure that the soil at the bottom and sides of the excavation for the leachfield is not compacted or smeared. The bottom of the excavation shall be level and the bottom and sides of the excavation shall be scarified. In no case shall exposed boulders in the walls or bottom of the excavation be left in place. Voids created by the removal of boulders shall be filled with gravel meeting the requirements in Rule 32.12. Exposed roots within the excavation shall be cut back to the walls of the excavation. No part of the excavation for the leachfield shall be into groundwater. All storm deposited sand in the backdune environment and human transported material existing in the proposed leachfield and five (5) feet around and below shall be removed prior to OWTS installation unless the material is deemed to be acceptable to the Director.

32.10 Stone- The stone used in the leachfield shall consist of clean, washed stone ranging from three quarter (¾) inch to not more than two (2) inches in size and free of fines, soils, stone dust or debris. The stone shall be covered with a layer of synthetic filter fabric that meets the requirements of Rule 32.11.

32.11 Filter Fabric- A layer of non-woven synthetic filter fabric shall be placed over all stone used in the OWTS construction before backfilling. The filter fabric shall have adequate tensile strength to prevent ripping during installation and backfilling, adequate air permeability to allow free passage of gases, and adequate particle retention to prevent downward migration of soil particles.

32.12 Gravel

32.12.1 The gravel base material and, where applicable, the gravel between the trenches shall consist of clean sand and gravel free of organic matter and foreign substances. The gravel shall not contain any material larger than three (3) inches and up to ten percent (10%) may be sized between three-quarters (¾) and three (3) inches. Gravel shall meet the following criteria:

Table 32.12.1

Sieve Size	Percent Passing
3/4"	90% - 100%
#4	55% - 100%
#10	40% - 100%
#40	10% - 50%
#100	0% - 20%
#200	0% - 5%

32.12.2 The gravel shall be placed in shallow lifts and properly compacted. The surface of the gravel upon which the stone will be laid shall be level and scarified.

32.13 Depth of Cover- The minimum cover over the invert of the distribution lines shall be one and one-half (1½) feet and the maximum cover shall be two and one-half (2½) feet. Minimum cover elevations shall be maintained over the full area of the leachfield, including area excavated pursuant to Rule 33.5.1.

32.14 Backfill- All backfill shall be free of boulders and stones greater than six (6) inches in diameter, frozen clumps of earth, rubbish, masonry, stumps or waste construction materials. Backfill shall be placed carefully to avoid displacement and damage to piping and chambers. Heavy machinery shall not be permitted to pass over the leachfield.

32.15 Fill Easements- Where human transported material ("fill") is required and where it is necessary to fill beyond the boundary of the subject property to meet the requirements of these Rules, no approval will be granted unless the adjoining property owner(s) has given a permanent legal release (easement, etc.) filed in the land evidence records of the municipality granting such right to the owner of the applicant property. A copy of such right of access and use shall be attached to the application.

32.16 Adjacent Side Slope- A minimum ten (10) foot horizontal separation distance shall be provided between the outer edge of the stone in the outer dispersal trench and any ground surface elevation less than the elevation of the invert of the distribution line. The adjacent side slope shall not be steeper than 3:1 (horizontal:vertical) for a twenty-five (25) foot minimum distance from the edge of the stone in the dispersal trench or until the toe of the slope returns to the elevation of the original grade. The toe of the 3:1 slope shall be a minimum of five (5) feet from any property line.

32.17 Structural Retaining Walls- A minimum of twenty-five (25) feet shall be maintained from the outer edge of the stone in the outer dispersal trench to any structural retaining wall. If the structural retaining wall is above the seasonal high groundwater table a lesser setback distance may be allowed. A greater setback distance may be required for OWTSs with a design flow of one thousand (1000) gallons per day or more. The Department may require additional information, including but not limited to an analysis of the

hydrogeological conditions of the site. Structural retaining walls shall be a minimum of two (2) feet from the property line unless the adjacent property owner grants the applicant written permission or a construction easement to provide access to install the wall. The wall design shall ensure adequate control of surface water runoff. The Director may require that the structural retaining wall be designed by a Professional Engineer registered in Rhode Island.

32.18 Surface Water Drainage- OWTSs shall be designed to prevent the flow of surface water from the surrounding area onto the leachfield. The OWTS design shall provide for diversion of surface water runoff so as not to cause or increase the severity of drainage problems to adjacent properties.

32.19 Leachfield Protection

32.19.1 Curbing- OWTSs serving other than individual dwellings shall be adequately curbed or fenced so as to exclude vehicular traffic, unless the OWTS is a concrete chamber OWTS constructed in accordance with Rule 34.9. Parking areas adjacent to a leachfield shall be graded or curbed to divert runoff from the leaching area.

32.19.2 The boundary of the leachfield shall be staked and flagged to protect the leachfield from vehicle traffic and excessive weight loads before and during construction of the OWTS and the structure. Flagging shall remain in place until all construction activities at the site are complete.

32.20 Finish Grade Stabilization- Immediately after completion of final grading, the area of disturbance due to installation of the OWTS shall be stabilized by mulching and seeding, or sodding, to establish a permanent vegetative cover to prevent erosion.

RULE 33. DISPERSAL TRENCHES

33.1 Effective Leaching Area- The effective leaching area shall be determined by the depth of stone meeting the requirements of Rule 32.10 that is placed below the distribution line in the trench and the width of the trench. The effective leaching area of dispersal trenches containing one-half (½) feet of stone below the pipe invert shall be the total bottom area. Credit will be allowed for added sidewall absorption area gained by increasing the depth of stone in the trenches. Such credit shall be determined in accordance with Table 33.1 which gives the square footage allowed per lineal foot of trench as the depth of stone increases. The maximum depth of stone allowed is one and one-half (1½) feet. The bottom of the dispersal trench shall have a maximum width of three (3) feet. The maximum depth of stone below the pipe invert shall be one-half (½) feet when either of the following occur:

33.1.1 The seasonal high groundwater table is within two (2) to four (4) feet of the original ground surface; or

33.1.2 A restrictive layer is within four (4) to six (6) feet of original ground surface.

Table 33.1. Effective Leaching Area

Depth of Stone Below Invert (Feet)	Area Allowed per Linear Foot of Trench (Sq. ft/ft)		
	24" Wide Trench	30" Wide Trench	36" Wide Trench
0.5	2.0	2.5	3.0
1.0	2.7	3.2	3.7
1.5	3.2	3.7	4.2

33.2 Distribution Lines

33.2.1 That portion of the distribution line from the distribution box to the beginning of the dispersal trench shall be a minimum of two (2) feet in length, four (4) inch diameter SDR 35 PVC, imperforated and laid with firmly connected watertight joints.

33.2.2 The invert of the distribution lines in the trench shall be two (2) inches lower than the invert of the invert of the outlet of the distribution box. The distribution lines in the trench shall be level. The first foot of the distribution line in the trench shall be imperforated SDR 35 PVC. Beyond the first foot, the distribution lines in the trench must consist of SDR 35 perforated PVC pipe with a minimum diameter of four (4) inches, or an equivalent pipe approved by the Director. The perforations shall be evenly spaced in two (2) rows, one on each side of center, located at thirty (30) degrees off vertical center in the lower half of the pipe. The perforations shall be no smaller than three-eighths (⅜) inch and no larger than five-eighths (⅝) inch in diameter. Pipe joints shall be firmly connected. The ends of all distribution lines shall be inter-connected.

33.2.3 The maximum length of a dispersal trench shall be as follows:

(A) Without dosing– fifty (50) feet;

(B) With a tipping distribution box– seventy-five (75) feet; or

(C) With a pump– one hundred (100) feet.

33.3 Stone- The stone surrounding the distribution lines shall meet the requirements of Rule 32.10. The stone shall cover the full width of the trench, extend to the proper design depth, and extend two (2) inches above the top of the distribution lines. The stone shall be covered with a layer of synthetic filter fabric that meets the requirements of Rule 32.11.

33.4 Leachfield Construction Where the Invert of the Distribution Lines is Below Original Grade (See Figure 7)

33.4.1 The soil between the dispersal trenches shall remain undisturbed.

33.4.2 The Director may approve designs where the soil within the entire area of the leachfield is removed if the applicant shows that trench excavation is impractical, for example due to the presence of excessive boulders or stumps. If any B horizon soil remains, only tracked vehicles shall be allowed within this area to avoid compacting the soil. If the soil within the entire area of the leachfield is removed, the soil shall be replaced with properly compacted gravel meeting the requirements of Rule 32.12 to an elevation that will be two (2) inches above the top of the distribution lines. The trenches shall be excavated out of the compacted gravel.

33.4.3 A six (6) inch layer of gravel meeting the requirements of Rule 32.12 shall be placed below the stone in the dispersal trench. Where the bottom of the stone lies on or within a soil horizon that meets the description of Soil Category 1 from Rule 15.11 and such horizon is at least six (6) inches thick below the stone, the six (6) inch gravel layer is not necessary. However, if this Soil Category 1 horizon is described as extremely cobbly, the six (6) inch gravel layer shall be required.

33.4.4 The minimum distance between walls of adjacent dispersal trenches shall be five (5) feet, however, greater distances are recommended.

33.5 Leachfield Construction Where the Invert of the Distribution Lines is Above Original Grade (see Figure 8)

33.5.1 The leachfield and five (5) feet beyond the leachfield shall be stripped of all topsoil (A horizons). In order to avoid compaction of the B soil horizon, only tracked vehicles shall be allowed within this area.

33.5.2 Properly compacted gravel that meets the requirements of Rule 32.12 shall be placed throughout the excavation to an elevation that will be two (2) inches above the top of the distribution lines. Dispersal trenches shall be excavated out of the compacted gravel. There shall be a minimum six (6) inch gravel base layer meeting the requirements of Rule 32.12 below the stone.

33.5.3 The maximum depth of stone below the distribution line invert shall be one-half (½) feet; and

33.5.4 The minimum distance between walls of adjacent dispersal trenches shall be ten (10) feet.

33.6 Leachfield Construction on Sloping Sites- Where the dispersal trenches are to be constructed such that the invert of the distribution lines in the trenches will not all be at the same elevation, the invert of the distribution lines shall be below the original grade, the distribution lines in the trenches shall be laid level, and the leachfield shall be constructed in accordance with the following (see Figure 9):

33.6.1 The distribution box shall provide equal dosing to each dispersal trench;

33.6.2 A tipping distribution box or pump shall be used;

33.6.3 Leachfield trenches shall be parallel to the contours of the existing grade where possible;

33.6.4 The ends of the distribution lines shall be connected by a relief line that is imperforated, SDR 35 PVC laid with watertight joints that is of the same diameter as the perforated pipe that it connects;

33.6.5 The minimum distance between walls of adjacent dispersal trenches shall be ten (10) feet;

33.6.6 Gravel shall be placed below the stone in accordance with Rule 33.4.3;

33.6.7 Each dispersal trench must meet the adjacent side slope requirements of Rule 32.16;

33.6.8 The soil between the dispersal trenches shall remain undisturbed. If the presence of boulders or other obstacles make trench excavation impractical, the OWTS shall be constructed in accordance with Rules 33.4 or 33.5; and

33.6.9 The Director may require that OWTSs with a design flow exceeding six hundred ninety (690) gallons per day submit additional information regarding wastewater loading and groundwater flow to ensure OWTS effectiveness on sloping sites.

33.7 Location Under Traffic Areas- The leachfield for a dispersal trench system shall not be paved or subject to vehicular traffic, including parking.

33.8 Summary of Dispersal Trench Construction Details:

Maximum length per line without dosing	50 feet
Maximum length per line with tipping distribution box	75 feet
Maximum length per line with pump	100 feet
Minimum diameter of distribution lines	4 inches
Maximum width of dispersal trench bottom	3 feet
Minimum distance between walls of adjacent trenches	5 feet/10 feet*
Minimum cover over invert of distribution lines	1.5 feet
Maximum cover over invert of distribution lines	2.5 feet

* 10 feet for those OWTSs on sloping sites and for those OWTSs where the invert of the distribution lines is above original grade.

RULE 34. CONCRETE CHAMBERS
(See Figure 10)

34.1 An OWTS using precast concrete chambers may be constructed in lieu of a dispersal trench OWTS. Concrete chambers must be preceded by a septic tank and must be installed in a trench configuration. Deep concrete chambers meeting the requirements of Rule 34.4 will not be permitted except for OWTS Applications for Repair when no other type of leachfield can be utilized.

34.2 Shallow Concrete Chambers

34.2.1 Dimensions- Shallow concrete chambers are four (4) feet by eight (8) feet by eighteen (18) inches deep with an open bottom and perforated side walls.

34.2.2 Site limitations- Shallow concrete chambers shall not be permitted where any of the following occur:

(A) The chamber invert would be more than one (1) foot above the original grade;

(B) The chamber inverts would be set at different elevations; or

(C) The seasonal high groundwater table is less than four (4) feet from the original ground surface.

34.3 Shallow Concrete Chamber Effective Leaching Area- Effective leaching area for shallow concrete chambers shall be calculated based on Table 34.3. Required minimum leaching area shall be calculated in accordance with Rule 32.2.

Table 34.3: Shallow Concrete Chamber Effective Leaching Area

	Shallow Concrete Chambers	
	12" stone below	24" stone below (Note 1)
Each end unit (sq. ft.)	78	102
Each Interior Unit (sq. ft.)	64	80

Note 1: Shallow concrete chambers installed with twenty-four (24) inches of stone below the chamber may be used for OWTS Applications for Repair only.

34.4 Deep Concrete Chambers-

34.4.1 Dimensions- Deep concrete chambers are approximately equal in width and depth with an open bottom and perforated side walls.

34.4.2 Limitations- Deep concrete chambers are prohibited for OWTS Applications for New Building Construction and OWTS Applications for Alterations to a Structure. Deep concrete chambers will not be permitted for OWTS Applications for Repair where another type of leachfield designed in accordance with Rules 32, 33, and 34 can be sited and is deemed acceptable by the Department. The Licensed Designer must demonstrate that the repair alternatives to a deep concrete chamber, other than a bottomless sand filter or pressurized shallow narrow drainfield, are not feasible.

34.5 Deep Concrete Chamber Effective Leaching Area- Effective leaching area for deep concrete chambers shall be calculated based on Table 34.5. Required minimum leaching area shall be calculated in accordance with Rule 32.2.

Table 34.5: Deep Concrete Chamber Effective Leaching Area

	Deep Concrete Chambers
	12" stone on sides, 12" stone below
Each end unit (sq. ft.)	98
Each Interior Unit (sq. ft.)	58

34.6 Concrete Chamber Construction

34.6.1 Concrete chambers shall be constructed of precast concrete. The bottom of the chambers shall be open and the sides and end (end units) shall be perforated.

34.6.2 Access- The top of the chamber trench shall have an access opening into a chamber at intervals not greater than fifty (50) feet that consists of a removable cover of concrete, iron or other durable material. For OWTSs designed to dispose of up to two thousand (2,000) gallons per day and OWTSs that are not located under a paved area, the top of the access opening shall accommodate a riser and

shall be brought to within one (1) foot of the finished grade and properly marked. For OWTSs designed to dispose of greater than two thousand (2,000) gallons per day, commercial OWTSs, and all OWTSs located under paved areas, the access openings shall meet the following requirements:

(A) Access openings shall have a riser and shall be brought to finished grade;

(B) Lids on the top of the concrete chambers should remain in place where practical. Lids for the openings at finished grade shall prevent unauthorized entry by meeting either of the following:

(i) Lids shall weigh a minimum of fifty-nine (59) pounds and fit tightly into the riser as shown in Figure 6; or

(ii) Lids shall be tamper resistant and mechanically fastened.

(C) Surface water shall be diverted away from the access openings; and

(D) Concrete chambers in place as of January 1, 2008 that have access openings to finished grade shall be in compliance with the provisions of 34.6.2(B) no later than January 1, 2013.

34.7 Excavation and Construction of a Concrete Chamber Leachfield

34.7.1 The overall width of the trench must not exceed six (6) feet.

34.7.2 Spacing- The minimum distance between walls of adjacent trenches in a concrete chamber leachfield shall be at least six (6) feet.

34.7.3 The soil between the dispersal trenches shall remain undisturbed. The Director may approve designs where the soil within the entire area of the leachfield is removed if the applicant shows that trench excavation is impractical, for example due to the presence of excessive boulders or stumps. When the soil within the entire area of the leachfield is removed, the soil shall be replaced with properly compacted gravel meeting the requirements of Rule 32.12 to a depth that will be to the top of the chamber. The trench shall be excavated out of the compacted gravel.

34.7.4 A six (6) inch layer of gravel meeting the requirements of Rule 32.12 shall be placed below the stone in the trench. Where the bottom of the stone lies on or within a soil horizon that meets the description of Soil Category 1 from Rule 15.11 and such horizon is at least six (6) inches thick below the stone, the six (6) inch gravel base layer is not necessary. However, if this Soil Category 1 horizon is described as extremely cobbly, the six (6) inch gravel base layer shall be required.

34.7.5 Stone- Stone meeting the requirements of Rule 32.10 shall be placed beneath the chamber in accordance with Rule 34.3 or Rule 34.5. The space between the excavation and the chamber wall shall be twelve (12) inches and shall be backfilled with stone to the top of the chamber. The stone and the top of the chambers shall be covered with filter fabric that meets the requirements of Rule 32.11.

34.8 Effluent Distribution

34.8.1 The maximum length of a chamber trench shall be as follows:

(A) Without dosing– fifty (50) feet;
(B) With a tipping distribution box – seventy-five (75) feet; or
(C) With a pump– one hundred (100) feet.

34.8.2 Effluent shall be applied to the chamber trenches at least every twenty-five (25) feet.

34.8.3 For multiple trench concrete chamber leachfields, the ends of the chamber trenches shall be interconnected with imperforated SDR 35 PVC pipe laid with watertight joints. If the pipe will be subject to vehicular traffic, it shall be Schedule 40 PVC.

34.9 Location Under Traffic Areas- The area subject to vehicular traffic, including parking areas, shall be limited to twenty-five percent (25%) of the leachfield area. Where any portion of the leachfield is installed under an area subject to vehicular traffic, the structure must be capable of withstanding HS-20 wheel loads. All access manholes in areas subject to vehicular traffic shall be brought to grade with covers and frames capable of withstanding HS-20 wheel loads and meeting the requirements of 34.6.2 (A)-(D). Such OWTSs must be vented with screened vents located in a protected area.

RULE 35. LARGE OWTS REQUIREMENTS

35.1 Applicability- Large OWTSs defined below shall comply with all other applicable provisions of these Rules in addition to the requirements in this Rule 35. A large OWTS shall be any OWTS designed, installed or operated that meets any of the criteria in Rule 35.1.1-35.1.4 below.

35.1.1 Any single OWTS designed to treat five thousand (5,000) gallons or more per day;

35.1.2 Multiple OWTSs for any project on one or more parcels of land, excluding residential subdivisions, where the total design flow for the project is five thousand (5,000) gallons or more per day;

35.1.3 Multiple OWTSs serving more than one (1) unit in a residential subdivision provided that the total design flow of these OWTSs, each serving more than one (1) unit, is five thousand (5,000) gallons or more per day; or

35.1.4 Proposed OWTSs and existing OWTSs on the parcel that will result in a total design flow for the parcel exceeding five thousand (5,000) gallons per day.

35.2 Application Requirements- All submittals for OWTSs meeting the definitions in Rule 35.1 shall include the following:

35.2.1 Notice Requirements: Each application for a large OWTS shall be accompanied by a list identifying the names and addresses of the local building official, the water supply agency whose water supply is drawn from the watershed or wellhead protection area wherein the property is located, if applicable, all property owners within four hundred (400) feet of any component of the proposed OWTS, and all abutting property owners.

(A) Upon application, the applicant shall notify each person identified in Rule 35.2.1 above, of the application by certified mail, return receipt requested.

(B) Each notice shall substantially conform to a form to be provided by the Director and shall include the application number and a certificate of service.

(C) The applicant shall clearly mark each return receipt with the application number and the words "5000 Gallon OWTS."

(D) All persons subject to the notice shall be permitted twenty (20) days from the date specified in the certificates of service within which to submit written comments or information bearing upon the subject application.

(E) All timely submitted comments or information bearing upon the subject application and relating to the intent and purpose of these Rules shall be considered by the OWTS Program staff as part of their review of the application.

(F) When all certified receipts have been returned to the applicant, copies of each notice, accompanied by the appropriate certified receipt, shall be filed with the OWTS Program along with a letter requesting that the application be reviewed for final determination.

(G) If a correctly addressed, certified notice is returned to the applicant, the applicant may submit the returned envelope and certified receipt, unopened, along with the other return receipts as proof of the applicant's good faith attempt to serve the notice.

35.2.2 Soil evaluation, where required by Rule 17;

35.2.3 Description of the OWTS and the treatment objectives;

35.2.4 Characteristics of the wastewater;

35.2.5 Groundwater mounding calculations for any of the component leachfields that are sized for a design flow of five thousand (5,000) gallons per day or greater;

35.2.6 Impact analysis in accordance with Rule 35.3 where the groundwater is classified GA or GAA in accordance with the DEM "Rules and Regulations for Groundwater Quality";

35.2.7 Construction materials;

35.2.8 Schedule for phased development if applicable; and

35.2.9 Plan for operation and maintenance of the OWTS including qualifications of those responsible for maintenance and long-term agreements for maintenance. Such plan shall specify frequency of monitoring and performance inspections and shall include routine maintenance logs needed for proper operation of the OWTS.

35.3 Impact Analysis- Applicants shall be required to demonstrate that the proposed disposal site is capable of accepting, treating and transmitting effluent at the proposed application rate without adverse impact to surface water or groundwater. Such analysis shall include, but not necessarily be limited to:

35.3.1 Surface Water: Applicants shall submit an evaluation of the effect of estimated pollutant loading to surface waters; and

35.3.2 Groundwater: Applicants shall conduct modeling of nitrate concentrations in groundwater downgradient of the OWTS at any compliance point defined as the property boundary, drinking water well, or other sensitive receptor as determined by the Director. This compliance point may extend downgradient beyond the applicant's property line if the adjacent property is designated as a

groundwater discharge zone in accordance with the DEM "Rules and Regulations for Groundwater Quality." The nitrate concentration modeling shall be done in accordance with the following:

(A) For a single OWTS designed to treat five thousand (5,000) gallons or more per day (Rule 35.1.1), the applicant shall conduct a nitrate impact analysis that models a contaminant plume emanating from the OWTS;

(B) For large OWTS defined pursuant to Rules 35.1.2, 35.1.3, or 35.1.4 where one or more of the OWTSs is designed to treat one thousand (1,000) gallons or more per day but less than five thousand (5,000) gallons per day, the nitrate impact analysis may use the entire project site for nitrate dilution modeling unless the Director requires a nitrate impact analysis that models a contaminant plume emanating from any of the OWTSs; or

(C) For large OWTS defined pursuant to Rules 35.1.2, 35.1.3, or 35.1.4 where all of the OWTSs are designed to treat less than one thousand (1,000) gallons per day, the nitrate impact analysis may utilize the entire project site for nitrate dilution modeling.

35.4 Groundwater Monitoring- Groundwater monitoring for nitrate and other possible contaminants, at a frequency to be determined by the Director, may be a required condition of the permit approval. Pursuant to the DEM "Rules and Regulations for Groundwater Quality," the Department may require that actions be taken by the applicant when concentrations of nitrate in the groundwater at the point of compliance exceed the preventive action limit of five (5) mg/l.

RULE 36. ALTERNATIVE TOILETS

36.1 Alternative toilets include composting toilets that comply with the requirements of the National Sanitation Foundation Standard 41 "Non-Liquid Saturated Treatment Systems" and incinerator toilets.

36.1.1 Alternative toilets shall be installed, operated and maintained in accordance with the manufacturer's specifications; have a positive ventilation system; and must convert toilet contents to an inert, stable, or otherwise harmless condition.

36.1.2 The owner shall hold a valid maintenance contract at all times with an entity or individual that is certified by the alternative toilet vendor to provide maintenance of the alternative toilet. The minimum maintenance contract term shall be two (2) years.

36.1.3 The owner shall record the approved OWTS construction permit application form and associated permit conditions for this alternative toilet and the initially executed maintenance contract for the system in the municipal land evidence records and provide DEM a copy of the recorded document prior to DEM issuing a certificate of conformance.

36.1.4 Two (2) years after the issuance of the Certificate of Conformance, and every two (2) years thereafter, the owner shall submit a report prepared by a System Inspector documenting the condition of all aspects of the OWTS, including, but not limited to, certification that the OWTS has not been modified and the design remains as permitted.

36.1.5 The Department may impose additional conditions on the approval of an alternative toilet to ensure proper operation and protection of public health and the environment.

36.2 Separate OWTS- When an alternative toilet is utilized, a separate OWTS shall be provided for the treatment of any graywater and designed on sixty percent (60%) of the normal daily design flow as determined by Rule 21. If wastewater from any conventional toilets is directed to this leachfield, the leachfield must be designed for one hundred percent (100%) of the daily design flow.

36.3 Residuals - Solids produced by alternative toilets may be buried on site, unless prohibited by Rule 39. Residuals shall not be applied to food crops. Alternative toilets that may generate excess liquids shall either be designed such that the residual liquids are pumped to the graywater septic tank or to a separate holding tank. Liquids shall be removed from this separate holding tank by a DEM permitted septage transporter. This holding tank shall be designed as follows:

36.3.1 Have a capacity of two hundred fifty (250) gallons or one year's projected flow as determined by the manufacturer, whichever is greater;

36.3.2 Be watertight and meet the construction and materials standards for septic tanks in Rule 26.2; and

36.3.3 Be equipped with an audio-visual alarm set to activate when the tank reaches eighty percent (80%) of its capacity.

36.4 Removal and Replacement – The property owner shall submit an OWTS Application for New Building Construction pursuant to Rule 17.5 in order to remove or replace the alternative toilet.

RULE 37. ALTERNATIVE OR EXPERIMENTAL TECHNOLOGY APPROVAL

37.1 No person shall submit an OWTS design application incorporating an alternative or experimental component or technology for wastewater treatment unless such technology has been placed on the Department's approved Alternative or Experimental Technology List.

37.2 Administrative- The Department shall:

37.2.1 Maintain a list of all the approved Alternative or Experimental technologies and all approved guidance documents;

37.2.2 Charge fees to cover the cost of administering the Alternative or Experimental approval procedure, and reviewing, monitoring and tracking the performance of alternative or experimental technologies; and

37.2.3 Have the authority to remove any approved Alternative or Experimental technology from the Department's approved list whenever the applicant fails to submit reports or monitoring data; fails to perform required maintenance; or fails to fulfill any other required tasks stated within these Rules, the approval letter or the approved guidance document.

37.3 Application Procedure- Application shall be on forms approved by the Director, and shall include the proper fee, all required submittals, performance data and a draft guidance document that details all design, installation, operation and maintenance, and other requirements.

37.4 Alternative Technology Evaluation Criteria- The Director may approve an alternative OWTS or technology if it meets the following criteria:

37.4.1 Class One:

(A) The vendor provides at least four (4) consecutive years of performance data per installation for no fewer than ten (10) installations with data collected no less frequently than quarterly that demonstrates that department standards are met; and

(B) The vendor demonstrates that the technology has been approved and utilized successfully for at least four (4) consecutive years in Rhode Island with no fewer than ten (10) installations or at least four (4) consecutive years in at least three other jurisdictions with no fewer than ten (10) installations in each jurisdiction.

37.4.2 Class Two: Satisfy either (A) or (B) below:

(A) For any technology:

(i) The vendor provides at least two (2) consecutive years of performance data per installation for no fewer than ten (10) installations with data collected no less frequently than quarterly, that documents that Department standards are met;

(ii) The vendor demonstrates a theory or applied research; and

(iii) The vendor demonstrates that the technology has been approved and utilized successfully for at least two (2) consecutive years in Rhode Island or at least two (2) consecutive years in another jurisdiction with no fewer than ten (10) installations in each jurisdiction.

(B) For a nitrogen reducing technology:

(i) The vendor provides certification that the technology meets NSF/ANSI "Standard 245- Wastewater Treatment Systems- Nitrogen Reduction" and the testing results show a preponderance of treated effluent nitrogen concentrations of nineteen (19) mg/l or less; or

(ii) The vendor demonstrates approval for use in another jurisdiction in an area where the temperature conditions are similar to or colder than those in Rhode Island and with technology review criteria substantially equivalent to Class One or Class Two listed above in Rule 37.4.1 or 37.4.2 (A). Substantially equivalent review in another jurisdiction shall be held to mean the other jurisdiction has a minimum nitrogen reduction standard of fifty percent (50%) reduction in total nitrogen concentration and a maximum effluent total nitrogen concentration of nineteen (19) milligrams per liter and the other jurisdiction has a review process in which the vendor's data is evaluated in light of a technology performance claim.

37.4.3 Only those alternative technologies that have been approved and are on the approved Alternative or Experimental Technology List shall be permitted by the Director.

37.5 Alternative OWTS Component Evaluation Criteria- The Director may approve an Alternative OWTS Component if it meets the following criteria:

37.5.1 Class One:

(A) The applicant documents that applicable manufacturer's and material standards are met;

(B) The applicant provides at least two (2) consecutive years of performance data for no fewer than ten (10) installations that demonstrates Department standards are met, if applicable; and

(C) The applicant demonstrates that the component has been approved and utilized successfully for at least two (2) consecutive years in Rhode Island or at least two (2) years in at least three (3) other jurisdictions for no fewer than ten (10) installations in each jurisdiction.

37.5.2 Class Two:

(A) The applicant documents that applicable manufacturer's and material standards are met;

(B) The applicant provides one (1) year of performance data for no fewer than ten (10) installations that demonstrates Department standards are met, if applicable;

(C) The applicant demonstrates a theory or applied research; and

(D) The applicant demonstrates that the component has been approved and utilized successfully for a minimum of one (1) year in Rhode Island or in at least one (1) other jurisdiction with no fewer than ten (10) installations.

37.5.3 Only those Alternative OWTS components that have been approved and are on the approved Alternative or Experimental Technology List shall be permitted by the Director.

37.6 Experimental Technology Evaluation Criteria- The intent of an Experimental Technology Approval is to evaluate, under actual field conditions, alternative OWTS that appear technically capable of providing levels of environmental protection at least equivalent to those provided by an OWTS installed in compliance with these Rules. Data gathered under an Experimental Technology approval may be used to apply for Alternative Technology Class Two approval.

37.6.1 Site Selection- Experimental Technology vendors shall propose at least three (3) sites and no more than ten (10) sites where the technology will be applied. The technology may be approved for additional sites in future years if the vendor demonstrates the initial installations meet performance claims. Each location shall provide a suitable area for the installation of an OWTS permitted under these Rules or an OWTS on the Department's approved Alternative Technology list. The Director reserves the right to waive this requirement for multi-family or commercial OWTSs.

37.6.2 The Director may approve an Experimental Technology if the vendor meets the following criteria:

(A) Prior to the approval of any OWTS utilizing the Experimental Technology, the vendor shall supply data that demonstrates that the Experimental Technology will work in practice and in theory;

(B) The vendor agrees in writing to retain a third party acceptable to the Department to conduct sampling on each of the OWTS with data collected no less frequently than quarterly to document that the Experimental Technology meets performance claims;

(C) Substandard Performance- The vendor agrees in writing to the following conditions regarding the performance of the Experimental Technology:

(i) For OWTS Applications for New Building Construction and OWTS Applications for Alteration to a Structure where design flow is increased, the vendor must guarantee the

performance of the Experimental Technology and provide for replacement with an OWTS on the Department's Alternative Technology List if the Department determines that the Experimental Technology fails to meet the performance claim(s) after two (2) years;

(ii) For OWTS Applications for Repair and OWTS Applications for Alteration to a Structure where there is no increase in flow, the vendor or system owner may, at the Department's discretion, be required to repair, replace, or take any other action as required by the Department if the Department determines that the Experimental Technology fails to meet the performance claims after two (2) years or is found to be a failed OWTS.

(D) Financial Responsibility- The vendor proposing the Experimental Technology, the property owner and subsequent purchasers shall submit a signed statement to the Director agreeing to repair, replace, or modify the Experimental Technology, including to install an OWTS permitted under these Rules or an OWTS listed on the Department's Approved Alternative Technology List if the Department determines that the Experimental Technology fails to perform as designed. The signed statement must clearly state who is responsible for the cost of repairing, replacing, or modifying the OWTS, whether through a bond or other form of financial security posted by the vendor and acceptable to the Director, or by the written agreement of the system owner to accept financial responsibility.

37.7 Review and Approval

37.7.1 The Director shall review the application and respond as follows:

(A) Approve or deny the application as submitted;

(B) Recommend resubmission of the application with modifications as proposed by the Director;

(C) Recommend resubmission and reclassification under Rules 37.4 –37.6; or

(D) Recommend both resubmission of the application with modifications and reclassification.

37.7.2 Technical Review- The Department shall establish an Onsite Wastewater Treatment System Technical Review Committee (OWTS TRC) consisting of individuals with technical or scientific knowledge applicable to OWTS whose purpose is to provide technical advice to the Director. The Department shall select members for the OWTS Technical Review Committee from one or more of the following organizations: Department of Environmental Management; CRMC or other state agencies; University/college academic communities; OWTS design and installation firms; Environmental organizations; Public utilities; Builders; Local municipalities; and Other parties. At the request of the Director, the OWTS Technical Review Committee may review the application and submit recommendations on the proposed Alternative Technology, Alternative OWTS Component or Experimental Technology. Recommendations from the OWTS Technical Review Committee shall be submitted to the Director within ninety (90) days from the application date.

37.7.3 The Director may establish special conditions as necessary to ensure adequate protection of the public health and the environment in its approval of alternative or experimental technologies. Such conditions may include without limitations: special qualification requirements for designers and installers; specification of site characteristics; or monitoring, testing and reporting requirements.

37.7.4 If the Alternative or Experimental Technology is approved by the Director, the applicant shall submit a finalized guidance document to the Director detailing all design, installation, operation and

maintenance requirements. Once the guidance document has been approved, the Alternative or Experimental Technology shall be placed on the Department's list. The Department shall maintain the approved Alternative or Experimental Technology List and maintain all appropriate guidance documents for the following:

(A) Alternative or Experimental Technologies that are approved by the Director; and

(B) Alternative OWTS Components that are approved by the Director.

37.8 Approved Alternative or Experimental Technologies

37.8.1 The Director may require any of the following:

(A) Monitoring or sampling of any OWTS or OWTS component;

(B) Submittal of evaluation reports when an OWTS or OWTS component's performance is evaluated; or

(C) An annual report of all OWTS or component installations, failures and corrective action taken.

37.8.2 Persons desiring to modify an approved Alternative or Experimental Technology currently on the approved Alternative or Experimental Technology List shall make the request in writing and submit the following to the Department:

(A) Documentation demonstrating the applicant's compliance with the terms or conditions of the original approval of the Alternative or Experimental Technology; and

(B) Required fees, in accordance with Rule 50 for Alternative or Experimental Technology.

37.8.3 In order to remain on the Department's approved Alternative or Experimental Technology List, the applicant shall submit:

(A) Application for renewal ninety (90) days before expiration of the certification;

(B) Renewal fee in accordance with Rule 50; and

(C) Documentation that the applicant is in compliance with the requirements of these Rules and in compliance with the expiring certification.

37.9 OWTS Applications Utilizing Alternative or Experimental Technology- Once an Alternative or Experimental Technology application is approved, individual applications to design, construct, alter, or install a Department approved Alternative or Experimental Technology may be submitted to the OWTS Section of the Office of Water Resources.

37.9.1 All applicants obtaining an OWTS permit for a Department approved Alternative or Experimental Technology requiring special operation and maintenance procedures shall:

(A) File a copy of the initially executed contract for the OWTS's operation and maintenance, (including all required maintenance procedures and monitoring schedules) with the land evidence records of the municipality in which the OWTS is located; and

(B) Submit to the Department a certified copy of the recorded contract setting forth the date of the recordation and the book and page where the contract is located in the records of the municipal land evidence office.

37.9.2 The Department shall not issue a conformance until the documents in Rule 37.9.1 are recorded with the municipality and a certified copy of the recorded contract is submitted to the Department.

RULE 38. CRITICAL RESOURCE AREAS -- GENERAL

38.1 Areas have been identified as critical resource areas which are deemed to be particularly sensitive to the detrimental effects of nutrients, pathogenic organisms, organic chemicals and other substances that may be present in effluent from OWTSs. These areas are in need of special protection from such effects due to the unique and irreplaceable value of the resource as a public water supply, fisheries habitat or public recreation area.

38.2 Standards for siting and design of OWTSs in these Rules 38, 39, and 40 are established to enhance the treatment capability of OWTSs and thereby reduce the potential for adverse effects to critical resources. In areas designated as critical resources, the standards of Rules 38, 39, and 40 shall supersede minimum standards wherever applicable.

38.3 Designation- Areas designated as critical resource areas are defined below in Rule 38.3.1 – 38.3.3. If the applicant disputes a delineation in Rule 38.3.1 – 38.3.3, the applicant may submit information on groundwater or surface water flow to demonstrate to the Director by a preponderance of clear and scientifically valid evidence that the delineation in question is incorrect.

38.3.1 Salt Pond Critical Resource Area: The watersheds, or portion thereof, to the salt ponds of Charlestown, Narragansett, South Kingstown, and Westerly as determined by the Rhode Island Coastal Resources Management Council's Salt Ponds Region Special Area Management Plan (see Figure 11), unless a determination of the groundwater recharge area to the salt ponds has been adopted by the Department and the Coastal Resources Management Council. The Salt Pond critical resource area includes the watersheds, or portion thereof, to the following: Maschaug Pond, Winnapaug Pond, Quonochontaug Pond, Ninigret Pond, Green Hill Pond, Trustom Pond, Cards Pond, Potter Pond, and Pt. Judith Pond.

38.3.2 Narrow River Critical Resource Area: The Narrow River watershed, or portion thereof, as determined by the Rhode Island Coastal Resources Management Council's Narrow River Special Area Management Plan (see Figure 12), unless a determination of the groundwater recharge area to the Narrow River has been adopted by the Department and the Coastal Resources Management Council.

38.3.3 Drinking Water Supply Watersheds: Watersheds of public water system drinking water supply reservoirs, unless a determination of the groundwater recharge area to the reservoir has been adopted by the Department. The public water systems include the following and any other public water system with a drinking water supply reservoir approved by the Rhode Island Department of Health (see Figures 13-16): Bristol County Water Authority, Cumberland (town of), Eleanor Slater Hospital/Zambarano Unit, Jamestown (town of), New Shoreham (town of), Newport (city of), Pawtucket Water Supply Board, Providence Water Supply Board, Stone Bridge Fire District, Woonsocket (city of), and Yawgoog Scout Reservation.

38.4 OWTS Location- The applicant shall be required to certify the location of a disposal area with respect to any critical resource area. If the Department determines that an OWTS may be wholly or partially located within a critical resource area, the applicant shall be required to provide evidence of the location with respect to the critical resource.

38.5 OWTS Applications for Alteration to a Structure in Critical Resource Areas- An OWTS Application for Alteration to a Structure which will result in an increase in the flow or change in the type of wastewater within a Critical Resource Area may not be approved unless the OWTS meets all design and siting requirements of the Rules in effect at the time of permit application. The Department may grant an exemption to this provision through the variance process pursuant to Rule 48 if it is demonstrated that the deviation from the standard is minor.

RULE 39. REQUIREMENTS IN THE SALT POND AND NARROW RIVER CRITICAL RESOURCE AREAS

39.1 For OWTSs located in the Salt Pond and Narrow River critical resource areas as defined in Rule 38.3.1 and Rule 38.3.2, respectively, the standards established in Rule 38 and in this Rule 39 shall supersede minimum standards established elsewhere in these Rules.

39.2 Nitrogen Reducing Technology

39.2.1 Nitrogen reducing technology shall be required for all OWTS Applications for New Building Construction, all OWTS Applications for Alteration to a Structure, and OWTS Applications for Repair in the Salt Pond and Narrow River critical resource areas. DEM may waive this requirement for Applications for Repair involving only the replacement of the septic tank if the applicant demonstrates that the leachfield is not failed based on the criteria in Rule 7, met the Rules in effect when the leachfield was installed, and is located more than two hundred (200) feet from a coastal shoreline feature. Applicants must still meet all CRMC established density and other requirements where applicable.

39.2.2 Use of composting toilets- Composting toilets meeting the criteria of Rule 36 may be approved for use as a nitrogen reducing technology provided that:

(A) Solid and liquid residuals produced by the composting toilet are removed from the site and properly disposed of at an approved facility beyond the boundary of the Salt Pond and Narrow River Critical Resource Area;

(B) All blackwater from the structure must receive treatment via the composting toilet; and

(C) All liquid residuals are directed to a holding tank consistent with Rule 36.3.

39.2.3 Exemptions for Applications for Repair- The provisions of Rule 39.2.1 may not apply to an OWTS Application for Repair if the Municipality where the OWTS is located:

(A) Adopts an ordinance that the Department determines reduces the long-term nitrogen load to the Salt Ponds or Narrow River equivalent to or more than the provisions of Rule 39.2.1; and

(B) Enters into a legally binding agreement with the Department and petitions the Department for prior review of pertinent applications pursuant to Rule 17.3.

39.3 Location- The horizontal distances between the parts of any OWTS and the feature requiring a setback shall not be less than those shown in Table 22.1 and 22.3.

39.4 Site Suitability- OWTS shall not be located where the seasonal high groundwater table is within five (5) feet of the original ground surface, or where a restrictive layer or bedrock is within seven (7) feet of the original ground surface, except in areas where the seasonal high groundwater table is within two (2) to five (5) feet of the original ground surface, or where a restrictive layer or bedrock is within four (4) to seven (7) feet of the original ground surface and either of the following in 39.4.1 or 39.4.2 occur. Twenty-five (25) feet shall be maintained from the leachfield to any area where the groundwater table is less than two (2) feet to the original ground surface, or where bedrock is less than four (4) feet to the original ground surface.

39.4.1 Application is for an Alternative or Experimental OWTS approved pursuant to Rule 37 for use under these conditions; or

39.4.2 Application is for a dispersal trench OWTS that meets the following conditions:

(A) The maximum depth of stone below the distribution pipe invert is one-half (0.5) feet; and

(B) The minimum distance between walls of adjacent dispersal trenches is ten (10) feet.

39.5 OWTS Vertical Separation Distance to Groundwater- The bottom of the stone underlying the leachfield (or surface upon which the biomat develops) shall be at least four (4) feet above the seasonal high groundwater table when either soil category 1, 2, 3, 4, or 6 are encountered in determining the maximum leachfield loading rate in accordance with Rule 32.2.2.

RULE 40. REQUIREMENTS IN DRINKING WATER SUPPLY WATERSHED CRITICAL RESOURCE AREAS

40.1 For OWTSs located in drinking water supply watersheds as defined in Rule 38.3.3, the standards established in Rule 38 and this Rule 40 shall supersede minimum standards established elsewhere in these Rules.

40.2 Subsurface Drains- Subsurface drains to lower the seasonal high groundwater table are not permitted.

40.3 OWTS Separation Distance to Groundwater- The bottom of the stone underlying the leachfield (or surface upon which the biomat develops) shall be at least 4 feet above the seasonal high groundwater table when either soil category 1, 2, 3, 4, or 6 are encountered in determining the maximum leachfield loading rate in accordance with Rule 32.2.2.

40.4 Location- The horizontal distances between the parts of any OWTS and the feature requiring a setback shall not be less than those shown in Table 22.2.

RULE 41. NITROGEN LOADING IN AREAS OF ONSITE DRINKING WATER WELLS

41.1 Applicability- For all OWTS applications for New Building Construction and for Alterations to a Structure, the design flow for an OWTS shall not exceed three hundred forty-five (345) gallons per day per

twenty thousand (20,000) square feet of applicant's lot area where the property utilizing the OWTS or any adjacent lot is served by an onsite drinking water well (public or private), or if there is a drinking water well within two hundred (200) feet of the proposed OWTS, except as provided for below in Rule 41.2 and Rule 41.3. The Director may require this standard to be met for OWTS Applications for Repair in areas where the groundwater is shown to exceed the Preventive Action Limit for nitrate of five (5) mg/l, pursuant to the DEM "Rules and Regulations for Groundwater Quality." The three hundred forty-five (345) gallons per day per twenty thousand (20,000) square feet loading limitation is equivalent to approximately one-sixth (1/6) acre of applicant's lot area per bedroom. This Rule applies to all OWTS except those subject to the requirements of Rule 35. Applicants must still meet all CRMC established density and other requirements where applicable. Compliance with Rule 41 does not relieve applicants of the nitrogen reducing technology requirements in Rule 39.

41.2 Design Flow Calculation- The three hundred forty-five (345) gallons per day per twenty thousand (20,000) square feet design limit may be exceeded for OWTSs utilizing nitrogen reducing technology. The allowed design flow with a nitrogen reducing technology is derived using Equation 41.2 or read from Table 41.2. For the purposes of Rule 41, there are no limits on the design flow of OWTSs with nitrogen reducing technologies that are approved by the Director as meeting the nitrogen standard of ten (10) mg/l.

Equation 41.2 Nitrogen Loading

$$\frac{MaximumDesignFlow}{20{,}000\ ft^2} = \frac{1}{1-\left(\frac{\%\ \text{Nitrogen Removal}}{100}\right)} \times 345\ \text{gpd}$$

Table 41.2 Nitrogen Loading

Nitrogen Removal (Percentage)	Effluent Nitrogen Concentration (mg/l)	Maximum Design Flow per 20,000 sq. ft. (gpd)
50	19	690
66	13	1015
75	10	1380

41.3 Exceedance of Design Flow Calculation- The three hundred forty five (345) gallons per day per twenty thousand (20,000) square feet design limit or other design limit utilizing nitrogen reducing technologies pursuant to Rule 41.2 may be exceeded by the establishment of nitrogen credit land meeting the requirements of Rule 41.4 under the following circumstances:

41.3.1 For subdivisions- The design limit must be met over the entire area of the subdivision. This can be met by designating portions of the subdivision as nitrogen credit land.

41.3.2 For individual lots- The design limit can be calculated by establishing adjacent properties as nitrogen credit land with the consent of the property owner.

41.4 Nitrogen Credit Land- Nitrogen credit land cannot be designated on land that is already being used to meet the nitrogen loading requirements for an OWTS approved by the Director. Nitrogen credit land must be restricted by a deed restriction, conservation easement, or other appropriate legal instrument recorded in the municipal land evidence records such that:

41.4.1 Addition of nitrogen from wastewater discharge, nitrogenous fertilizer (synthetic or natural), and raising and grazing livestock is prohibited; and

41.4.2 Impervious surfaces, which reduce recharge, including paved streets, paved parking areas, and structures are prohibited.

RULE 42. PERMIT EXPIRATION

42.1 Expiration of Permits for OWTS Applications for New Building Construction and OWTS Applications for Alteration to a Structure-

42.1.1 Except for permits eligible for tolling pursuant to R.I. Gen. Laws §42-17.1-2.5 as provided in Rule 42.1.2, all permits for OWTSs for New Building Construction and OWTSs for Alteration to a Structure approved in accordance with Rule 17 shall expire five (5) years from the date of the issuance of the permit.

42.1.2 Pursuant to R.I. Gen. Laws §42-17.1-2.5, and unless otherwise ordered by the Department, permits for New Building Construction or Alteration to a Structure relating to the development of property that were valid on, or issued after, November 9, 2009 that are subject to tolling pursuant to R.I. Gen. Laws §42-17.1-2.5 shall be tolled for the period provided by R.I. Gen. Laws §42-17.1-2.5 and expire on the date five (5) years after approval plus the tolling period in accordance with said statute.

42.2 Expiration of Permit After Start of Construction-

42.2.1 Notwithstanding Rule 42.1, where a permit for an OWTS for New Building Construction has been issued, and construction of the building foundation or OWTS has begun, the applicant shall have one (1) year from the start of construction, within which to complete both the foundation and OWTS. If the building foundation and OWTS are not completed within one (1) year of the commencement of construction, the permit, including any variances or decisions issued through the variance process or by the Director, shall expire. The Director may waive this expiration requirement for good cause.

42.2.2 Where a permit for an OWTS for New Building Construction has been issued relating to the development of property and construction of the building foundation or OWTS was initiated between November 10, 2008 and November 9, 2009 inclusive, the applicant shall have until June 30, 2013 within which to complete both the foundation and OWTS. If the building foundation and OWTS are not completed by June 30, 2013, the permit, including any variances or decisions issued through the variance process or by the Director, shall expire.

42.3 Expiration of Permits For OWTS Repairs- All permits for repairs to OWTSs issued in accordance with Rule 17.7 shall expire as follows:

42.3.1 Where a permit for OWTS repair is issued following the property owner's receipt of a Notice of Violation issued by the Department, all repair work must be completed within the time periods set forth in the Notice of Violation; and

42.3.2 In all other cases, permits for OWTS repair shall expire as specified in the permit itself. In no case shall any permit for a repair to an OWTS be valid for more than one (1) year from the date of issuance of the permit.

42.4 Expiration of Unconformed Installed Systems- OWTSs that have been installed but are not able to be conformed, as of the effective date of these Rules, because the building sewer has not been connected through the building foundation to the interior plumbing or for other reasons shall be reviewed on a case-by-case basis.

42.5 Expiration of OWTS Suitability Determinations- OWTS Suitability Determinations may not be renewed. All OWTS Suitability Determinations issued in accordance with Rule 17.4 shall expire as follows:

42.5.1 All OWTS Suitability Determinations issued prior to the effective date of these Rules shall expire five (5) years from the date of issue, or one (1) year from the effective date of these Rules, whichever is later.

42.5.2 All OWTS Suitability Determinations issued after the effective date of these Rules shall expire five (5) years from the date of determination, or concurrent with the expiration date of the building permit, whichever is later. Building permit must be issued within one (1) year of the date of the OWTS Suitability Determination.

RULE 43. OWTS INSTALLATION

43.1 License Required- Installation, construction, alteration, or repair of any OWTS shall be performed by an installer licensed in accordance with Rule 13, or a master plumber licensed under Chapter 5-20 of the General Laws of Rhode Island, as amended. This requirement does not apply to an applicant installing, constructing, altering, or repairing an OWTS to serve a building the applicant occupies or will occupy as the applicant's intended permanent domicile, provided that the applicant has obtained written permission for that work and has obtained the Director's approval of the plans and specifications for that work prior to the start of any construction.

43.2 Responsibilities of a Licensed Installer- A Licensed Installer shall adhere to the following:

43.2.1 Perform all work in compliance with approved plans and specifications only;

43.2.2 Report to the Licensed Designer discrepancies on an approved plan which the installer may note during construction;

43.2.3 Utilize only quality grade construction materials approved by the Director;

43.2.4 Utilize only the best construction techniques to provide for the best possible installations;

43.2.5 Work only under valid plans approved by the Director, and to commence work only after completely reviewing the entire approval including the application, the layout plans, all typical specification sheets, and other attachments;

43.2.6 Adhere to each and every term of approval as stipulated by the Director in his or her approval of the particular plan; and

43.2.7 Stop construction and notify the Licensed Designer if unanticipated conditions are encountered that indicate the OWTS cannot be installed in accordance with the approved application, plan and specifications, or any terms and conditions contained therein.

43.3 Responsibilities of a Licensed Designer- The Licensed Designer shall be responsible for witnessing and inspecting the installation of the OWTS that the Licensed Designer has designed. In no case shall the individual witnessing and inspecting the installation of the OWTS be the Licensed Installer who installs the OWTS, except for the repair of an OWTS. Any individual assisting a Licensed Designer in witnessing and inspecting the installation of an OWTS must be an employee of the same business entity as the Licensed Designer, and such individual must work under the Licensed Designer's direct supervision in respect to witnessing and inspecting the installation of the OWTS. The Licensed Designer shall be available to directly witness and inspect the system installation to resolve any instances of non-compliance, design conflicts resulting from changed conditions or other circumstances, or as may be requested by the Department. The Licensed Designer shall inform the owner, in writing, of any special conditions, operating requirements, or periodic maintenance needs associated with the installed OWTS.

43.4 Areas Served by Private Drinking Water Wells- Prior to installation of an OWTS in areas served by private drinking water wells, the Licensed Designer shall verify that conditions on site and adjacent to the site are the same as at the time of design approval, or have not changed in a manner that would affect the original design. If conditions have changed in a manner that would affect the original design, the Licensed Designer shall notify the Department prior to installation of the OWTS.

43.5 Notification to Department- The Licensed Designer shall notify the Department during normal business hours at least twenty-four (24) hours prior to the installation of any OWTS. The Department, at its discretion, may inspect any aspect of the installation. All Department-required inspections must be inspected by the Licensed Designer prior to notification to the Department.

43.6 Inspection- The Licensed Designer shall, at minimum, inspect and make measurements, where appropriate, of the following components and steps in the installation of the OWTS:

43.6.1 The exposed bottom of the excavation for the leachfield;

43.6.2 The size and condition of all structures such as the septic tank, distribution box, flow diffusers, etc.;

43.6.3 The elevation of all pipe inverts;

43.6.4 All sand media and aggregate is in accordance with specifications and is placed in accordance with the design plan;

43.6.5 Completed installation prior to covering;

43.6.6 The type of backfill and that the backfill is properly placed and compacted;

43.6.7 Final soil cover; and

43.6.8 All horizontal setbacks, including from the building and any wells on the site or on abutting lots.

43.7 Unforeseen Conditions- If conditions are encountered during construction which indicate that the OWTS cannot be installed or is not installed in accordance with the permit, or any terms and conditions contained therein, the Licensed Designer shall notify the Director as soon as possible, but no later than

twenty-four (24) hours after discovery. The Department shall maintain written guidance on specifications for construction tolerances as well as conditions under which as-built plans and redesigned plans are required. The Licensed Designer shall stop construction if conditions are such that a redesign is required. Notification is not required if all design elements are within the tolerances established by the Department through written guidance. In response to the designer's notification, the Director shall either:

43.7.1 Authorize the Licensed Designer to proceed with the work onsite and to provide appropriate documentation to the Department as may be required by the Director;

43.7.2 Require the Licensed Designer to submit as-built plans within ten (10) business days after the OWTS is installed to record changes that are in compliance with the standards in these Rules, but which need to be documented; or

43.7.3 Require the Licensed Designer to submit redesigned plans and specifications to the Director for approval showing changes from the original approved application, plan and specifications.

43.8 Installation Verification- The Licensed Designer shall collect the information in Rules 43.8.1 - 43.8.4 that can be used to verify that the installation of the OWTS was performed as specified. The Licensed Designer shall keep this information on file for a minimum of ten (10) years from the date of the Certificate of Construction in Rule 44. At the Department's request, the Licensed Designer shall make this information available for review.

43.8.1 Daily inspection report (weather conditions, individuals onsite, work accomplished, and other information customarily included in inspection reports);

43.8.2 A minimum of two photographs of the OWTS being installed, which must include the bottom bed and the completed system prior to covering;

43.8.3 List of all materials used, their source, and the dates delivered to the site; and

43.8.4 Product specification sheets, if different from those specified in the approved design.

43.9 Replacement Designer- An applicant may apply to the Director for approval to have a Licensed Designer, other than the one that designed the OWTS, be responsible for witnessing and inspecting the installation under the conditions specified in Rules 43.9.1 and 43.9.2. The Director may grant the approval provided the replacement Licensed Designer has a license issued in accordance with Rules 9 and 10 authorizing the Licensed Designer to design the type of OWTS in question, and the replacement Licensed Designer signs an affidavit assuming full responsibility for installation of the OWTS in accordance with the DEM issued permit.

43.9.1 An applicant may apply to the Director for a replacement Licensed Designer in either of the following circumstances:

(A) The Licensed Designer of the OWTS is incapable of witnessing and inspecting the OWTS;

(B) The Licensed Designer of the OWTS is unavailable or absent after a period of thirty (30) days as confirmed by the Department; or

(C) The applicant contracted with a business entity for design services and the Licensed Designer who prepared the OWTS design is no longer employed by that business entity.

43.9.2 An applicant may choose to select a replacement Licensed Designer for reasons other than those in Rule 43.9.1, in which case the applicant must submit a redesign prepared by the replacement Licensed Designer. Any variance previously approved by the Department shall remain valid, provided that the Department agrees that the circumstances and facts regarding the variance are the same as the facts under which the original variance was granted or that the variance in the redesign represents less of a deviation from the Rules than the original variance.

43.10 Certificate of Construction- The Licensed Designer that is responsible for the OWTS installation shall complete a Certificate of Construction in accordance with Rule 44. The Certificate of Construction shall not be construed to release the Licensed Installer from liability.

43.11 Once the Licensed Designer has certified that the OWTS has been properly installed and is operational, the Licensed Designer shall provide information and recommendations to the applicant in writing on specific OWTS operation and maintenance practices, including those needed to reduce the risk of premature failure and avoid pollution of the waters of the state.

43.12 The Licensed Designer is not responsible for any negligent act or omission of a user of an OWTS, including but not limited to, failure to properly use and maintain the OWTS, which causes damage to the OWTS.

RULE 44. CERTIFICATE OF CONSTRUCTION

44.1 Certificate of Construction Required- The Licensed Designer that is responsible for the OWTS installation in accordance with Rule 43 shall complete a Certificate of Construction that certifies that the OWTS was installed in conformance with the approved application, plans, specifications, applicable statutes and regulations and that the License Designer is responsible for having witnessed and inspected the installation. The Certificate of Construction shall be on forms approved by the Director. The Certificate of Construction shall include, but not be limited to, the following:

44.1.1 Name and license number of the Licensed Designer;

44.1.2 Name and license number of the Licensed Installer; and

44.1.3 Distances from two building foundation corners to the septic tank manhole, to the distribution box, and to the leachfield corners.

44.2 Submittal to Department- The Certificate of Construction shall be submitted to the Director within five (5) business days after the OWTS, building foundation, drinking water well, and other appurtenances, as may be specified in written Department guidance, have been constructed in accordance with the design plan. If an operations and maintenance agreement is required pursuant to the terms of the permit and a copy of the operations and maintenance agreement is available, the agreement shall be submitted to the Department with the Certificate of Construction. The Licensed Designer who performs the witnessing of an OWTS installation may not withhold issuance of the Certificate of Construction provided the requirements of this Rule 44 are met. The Licensed Designer shall provide a copy of the Certificate of Construction to the property owner.

RULE 45. CERTIFICATE OF CONFORMANCE

45.1 The applicant for an OWTS permit shall obtain a Certificate of Conformance from the Department prior to use of any OWTS. The Certificate of Conformance means that the OWTS that has been installed appears to substantially conform with the design requirements and other requirements as indicated on the application and associated plans and specifications.

45.2 Any applicant who constructs a new building or building improvement which requires a new or altered OWTS and a Certificate of Occupancy prior to use shall obtain a Certificate of Conformance prior to such occupancy.

45.3 A municipality may only grant a Certificate of Occupancy pursuant to Rhode Island General Law Section 23-27.2-13 and Chapter 23-27.3, where the person applying for such Certificate of Occupancy presents to the municipality the written Certificate of Conformance of the Director as required in Rule 45.1.

45.4 The OWTS permit remains valid once the Certificate of Conformance has been issued.

RULE 46. PERMIT SUSPENSIONS AND REVOCATIONS

46.1 Applicability- The Director may suspend or revoke any permit granted under these Rules in the event that subsequent examination reveals that the application is incomplete, incorrect or not in compliance with these Rules, or any conditions at the site are such that the approved design is no longer in accordance with these Rules.

46.2 Notice- The applicant shall be given written notice by certified mail, return receipt requested, of such action to suspend or revoke a permit by the Director. Such notice shall be in conformance with the Administrative Procedures Act, R.I. General Laws Sections 42-35-9(b) and 42-35-14, as amended.

46.3 Request for Hearing- An applicant may request a hearing on the suspension or revocation with the Department of Environmental Management, Administrative Adjudication Division. Such request must be in writing and shall be filed with the Department's Administrative Adjudication Division within thirty (30) calendar days of receipt of the notice of permit suspension or revocation.

46.4 Cessation of Work- Upon issuance of a suspension or revocation of any permit from the OWTS Program, no construction activity may be performed or continue to be performed on the property until such time as the suspension or revocation is rescinded or released by the Director. Where the applicant requests a hearing in accordance with Rule 47.3, the suspension or revocation shall be stayed. However, any and all work performed on the property shall be at the applicant's own risk.

46.5 Investigations- The Director shall conduct an investigation of any signed, written complaint received from any person regarding an application for an OWTS. The complaint shall specify the nature of the problems and include all appropriate information to allow the Director to evaluate the complaint.

RULE 47. VARIANCE REQUESTS

47.1 Applicability- Applications for the approval of plans and specifications for an OWTS may include a request for a variance from the provisions of the Rules Establishing Minimum Standards Relating to

Location, Design, Construction, and Maintenance of Onsite Wastewater Treatment Systems. Requests for variance will not be required for OWTS Applications for Alteration to a Structure where there will be no increase in wastewater flow or OWTS Applications for Repair.

47.2 Requests for variances shall be attested to by a Class II or Class III Licensed Designer.

47.3 Contents of Variance Request- Requests for variances shall be on forms approved by the Director. It is the applicant's responsibility to demonstrate by a preponderance of clear and scientifically valid evidence by means of a comprehensive analysis having a probative value that the requested variance(s) will not be contrary to the public health, the public interest or the environment. Applicants must comply with local ordinances, however, such compliance can not be used to justify or support a variance request under these Rules.

47.3.1 The comprehensive analysis shall provide adequate scientific and technical evidence on how the proposed design will mitigate potential adverse impacts on the following:

(A) Public health;

(B) Any surface water drinking water supply or tributary thereto and any public or private drinking water well and any associated transmission lines that may be affected, including the cumulative impacts of the system to the surrounding area;

(C) Any body of water including, but not limited to, impacts on groundwater or surface water quality and to the ability of the water body to support or maintain flora and fauna as well as other designated water uses;

(D) Public use and enjoyment of any recreational resource; and

(E) Surrounding persons or property as a potential cause of any public or private nuisance.

47.3.2 The comprehensive analysis shall include, but not be limited to:

(A) An analysis of any limiting conditions of the site;

(B) An analysis of the amount and characteristics of the wastewater discharged; and

(C) An analysis of the ability of the site to accept, transmit and treat wastewater.

47.3.3 The variance request(s) shall be accompanied by a list identifying the names and addresses of the local building official and all property owners within two hundred (200) feet of any component of the proposed OWTS for which a variance(s) has been requested.

47.3.4 Nothing herein shall prevent the Director from requesting additional information deemed necessary.

47.4 Compensatory Mitigation- Other elements of the applicant's system design (in which no variance is requested) may result in greater protection of the public health and the environment than is required by meeting the minimum standards of these Rules. In such case, the applicant may include how these elements of the system provide compensatory mitigation for the variance(s) requested as part of the comprehensive analysis required in Rule 47.3.2. Compensatory mitigation may be in the form of, but is not limited to: alternative or experimental technologies approved pursuant to Rule 37 provided such systems are not

required by other Rules herein, greater setback distances than required in Rule 22, greater separation distances to groundwater than required in Rule 32.4, reductions in design flow, reductions in pollutant loading on neighboring properties, decreasing the loading rate per square foot of leachfield, and decreasing the linear loading rate.

47.5 Cumulative Impact Assessment- Any application for an OWTS proposed to be installed on a lot less than ten thousand (10,000) square feet in area which requires more than one (1) variance and which will be located within one hundred (100) feet of any public or private drinking water well will not be approved unless a Cumulative Impact Assessment of the variances is conducted by the applicant and submitted to the Department along with the variance request. The Cumulative Impact Assessment shall include, but not be limited to: a description of all abutting properties identifying the location of all OWTSs, surface waters, wetlands, and private or public drinking water wells; a concise description of all variances granted in the permitting of these abutting OWTSs; and any additional information which the Director may deem appropriate.

47.6 Notification Requirements

47.6.1 Once the applicant's plans and specifications have been determined to be complete by the Department, the applicant shall notify the local municipal building official and all property owners within two hundred (200) feet of any component of the proposed OWTS of the pending application for an OWTS with variance(s). If a variance is requested from the minimum setback requirement to a public water supply well, public water line or a surface water reservoir including tributaries and tributary wetlands or subsurface drains directly discharging thereto, then the applicant shall also notify the applicable public water system entity or agency.

47.6.2 Exemptions from Notification Requirements

(A) OWTS applications for Alteration to a Structure that include a request for a variance from the provisions of these Rules are exempt from the notification requirements in Rule 47.6.

(B) The Director may waive the notification requirements in Rule 47.6 if the variance request is limited to a variance from a provision of these Rules specifying horizontal setbacks from a feature on the applicant’s property only.

(C) The Director may waive the notification requirements in Rule 47.6 if, in the opinion of the Director, the variance request will be denied based on the information submitted, or lack thereof, or based on the standards in Rule 48.2.2.

47.6.3 Each notice shall include:

(A) A copy of the Variance Request Form(s) submitted to the OWTS Program;

(B) A cover letter conforming to a form to be provided by the Director, which shall include at least the following information:

(i) The application number;

(ii) A statement of the purpose of the notification;

(iii) A certificate of service; and

(iv) A statement advising the recipient that the recipient may, within twenty (20) days of the date specified in the certificate of service, provide the Director with written comments or information bearing upon the subject application; and

(C) Reduced-scale site plans identical to those submitted to the DEM OWTS Program.

47.6.4 All notices shall be forwarded by certified mail, return receipt requested. The applicant shall clearly mark each return receipt with the application number and the words "Variance Request."

47.6.5 When all certified receipts have been returned to the applicant, copies of each cover letter, accompanied by the appropriate certified receipt, shall be filed with the OWTS Program along with a letter requesting that the application be submitted to the variance review process for final review and determination.

47.6.6 If a correctly addressed, certified notice is returned to the applicant, the applicant may submit the returned envelope and certified receipt, unopened, along with the other return receipts as proof of the applicant's good faith attempt to serve the notice.

47.7 Redesign Applications- For redesign applications submitted to the Department, any variance request previously approved by the Department shall remain valid, provided that the Department determines that either:

47.7.1 The circumstances and facts regarding the variance are the same as the facts under which the original variance was granted; or

47.7.2 The variance in the redesign represents no greater deviation from the Rules than the original variance.

RULE 48. VARIANCE REVIEW PROCESS

48.1 Preliminary Review and Recommendation- All variance requests shall be reviewed by the Department for the purpose of determining whether such variance(s) would be contrary to the public health, the public interest or the environment. In reviewing the applicant's variance requests, the Department may consult with other experts, whether employed by the Department or not. As part of the review of any variance request(s), the Department shall consider:

48.1.1 All evidence submitted by the applicant, the local municipal building official and the notified property owners bearing upon the subject application;

48.1.2 The number and extent of the limiting conditions at the site and surrounding area; and

48.1.3 Whether the site characteristics are less than optimum for wastewater treatment and dispersal.

48.2 Variance Review Standards

48.2.1 Approval- A variance request from the minimum standards set forth in these Rules shall be approved if it is determined that such a variance(s) will not be contrary to the public health, the public interest, or environmental quality.

48.2.2 Denial- A variance request from the minimum standards set forth in these Rules shall be denied when:

(A) The applicant has failed to provide clear, accurate, and substantive information to enable the Department to determine that the requested variance will not be contrary to the public health, the public interest, or environmental quality;

(B) The evidence fails to demonstrate that the same degree of environmental protection provided under these Rules can be achieved without strict application of the provision for which the variance has been requested;

(C) The evidence demonstrates that the OWTS will not function as proposed in the application;

(D) The evidence indicates that the approval of the OWTS would otherwise be contrary to the public health, the public interest, or environmental quality; or

(E) The variance request is for one of the following:

(i) The variance request is for an action that is prohibited in Rule 8, excluding the prohibition regarding holding tanks in Rule 8.15;

(ii) The variance request is from the requirements of Rule 14.2 on a site located in the Salt Pond or Narrow River Critical Resource Areas unless the applicant demonstrates that a net reduction in overall, long-term nitrogen loading to the watershed will result;

(iii) The variance request resulted from the applicant subdividing the property after December 31, 1995 unless the applicant demonstrates that the reason for the variance requested is not the result of action by the applicant, or prior owners of the property;

(iv) The variance request is from the requirement that soil and seasonal high groundwater table data must have been determined within the past five (5) years;

(v) There is a public wastewater system reasonably accessible to the structure to be served by the OWTS;

(vi) The variance request is for new lots under ten thousand (10,000) square feet platted or otherwise created after June 18, 1992 unless the applicant demonstrates that the reason for the variance requested is not the result of action by the applicant, or prior owners of the property;

(vii) The variance request is for less than the eighty (80) foot minimum setback distance from a private drinking water well in Table 22.4, Note 3;

(viii) The variance request is from the two hundred (200) foot public well setback requirement for a drilled rock, driven, or dug well in Table 22.4 or from the four hundred (400) foot public well setback from a gravel packed or gravel developed well in Table 22.4. Such a variance request may be approved if either of the following occurs:

(1) If the public well is not on the same property that is subject to the OWTS Application, the applicant provides documentation that the well owner has an approved variance from the Rhode Island Department of Health for an inner protective zone that does not include the location of the proposed OWTS; or

(2) If the public well is on the same property that is subject to the OWTS Application, the applicant provides documentation that the Rhode Island Department of Health has approved of the requested activity;

(ix) The variance request is for a depth to groundwater from original ground surface of less than twelve (12) inches or for a depth to a restrictive layer or bedrock of less than thirty-six (36) inches;

(x) The variance request is from the nitrogen reducing technology requirements in the Salt Pond and Narrow River Critical Resource Areas in Rules 39.2; or

(xi) The variance request is from the requirements in Rule 41 (Nitrogen Loading in Areas of Onsite Drinking Water Wells).

48.2.3 Terms and Conditions- The variance decision may contain such terms and conditions as the Director deems necessary to protect the public interest, the public health, or the environment.

48.3 Recommended Determination- Upon completion of their review, the OWTS Program Staff shall prepare a written recommendation of approval or denial of the variance request. The review shall identify the factors considered in the review process, specify the bases for their recommendation, and identify any suggested conditions for approval.

48.4 Final Determination- Upon review of the recommendation submitted in accordance with Rule 48.3, the Director shall render a final written decision approving or denying the requested variance(s). In arriving at a final decision, the Director may:

48.4.1 Adopt the recommendation, with or without additional written comments or conditions;

48.4.2 Reject the recommendation; in which case the Director shall render a written decision specifying the bases for the rejection; or

48.4.3 Remand the matter back to the OWTS Program Staff for further review and consideration of certain specified factors.

RULE 49. APPEALS

49.1 Right to Appeal- Any person whose permit application is denied may appeal to the Director for review of the decision on which the denial is based by filing an appeal with the Administrative Adjudication Division.

49.2 Filing of Appeal- All appeals shall be in writing and shall be filed with the Department's Administrative Adjudication Division within thirty (30) calendar days of receipt of the denial of the subject application.

49.3 Contents of Appeal- Every appeal shall contain:

49.3.1 A detailed basis upon which the appeal is taken;

49.3.2 A plat plan of the area of the subject application;

49.3.3 A list of the names and addresses of:

(A) The applicant;

(B) The municipality in which the property is located;

(C) The owner of any surface water supply as identified by Rule 38.3, if applicable; and

(D) The owners of record of real property within two hundred (200) feet of any component of the applicant's proposed OWTS; and

49.3.4 A certified check, bank draft or money order in the amount of one thousand five hundred ($1,500) dollars in accordance with Rule 50.4.

49.4 Notice of Administrative Hearing- Upon the filing of an appeal with the Administrative Adjudication Division, and once the hearing schedule allows, the Administrative Adjudication Division shall notify the following, by first class mail, of the date, time and place of the adjudicatory hearing, in conformance with R.I. General Laws Section 42-35-9, as amended: the applicant; the municipality in which the property is located; the owner of any surface water supply as identified by Rule 38.3, if applicable; and the owners of record of real property within two hundred (200) feet of any component of the applicant's proposed OWTS.

49.5 Conduct of Hearing- The notice and conduct of the hearing by the Department of Environmental Management, Administrative Adjudication Division, shall comply in all respects with the provisions of the Administrative Procedures Act, R.I. General Laws Chapter 42-35, and the Rules of Practice and Procedure for the Administrative Adjudication Division for Environmental Matters.

49.6 Burden of Proof- At the adjudicatory hearing, the applicant shall have the burden of proof to demonstrate through clear and convincing evidence that:

49.6.1 A literal enforcement of the Rules will result in unnecessary hardship;

49.6.2 That the OWTS will function as proposed in the application; and

49.6.3 That the issuance of a permit will not be contrary to the public interest, public health and the environment. In order to demonstrate that the proposed OWTS will not be contrary to the public interest, public health and the environment, the applicant must introduce clear and convincing evidence to the satisfaction of the Director that:

(A) The waste from the proposed OWTS will not be a danger to public health;

(B) The OWTS to be installed will be located, operated and maintained so as to prevent the contamination of any drinking water supply or tributary thereto;

(C) The waste from the proposed OWTS will not pollute any body of water or wetland;

(D) The waste from the proposed OWTS will not interfere with the public use and enjoyment of any recreational resource; and

(E) The waste from the proposed OWTS will not create a public or private nuisance.

49.7 The Director may approve a permit or grant a variance from a provision of these Rules, except for the prohibitions in Rule 8, where it is determined by the Director that:

49.7.1 A literal enforcement of such provisions will result in unnecessary hardship to the applicant;

49.7.2 That the OWTS will function as proposed in the application; and

49.7.3 That the permit or variance sought will not be contrary to the public interest, public health and the environment.

49.8 The decision of the Director may contain such terms and conditions as deemed necessary to protect the public interest, public health and the environment.

RULE 50. FEES

50.1 Administrative

50.1.1 All applicants, except for state and local governmental entities, shall be liable for the payment of fees to the Department as set forth below.

50.1.2 Payment of Fees- All fees shall be due at the time the initial form or request is submitted to DEM requesting that it undertake one of the activities specified in Rule 50.2 below. The Department will not undertake any such activity until payment has been received.

50.1.3 Commercial OWTSs- For the purpose of assessing fees, all duplex and multi-family residential OWTSs shall be considered commercial OWTSs.

50.1.4 Field testing pursuant to Rules 15 or Rule 16 must be completed on the scheduled day of witnessing. Conditions encountered or lack of preparedness by the Licensed Designer that requires additional witnessing by the Department will require an additional fee.

50.2 Fee Schedule

Table 50.2 Fee Schedule

DESCRIPTION	FEE
Soil Evaluations	$150.00 per OWTS
Wet Season Determinations	$100.00 per OWTS
Bedrock Test Holes	$100.00 per OWTS
Test Holes in Storm Deposited Sand or Human Transported Material	$100.00 per OWTS
Reinspection	$100.00
Application for OWTS Suitability Determination	$100.00
OWTS Application for New Building Construction and OWTS Application for Alteration to a Structure. The fees for applications utilizing a pretreatment technology, excluding leachfield systems and components, approved as an Alternative or Experimental Technology pursuant to Rule 37 or a technology not included in these rules specifically engineered for the application, shall be two (2) times the following fees: (Note: The fee for a Joint OWTS/Freshwater Wetlands Application is the sum of the OWTS fee and the Wetlands Preliminary Determination fee.)	
Single Family Residences:	
Single Family Residence	$150.00
Commercial OWTSs:	
Less than 2,000 gpd	$200.00
2, 000 gpd to 4, 999 gpd	$500.00
5, 000 gpd to 9, 999 gpd	$1,000.00
10,000 gpd or More	$2,000.00
Subdivision Review	
1 to 9 Lots	$100.00 per lot
10 Lots or More	$1,000.00 plus $50.00 per lot for each lot over 10
OWTS Application for Repair. The fees for applications utilizing a pretreatment technology, excluding leachfield systems and components, approved as an Alternative or Experimental Technology pursuant to Rule 37 or a technology not included in these rules specifically engineered for the application, shall be two (2) times the following fees:	
Single Family Residence	$100.00
Commercial OWTSs:	
Less than 2,000 gpd	$150.00
2,000 gpd to 4,999 gpd	$300.00
5,000 gpd to 9,999 gpd	$600.00
10,000 gpd or More	$1,000.00
Transfer, including Joint OWTS/Freshwater Wetlands Application	$50.00
Any Variance Request for OWTSs: Residential and Commercial (Variance Request Fee is in addition to the application fee)	$300.00

DESCRIPTION	FEE
If the application has been previously reviewed by the Department and found deficient and the re-submission does not address these deficiencies, then the Department will assess a fee for the second re-submission equal to fifty percent (50%) of the original fee. In no case shall this resubmission fee exceed $300.00.	
Alternative or Experimental Technology:	
Alternative OWTS or Technology:	
Class One	$1,000.00
Upgrade from Class Two to Class One	$500.00
Class Two	$1,000.00
Alternative OWTS Component:	
Class One	$200.00
Class Two	$300.00
Experimental OWTS or Technology	$2,000.00
Renewal of Alternative or Experimental Technology Application:	
Alternative OWTS or Technology Class Two	$500.00
Alternative OWTS Component Class Two	$150.00
Experimental OWTS or Technology	$1,000.00
Installer's Licenses:	
Examination and New License Application (3 years, the Department may pro-rate fee if the license is issued for less than 3 years)	$175.00
License Renewal (3 years, the Department may pro-rate fee if the renewal is for less than 3 years)	$150.00
Class I, II, III, and IV Licenses:	
Examination and New License Application (3 years, the Department may pro-rate fee if the license is issued for less than 3 years)	$200.00
License Renewal (3 years, the Department may pro-rate fee if the renewal is for less than 3 years)	$150.00
License Renewal Late Fees	
<1 year expired	$100.00
1-2 years expired	$200.00
2-3 years expired	$300.00

50.3 Additional Fees- These additional fees shall be collected prior to the Department's review of the submission(s) under consideration. No final approval or denial shall be issued by the Director until such time as these additional fees have been received.

Table 50.3 Additional Fees

DESCRIPTION	FEE
Designers Affidavit Continuing Validity - per lot	$50.00
Designers Affidavit – Subdivisions	$100.00
Revision to Subdivision (1 to 9 lots) per lot	$50.00
Revision to Subdivision (10 or more lots)	$500.00
As Builts - Requested or Submitted	$50.00
Redesign - Single Family	$100.00
Redesign - Commercial - less than 2,000 gpd	$150.00
Redesign - Commercial - more than 2,000 gpd	$400.00
Redesign – Joint OWTS/Freshwater Wetlands Application	$150

50.4 Costs of Appeal- Any person who requests an appeal pursuant to Rule 49 shall also be liable for fees to cover costs incurred in the holding of the hearing. The fee shall be sufficient to defray the costs incurred by the Administrative Adjudication Division for, but not limited to: all investigations; the appearance of a stenographer and the original transcript; renting a room, when necessary; and the costs associated with the appearance of the hearing officer. The applicant must pay the Director the sum of one thousand five hundred dollars ($1,500.00) as a deposit against the actual costs of a hearing before a hearing will be scheduled.

RULE 51. OPERATION AND MAINTENANCE

51.1 Operation- It is the property owner's responsibility to ensure that the OWTS achieves the performance requirements applicable to the approved OWTS.

51.2 Maintenance- All OWTSs shall be maintained in good repair by the owner. The Director may order the owner to maintain or repair an OWTS within a reasonable time if the Director finds them to be in need of the same. In order to maintain long-term viability of the OWTS, it is the owner's responsibility to:

51.2.1 Ensure that the OWTS is used only for wastewater in amounts that do not exceed the design flow;

51.2.2 Properly maintain the OWTS, including but not limited to, inspection of the OWTS or pumping of the septic tank as needed;

51.2.3 Protect the OWTS from physical disturbance;

51.2.4 Ensure that all access opening covers are secured and maintained; and

51.2.5 Ensure that trees and shrubs are not growing within the area of the leachfield and within ten (10) feet of the leachfield.

51.3 The provisions of Rule 51.1 and Rule 51.2 for operation and maintenance apply to any OWTS that has been issued a Certificate of Conformance pursuant to Rule 45.

51.4 Future Modifications- Once a Certificate of Conformance has been issued pursuant to Rule 45, nothing in these Rules shall prevent the property owner from retaining another qualified Licensed Designer,

including another Licensed Designer from the same business entity that originally designed the OWTS, that the property owner chooses to conduct work on the OWTS.

RULE 52. REMOVAL AND ABANDONMENT

52.1 Removal- Any OWTS components that are excavated and removed off-site must be properly disposed of at a licensed solid waste landfill.

52.2 Abandonment On Site- Septic tanks, grease tanks, pump tanks, holding tanks, concrete chambers and cesspools that are no longer in use shall be properly abandoned. The structure shall be emptied of all wastes and then either removed, filled with clean sand or crushed and the area backfilled with clean soil.

RULE 53. CESSPOOL PHASE-OUT

53.1 General- Cesspools are not an approved method of wastewater disposal in Rhode Island, and all existing cesspools are considered to be substandard in accordance with Rule 6.7. Cesspools in Rhode Island must be removed and replaced if they meet the failure criteria in Rule 7, meet the definition of a large capacity cesspool in Rule 7, local government ordinances require removal and replacement, or if they are subject to the requirements of Rules 53.3-53.7 pursuant to R.I.G.L § 23-19.15.

53.2 Large Capacity Cesspools- The use of large capacity cesspools is prohibited statewide in accordance with US Environmental Protection Agency "Revisions to the Underground Injection Control Regulations for Class V Injection Wells", December 7, 1999, 40 CFR Parts 9, 144, 145 and 146. Any such large capacity cesspool shall cease to be used and shall be properly removed or abandoned in accordance with Rule 52. Any large capacity cesspool shall be properly removed or abandoned within one (1) year of discovery unless an immediate public health hazard is identified, in which case the director may require a shorter period of time.

53.3 Determining Property Owners Subject to Rule 53- The Director will attempt to notify property owners that, based on records available to the Department, appear to be subject to Rule 53. Said notifications shall be made via first class U.S. Mail, postage prepaid, to the owner(s) whose name(s) and address appear on the respective municipal tax assessor database. Property owners not notified may still be subject to this Rule if it is later determined that they own a structure served by a cesspool within two hundred (200) feet of one of the features identified in Rule 53.3.1. However, no enforcement action will be taken specifically pursuant to Rule 53 if the property owner replaces the cesspool within one (1) year of discovery by the Department that they are within two hundred (200) feet of one of the features identified in Rule 53.3.1, or by January 1, 2014, whichever is later.

53.3.1 Applicability-- Rules 53.3-53.7 apply to cesspools located:

(A) Within two hundred (200) feet of the inland edge of a coastal shoreline feature bordering a tidal water area (corresponding to the jurisdiction of the RI Coastal Resources Management Council as described in R.I.G.L. § 46-23-6(2)(iii));

(B) Within two hundred (200) feet of a public drinking water supply well; and

(C) Within two hundred (200) feet of the high water mark of a surface drinking water supply impoundment with an intake for the water supply. See Figures 13-16.

53.3.2 Property owners identified as subject to this Rule may provide substantive evidence to demonstrate to the Department that they are not subject to this Rule by the means identified in Rule 53.3.2(A) or (B). Any of the means chosen to show that a property owner is exempt from the provisions of Rule 53 are, at the Director's discretion, subject to review by the Department.

(A) Provide evidence that the structure is not served by a cesspool by any of the following:

(i) Submitting documentation that the structure is served by a permitted OWTS or is connected to a public wastewater treatment system;

(ii) Hiring a System Inspector to certify on a form approved by the Director that the structure is not served by a cesspool; or

(iii) Certifying that the structure is not served by a cesspool on a form approved by the Director.

(B) Provide evidence that the cesspool is not within two hundred (200) feet of one of the features identified in Rule 53.3.1 by any of the following:

(i) Hiring a qualified person to certify on a form approved by the Director that the cesspool is not within two hundred (200) feet of the feature of concern;

(ii) Certifying that the cesspool is not within two hundred (200) feet of the feature of concern on a form approved by the Director; or

(iii) Property owners that have been identified as within two hundred (200) feet of the inland edge of a coastal shoreline feature bordering a tidal water area (corresponding to the jurisdiction of the RI Coastal Resources Management Council) may apply to the Coastal Resources Management Council for a Preliminary Determination as to whether the subject property is within CRMC jurisdiction. Property owners can then submit this information to certify on a form approved by the Director that the cesspool is not within two hundred (200) feet of the inland edge of the shoreline feature.

53.4 Cesspool Inspection- The owner of a property served by a cesspool located within one of the areas in Rule 53.3.1 shall cause an inspection to be performed on the cesspool by a System Inspector within six (6) months from the date of notification pursuant to Rule 53.3, but no later than January 1, 2012, whichever is sooner. The purpose of the inspection is to determine whether or not the cesspool is failed as defined in Rule 7. The owner may submit the results of an earlier inspection conducted within one (1) year prior to the date of notification, provided the inspection meets all the criteria in Rule 53.4. An inspection report including the information requested in Rule 53.4.1-53.4.8 shall be submitted to the Department within thirty (30) days of the inspection. Pumping the cesspool is not required. The inspection shall be conducted as follows:

53.4.1 To the extent practical, determine how often the cesspool has been pumped out;

53.4.2 To the extent practical, determine if the cesspool has shown to contaminate a drinking water well or watercourse;

53.4.3 Inspect the cesspool cover. A cracked cover shall be replaced as soon as possible;

53.4.4 Inspect for evidence that the cesspool fails to accept or dispose of wastewater as evidenced by wastewater at the ground surface above or adjacent to the cesspool, or in the building served;

53.4.5 Determine the liquid depth in the cesspool below the inlet pipe invert;

53.4.6 Determine the cesspool's structural integrity;

53.4.7 To the extent practical, determine if the bottom of the cesspool is below the groundwater table; and

53.4.8 Identify any overflow or other outlet pipe. Locate the terminus of any identified outlet.

53.5 Cesspool Removal and Replacement- Cesspools found to be located within the areas identified in Rule 53.3.1 shall cease to be used for wastewater disposal and shall be properly abandoned in accordance with the schedule below in Rule 53.5.1- 53.5.3. Any cesspool required to be abandoned pursuant to this Rule shall be abandoned in accordance with Rule 52 and such cesspool shall be replaced with an approved OWTS, or the building served by the cesspool shall be connected to a public wastewater system, prior to the applicable deadlines contained in this Rule.

53.5.1 Any cesspool deemed by the department or a System Inspector to be failed shall be properly abandoned within one (1) year of discovery unless an immediate public health hazard is identified, in which case the director may require a shorter period of time.

53.5.2 Any cesspool located on a property which has a sewer stub enabling connection to a public wastewater system shall be abandoned in accordance with Rule 52 and the building served by such cesspool shall be connected to the public wastewater system by January 1, 2014. If such owner of land is required to connect to the public wastewater system and fails to do so in the prescribed time period, then such owner of land shall be required by the local authority to pay usage fees as if such owner of land were connected to the public wastewater system.

53.5.3 Any cesspool within two hundred (200) feet of the inland edge of a coastal shoreline feature bordering a tidal water area (corresponding to the jurisdiction of the R.I. Coastal Resources Management Council), or within two hundred (200) feet of a public drinking water supply well, or within two hundred (200) feet of a surface drinking water supply impoundment with an intake for the water supply, shall be removed or abandoned in accordance with Rule 52 by January 1, 2014.

53.6 Temporary Hardship Extension- The Director may grant an extension for the removal and replacement requirements in Rule 53.5.3 provided the homeowner demonstrates undue hardship and the cesspool is not a failed system. Undue hardship is 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 federal Housing and Urban Development standards for the community within which the cesspool is located. Requests for a hardship waiver must be made within six (6) months after the inspection required by Rule 53.4 and shall be on forms provided by the Director and accompanied by all necessary financial information specified on the form. Said extension form shall be recorded in the land evidence records of the municipality where the property is located. No extension shall extend beyond January 1, 2019. Any extension granted shall expire upon transfer or sale of the land or easement upon which the cesspool is located and any such cesspool shall be replaced within six (6) months of the transfer or sale or by January 1, 2019, whichever is sooner.

53.7 Exemptions-

53.7.1 The provisions of Rule 53.3 – Rule 53.6 shall not apply to any cesspool located in an area of a community covered by a municipal onsite wastewater management ordinance that requires the risk-based phase-out of cesspools prior to January 1, 2014. The Department shall maintain a list of exempt communities.

53.7.2 The provisions of Rule 53.5.3 shall not apply to any cesspool located on a property that is properly designated to be served by a public wastewater system no later than January 1, 2020 provided that:

(A) It is not a failed cesspool;

(B) The sewering project is identified in the city, town or sewer district's wastewater facilities plan as approved by the Department prior to January 1, 2013;

(C) The municipality, acting through its city or town council, states in writing to the Director by January 1, 2013 that the municipality will complete construction of the sewering project on or before January 1, 2020; and

(D) The property owner certifies, in writing, that the dwelling/building will be connected to the public wastewater system within six (6) months of receipt of the notification to connect to said system and that no increase in flow or number of bedrooms in the structure will occur until the connection is made; and

(E) No later than December 31, 2014, the municipality holds bonding authorization or some other dedicated financial surety for expansion of the public wastewater system to the area of the building served by the cesspool. If the municipality fails to demonstrate such surety, exemption under Rule 53.7.2 shall terminate and the cesspool shall be replaced by June 30, 2015.

RULE 54. GUIDANCE DOCUMENTS

54.1 Issuance- The Department is authorized to issue guidance documents that support the intent and purpose of these Rules. Such guidance documents shall not serve to alter the intent of the Rules herein. The documents may serve as guidance on interpreting the evolving science and technologies that are used to support the Rules or to explain in further detail the administrative procedures for complying with these Rules.

54.2 Review- Department prepared guidance documents shall be subject to review and comment through either formal public notice, the Technical Review Committee (Rule 37.7.2), or through other Department convened stakeholder groups. Once a guidance document is issued by the Department, it shall be subject to, at minimum, an annual review, at which time all comments received within the past year shall be considered.

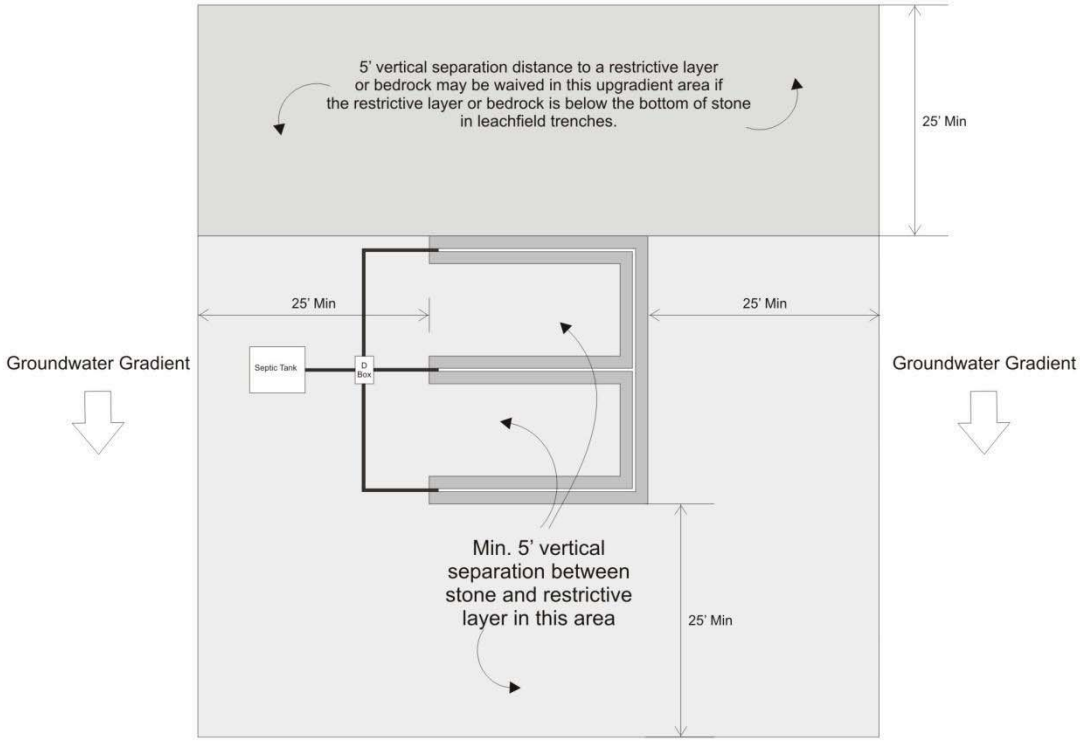
RULE 55. SUPERSEDED RULES

On the effective date of these Rules, all previous Rules regarding the establishment of minimum standards for the location, design, construction and maintenance of onsite wastewater treatment systems shall be superseded. However, any enforcement action taken by, or application submitted to, the Department prior to the effective date of these Rules shall be governed by the rules in effect at the time the enforcement action was taken, or application filed.

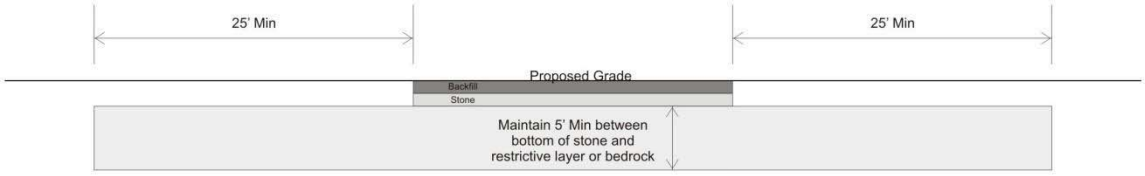
Figure 1: Leachfield Over Restrictive Layer or Bedrock

Not to Scale

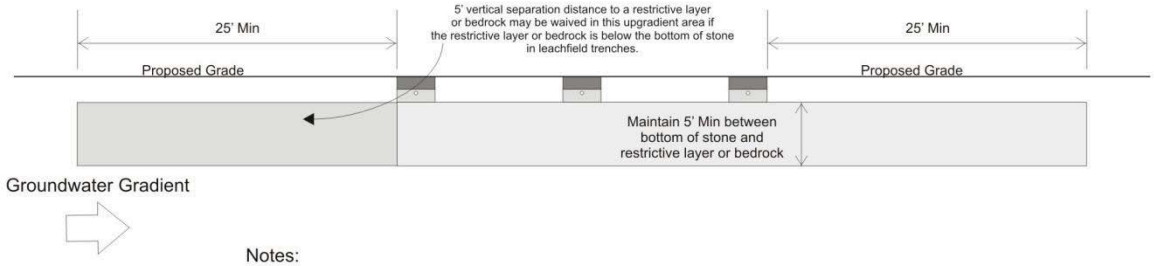
Plan View



Cross Section Perpendicular to Groundwater Flow



Cross Section Parallel to Groundwater Flow



Notes:

-The minimum depth from the original ground surface to a restrictive layer or bedrock is 4' and must be met within 25' of all sides of the leachfield (Rule 32.5).

-Excavating into a restrictive layer or bedrock is not permitted unless otherwise approved by the Director (See Rule 32.8).

Figure 2

Minimum Setback Distances in Drinking Water Supply Watershed Critical Resource Areas

Note: The setback distances in Figure 2 are for OWTS with design flow less than 5000 gpd. For OWTS with design flow greater than 5000 gpd, the setback distances are doubled. See Table 22.2.

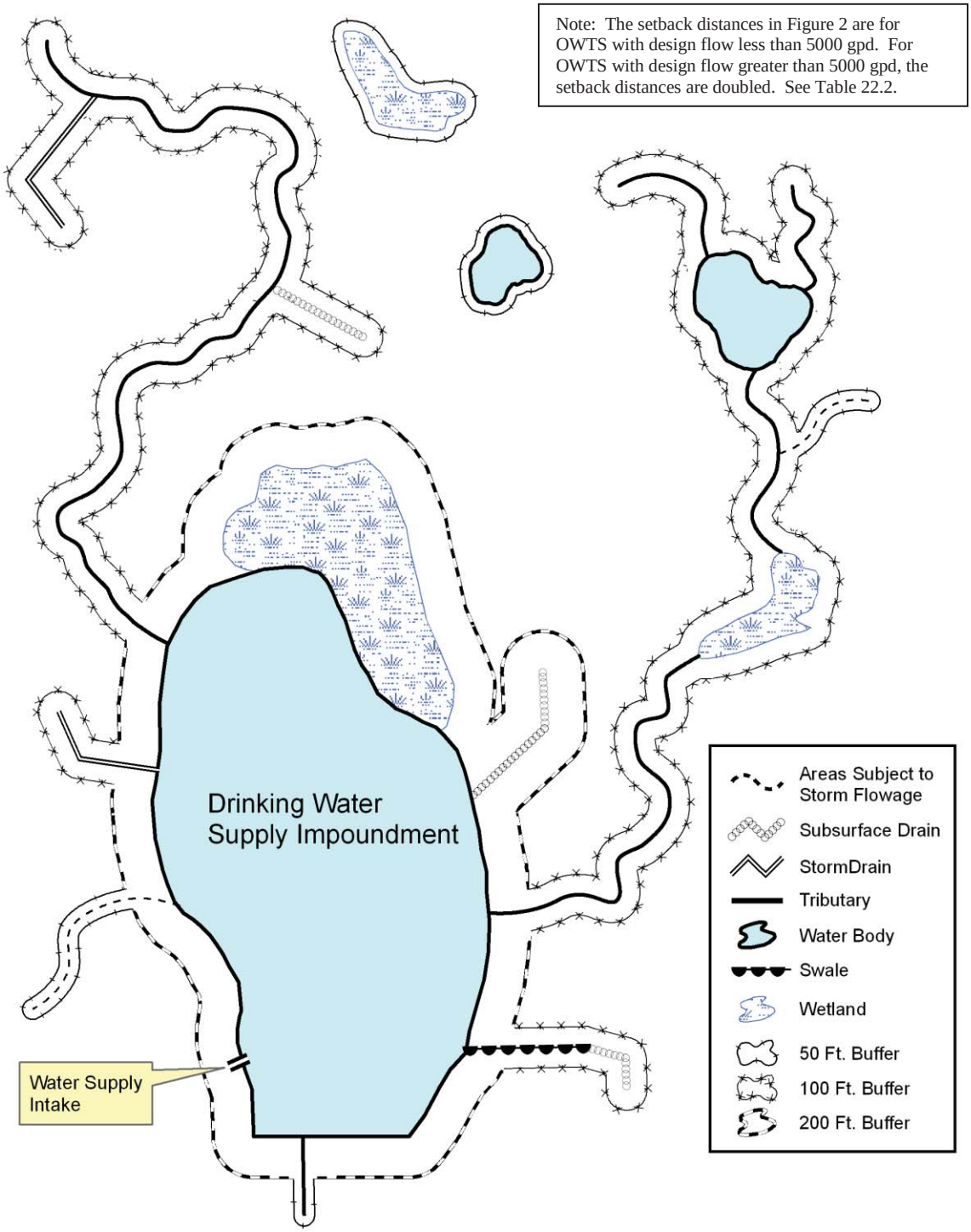


Figure 3

Minimum Setback Distances in the Salt Pond and Narrow River Critical Resource Areas

Note: The setback distances in Figure 3 are for OWTS with design flow less than 5000 gpd. For OWTS with design flow greater than 5000 gpd, the setback distances are doubled. See Table 22.3.

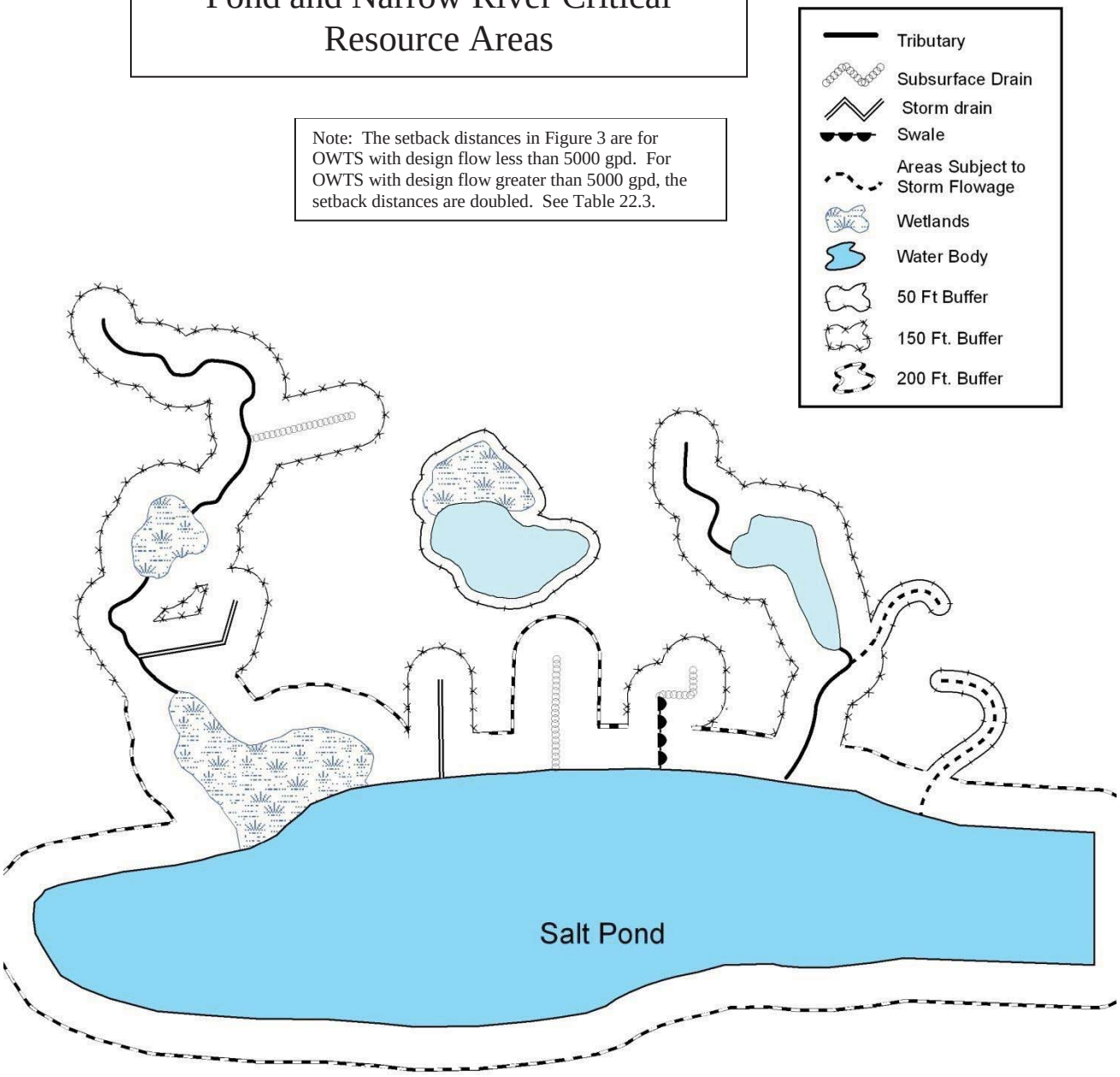
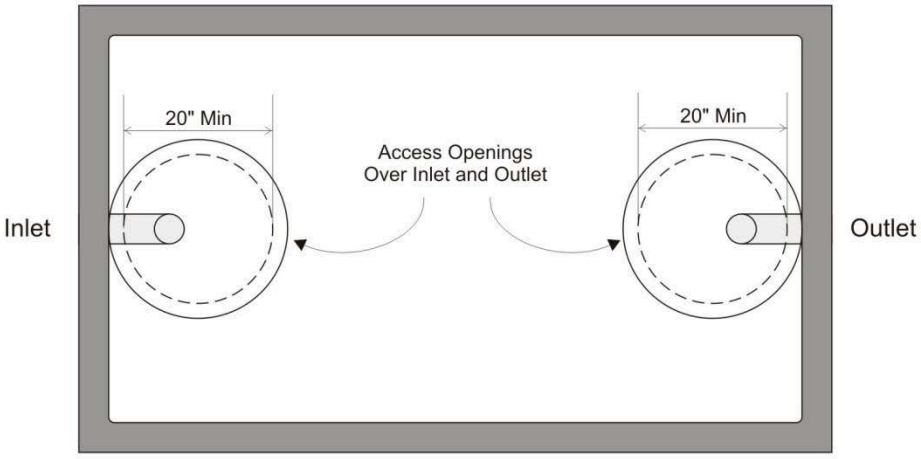
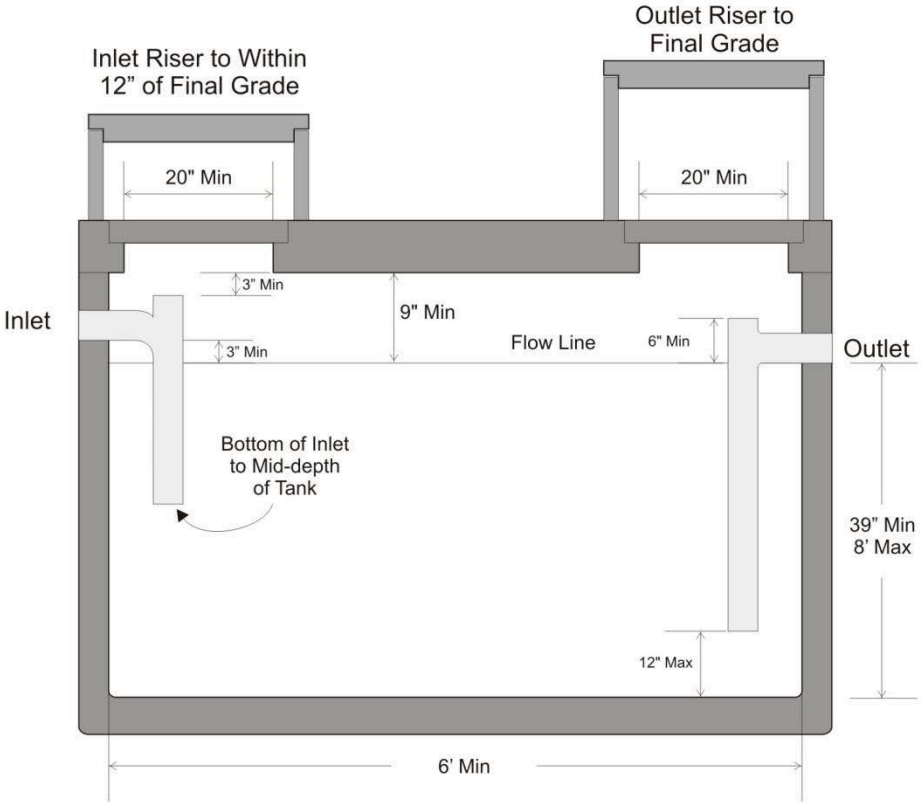


Figure 4: Grease Tanks

Not To Scale, Consult Rule 25 For Details



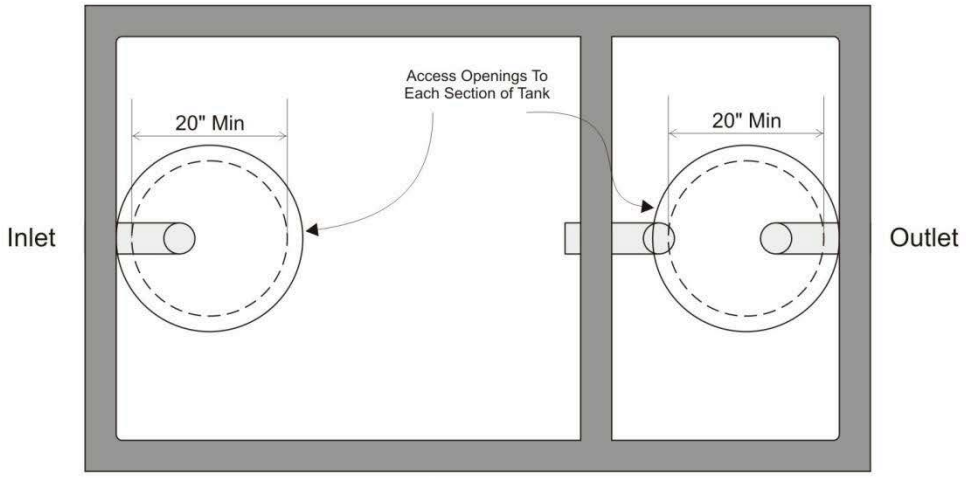
Plan View



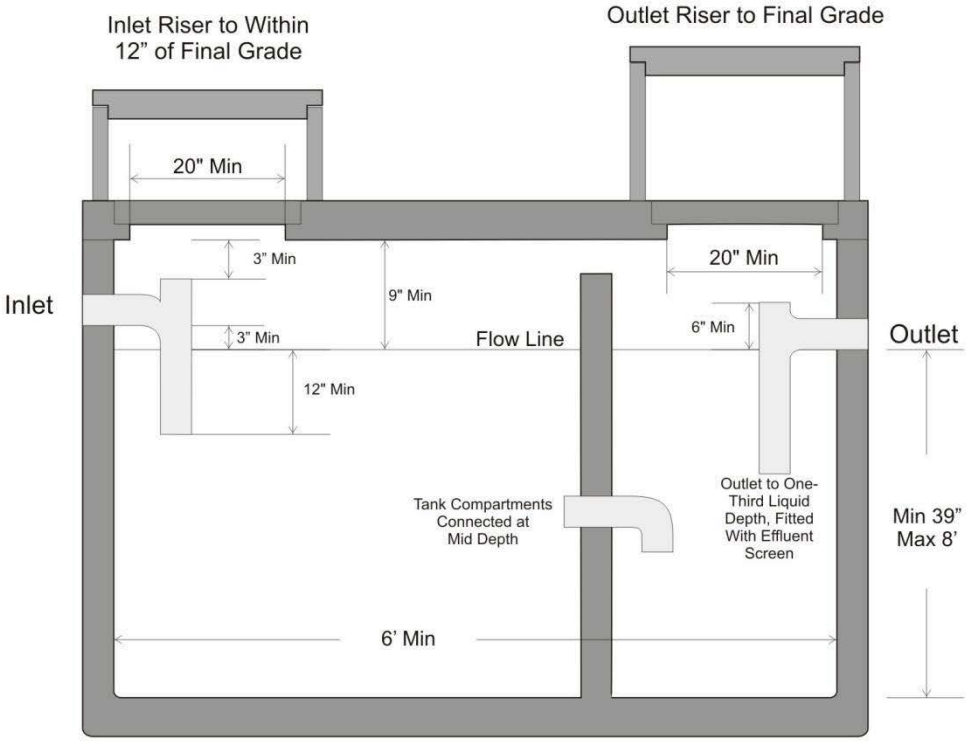
Cross Section View

Figure 5: Septic Tanks

Not To Scale, Consult Rule 26 For Details



Plan View

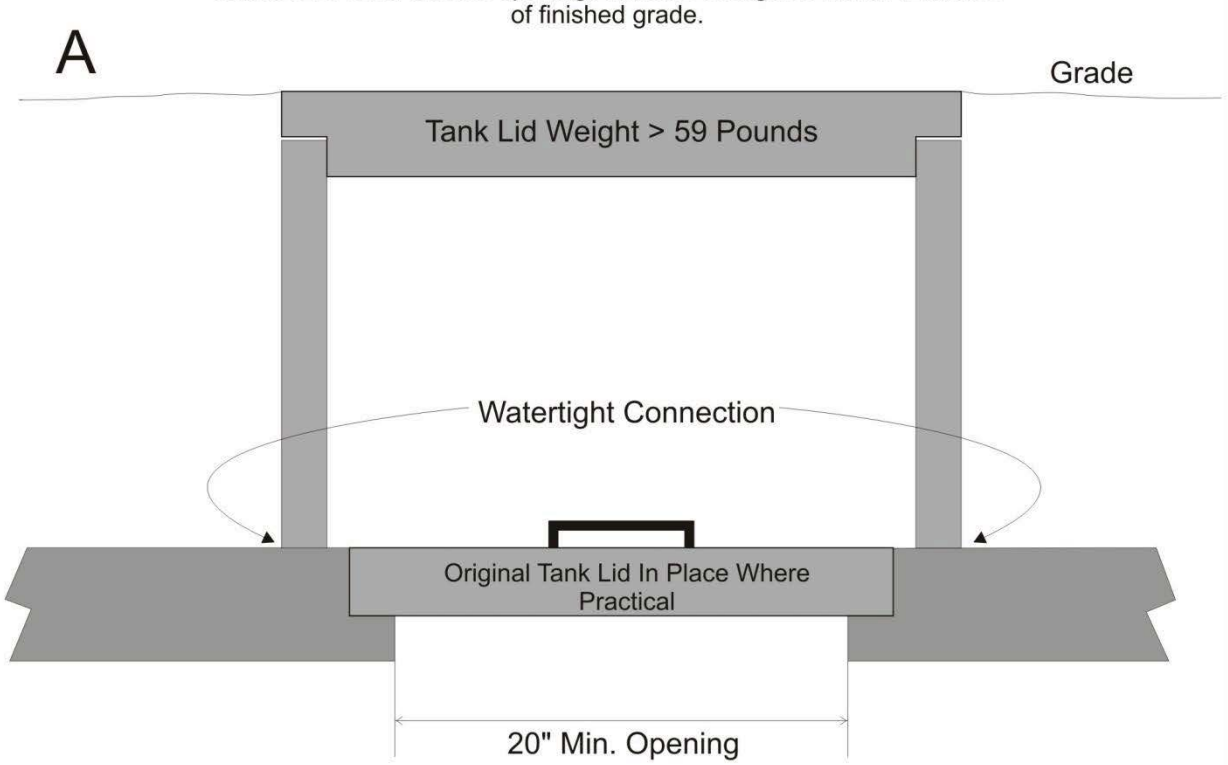


Cross Section View

Figure 6: Septic Tank Riser Detail

Not To Scale, Consult Rule 26.7.2 For Details

Note: Risers over outlet tees must be brought to finished grade, outlets over other access openings must be brought to within 12 inches of finished grade.



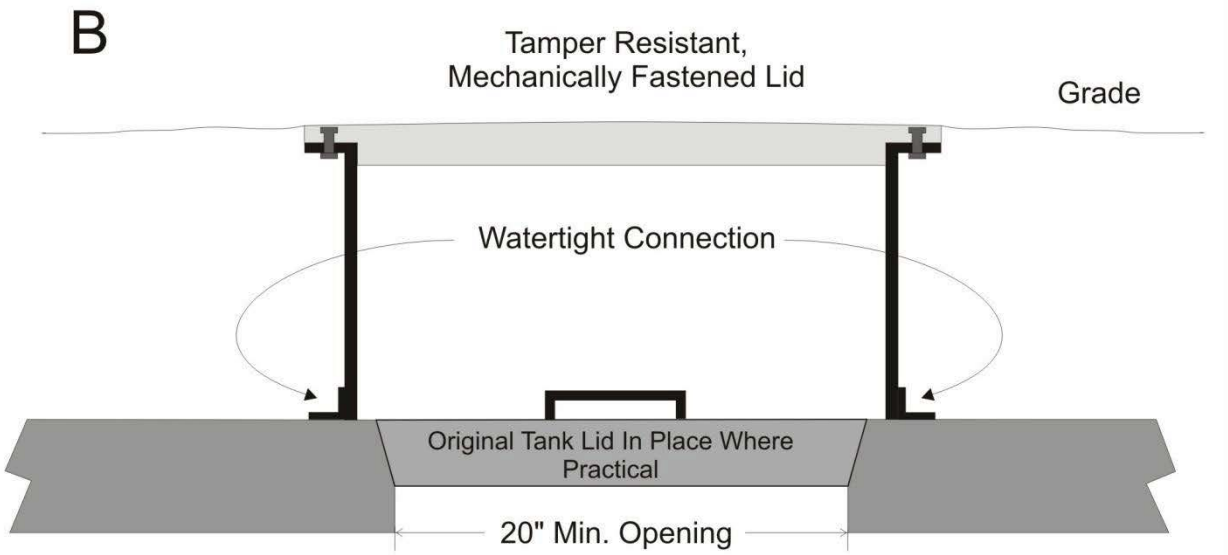
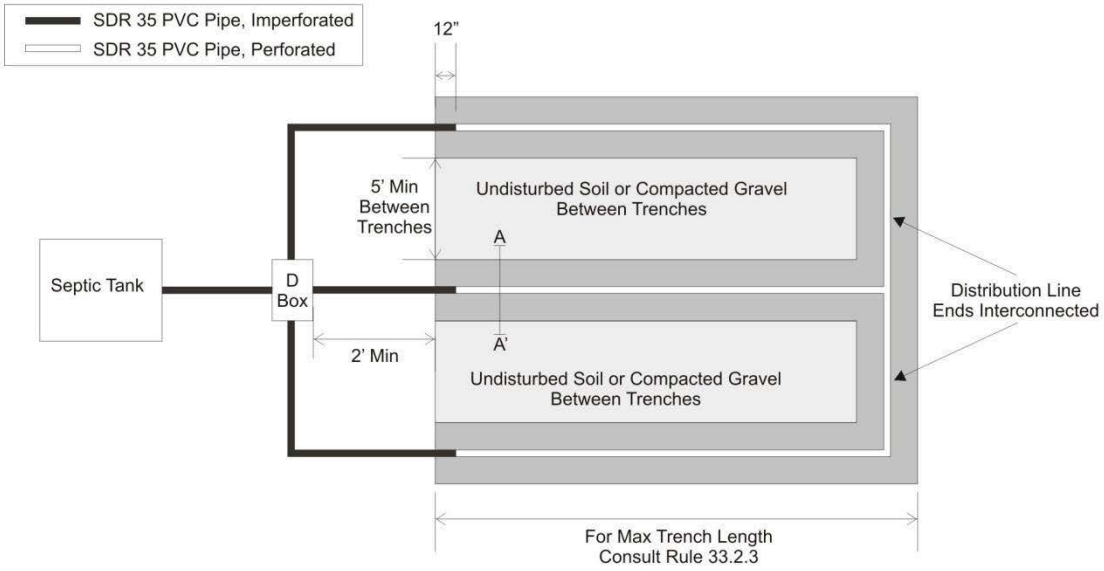
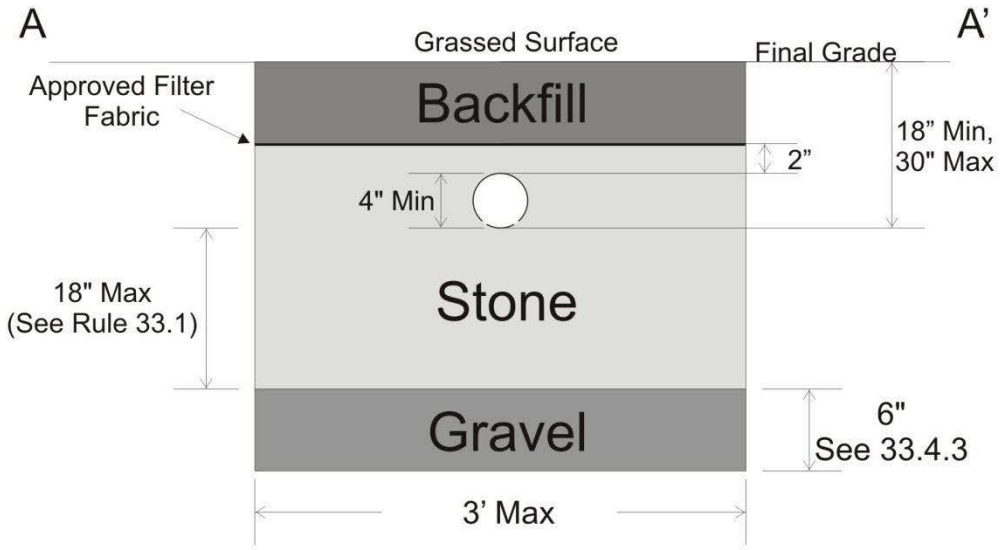


Figure 7: Leachfield Construction, Invert of Distribution Lines Below Original Grade

Not to Scale, Consult Rule 33.4 for Details



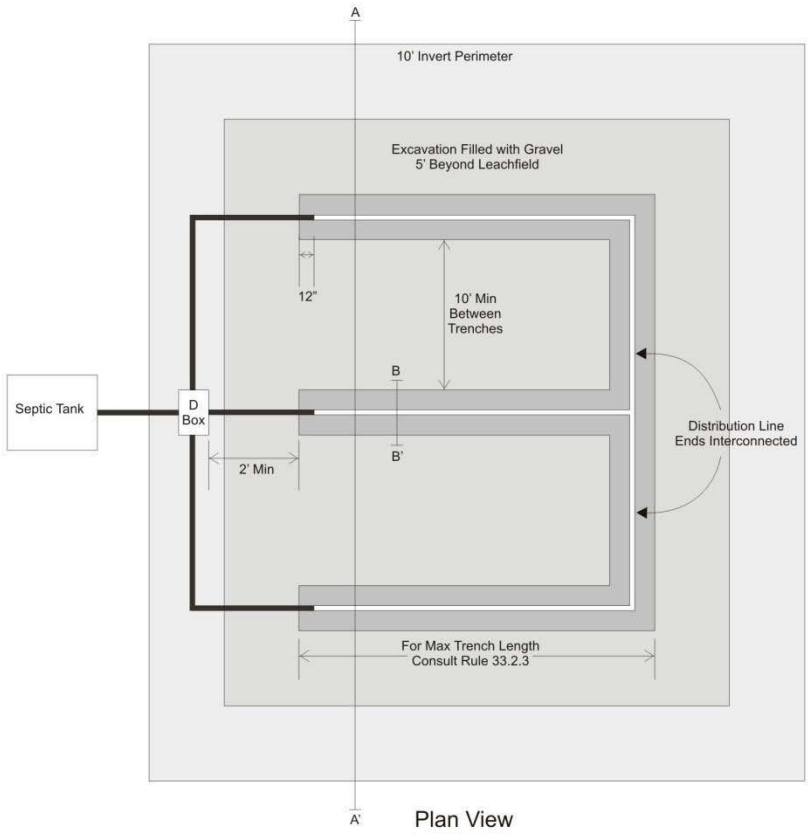
System Plan View



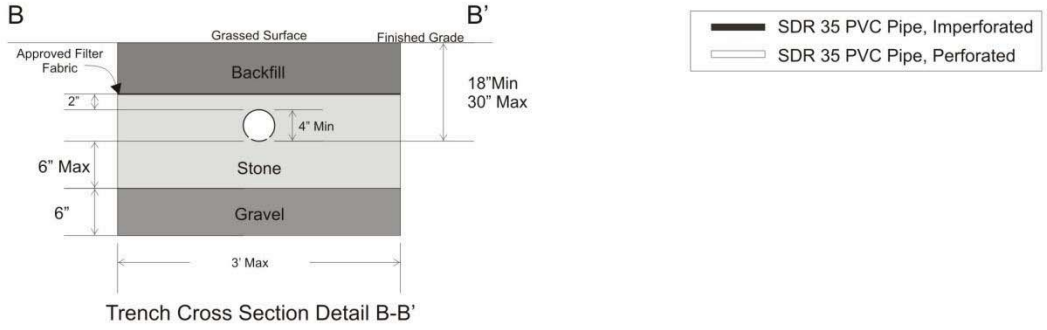
Trench Cross Section View

Figure 8: Leachfield Construction, Invert of Distribution Lines Above Original Grade

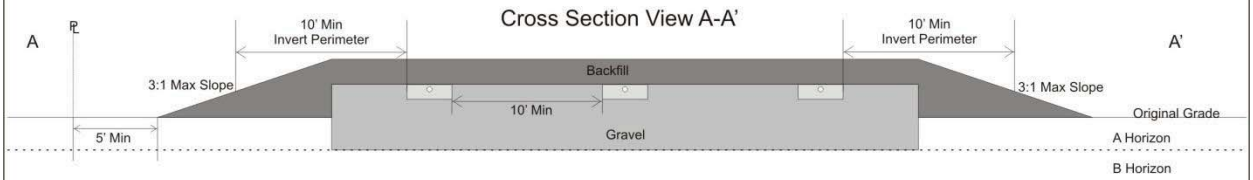
Not to Scale, Consult Rule 33.5 for Details



Plan View



Trench Cross Section Detail B-B'

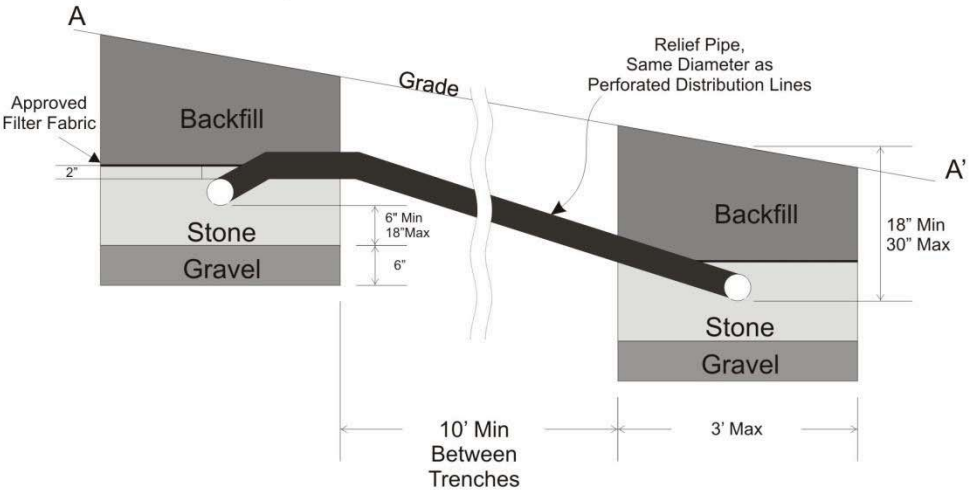


Note: See also Rule 32 for additional details and requirements for leachfield construction.

Figure 9: Leachfield Construction on Sloping Sites

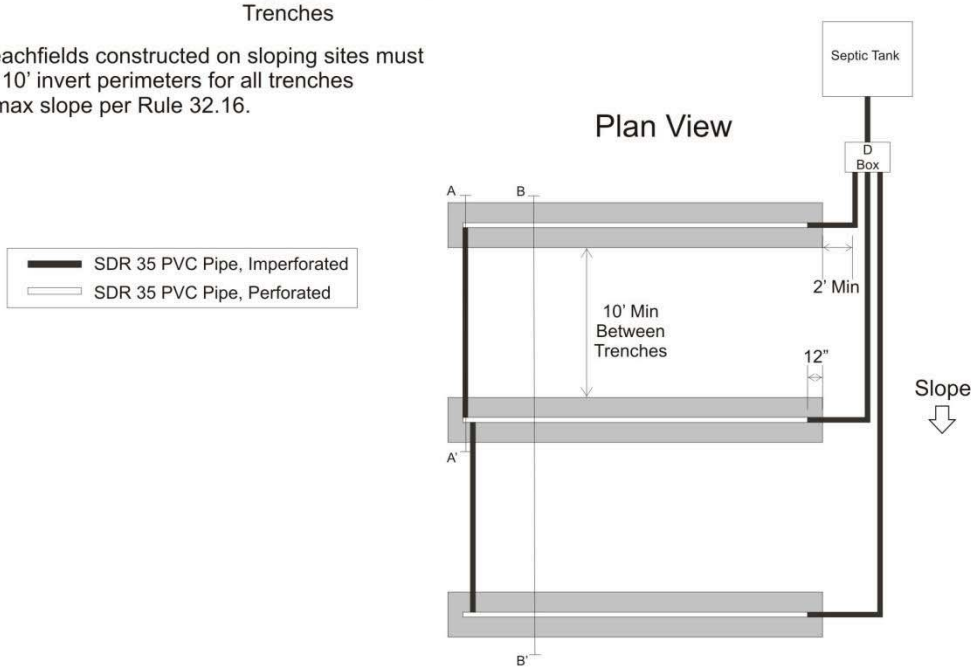
Not to Scale, Consult Rule 33.6 for Details

Relief Pipe and Trench Cross Section Detail

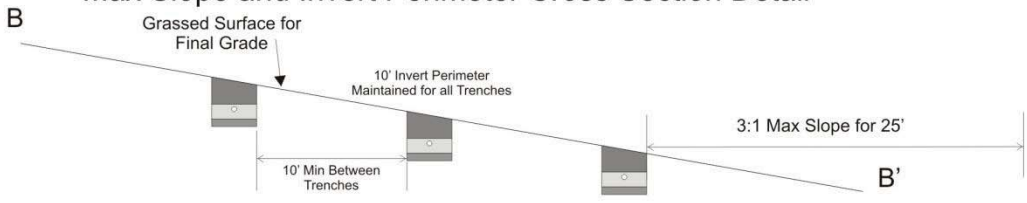


Note: Leachfields constructed on sloping sites must maintain 10' invert perimeters for all trenches and 3:1 max slope per Rule 32.16.

Plan View



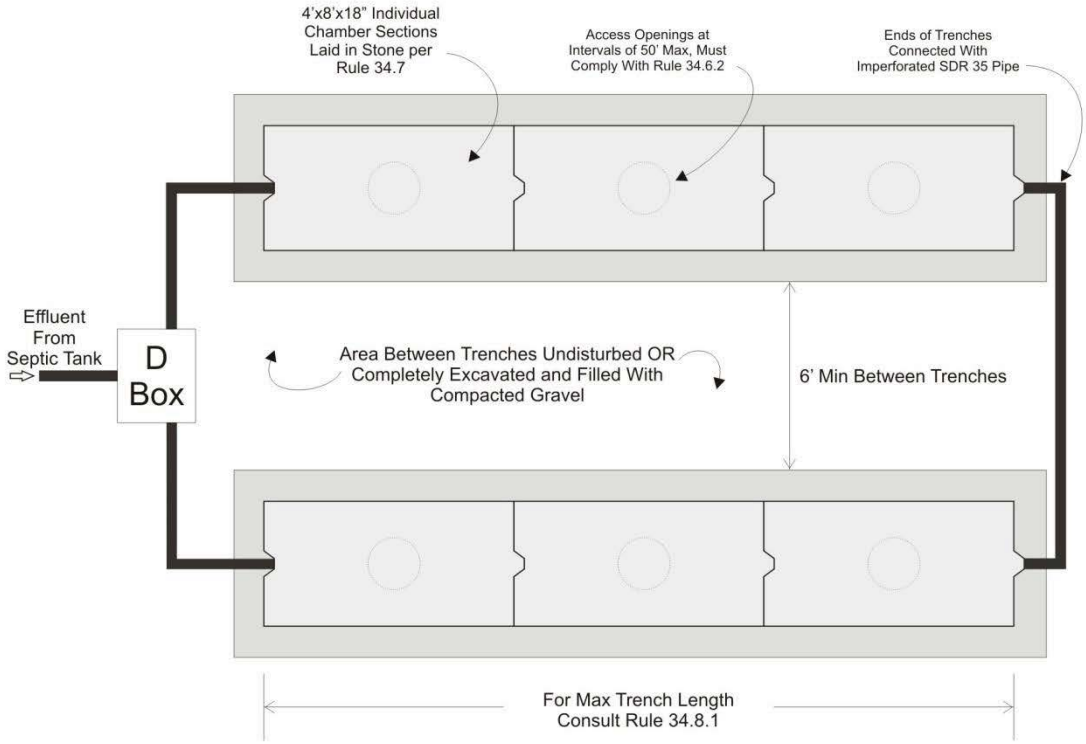
Max Slope and Invert Perimeter Cross Section Detail



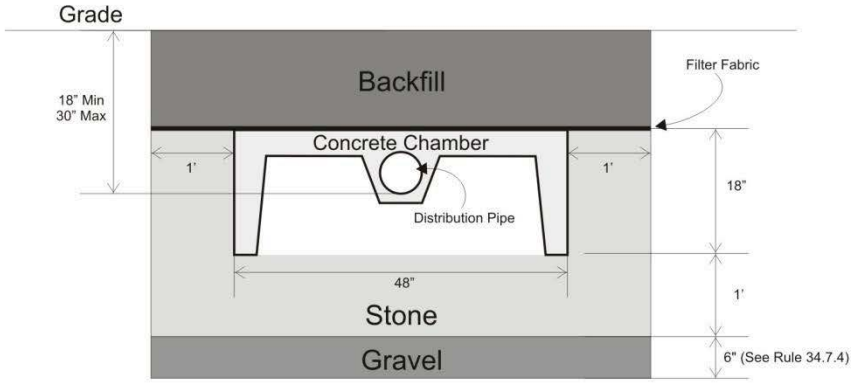
Note: See also Rule 32 for additional details and requirements for leachfield construction.

Figure 10: Shallow Concrete Chambers

Not to Scale, Consult Rule 34 for Details



Sample Leachfield, Plan View



Typical Trench Cross Section View

Figure 11. South Shore Salt Ponds Critical Resource Area
For a detailed look at a location, go to the DEM website, go to "Maps," go to "Environmental Resource Maps" and build a map of your choice.

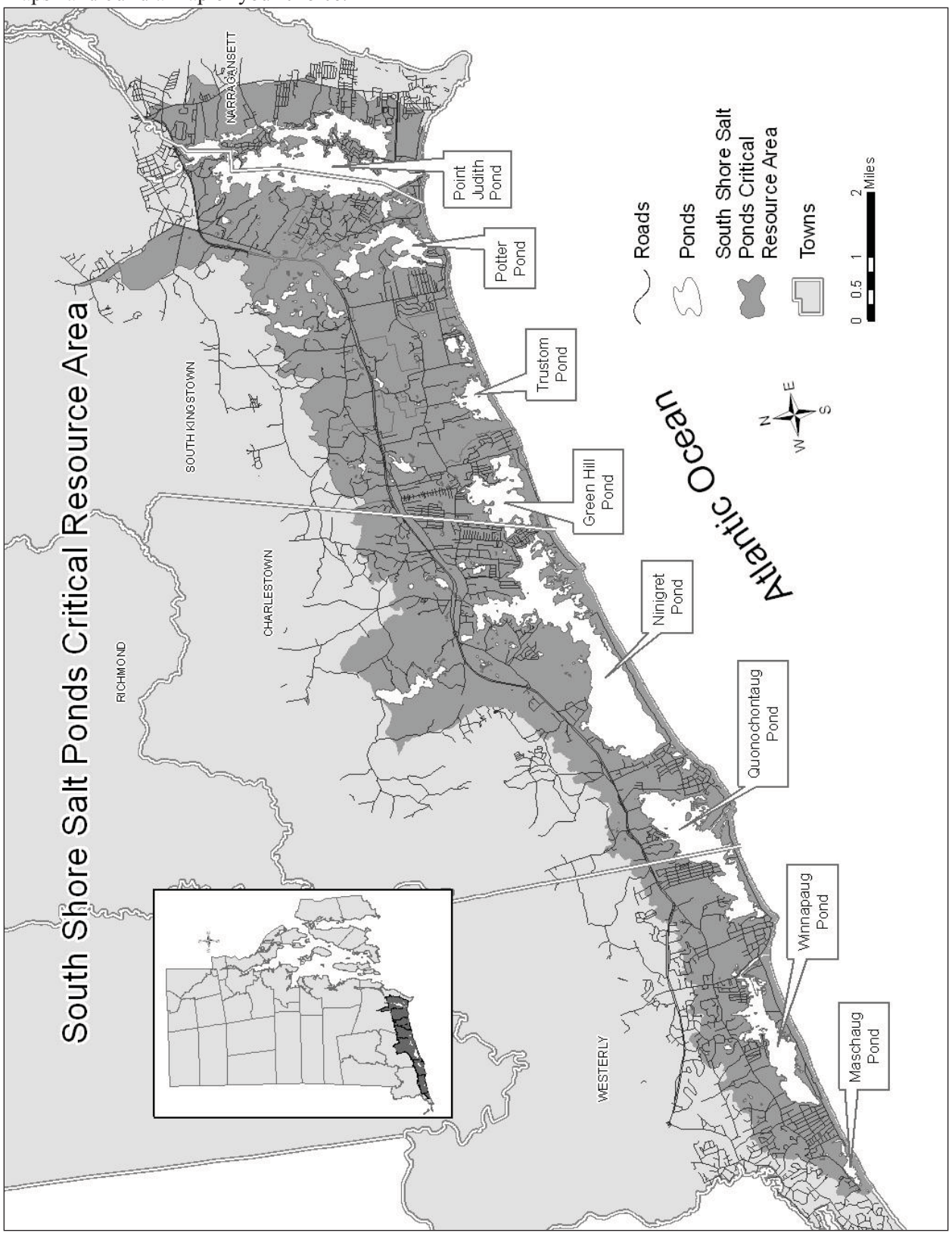


Figure 12. Narrow River Critical Resource Area
For a detailed look at a location, go to the DEM website, go to "Maps," go to "Environmental Resource Maps" and build a map of your choice.

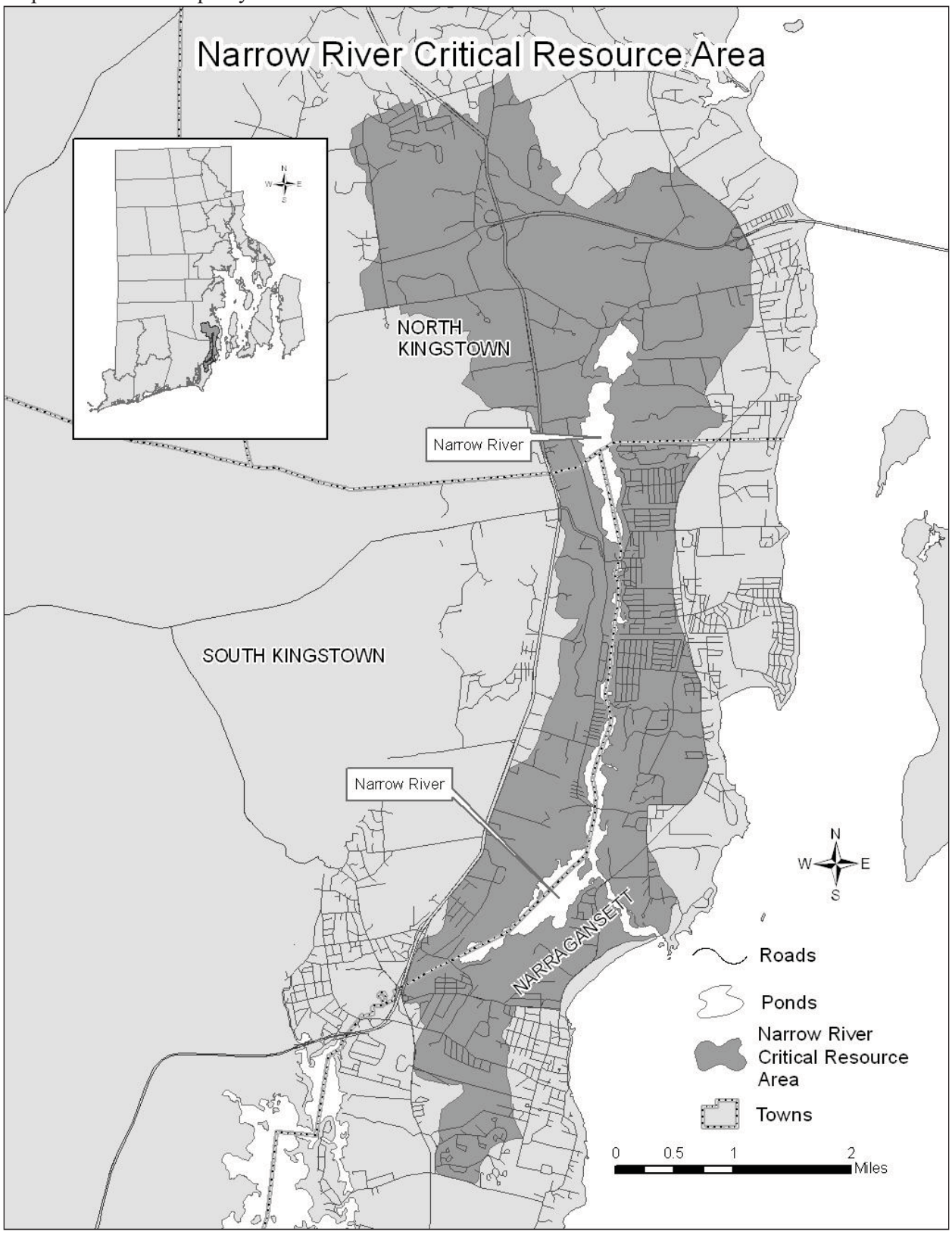


Figure 13. For a detailed look at a location, go to the DEM website, go to "Maps," go to "Environmental Resource Maps" and build a map of your choice.

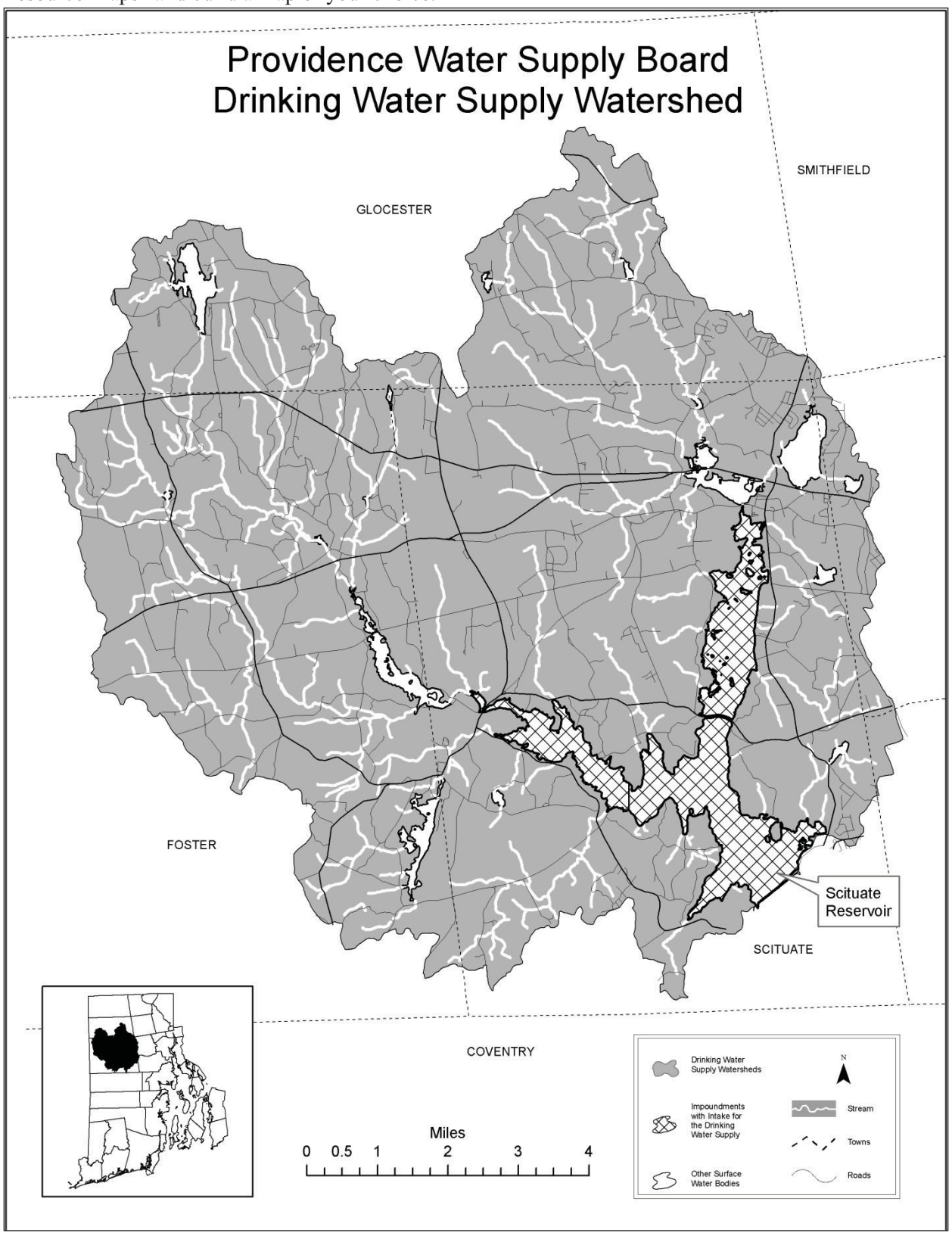


Figure 14. For a detailed look at a location, go to the DEM website, go to “Maps,” go to “Environmental Resource Maps” and build a map of your choice.

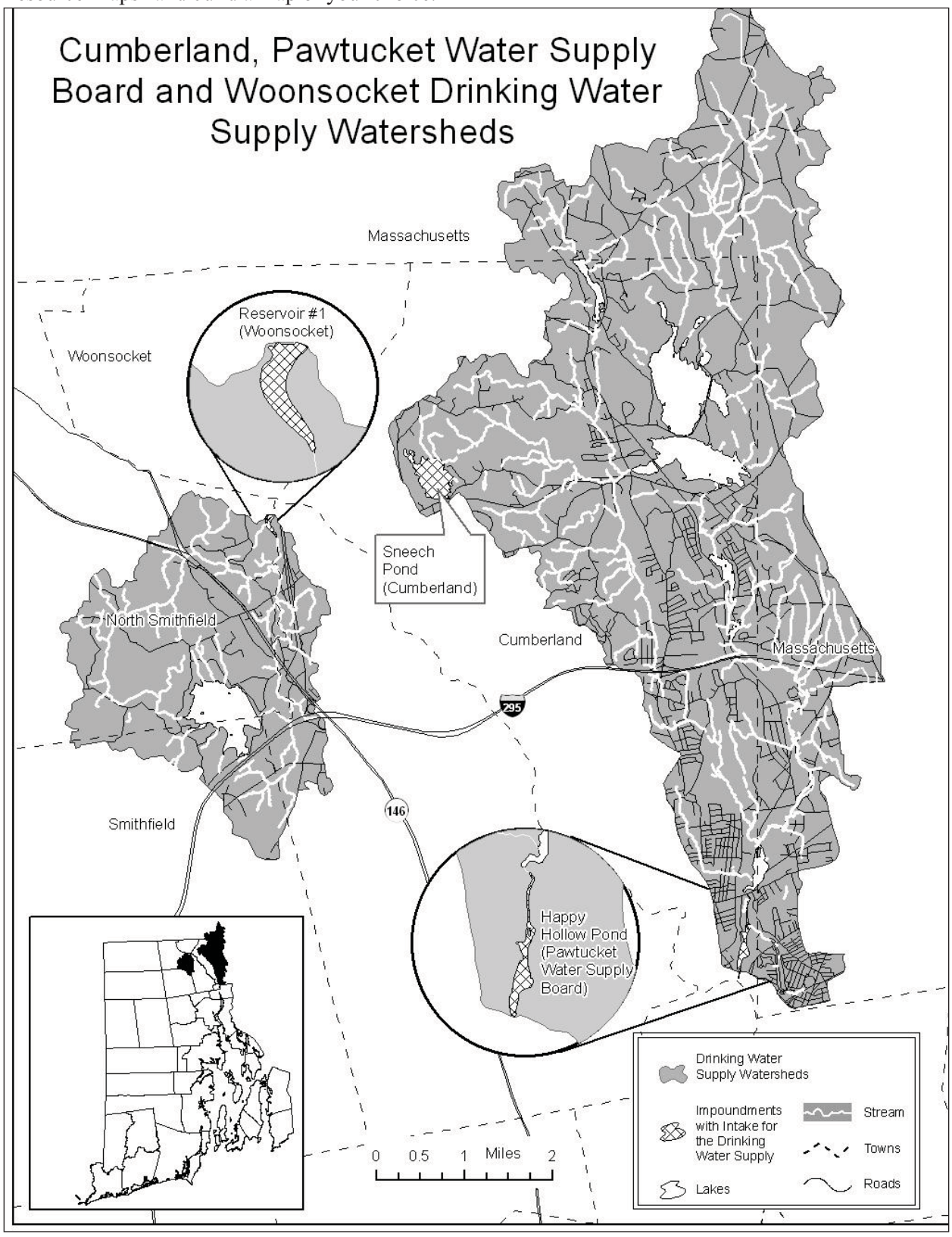


Figure 15. For a detailed look at a location, go to the DEM website, go to "Maps," go to "Environmental Resource Maps" and build a map of your choice.

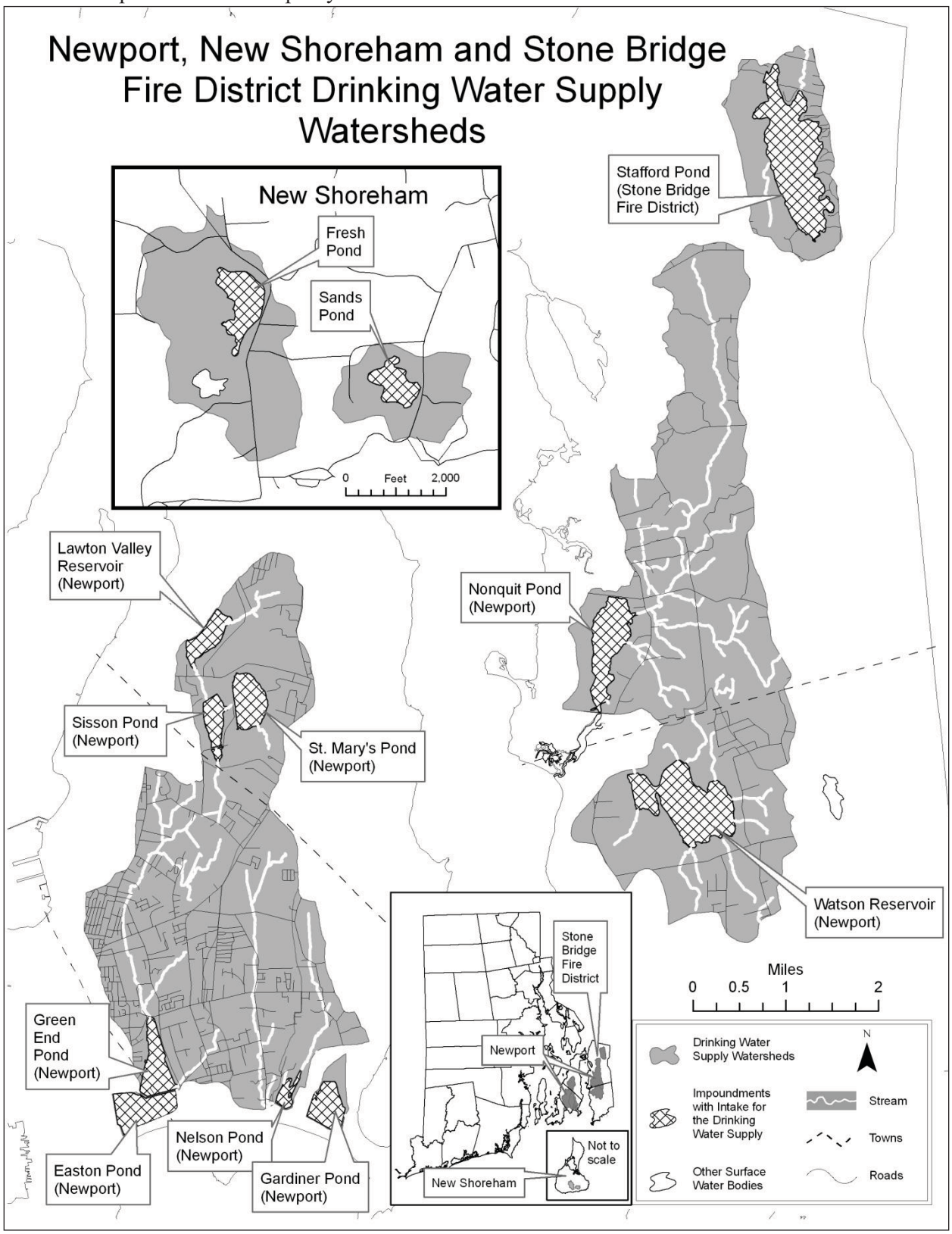
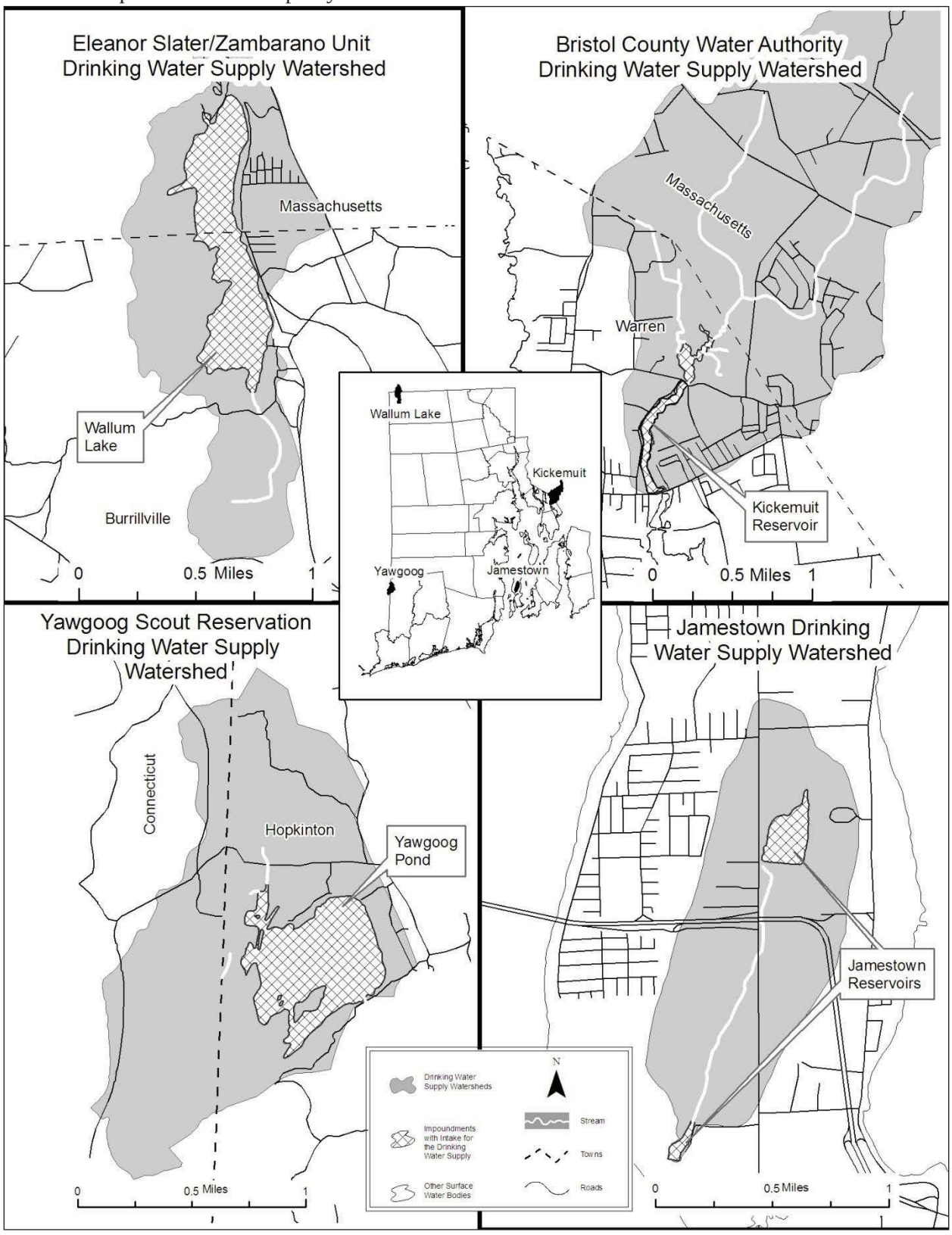


Figure 16. For a detailed look at a location, go to the DEM website, go to "Maps," go to "Environmental Resource Maps" and build a map of your choice.



RULE 56. EFFECTIVE DATE

The foregoing "Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems," after due notice, are hereby adopted and filed with the Secretary of State this_____ day of _____, 2014 to become effective twenty (20) days thereafter, in accordance with the provisions of Chapters 5-56.1, 23-19.5, 42-35, 42-17.1, 42-17.6 of the General Laws of Rhode Island of 1956, as amended.

_____

Janet Coit, Director
Department of Environmental Management

Notice Given On: 5/22/14

Public Hearing Held: 6/23/14

Filing Date: 6/26/14

Effective Date: 7/16/14

Rhode Island Department of Environmental Management

To: Interested Parties

Date: March 22, 2013

Subject: **Alternative or Experimental Onsite Wastewater Treatment System (OWTS) Technologies**

Attached herewith is the official “List” of Approved Alternative / Experimental (A/E) Technologies for onsite wastewater treatment. These technologies have been approved pursuant to RIDEM OWTS Rules. The technologies have been reviewed and accepted by a nine member Technical Review Committee composed of representatives of local government, the University of Rhode Island, CRMC, environmental organizations, and the private sector.

Immediately following this cover is a brief summary of the A/E technology application process and a fact sheet entitled "Guidance to OWTS Designers” that provides additional information and specifies responsibility for designers who are contemplating the use of an approved A/E technology.

Should you have any question or need further information, please contact Deb Knauss of the OWTS Program Office at deb.knauss@dem.ri.gov or 401-222-4700 x 7612.

Rhode Island Department of Environmental Management

February 2013

ALTERNATIVE/EXPERIMENTAL ONSITE WASTEWATER TREATMENT SYSTEMS (OWTS) TECHNOLOGY PROGRAM

Onsite Wastewater Treatment System Rules, provide the basis for approval of Alternative/Experimental (A/E) Technologies in Rhode Island. A/E systems are designed as alternatives to conventional OWTS or parts of a conventional system. A conventional system is a traditional OWTS with a septic tank, pump chamber with pump or siphon (if needed), distribution box and a standard leachfield with gravity distribution. An Alternative/Experimental System or Technology is an OWTS that does not meet the location, design or construction requirements of a conventional system, but has been demonstrated through field testing, calculations and other engineering evaluations to provide the same degree (or better) of environmental and public health protection.

There are three different categories of A/E technologies: alternative systems, system components, and experimental systems.

Alternative Systems - This category has two classes of certification: Class I and Class II.

- A **Class I** certification is issued to technologies that have been shown to have at least four (4) consecutive years of performance data per installation for no fewer than ten (10) installations, collected no less frequently than quarterly, which clearly demonstrate that all applicable standards have been met. A Class I system must also have been approved for at least four (4) consecutive years in Rhode Island with no fewer than ten installations or at least four (4) consecutive years in at least three (3) other jurisdictions, with no fewer than ten (10) installations in each jurisdiction. Class I certifications do not require renewal.
- A **Class II** certification may be issued to technologies under the following conditions:
    - The applicant documents at least two (2) consecutive years of performance data per installation for no fewer than ten installations, with data collected no less frequently than quarterly that demonstrates that Department standards have been met, have demonstrated a theory or applied research, and the applicant demonstrates that the technology has been approved and utilized successfully for at least two (2) consecutive years in Rhode Island or at least two (2) consecutive years in another jurisdiction with no fewer than ten (10) installations in each jurisdiction, ***or***

    For a nitrogen reducing technology:

    - The applicant provides certification that the technology meets NSF/ANSI "Standard 245- Wastewater Treatment Systems- Nitrogen Reduction" and the testing results show a preponderance of treated effluent nitrogen concentrations of nineteen (19) mg/l or less; or
    - demonstrates approval for use in another jurisdiction in an area where the temperature conditions are similar to or colder than those in Rhode Island and with technology review criteria substantially equivalent to Class One or Class Two summarized above and detailed in OWTS Rules 37.4.1 or 37.4.2 (A)-(B). The full text of the Rules is available at: http://www.dem.ri.gov/pubs/regs/regs/water/owts12.pdf

Class II certifications require renewal every five years.

System Components - This category also has two classes of certification: Class I and Class II.

- A **Class I** system component certification is issued for a component when the applicant documents that applicable manufacturer's and material standards are met; the applicant provides at least two (2) consecutive years of performance data for no fewer than ten (10) installations that demonstrates

Department standards are met, if applicable; and the applicant demonstrates that the component has been approved and utilized successfully for at least two (2) consecutive years in Rhode Island or at least two (2) years in at least three (3) other jurisdictions for no fewer than ten (10) installations in each jurisdiction.

- A **Class II** system component certification is issued for a component when the applicant documents that applicable manufacturer's and material standards are met; the applicant provides at least one (1) year of performance data for no fewer than ten (10) installations that demonstrates Department standards are met, if applicable; the applicant demonstrates that the component has been approved and utilized successfully for at least one (1) year in Rhode Island or at least one (1) other jurisdictions for no fewer than ten (10) installations in each jurisdiction.

Experimental Systems - This category is designed to allow innovative systems, that have been demonstrated to work in practice or theory, to be installed on a limited basis as they are further tested and studied.

Experimental use is approved when:

1. The applicant demonstrates that the technology will work in practice and in theory;
2. Provides for three (3) to ten (10) proposed installations, a suitable area at each location for the installation of an OWTS permitted under the OWTS Rules, or a Class One A/E OWTS Technology;
3. The applicant proposing the Experimental Technology, the property owner(s) and subsequent purchaser(s) submit a signed statement to the Director agreeing to abandon the Experimental Technology and install an OWTS permitted under these Rules, or a Department approved Class One A/E OWTS Technology if the Experimental OWTS fails to perform as designed; and
4. The applicant submits documentation securing a bond or other form of financial security acceptable to the Director, to replace the entire OWTS in the event it fails to perform as designed.

Review and Approval Process

For a technology or component to be approved for use in the state of Rhode Island, the Vendor of that technology must submit an application package to the Department's A/E Technology Program for review. The application package is reviewed by Department staff for completeness. Completed applications are forwarded to the Department's OWTS Technical Review Committee (TRC). The TRC is made up of members from the Department, Coastal Resource Management Council, local Universities, OWTS design and installation firms, local municipalities, and environmental organizations. The TRC reviews all A/E applications and makes recommendations to the Department based on their findings. The Department then issues the final approval or denial.

An approval is documented in the form of a Certification signed by the Chief of Groundwater and Wetlands Protection in the Office of Water Resources. The Certification lists any design, maintenance or installation requirements or restrictions placed on the technology and it also indicates the general requirements and any sampling and reporting requirements associated with the technology.

After a technology is approval is certified by the Department, the Vendor must submit a Design and Installation Manual for review. When the technology's Design and Installation Manual is approved the technology is then placed on the Department's List of Approved Innovative/Alternative Technologies. Once an A/E technology is on the list then individual applications to design, construct, alter, or install these technologies may be submitted to the Department. Please note that an A/E technology is not approved for use under the program until placed on the list. Individual OWTS applications submitted to the Department proposing a technology not yet listed as of the date of receipt of the application must be submitted through the variance process.

GUIDANCE TO OWTS DESIGNERS

Rhode Island Alternative/Experimental OWTS Technology Program

The purpose of this section is to provide guidance on the design, installation and use of the approved technologies under the Rhode Island A/E OWTS Technology Program. By following this guidance, designers will help promote the acceptance and beneficial use of A/E technologies in Rhode Island and expedite the approval process for individual applications.

A/E technologies generally offer improved performance over conventional technologies by using one or a combination of innovative designs, patented products, alternative materials, filtration processes, recirculation systems, pumps, or other electromechanical devices. The primary application for these technologies is at existing home sites on substandard lots having failing or otherwise inadequate OWTSs, and at other sensitive or difficult sites. A/E technologies often require special design and maintenance considerations, and some may involve significant additional design, installation or operational cost.

Certification

The certification letter issued by the Department for each A/E technology is the primary source of information concerning the terms and requirements guiding the use of the technology under the A/E program. The certification includes the design requirements, design exceptions, special operation and maintenance requirements, and obligations of the vendor. Copies of the certifications are available from the vendor.

Important: Please note that the certification represents only that the Department has accepted the technology for listing on the List of Approved A/E Technologies in accordance with its Rules. It is not an endorsement of the technology, nor is it a recognition of any claim other than that which is specifically stated in the certification letter.

Authority to Design

Please note that technology certifications specify the license classes which are authorized to submit to the Department design applications incorporating any of these approved A/E OWTS technologies. These classes are listed with the technology summaries provided herein as “Authority to Design”.

Designer Responsibility to Inform Purchasers and Users

Conventional OWTS systems are relatively well understood by the general public. Most people know about basic septic system components, their limited operation and maintenance requirements, and have a rough idea of costs. A/E technologies, on the other hand, vary considerably from these familiar standards. As a practical matter, the Department will not be able to inform the public adequately about the many different A/E technologies. Accordingly, this responsibility will fall upon the vendors of the technologies and, more particularly, upon designers who elect to use or recommend these technologies to their clients.

Begin by making sure you obtain from the vendor the complete details of the technology, including its design and installation details, operational and maintenance requirements, applicability to the siting or design problem you are attempting to address, and all costs. Next, give your client a complete copy of the certification for the technology issued to the vendor and ask your client to read it. The certification contains many special provisions of which users or purchasers should be apprised. The certification requires that the vendor provide any purchaser of the system with a copy of the Department’s approval prior to the sale of the system. Take time to familiarize the client with all relevant details of the technology. These details may include: appearance or aesthetic aspects, such as above ground tanks, vents or other components; manhole covers; motors; pumps; electrical panel boxes; energy requirements; periodic maintenance needs; costs including design, installation, operating and maintenance costs; noise; and odors, if any. The expected service life of the equipment and

overall system should also be addressed. Finally, the advantages and disadvantages of each technology being considered should be fully explained.

Design

Manuals: Each A/E technology is required to have a Design, Installation and O&M Manual. The manuals are produced by the manufacturer or vendor and should be obtained directly from them. The contact name, address and telephone number of the vendor is given on the A/E technology list. The manuals are intended to supply all of the required information to enable design and installation of the A/E system. The manuals also include a copy of the Department's certification letter. Vendors must ensure proper training to help acquaint you with their technologies and answer questions. Some vendors offer specific design and installation services. Some offer services as part of the cost of supplying the product; others may offer additional services on a fee for service basis.

Leachfield Size Reduction: Certain A/E technologies have been approved with an allowance for a reduction in leachfield size. However, for new building construction, the designer proposing a reduced leachfield area must demonstrate that sufficient land area is available to permit installation of a full size leachfield; this should be shown on the plan as an extension of the proposed leachfield area. The additional area must be clearly labeled as the "reserve area", so that it is clear that no construction will take place in this area. The full size leachfield shall meet all OWTS regulatory requirements. Please note that in most cases the leachfield size reduction may only be applied to conventional leachfield types contained in the rules. The size reduction ordinarily does not apply to the Eljen GSF system because this system is considered an A/E technology. Sizing for Eljens should comply with the requirement in the certification.

Electrical: Electrical components and wiring must comply with applicable state and local codes. Power interrupt alarms, where required, generally must be placed on the exterior of the building. The Department will allow interior placement at commercial buildings where access to the interior is readily available during normal business hours.

Operational Requirements: All mechanical treatment systems require electrical power. One or more controllers are normally supplied. Hours of operation are sometimes adjustable and must be reviewed as part of the design process. Operational controls must be set so as to optimize treatment and ensure compliance with the operational efficiencies stipulated by the terms of the certification.

Eljen GSF: The Eljen GSF leachfield system may be used with a single trench line. Normally, two trench lines are required for the minimum trench design according to state Rules.

Effluent Filters: Several effluent filters have been approved for use. Please note that a manhole to grade is required over the outlet port above the effluent filter to facilitate maintenance of the filter.

Variances

Designs incorporating A/E technologies must comply with all other applicable OWTS standards. Where these standards cannot be met, a variance application must be filed in order that the Department properly assess the impacts of the variance request on the operation of the system and on the environment. The fee for the specially engineered system will not be assessed if the only engineered feature is the approved A/E technology.

Nitrogen-Reducing Treatment Systems

Technologies currently recognized as capable of significantly reducing nitrogen levels in residential wastewater are Advantex AX, Advantex AX-RT, Amphidrome, Bioclere, FAST, Hydro Kinetic Model FEU, Nitrex, Norweco, Inc. Singulair TNT & Green TNT, SeptiTech, Siegmund Singulair DN and the RSF as provided in the Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - December 2013. The Department may impose additional monitoring requirements for any nitrogen-reducing system design that is not covered under an A/E approval.

Non-Endorsement

The Department of Environmental Management certification under the A/E program does not represent an endorsement by the agency of any system or technology. A representation by any person, vendor or designer that the Department endorses any A/E technology is strictly prohibited.

Rhode Island Department of Environmental Management
Office of Water Resources

Onsite Wastewater Treatment System Program
Use of Dispersal Trench and Approved Alternative Leachfields
With Approved A-E Advanced Treatment Systems

October 2, 2008

Effective immediately for all New Building Construction, Alteration and Repair Applications, RIDEM announces the following changes to applicable Alternative – Experimental Technology Certifications concerning requirements for use of pressurized shallow narrow drainfields (PSNDs) or bottomless sand filters (BSFs) with RIDEM approved nitrogen removal OWTS technologies in the Salt Pond and Narrow River Critical Resource Areas:

Dispersal trench (or conventional leachfield) and approved alternative leachfield technologies may be used in the design of any OWTS in the Salt Pond and Narrow River Critical Resource Area provided that the leachfield design complies with all setback and design requirements of the OWTS Rules. Designs employing a reduced leachfield area as may be allowed pursuant to the applicable A-E advanced treatment technology certification must show the 100% leachfield area on the plans and demonstrate compliance with all setbacks required by the OWTS Rules. Designs for Repair applications are not required to show the 100% leachfield area.

Please note that the use of dispersal trenches (conventional leachfields) in the Salt Pond and Narrow River Critical Resource Areas will not likely be allowed where a variance application to any minimum standard is required. For single family residential applications, the designer should employ a pressurized shallow narrow drain field (PSND) or bottomless sand filter (BSF). If a design using a dispersal trench or alternative leachfield cannot meet the minimum setback standards contained in the OWTS Rules, the Department will require consideration of alternate designs – including a reduction in project scale for new construction and other projects which propose an increase in wastewater flow – that would enable compliance or substantial compliance with the OWTS Rules prior to or as part of any application for variance to the minimum setback standards contained in said Rules.

Please also note that should any language above deviate from that contained in any A-E technology certification, the provisions given herein shall apply to that certification.

List of Approved Alternative/Experimental OWTS

LEACHFIELD SYSTEMS

Technology Name: **Perc-Rite® Drip Dispersal System**

Vendor Information:
Tom Ashton R.E.H.S, C.P.S.S.
Regulatory Relations
American Manufacturing Company, Inc.
PO Box 97
22011 Greenhouse Road
Elkwood, VA 22718

Phone: 1-800-345-3132
Fax: 540-825-7234

Regional Contacts:
Dan Ottenheimer
Oakson, Inc.
6 Sargent Street,
Gloucester, MA 01930

Email: info@oaksoninc.com
Phone: 1-877-Oakson1
1-978-282-1322
Fax: 978-282-1318
Website: www.OaksonInc.com

Certification: Component Technology - Class II Component

Technology Type: Alternative Leachfield Component

Authority to Design: Cl-II & III Licensed Designers

Description: The Perc-Rite® Drip Dispersal System receives time-dosed effluent from a final dosing tank after either a septic tank or a RIDEM approved pre-treatment system producing a minimum effluent quality of TSS/BOD of 30/30 mg/L and FOG of 5 mg/L and following 115-micron disc filtration, disperses effluent below the soil surface through ½" nominal diameter pressurized tubing.

Technology Name: **ARC 18*, ARC 24, ARC 36 and ARC 36 HC**

Vendor Information:
Infiltrator Systems, Inc.
4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475

David Lentz, PE
Regulatory Director
(860) 577-7198
dlentz@infiltratorsystems.net

Technical Services
(800) 221-4436

Certification: Alternative Component - Class II

Technology Type: Alternative Leach Field Component

Authority to Design: Cl-II & III Licensed Designers

Description: The Component is arc-shaped, molded high-density polyethylene, with a solid roof, louvered sidewalls and an open bottom; it is installed in a trench configuration. Sizing is based on a 1.72 multiplier of the open bottom area with a maximum of 4.0 SF/LF. No stone is used in this installation and trenches are required to be interconnected.

*The ARC 18 chamber is also approved for use as the dome structure in a Pressurized Shallow Narrow Drainfiled (PSND). Design and sizing are in accordance with specification in the RIDEM Sand Filter Guidance Document and the approved vendor's design and installation manual.

Technology Name: **Bottomless Sand Filter**

Vendor Information: Generic

Certification: Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

Technology Type: Alternative Leachfield

Authority to Design: Cl-II & III Licensed Designers

Description: An equal or superior leachfield for pretreated effluent which is applied under pressure to a 2' bed of specified sand media. The effluent is pumped to and distributed by SCH 40 PVC or equivalent surrounded by a minimum of 6" of peastone. Wastewater trickles down in unsaturated thin-film flow through sand media in a time dosed mode. After treatment the effluent is disposed directly under the sand filter. The technology is targeted for single family sized systems where soil and site conditions exist that make the use of conventional or shallow narrow drain fields impractical or not economical.

Technology Name: **Cultec Contactor Chambers Models 75, 100, 125 & Field Drain Panels (C-1, C-2, C-3 & C-4)**

Vendor Information: Cultec, Inc.
878 Federal Road
Brookfield, CT 06804
(800) 4-CULTEC

Certification: Component Technology - Class I Component

Technology Type: Alternative Leachfield Component

Authority to Design: Cl-I, II & III Licensed Designers

Description: The System consists of high-density polyethylene arch-shaped chambers that have holes along the sidewall of the lower portion of the units. Three models of Contactor Chambers (models 175, 100 and 125) and four Field Drain Panel configurations (C-1, C-2, C-3, C-4) have been approved. The system is installed with 1 ft. of stone beneath the chambers and additional stone filling the sidewall space between the trench wall and the chamber. Trench width and depth varies with the model of the system, see the RIDEM issued Cultec Certification for more details. These chambers shall be sized based on DEM's approval and designed in accordance with DEM Rules for shallow concrete chambers (flow diffusers) Rule 34.2.

Technology Name: **Eljen Geotextile Sand Filter (GSF)**

Vendor Information: Eljen Corporation
James Donlin, or Brian Parker
125 McKee Street
East Hartford, CT 06108
(800) 444-1359

Certification: Alternative System or Technology - Class I

Technology Type: Alternative Leachfield

Authority to Design: Cl-I, II & III Licensed Designers

Description: The Eljen GSF is designed to replace the gravel/stone media of a conventional trench leachfield. GSF modules are constructed of a cuspated plastic core that is completely enveloped by a geotextile fabric that is folded accordion style over and under the plastic core. Each GSF module unit is 3 feet wide, 4 feet long, and 7 inches high, and is designed to be installed in a trench with a minimum of 6 inches of concrete sand bedding beneath and along the sidewalls of the units. The GSF has been assigned the following sizing criteria: one linear foot of GSF is equivalent to 7 square feet of required leachfield area.

Technology Name: **Geoflow Drip System**
Geoflow WASTEFLOW™ Classic WF16-4-24 and WF16-2-24
Geoflow WASTEFLOW™ PC WFPC16-4-24 and WFPC16-2-24

Vendor Information:

Karen Ferguson
Geoflow, Inc.
506 Tamal Plaza
Corte Madera, CA 94925

Phone: 800-828-3388
Fax: 415-927-0120
E-mail: krf@geoflow.com
Web: www.geoflow.com/

Regional Contacts:

J&R Sales & Service, Inc.
James Dunlap
44 Commercial Street
Raynham, MA 02767

Phone: 508-823-9566
Fax: 508-880-7232
E-mail: jim@jrengprod.com

Certification: Component Technology - Class II Component

Technology Type: Alternative Leachfield Component

Authority to Design: Cl-II & III Licensed Designers

Description: The Geoflow subsurface drip dispersal system time doses effluent below the soil surface through ½" nominal diameter pressurized tubing. Following treatment by a RIDEM approved A/E treatment system producing a minimum effluent quality of TSS/BOD of 30/30 mg/L and FOG of 5 mg/L, the wastewater is discharged to a final dosing tank for timed-dosing to the Component.

Technology Name: **GeoMat 1200 and GeoMat 3900**

Vendor Information:

Geomatrix Systems, LLC
114 Mill Road East
Old Saybrook, CT 06475

Contacts:

David Potts
Phone: 860-510-0730
Fax: 860-510-0735
Web: http://www.geomatrixsystems.com/

Certification: Component - Class II

Technology Type: Alternative Leachfield

Authority to Design: Cl-II and III Licensed Designers

Description: GeoMat is a leaching system comprised of a one-inch thick core of fused, entangled plastic filaments; it is installed on natural soil or a sand interlayer where specified in applicable design guidance. GeoMat 1200 is sleeved in geotextile fabric and a low-pressure distribution line (1-inch Schedule 40 PVC), with down-facing orifices set in clear plastic orifice shields, is inserted into the fabric sleeve, on top of the mat material and then covered by soil to a depth between 6 and 12 inches. GeoMat 3900 is dosed by two low-pressure distribution lines (1-inch Schedule 40 PVC), with down-facing orifices set in clear plastic orifice shields. The
GeoMat 3900 and its two dosing pipes are covered by geotextile fabric prior to backfilling. Cleanout/distal pressure monitoring ports are installed on the terminal end of each of the distribution lines for both GeoMat 1200 and 3900. The Component is used in conjunction with a time-dosed pump apparatus and must be preceded by a RIDEM approved treatment technology producing an effluent quality of at least 30 mg/l for both TSS and BOD.

Technology Name: **Infiltrator Chambers**
Double-Wide Standard Infiltrator Chambers
Double-Wide High Capacity Infiltrator Chambers

Vendor Information: Infiltrator Systems, Inc.
Judd Efinger
4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
(800) 221-4436

Certification: Component Technology - Class I

Technology Type: Alternative Leachfield Component

Authority to Design: Cl-I, II & III Licensed Designers

Description: The Infiltrator Chambers are arch-shaped high density polyethylene chambers with a nominal width of 2.83 ft. and a length of 6.25 ft. with a ¼ inch high horizontal slots along the sidewall on the lower half of the units. The Standard Chamber is 12 inches high and the High Capacity Chamber is 16 inches high. The system is installed in a 6 ft. wide trench with 1 ft. of stone beneath the chambers and additional stone filling the sidewall space between the trench wall and the chamber. These chambers shall be sized based on DEM's approval and designed in accordance with DEM Rules for shallow concrete chambers (flow diffusers) Rule 34.2.

Technology Name: **Infiltrators (Stoneless Trench Configuration)**
Quick 4 Standard Chamber
Quick4 Equalizer 24 Low Profile Chamber

Vendor Information Infiltrator Systems, Inc.
6 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
(800) 221-4436

Certification Component Technology – Class I

Technology Type Alternative leachfield component

Authority to Design: Cl-I, II & III Licensed Designers

Description : The component is an arch shaped Polyolefin injection molded chamber with louvered side slots installed in a trench configuration. The Quick 4 Standard Chamber is sizing is based on a 1.72 multiplier of the open bottom area with a maximum of 4.0 SF/LF. No stone is used in this Installation and trenches are required to be interconnected. The Quick4 Equalizer 24 Low Profile Chamber is approved exclusively for use as the dome structure in a Pressurized Shallow Narrow Drainfiled (PSND). Design and sizing are in accordance with specification in the RIDEM Sand Filter Guidance Document and the approved vendor's design and installation manual.

Technology Name: **Pressurized Shallow-Narrow Drainfield**

Vendor Information: Generic

Certification: Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

Technology Type: Alternative Leachfield

Authority to Design: Cl-II & III Licensed Designers

Description: Pre-treated effluent of at least 30/30 TSS/BOD is applied under pressure through distribution laterals of 1 to 1 ¼ inch Schedule 40, pressure rated PVC pipe, installed 8-12 inches below existing and finish grades. The distribution pipe is covered with a dome-like structure made of 12 inch diameter PVC pipe (or approved equivalent) cut lengthwise; this dome and the pressure-distribution pipe are supported by one (1) inch diameter Schedule 40 PVC support pipes, which also act as a spreader device for the dome, and provide a greater bearing surface for the dome. Schedule 40 PVC or equivalent sweep elbows (turnups) at the distal end of each drainfield lateral facilitate maintenance and inspection.

SYSTEM COMPONENTS

A. EFFLUENT FILTERS

Technology Name: **GAG SIM/TECH Filter**

Vendor Information:
Gary Koteskey, President
SIM/TECH Filter
06598 Horton Bay North Rd
Boyne City, MI 49712
616-582-7327

Certification: Component Technology - Class I

Technology Type: Pump effluent filter for use with pressure distribution system

Authority to Design: Cl-I, II & III Licensed Designers

Description: The SIM/TECH filter is 3 inches in diameter, 18 inches in length, made of schedule 40PVC (or ABS) and stainless steel containing 1/16 inch holes with a total open area of 69.52 sq. in. (41%). It is placed on the discharge side of a pump and lessens clogging of small diameter holes of pressure distribution piping.

Technology Name: **OSI Effluent Screens, Screened Pump Vaults and Biotube Pump Vaults**
Filters: F, FE, FT, and FTI Series
Screened Vaults: OSI200, SV1500
Biotube Pump Vaults: PVU Series (replaces SVT Series)
PVU57-1819, PVU57-2419, PVU68-1819, PVU68-2425

Vendor Information:

Orenco Systems Inc. **(OSI)**
Eric Ball, VP Product Development
Terry Bounds, Executive VP
814 Airway Avenue
Sutherlin, OR 97479-9012
(514) 459-4449
www.orenco.com

Regional Contacts:

Atlantic Solutions
Robert Johnson
2417 East Main Road
Portsmouth, RI 02871
(401) 293-0176

Green Wastewater Solutions
Richard Pezza
80 Kilvert Street
Warwick, RI 02886
(401) 737-7600

Certifications: Component Technology - Class I

Technology Type: Effluent Screen and Pump Vault Filter

Authority to Design: Cl-I, II & III Licensed Designers

Description: OSI effluent screens are constructed of reinforced cylinders of 1/8-in. mesh polyethylene with a fiberglass base; they are used in effluent dosing tanks to minimize the solids leaving the tank. OSI screened pump vaults are designed for use with conventional low-head style effluent and sewage pumps; they are installed at the outlet end of a single or double compartment septic tank. The screened vault minimizes entry of solids to the pump. OSI Biotube pump vaults are installed at the outlet end of a single or double compartment septic tank or separate dosing tanks in effluent pumping systems. Pump vaults house a Biotube effluent filter that minimizes solids carryover to following components in the system. Pump vaults are 12 in. in diameter, and accommodate one pump (simplex) or two pumps (duplex).

Technology Name: **Polylok PL-122, PL-525 & PL-625 Effluent Filters**

Vendor Information: Polylok, Incorporated
3 Fairfield Blvd.
Wallingford, CT 06492

http://www.polylok.com

Patrick Mulhall
Vice President, Sales and Marketing
877-765-9565

Certification: Component Technology - Class I

Technology Type: Effluent Filter

Authority to Design: Cl-I, II & III Licensed Designers

Description: The Polylok PL-122, PL-525 and PL-625 are wastewater effluent filters designed for installation at the outlet of a septic tank to minimize solids from passing to the leachfield.

- **PL-122** has 122 linear feet of 1/16th-inch slots and is suitable for residential flows up to 1,500 gallons per day; it is modular, providing increased filtration area by snapping two or more filters together.
- **PL-525** has 525 linear feet of 1/16th-inch slots and is rated for residential or commercial flows up to 10,000 gallons per day.
- **PL-625** has 625 linear feet of 1/32nd-inch slots; it is rated for residential or commercial flows up to 10,000 gallons per day and is suitable for use in grease tanks.

All three filters are alarm accessible and are equipped with a gas deflector and buoyant shut-off ball that prevents flow of unfiltered effluent from the tank when the filter is removed for maintenance.

Technology Name: **Zabel A-1800, A-100, A-300**
Residential and Commercial Wastewater Filters

Vendor Information: Zabel Environmental Technology
10409 Watterson Trail
Jefferson, KY 40299
(800) 221-5742

Certification: Component Technology - Class I

Technology Type: Effluent Filter

Authority to Design: Cl-I, II & III Licensed Designers

Description: The Zabel filters are PVC wastewater effluent filters designed to be installed at the outlet of a septic tank to prevent solids from passing to the drain field.

Technology Name: **Zoeller Effluent Filters**

Vendor Information: Zoeller Pump Co.
3469 Cane Run Road
Louisville, KY 40211
(800) 928 7867

Certification: Component Technology Class I

Authority to Design: Cl-I, II & III Licensed Designers

Description: The technologies includes a mode series of pumps in screened Vaults designed for installation at the outlet of a septic tank to prevent solids passing to the leachfield. There is also approval for a commercial septic tank effluent filter to prevent solids carryover.

SYSTEM COMPONENTS

B. DISTRIBUTION COMPONENTS

Technology Name: **Polylok PL- Dipper Box**

Vendor Information: Polylok, Inc./Zabel Environmental
3 Fairfield Boulevard
Wallingford, CT 06492
877-765-9565

Certification: Component Technology - Class I

Technology Type: Distribution Box

Authority to Design: Cl-I, II & III Licensed Designers

Description: The Polylok Dipper Box is a leachfield dosing mechanism designed on the pivot and balance principal. The Component is comprised of a specially designed concrete distribution box with dipper tray assembly. The dipper storage tray receives effluent from the septic tank; a volume of 1.5 gallons causes the tray to tip, discharging its contents within the distribution box to equally distribute effluent to each line of the leaching component.

Technology Name: **Zoeller Tru-Flow D-Box**

Vendor Information: Zoeller Pump Co.
P.O. Box 16347
Louisville, KY 40256-0347

Certification: Component technology – Class I

Technology Type: Distribution Box

Authority to Design: Cl-I, II & III Licensed Designers

Description: The unit is comprised of a diverter basin and a diverter assembly to evenly split flow to five outlet lines by adjusting a bubble level and adjustment screw in the event of uneven settling.

SYSTEM COMPONENTS

C. TANKS

Technology Name: **Infiltrator TW-Series Tanks**
TW-900, TW-1050, TW-1250, TW-1500

Vendor Information: Infiltrator Systems, Inc.
6 Business Park Road
PO Box 768
Old Saybrook, CT 06475
(800) 221-4436

Certification: Component – Class II

Technology Type: Tank

Authority to Design: Cl-I, II & III Licensed Designers

Description: Infiltrator Systems, Inc.'s TW-Series tanks are manufactured of rotationally molded polyethylene and are certified by IAPMO and CSA. These tanks may be used in accordance with the RIDEM OWTS Rules, the Certification and the Vendor's RIDEM-approved design, installation and O&M manual.

NOTE: **As of June 30, 2011** these tanks will satisfy the provisions of the OWTS Rules, because the minimum liquid level for septic tanks was reduced from 48-inches to 39-inches in the June 2011 OWTS Rules revision; the Infiltrator TW-Series Tank certification was issued June 3, 2011.

ALTERNATIVE SYSTEMS

A. ADVANCED TREATMENT SYSTEMS

Technology Name: **AdvanTex AX20 *(Mode 1 Configuration)***
Also approved for nitrogen removal in Mode 3, see Nitrogen Reduction Treatment Systems

Technology Name: **AdvanTex AX100 *(Mode 1 Configuration)***
Also approved for nitrogen removal in Mode 3, see Nitrogen Reduction Treatment Systems

Technology Name: **AdvanTex® AX-RT Series: AX20-RT, AX25-RT *(Mode 1 Configuration)***
Other smaller or larger-scale AX-RT units if developed
Also approved for nitrogen removal in Mode 3, see Nitrogen Reduction Treatment Systems

Technology Name: **Amphidrome®**
Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems

Technology Name: **Bioclere**
Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems

Technology Name: **BioMicrobics FAST (Single Home and Modular)**
Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems

Vendor Information:	Bio-Microbics, Inc. Robert Rebori 8271 Melrose Drive Lenexa, KS 66412 (913) 492-0707	**Regional Contact:** Jim Dunlap, J&R Engineering 534 New State Highway Raynham, MA 02767 (508) 823-9566
Certification:	Alternative System or Technology - Class I	
Technology Type:	Aerobic Wastewater Treatment System – TSS & BOD Reduction	
Authority to Design:	Cl-II & III Licensed Designers	

Description: The FAST (Fixed Activated Sludge Treatment) system is an aerobic wastewater treatment system that utilizes an aerobic fixed film process that is a combination of the conventional trickling filter and activated sludge processes. The FAST system is designed to be installed within a two-compartment tank where the first compartment provides a primary settling zone for incoming sewage and the second houses the actual FAST system. The system contains submerged media that provide surfaces for microbial growth. Aeration and circulation are provided by a blower that pumps air into a draft tube that extends down the center of the tank. The system is capable of significantly reducing biological oxygen demand (BOD_5), total suspended solids (TSS), and total nitrogen in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leachfield size.

Technology Name: **The NIBBLER® Wastewater Treatment Process**
Models: NIBBLER® SBP (square pod) and NIBBLER® CBP (cylindrical pod)

Vendor Information:
Aqua Test, Inc.
P.O. Box 1116
Black Diamond, WA 98010
28620 Maple Valley Rd SE
Maple Valley, WA 98038

Tel: 1-800-221-3159
Fax: 425-413-9431
Website: www.aquatestinc.com

Matt Lee, President
Email: aquatestinc@yahoo.com
Tel: 1-800-221-3159
Fax: 425-413-9431

Distributor:
Atlantic Solutions, LTD
Bob Johnson
2417 East Main Road
Portsmouth, RI 02871
Tel: 401-293-0176
Website: www.atlanticsolutionsltd.com/
Email: bjohnson@septicsystems.net

Certification: Alternative System or Technology - Class II

Technology Type: Advanced Treatment System for BOD, TSS and FOG Removal

Authority to Design: Cl-II & III Licensed Designers

Description: The NIBBLER® Wastewater Treatment Process incorporates aerobic fixed film treatment and is designed based on organic load per NIBBLER® pod for removal of BOD, TSS and FOG, to reduce high strength commercial or residential wastewater to levels comparable to that of residential strength septic tank effluent.

The NIBBLER® **SBP** is comprised of a septic tank, grease tank (or comingle tank where a single plumbing stub is available) and a surge tank, which time doses the NIBBLER® based on average daily flow. The NIBBLER® SBP tank is followed by a clarifier tank, a pump tank, and then a leachfield or an advanced treatment system. Multiple NIBBLER® SBP tanks may be installed in parallel following a splitter basin.

The NIBBLER® **CBP** (cylindrical pod) is designed for installation with associated aeration system in existing septic tanks.

At the design organic loading rate of 0.81 pounds per day BOD per Nibbler pod, the RIDEM recognizes the System as capable of achieving the following guaranteed treatment objectives:

- At operating capacity: BOD5 <150 mg/L, TSS <125 mg/L and FOG <20 mg/L and,
- At peak design flow BOD5 <200 mg/L, TSS <150 mg/L and FOG <25 mg/L.

Technology Name: **Norweco Singulair Model 960 [concrete] (500, 750, 1000 1250 & 1500 GPD)**
Norweco Singulair Green® 960-600 [HDPE] (maximum design flow 600 gpd)

Vendor Information:
Norweco, Inc.
220 Republic Street
Norwalk, OH 44857

Tel: 419-668-4471
Web: www.norweco.com

Scott Hetrick, Sales Manager
Email: shetrick@norweco.com
Tel: 419-668-4471
Fax: 419-663-5440

Local Contacts (Distributors / Dealers):
Siegmund Environmental Services
49 Pavilion Ave., 2nd Floor
Providence, RI 02905

Telephone: (401) 785-0130

Laszlo Siegmund
Tel: 401-316-7877
Fax: 401-785-3110
Email: lsiegmund@siegmundgroup.com
Web:http://www.seswastewater.com/

Sterling Environmental Technologies
141 Asher Ave
Stonington, CT 06379

Tel: (401) 322-7669

Robert Frost
Tel: (401) 523-4812
Fax: (401) 315-0750
Email: bob@sterling-et.com

Certification: Alternative System or Technology - Class II

Technology Type: Advanced Treatment System for TSS & BOD Removal

Authority to Design: Cl-II & III Licensed Designers

Description: The Singulair wastewater treatment system is a self-contained three-chambered treatment system utilizing primary treatment (settling), mechanical aeration, clarification, and flow equalization to achieve treatment. Wastewater from the building enters the primary settling chamber through an inlet tee, then enters an aeration chamber. In the aeration chamber, an aspirator at the bottom of a shaft disperses air radially as fine bubbles provide oxygen for the biomass and vertically mix chamber contents. The wastewater in the aeration chamber passes through to the clarification chamber for final settling of solids. Treated wastewater passes through an effluent filter as it exits the system and is then gravity fed to the leachfield. The RIDEM recognizes the System as capable of achieving effluent concentrations of 30 mg/L for both TSS and BOD. Based on these reductions, the RIDEM has allowed for a 40% reduction in leachfield size.

Technology Name: **Norweco Singulair TNT [concrete] 750, 1000, 1250 and 1500**
Norweco Singulair Green TNT [HDPE] 600

See Nitrogen Reduction Treatment Systems.

Technology Name: **SeptiTech M series**

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Vendor Information: SeptiTech Inc.
220 Lewiston Road
Gray, Maine 04039
(207) 657-5252

Certification: Alternative System or Technology Class II

Technology Type: Recirculating Biological Trickling Filter

Authority to Design: Cl-II & III Licensed Designers

Description: The mixed liquor process repeatedly passes the effluent over water repellant Styrofoam beads which entrains the Microbes in the wastewater as it flows through the media. It is designed to be installed after a septic tank; a second tank houses the system. The Department has allowed a 50% reduction in conventional leachfield size.

Technology Name: **Single Pass Sand Filter**

Vendor Information: Generic

Certification: Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

Technology Type: Advanced Treatment System

Authority to Design: Cl-II and III Licensed Designers

Description: Wastewater, having received primary treatment in a septic tank or equivalent unit, is pressure dosed to a bed of specified sand media. Wastewater applications to the filter surface are controlled by both a programmable timer and float switch. Wastewater is dispersed over the sand filter surface in a PVC pipe distribution network surrounded in pea stone. Wastewater trickles down in unsaturated thin film-flow through the sand media, where biological treatment occurs. The treated wastewater (sand filter effluent) is collected in an underdrain at the bottom of the filter and discharged by pressure to a shallow - narrow drainfield, where additional treatment occurs. The system is capable of significantly reducing biological oxygen demand (BOD_5), and total suspended solids (TSS). Ammonia and pathogens reductions may also be achieved. The technology is targeted for use in critical resource areas and is intended to be used with shallow pressurized drainfields.

Technology Name: **Puraflo® Peat Biofilter**

Vendor Information:
Greg O'Donnell
Bord na Mona Environmental Products US, Inc.
P.O. Box 77457
Greensboro, NC 27417
800-PURAFLO

Certification: Alternative System or Technology - Class II

Technology Type: Advanced Treatment System

Authority to Design: Cl-II & III Licensed Designers

Description: The Puraflo is a modular pre-engineered biofiltration system that utilizes natural peat fiber as a biofilm media. Among the processes occurring are filtration, absorption, adsorption, ion exchange, and microbial assimilation. Primarily used in single pass mode. The system is capable of significantly reducing biological oxygen demand (BOD_5), and total suspended solids (TSS). Ammonia and pathogens reductions may also be achieved. The technology is targeted for use in critical resource areas and may be used with shallow pressurized drainfields.

B. NITROGEN REMOVAL SYSTEMS

Technology Name: **AdvanTex AX20 *(Mode 3 Configuration)***
(Also approved for TSS & BOD removal in Mode 1)

Vendor Information:
Orenco Systems Inc. **(OSI)**
814 Airway Avenue
Sutherlin, OR 97479-9012
(514) 459-4449
www.orenco.com

Eric Ball, VP Product Development
Terry Bounds, Executive VP
Jason Churchill, Government Relations Representative

Regional Contacts:
Atlantic Solutions
Robert Johnson
2417 East Main Road
Portsmouth, RI 02871
(401) 293-0176

Green Wastewater Solutions
Richard Pezza
80 Kilvert Street
Warwick, RI 02886
(401) 737-7600

Certification: Alternative System or Technology - Class One

Technology Type: Nitrogen Removal: TN ≤ 19 mg/L

Authority to Design: Cl-II & III Licensed Designers

Description: A prepackaged packed bed filter that significantly reduces BOD and TSS inside a waterproof container installed after a two compartment tank prior to discharge to a leachfield which may be reduced in size by 50%. When configured in Mode 3, this system is acknowledged as an approved nitrogen reducing system.

Technology Name: **AdvanTex AX100 *(Mode 3 Configuration)***
(Also approved for TSS & BOD removal in Mode 1)

Vendor Information:
Orenco Systems Inc. **(OSI)**
814 Airway Avenue
Sutherlin, OR 97479-9012
(514) 459-4449
www.orenco.com

Eric Ball, VP Product Development
Terry Bounds, Executive VP
Jason Churchill, Government Relations Representative

Regional Contacts:
Atlantic Solutions
Robert Johnson
2417 East Main Road
Portsmouth, RI 02871
(401) 293-0176

Green Wastewater Solutions
Richard Pezza
80 Kilvert Street
Warwick, RI 02886
(401) 737-7600

Certification: Alternative System or Technology - Class II

Technology Type: Nitrogen Removal: TN ≤ 19 mg/L

Authority to Design: Cl-II & III Licensed Designers

Description: A prepackaged packed bed filter that significantly reduces BOD and TSS inside a waterproof container installed after a two compartment tank prior to discharge to a leachfield which may be reduced in size by 50%. When configured in Mode 3, this system is acknowledged as an approved nitrogen reducing system.

Technology Name: **AdvanTex® AX-RT Series: AX20-RT, AX25-RT**
Other smaller or larger-scale AX-RT units if developed
(Also approved for TSS & BOD removal in Mode 1)

Vendor Information:
Orenco Systems Incorporated
814 Airway Avenue
Sutherlin, Oregon 97479

Website: www.orenco.com

Eric Ball, VP Product Development
Terry Bounds, Executive VP
Jason Churchill, Government Relations Representative
Phone: 419-668-4471
Fax: 419-663-5440

Distributors:
Atlantic Solutions, LTD
Bob Johnson
2417 East Main Road
Portsmouth, RI 02871
Tel: (401) 293-0176
Website: www.atlanticsolutionsltd.com/

Green Wastewater Solutions
Richard Pezza
80 Kilvert Street
Warwick, RI 02886
Tel: (401) 737-7600
Website: www.greenwastewatersolutions.com/

Certification: Alternative System or Technology - Class II

Technology Type: Advanced Treatment System for TSS and BOD removal and for Nitrogen Removal when configured in Mode 3: TN ≤19 mg/L

Authority to Design: Cl-II & III Licensed Designers

Description: The AdvanTex® AX-RT Series (the AX20-RT, AX25-RT and other smaller or larger-scale versions of the technology that might be developed), hereafter referred to as the System, is a recirculating textile filter treatment system. It is contained within a single fiberglass tank installed with the access panel at grade. It is preceded by a two-compartment septic tank and discharges to a leachfield. The RIDEM recognizes the System as capable of achieving effluent concentrations of less than or equal to 19 mg/L total nitrogen (TN) when configured in Mode 3 and 20 mg/L or less for TSS and BOD; based on TSS & BOD reductions, the RIDEM has allowed for a 50% reduction in leachfield size as applicable by leachfield type.

Technology Name: **Amphidrome®**

Vendor Information:	F. R. Mahoney & Associates, Inc. 273 Weymouth Street Rockland, MA 02370	**Contact:** Keith Dobey Tel: (781) 982-9300, Ext. 37 Fax: (781) 982-1056
Certification:	Alternative System or Technology – Class II	
Technology Type:	Nitrogen Removal: TN ≤ 19 mg/L	
Authority to Design:	Cl-II & III Licensed Designers	

Description: The Amphidrome® system uses a submerged attached growth bioreactor process operating in a batch mode.

The Amphidrome® system utilizes two tanks and one submerged attached growth bioreactor, called the Amphidrome® reactor. The first tank, the anoxic/equalization tank, is where the raw wastewater enters the system. The tank has an equalization section, a settling zone, and a sludge storage section. It serves as a primary clarifier before the Amphidrome® reactor.

This Amphidrome® reactor consists of the following four items: underdrain, support gravel, filter media, and backwash trough. The underdrain, constructed of stainless steel, is located at the bottom of the reactor. It provides support for the media and even distribution of air and water into the reactor. The underdrain has a manifold and laterals to distribute the air evenly over the entire filter bottom. The design allows for both the air and water to be delivered simultaneously--or separately--via individual pathways to the bottom of the reactor. As the air flows up through the media, the bubbles are sheared by the sand, producing finer bubbles as they rise through the filter. On top of the underdrain is 18" (five layers) of four different sizes of gravel. Above the gravel is a deep bed of coarse, round silica sand media. The media functions as filter, significantly reducing suspended solids and provides the surface area for which an attached growth biomass can be maintained. The Department allows a 50% reduction in conventional and approved AE "component technology" leachfield size with this System.

Technology Name: **Bioclere**

Vendor Information:	Aquapoint.3, LLC Mark Lubbers 39 Tarkiln Place New Bedford, MA 02745 (508) 985-9050 Extension 105 mlubbers@aquapoint.com	
Certification:	Alternative System or Technology - Class II	
Technology Type:	Nitrogen Removal: TN ≤ 19 mg/L	
Authority to Design:	Cl-II & III Licensed Designers	

Description: The Bioclere system is essentially a modified trickling filter positioned over a clarifier. Effluent from the septic tank enters Bioclere and is pumped up to the top of the insulated unit where it is evenly distributed over the surface of the filter media. Biochemical oxidation takes place as the water trickles through the filter and over the biological film that grows on the surface of the filter media. Oxygen is supplied to the system through a small axial fan located in the top of the housing. The system is capable of significantly reducing biological oxygen demand (BOD_5) and total suspended solids (TSS) in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leachfield size.

Technology Name: **FAST (Single Home and Modular)**

Vendor Information:
Bio-Microbics, Inc.
Robert Rebori
8271 Melrose Drive
Lenexa, KS 66412
(913) 492-0707

Regional Contact:
Jim Dunlap, J&R Engineering
534 New State Highway
Raynham, MA 02767
(508) 823-9566

Certification: Alternative System or Technology - Class II

Technology Type: Nitrogen-Removal: TN ≤ 19 mg/L

Authority to Design: Cl-II & III Licensed Designers

Description: The FAST (Fixed Activated Sludge Treatment) system is an aerobic wastewater treatment system that utilizes an aerobic fixed film process that is a combination of the conventional trickling filter and activated sludge processes. The FAST system is designed to be installed within a two-compartment tank where the first compartment provides a primary settling zone for incoming sewage and the second houses the actual FAST system. The system contains submerged media that provide surfaces for microbial growth. Aeration and circulation are provided by a blower that pumps air into a draft tube that extends down the center of the tank. The system is capable of significantly reducing biological oxygen demand (BOD_5), total suspended solids (TSS), and total nitrogen in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leachfield size.

Technology Name: **Hydro-Kinetic Model 600 FEU**

Vendor Information:
Norweco, Inc.
220 Republic Street
Norwalk, OH 44857

Tel: 419-668-4471
Fax: 419-663-5440
Web: www.norweco.com

Scott Hetrick, Sales Manager
Email: shetrick@norweco.com

James Meyer, Vice President of Engineering
Email: jmeyer@norweco.com

Technology Name & Model Numbers:
Hydro-Kinetic Model 600 FEU
(Maximum design flow 600 GPD)

Certification
Class Two

Technology Type:
Nitrogen Removal: TN ≤ 10 mg/L

Design Authority
Class II & III Designers

Local Contacts (Distributors/Dealers)

Siegmund Environmental Services, Incorporated
49 Pavilion Ave., 2nd Floor
Providence, RI 02905
Tel: 401-785-0130

Laszlo Siegmund
Tel: 401-316-7877
Fax: 401-785-3110
Email: lsiegmund@siegmundgroup.com
Web:http://www.seswastewater.com/

Sterling Environmental Technologies
141 Asher Ave
Stonington, CT 06379
Tel: 401-322-7669

Robert Frost
Tel: 401-523-4812
Fax: 401-315-0750
Email: bob@sterling-et.com

Description: The System uses extended aeration, attached growth, nitrification and denitrification processes to treat wastewater. It consists of four treatment chambers (pretreatment, anoxic, aeration and clarification) followed by a Hydro-Kinetic FEU filter containing filter media facilitating additional reduction of BOD and TSS by attached growth, prior to discharge to a leachfield. The clarification chamber incorporates a flow equalization unit. Aeration is controlled by a factory-programmed timer and wastewater is recirculated from the clarifier back to the anoxic chamber at factory set intervals. The system is available with both concrete and HDPE tankage and with the pre-treatment tank either integral to the other three chambers in a four-chambered tank, or as a distinct tank. Designs incorporating this System and a conventional leachfield shall be allowed a 40% reduction in the required leachfield size.

Technology Name: Nitrex™

Vendor Information:	Lombardo Associates, Inc. 188 Church Street Newton, MA 02458	**Contact:** Pio Lombardo, PE Tel: (617) 964-2924 Fax: (617) 332-5477 E-mail: pio@LombardoAssociates.com

Certification: Alternative System or Technology – Class II

Technology Type: Nitrogen Removal: TN ≤10 mg/L

Authority to Design: Cl-II & III Licensed Designers

Description:

The Nitrex™ Filter performs a treatment step as part of a multi-component onsite wastewater treatment system. The Nitrex™ Filter is preceded by a nitrifying advanced pretreatment system designed to convert organic nitrogen and/or ammonium to nitrate, prior to the Nitrex™ Filter performing the denitrification step. Any advanced treatment system used in conjunction with a Nitrex™ Filter must also be a Department approved A/E Technology and must be approved by the Vendor for use with the Nitrex™ Filter. The term "Nitrex™ Filter" shall mean the media-filled tank and associated components and controls produced by the Vendor to cause denitrification. The term Nitrex™ Filter System shall mean the Nitrex™ Filter and the advanced pretreatment system.

The Nitrex™ Filter provides a carbon source in the form of wood media for heterotrophic bacteria operating in an anerobic environment to reduce the nitrate to nitrogen gas. Nitrified effluent is piped into the bottom of the Nitrex™ Filter and moves vertically through the media under a slight pressure head caused by gravity or pressure; the denitrified effluent is then discharged to a drainfield.

The pretreatment system used in advance of the Nitrex™ Filter must be designed, installed, operated and maintained in accordance with the terms of the certification issued by the Department for use of that system.

Please note that this certification was revised February 23, 2012 and that the Nitrex™ Filter System may not be used with a BSF or PSND until further notice. See certification document (Nitrex) for further information.

Technology Name: **Norweco Singulair TNT [concrete] 750, 1000, 1250 and 1500**
Norweco Singulair Green TNT [HDPE] 600

Vendor Information:
Norweco, Inc.
220 Republic Street
Norwalk, OH 44857

Tel: 419-668-4471
Web: www.norweco.com

Scott Hetrick, Sales Manager
Email: shetrick@norweco.com
Tel: 419-668-4471
Fax: 419-663-5440

Local Contacts (Distributors / Dealers):
Siegmund Environmental Services
49 Pavilion Ave., 2nd Floor
Providence, RI 02905

Telephone: (401) 785-0130

Laszlo Siegmund
Tel: 401-316-7877
Fax: 401-785-3110
Email: lsiegmund@siegmundgroup.com
Web:http://www.seswastewater.com/

Sterling Environmental Technologies
141 Asher Ave
Stonington, CT 06379

Tel: (401) 322-7669

Robert Frost
Tel: (401) 523-4812
Fax: (401) 315-0750
Email: bob@sterling-et.com

Certification: Alternative System or Technology - Class II

Technology Type: Nitrogen Removal: TN ≤ 19 mg/L

Authority to Design: Cl-II & III Licensed Designers

Description: The Singulair TNT and Singulair Green TNT Wastewater Treatment System

The System consists of a three-chambered tank. The first chamber provides pretreatment, the second is an aeration chamber with an infused air system: air is introduced to the aeration chamber by an aeration system, which spins a hollow aspirator shaft, drawing air into the hollow shaft through four intake ports located beneath the aerator handle; the aerator vent through which the air is drawn is integral to the access cover above the aerator. The aeration system is controlled by a factory programmed, non-adjustable timer to run a 60 minute aeration cycle followed by a 60 minute anoxic cycle, during which the aerator is not running. Settling takes place in the clarification chamber (the third chamber) following aeration and currents generated by the spinning aerator draw sludge from the clarification chamber back to the aeration chamber. The Bio-Kinetic filter within the clarification chamber filters wastewater prior to discharge to a leachfield. The system is capable of significantly reducing biological oxygen demand (BOD_5) and total suspended solids (TSS) in the effluent. Based on these reductions, the Department has allowed for a 40% reduction in leachfield size.

Technology Name: **Recirculating Sand Filter**

Vendor Information: Generic

Certification: Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

Technology Type: Nitrogen Reducing Treatment System

Authority to Design: Cl-II and III Licensed Designers

Description: Wastewater, having received primary treatment in a septic tank or equivalent unit, flows by gravity to a recirculation (mixing) tank. In doses controlled by both a programmable timer and float switch, the mixed fresh wastewater and partially treated filter effluent is applied to a bed of coarse sand (fine gravel) media. This mixed wastewater is dispersed over the filter surface in a PVC distribution network surrounded in pea stone. Wastewater trickles down through the sand media, where biological treatment occurs. The treated effluent is collected in an underdrain at the bottom of the filter and discharged back to the recirculation tank. There most of it mixes with incoming wastewater, a small amount gets discharged to the drainfield, and the cycle begins again. Typically, a buoyant-ball check valve is used to control discharge and recirculation. Treated wastewater is discharged to a drainfield for additional treatment. The system is capable of significantly reducing biological oxygen demand (BOD_5), total suspended solids (TSS), and total nitrogen in the effluent. The technology is targeted for use in critical resource areas and is intended to be used with shallow pressurized drainfields.

Technology Name: **SeptiTech**
Models M400D, M550D, M750D, M1200D, M1500D, M2500D and M3000D

Vendor Information: SeptiTech, LLC
69 Holland Street
Lewiston, Maine 04240

Contacts: Dan Ostrye
Scott Samuelson
Lee Verbridge
Tel: (207) 333-6940
Fax: (207) 333-6944

Certification: Alternative System or Technology - Class II

Technology Type: Nitrogen Removal: TN $\leq$ 19 mg/L

Authority to Design: Cl-II and III Licensed Designers

Description: SeptiTech is an aerobic biological trickling filter, hereafter referred as the "System". The System is a two-tank design with a primary anoxic tank (a septic tank) followed by the aerobic trickling filter tank (the SeptiTech processor tank). Raw wastewater enters and passes through the primary anoxic tank to a reservoir beneath treatment media in the aerobic processor tank. The wastewater is aerated and sprayed onto the media; a programmable logic controller (PLC) controls the timing and sequence of the recirculation of wastewater in the lower collection reservoir. A portion of the wastewater is pumped back to the septic tank; this process is self-adjusting based on demand and is controlled by the PLC. Treated wastewater is time dosed to a leachfield. A 50% reduction of leachfield area is allowed for RIDEM approved Class 1 leachfield components and conventional leachfields.

Technology Name: **Siegmund Singulair Model DN [concrete] (500, 750, 1000 1250 & 1500 GPD)**
Siegmund Singulair Green® 600 [HDPE](maximum design flow 600 gpd)*

Vendor & Distributor:

Siegmund Environmental Services, Inc.
49 Pavilion Avenue
Providence, RI 02905
Tel: 401-785-0130

Laszlo Siegmund
Tel: 401-316-7877
Fax: 401-785-3110
Email: lsiegmund@siegmundgroup.com
Web:http://www.seswastewater.com/

Certification: Alternative System or Technology - Class II

Technology Type: Nitrogen Removal: TN ≤ 19 mg/L

Authority to Design: Cl-II & III Licensed Designers

Description: The Singulair wastewater treatment system is a self-contained three-chambered treatment system utilizing primary treatment (settling), mechanical aeration, clarification, and flow equalization to achieve treatment. Wastewater from the building enters the primary settling chamber through an inlet tee, then enters an aeration chamber. In the aeration chamber, an aspirator at the bottom of a shaft disperses air radially as fine bubbles provide oxygen for the biomass and vertically mix chamber contents. The wastewater in the aeration chamber passes through to the clarification chamber for final settling of solids. A portion of the clarified wastewater is recirculated back to either the inlet pipe (building sewer) or into the primary chamber for denitrification. Treated wastewater passes through an effluent filter as it exits the system and is then gravity fed to the leachfield. The RIDEM recognizes the System as capable of achieving effluent concentrations of 30 mg/L for both TSS and BOD and less than or equal to 19 mg/L TN. Based on these reductions, the RIDEM has allowed for a 40% reduction in leachfield size.

*Where site conditions and design flow accommodate, Norweco Singulair Green® 500 may be used in place of the concrete Singulair tank.

D. LEACHFIELD RENOVATION

Technology Name: **White Knight™ Microbial Inoculator/Generator Models WK-40 and WK-78**

Vendor Information:
Robert Silva, President
Knight Treatment Systems, Inc.
281 County Route 51A
Oswego, NY 13126
Tel: 800-560-2454
Fax: 315-343-6114
www.knighttreatmentsystems.com

Certification: Alternative System or Technology – Class II

Technology Type: Microbial Inoculator/Generator Leachfield Renovation

Authority to Design: Cl-I, II & III Licensed Designers

Description: The White Knight™ Microbial Inoculator/Generator (White Knight™) is contained within a HDPE cylinder, designed to be installed into a septic tank, continuously inoculating the tank with non-pathogenic IOS-500™ bacterial cultures. An air pump provides fine bubble aeration and circulation within the System bringing the bacteria into contact with fixed film substrate and the suspended organic compounds in the septic tank. The IOS-500™ bacteria released by the System digest organic wastes in the septic tank and in the leachfield.

White Knight™ is approved for renovation of Onsite Wastewater Treatment Systems (OWTS) that are organically clogged resulting in hydraulic failure, as follows.

1. a) In the Salt Pond and Narrow River Critical Resource Areas White Knight™ may be used only if the leachfield was properly sized in accordance with the Regulations in effect at the time the permit was approved, as evidenced by the approved permit. If the leachfield did not meet the requirements of the Regulations in effect at the time the permit was approved, or if there is no permit available for the subject system, the site is not eligible for use of White Knight™.

1. b) In all other areas of the State an approved permit, or system analysis performed by a Class II or III OWTS designer documenting that the system is suitable for use, is required.

2. Statewide, in addition to the two sets of requirements cited above, candidate site eligibility is determined based on system size, type and condition. The site evaluation must confirm that the system failure is due to organic clogging in the leachfield.

White Knight™ may also be installed in a properly functioning OWTS as well as a new OWTS, by application for new construction.

Appendix E

TOWN OF COVENTRY, RHODE ISLAND

RESULTS OF INTERVIEW OF SEPTAGE HAULERS
JULY 2009

As part of the data collection for the Coventry Wastewater Facilities Plan, several septage haulers servicing the Town of Coventry were interviewed. The information summarized below represents information supplied by the following persons:

Mr. Rick Nunes of Rick Nunes Construction
Mr. Paul Gosselin of P & J Cesspool Company
Mr. Ray Plante of Ray Plante & Sons
Mr. Paul Diffey of Diffey & Miller Inc.
Jane from answering service at Michael Perri & Sons

Other haulers were contacted but either could not supply information or did not have enough work in Coventry to be of value to this study. The majority of septage pumped by these haulers is from residential septic systems. Several of these haulers stated that their business was 80 percent or greater residential customers. The following questions were asked of each hauler and their responses are summarized below each question.

Q1. How many years have you been providing service to Coventry?

All companies surveyed stated that they had been providing service to Coventry for at least 20 years. The average was approximately 40 years.

Q2. What portion of your total work in Coventry is residential?

All companies surveyed stated that the majority of their work in Coventry is residential. One company stated that 100 percent of their work in Coventry is residential, and the lowest is 75 percent of work in Coventry being residential.

Q3. What is the average charge to a homeowner in Coventry for pumping a typical single-family residential septic tank?

The average typical charge for pumping a single-family residential septic tank is about $200, with a range from $190 to $215.

Q4. Where do you typically discharge the septage from Coventry?

All companies stated they discharged their septage from Coventry in Cranston, RI, while Warwick, RI and Lincoln, RI were each mentioned once in addition to Cranston, RI.

Q5. How much of the pumping in Coventry is for maintenance purposes, and how much is done for operation problems (odors, back-ups…etc).

Most companies stated that the percentage of pumping in Coventry for maintenance purposes has drastically increased in the past 10 years. Most companies stated that around 75 percent of the pumping they do in Coventry is for maintenance purposes. One company stated that they perform 50 percent of pumping for maintenance and 50 percent for operational problems; this is the lowest value. The average percent of the pumping in Coventry for maintenance purposes is 70 percent.

Q6. Do you also install/replace septic systems? If so, what is the typical cost to replace a single family residential system?

Most companies asked stated that they do replace septic systems, and expressed that the cost of replacement can vary drastically depending on the circumstances. The range of replacement cost is from about $8,000 to $20,000.

Below is a table showing the specific answers from each company interviewed.

RESULTS OF INTERVIEWS WITH SEPTAGE HAULERS IN COVENTRY, RI

	ANSWERS						
COMPANY	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	
						Min	Max
Rick Nunes Construction	30	75%	-	Cranston / Warwick	75%	$10,000	-
Ray Plante & Sons	20	90%	$205	Cranston / Lincoln	50%	$8,000	$12,000
P&J Cesspool Company	42	100%	$190	Cranston	65%	N/A	N/A
Diffey & Miller Inc	90	80%	$200	Cranston	80%	N/A	N/A
Michael Perri & Sons Inc	25	majority	$215	Cranston	80%	$10,000	$20,000
AVERAGE	41	86%	$203	Cranston	70%	$9,333	$16,000

Compiled by: Emily Mercurio

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Appendix F
Sewer Installation Schedule and Costs

Costs in this table are based on 20 Cities ENR=10038.80 (June 2015)

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
A (1)	New London Tpk	15	int.	4500	Existing		NA	WW	12.78	III
A (1)	Arnold Road	8		350	Existing		NA	WW	0.53	III
A (1)	Arnold Road	8		1650	$ 230.00	$ 379,500.00	7	I	2.50	III
A (1)	Crompton Road	8		550	$ 230.00	$ 126,500.00	4	WW	0.83	III
A (1)	Gay Street	8		550	$ 230.00	$ 126,500.00	4	WW	0.83	III
A (1)	Grandview Street	8		600	$ 230.00	$ 138,000.00	7	I	0.91	III
A (1)	Lions Drive	8		200	$ 230.00	$ 46,000.00	3	WW	0.30	III
A (1)	Longfellow Drive	8		800	$ 230.00	$ 184,000.00	13	WW	1.21	III
A (1)	Longfellow Drive	8		550	$ 230.00	$ 126,500.00	10	WW	0.83	III
A (1)	Martin Street	8		700	$ 230.00	$ 161,000.00	17	WW	1.06	III
A (1)	Rejane Street	8		500	$ 230.00	$ 115,000.00	9	WW	0.76	III
A (1)	Valrene Street	8		600	$ 230.00	$ 138,000.00	12	WW	0.91	III
A (1)	Wendy Drive	8		800	$ 230.00	$ 184,000.00	14	WW	1.21	III
A (1)	Whittier Drive	8		400	$ 230.00	$ 92,000.00	7	WW	0.61	III
A (1)	Area Total			12,750		$ 1,817,000.00	107		25.28	
	Cost per unit					$ 16,981.31				
A (2)	Lemis Street		P.S.			$ 375,000.00	0	A1		III
A (2)	Lemis Street	4	FM	1300	$ 110.00	$ 143,000.00	0	A1		III
A (2)	Angus Street	8		400	$ 230.00	$ 92,000.00	8	A1	0.61	III
A (2)	Angus Street	8		1000	$ 230.00	$ 230,000.00	22	A1	1.52	III
A (2)	Lemis Street	8		1150	$ 230.00	$ 264,500.00	24	A1	1.74	III
A (2)	Old North Road	8		400	$ 230.00	$ 92,000.00	7	A1	0.61	III
A (2)	Old North Road	8		250	$ 230.00	$ 57,500.00	2	A1	0.38	III
A (2)	Old North Road	8		1200	$ 230.00	$ 276,000.00	17	A1	1.82	III
A (2)	Rejane Street	8		600	$ 230.00	$ 138,000.00	6	A1	0.91	III
A (2)	Rosebud Street	8		100	$ 230.00	$ 23,000.00	1	A1	0.15	III
A (2)	Tiffany Road	8		1000	$ 230.00	$ 230,000.00	12	A1	1.52	III
A (2)	Traffold Park Drive	8		100	$ 230.00	$ 23,000.00	4	A1	0.15	III
A (2)	Traffold Park Drive	8		700	$ 230.00	$ 161,000.00	13	A1	1.06	III
A (2)	Traffold Park Drive	8		100	$ 230.00	$ 23,000.00	1	A1	0.15	III
A (2)	X-C Angus Street	8		300	$ 230.00	$ 69,000.00	2	A1	0.45	III
A (2)	X-C Old North Street	8		350	$ 230.00	$ 80,500.00	2	A1	0.53	III
A (2)	X-C Trafford Park Drive	8		250	$ 230.00	$ 57,500.00	2	A1	0.38	III
A (2)	Area Total			9,200		$ 2,335,000.00	123		11.97	
	Cost per unit					$ 18,983.74				
B (1)	Bonney Street	8		400	$ 230.00	$ 92,000.00	10	WW	0.61	III
B (1)	Cypress Road	8		600	$ 230.00	$ 138,000.00	8	WW	0.91	III
B (1)	Dawley Street	8		450	$ 230.00	$ 103,500.00	12	WW	0.68	III
B (1)	Deerfield Road	8		250	$ 230.00	$ 57,500.00	4	WW	0.38	III
B (1)	Dodd Street	8		300	$ 230.00	$ 69,000.00	4	WW	0.45	III
B (1)	Gilles Street	8		350	$ 230.00	$ 80,500.00	10	WW	0.53	III
B (1)	Kennedy Drive	8		650	$ 230.00	$ 149,500.00	10	WW	0.98	III
B (1)	Lantern Lane	8		600	$ 230.00	$ 138,000.00	11	WW	0.91	III
B (1)	Old North Road	8		300	$ 230.00	$ 69,000.00	5	WW	0.45	III
B (1)	Old North Road	8		1200	$ 230.00	$ 276,000.00	17	WW	1.82	III
B (1)	Old North Road	8		300	Existing		NA	WW	0.45	III
B (1)	Suzanne Street	8		350	$ 230.00	$ 80,500.00	4	WW	0.53	III
B (1)	Tiogue Avenue	8		1200	$ 230.00	$ 276,000.00	18	WW	1.82	III
B (1)	Tiogue Avenue	8		1300	Existing		NA	WW	1.97	III
B (1)	X-C Bonney Street	8		250	$ 230.00	$ 57,500.00	2	WW	0.38	III
B (1)	X-C C.H.A.	8		350	Existing		NA	WW	0.53	III
B (1)	X-C Lantern Lane	8		350	$ 230.00	$ 80,500.00	2	WW	0.53	III
B (1)	Area Total			9,200		$ 1,667,500.00	117		13.94	
	Cost per unit					$ 14,252.14				
B (2)	Englewood Road		P.S.			$ 150,000.00	0			III
B (2)	Englewood Road	3	FM	500	$ 90.00	$ 45,000.00	0			III
B (2)	Kennedy Drive	3	FM	250	$ 90.00	$ 22,500.00	0			III
B (2)	Deerfield Road	8		500	$ 230.00	$ 115,000.00	8	A2	0.76	III
B (2)	Englewood Road	8		500	Existing		NA	A2	0.76	III
B (2)	Kennedy Drive	8		100	$ 230.00	$ 23,000.00	2	A2	0.15	III
B (2)	Area Total			1,850		$ 355,500.00	10		1.67	
	Cost per unit					$ 35,550.00				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
C	East Shore Drive		P.S.			$ 300,000.00	0			II
C	Berkshire Road	8		200	$ 230.00	$ 46,000.00	2	TINT	0.30	II
C	Darton Road	8		375	$ 230.00	$ 86,250.00	7	TINT	0.57	II
C	East Shore Drive	8		1800	$ 230.00	$ 414,000.00	44	TINT	2.73	II
C	East Shore Drive	8		250	$ 230.00	$ 57,500.00	3	TINT	0.38	II
C	Elton Street	8		500	$ 230.00	$ 115,000.00	15	TINT	0.76	II
C	Mead Street	8		150	$ 230.00	$ 34,500.00	3	TINT	0.23	II
C	Mead Street	8		50	$ 230.00	$ 11,500.00	2	TINT	0.08	II
C	Middle Road	8		100	$ 230.00	$ 23,000.00	1	TINT	0.15	II
C	Mohawk Street	8		925	$ 230.00	$ 212,750.00	22	TINT	1.40	II
C	Mohawk Street	8		1000	$ 230.00	$ 230,000.00	25	TINT	1.52	II
C	Rawlinson Drive	8		450	$ 230.00	$ 103,500.00	10	D	0.68	II
C	Rawlinson Drive	8		1100	$ 230.00	$ 253,000.00	22	TINT	1.67	II
C	Seneca Street	8		700	$ 230.00	$ 161,000.00	16	TINT	1.06	II
C	X-C East Shore Drive	8		300	$ 230.00	$ 69,000.00	1	TINT	0.45	II
C	Area Total			7,900		2,117,000	173		11.97	
	Cost per unit					$ 12,236.99				
D	X-C James Street	12	Int.	200	$ 350.00	$ 70,000.00	1	E	0.45	II
D	X-C Pembroke Lane	12	Int.	900	$ 350.00	$ 315,000.00	4	E	2.05	II
D	Baylor Drive	8		100	$ 230.00	$ 23,000.00	1	E	0.15	II
D	Baylor Drive	8		500	$ 230.00	$ 115,000.00	7	E	0.76	II
D	Colby Drive	8		300	$ 230.00	$ 69,000.00	6	E	0.45	II
D	Columbia Avenue	8		2400	$ 230.00	$ 552,000.00	56	E	3.64	II
D	Pembroke Lane	8		1450	$ 230.00	$ 333,500.00	27	E	2.20	II
D	Pembroke Lane	8		2100	$ 230.00	$ 483,000.00	39	E	3.18	II
D	Pettine Street	8		1100	$ 230.00	$ 253,000.00	23	E	1.67	II
D	Princeton Avenue	8		1300	$ 230.00	$ 299,000.00	28	E	1.97	II
D	Princeton Street	8		600	$ 230.00	$ 138,000.00	15	E	0.91	II
D	Tiogue Avenue	8		600	$ 230.00	$ 138,000.00	14	E	0.91	II
D	Tiogue Avenue	8		1250	$ 230.00	$ 287,500.00	17	TINT	1.89	II
D	Yale Drive	8		1200	$ 230.00	$ 276,000.00	26	E	1.82	II
D	Area Total			14,000		$ 3,352,000.00	264		22.05	
	Cost per unit					$ 12,696.97				
E (1)	Laurel Avenue	12	Int.	1500	$ 350.00	$ 525,000.00	19	WINT	3.41	II
E (1)	Bernard Drive	8		450	$ 230.00	$ 103,500.00	7	TINT	0.68	II
E (1)	Centre Street	8		600	$ 230.00	$ 138,000.00	9	WINT	0.91	II
E (1)	Dexter Street	8		450	$ 230.00	$ 103,500.00	11	TINT	0.68	II
E (1)	Greene Street	8		400	$ 230.00	$ 92,000.00	7	WINT	0.61	II
E (1)	Matteson Street	8		500	$ 230.00	$ 115,000.00	10	WINT	0.76	II
E (1)	Pilgrim Avenue	8		600	$ 230.00	$ 138,000.00	13	TINT	0.91	II
E (1)	Pilgrim Avenue	8		2700	$ 230.00	$ 621,000.00	34	WINT	4.09	II
E (1)	Pilgrim Avenue	8		550	$ 230.00	$ 126,500.00	11	TINT	0.83	II
E (1)	Princeton Avenue	8		600	$ 230.00	$ 138,000.00	9	WINT	0.91	II
E (1)	Reddington Street	8		700	$ 230.00	$ 161,000.00	12	WINT	1.06	II
E (1)	Taft Street	8		550	$ 230.00	$ 126,500.00	9	WINT	0.83	II
E (1)	Vanderbilt Terrace	8		950	$ 230.00	$ 218,500.00	19	WINT	1.44	II
E (1)	Wesleyan Avenue	8		1200	$ 230.00	$ 276,000.00	25	WINT	1.82	II
E (1)	X-C Dexter Street	8		550	$ 230.00	$ 126,500.00	0	TINT	0.83	II
E (1)	Area Total			12,300		$ 3,009,000.00	195		19.77	
	Cost per unit					$ 15,430.77				
E (2)	George Street		P.S.			$ 468,000.00	0			II
E (2)	George Street	12	Int.	400	$ 350.00	$ 140,000.00	5	E1	0.91	II
E (2)	Sheltra Avenue	12	Int.	1350	$ 350.00	$ 472,500.00	24	E1	3.07	II
E (2)	Laurel Avenue	6	FM	250	$ 120.00	$ 30,000.00	0			II
E (2)	X-C Laurel Avenue	6	FM	500	$ 120.00	$ 60,000.00	0			II
E (2)	Amherst Avenue	8		400	$ 230.00	$ 92,000.00	7	E1	0.61	II
E (2)	Centre Street	8		350	$ 230.00	$ 80,500.00	5	E1	0.53	II
E (2)	Cornell Court	8		250	$ 230.00	$ 57,500.00	3	E1	0.38	II
E (2)	Laurel Avenue	8		1000	$ 230.00	$ 230,000.00	18	E1	1.52	II
E (2)	Princeton Avenue	8		650	$ 230.00	$ 149,500.00	11	E1	0.98	II
E (2)	Princeton Avenue	8		275	$ 230.00	$ 63,250.00	4	E1	0.42	II
E (2)	Sheltra Avenue	8		300	$ 230.00	$ 69,000.00	2	E1	0.45	II
E (2)	Taft Street	8		675	$ 230.00	$ 155,250.00	12	E1	1.02	II
E (2)	Turcotte Street	8		200	$ 230.00	$ 46,000.00	4	E1	0.30	II
E (2)	Wesleyan Avenue	8		700	$ 230.00	$ 161,000.00	13	E1	1.06	II
E (2)	X-C Laurel Avenue	8		500	$ 230.00	$ 115,000.00	3	E1	0.76	II
E (2)	Area Total			7,800		$ 2,389,500.00	111		12.01	
	Cost per unit					$ 21,527.03				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
F	Sandy Bottom Road		P.S.			Existing	NA			
F	Sandy Bottom Road	24	Int.	1400		Existing	NA	WINT	6.36	I
F	Tiogue Avenue	24	Int.	550		Existing	NA	WINT	2.50	I
F	Tiogue Avenue	24	Int.	1650		Existing	NA	WINT	7.50	I
F	Tiogue Avenue	18	Int.	300		Existing	NA	WINT	1.02	I
F	Tiogue Avenue	18	Int.	1200		Existing	NA	WINT	4.09	I
F	Tiogue Avenue	18	Int.	3000		Existing	NA	WINT	10.23	I
F	Tiogue Avenue	18	Int.	1200		Existing	NA	WINT	4.09	I
F	Tiogue Avenue	12	Int.	1600		Existing	NA	WINT	3.64	I
F	Tiogue Avenue	12	Int.	1100		Existing	NA	WINT	2.50	I
F	Sandy Bottom Road	15	FM	1600		Existing	NA			I
F	Main Street	15	FM	1100		Existing	NA			I
F	Area Total			14,700		$ -	NA		41.93	
	Cost per unit					$ -				
G	Arnold Road	12	Int.	600	$ 350.00	$ 210,000.00	13	TINT	1.36	I
G	Idaho Street	12	Int.	900		Existing	NA	TINT	2.05	I
G	Alaska Street	8		445		Existing	NA	TINT	0.67	I
G	Arizona Street	8		445		Existing	NA	TINT	0.67	I
G	Arnold Road	8		800	$ 230.00	$ 184,000.00	21	TINT	1.21	I
G	Colorado Street	8		475		Existing	NA	TINT	0.72	I
G	Edith Street	8		200	$ 230.00	$ 46,000.00	2	TINT	0.30	I
G	Glen Avenue	8		150	$ 230.00	$ 34,500.00	1	TINT	0.23	I
G	Hazel Street	8		350	$ 230.00	$ 80,500.00	5	TINT	0.53	I
G	Henry Avenue	8		200	$ 230.00	$ 46,000.00	4	TINT	0.30	I
G	Hilltop Avenue	8		250	$ 230.00	$ 57,500.00	3	TINT	0.38	I
G	Lakeside Drive	8		385		Existing	NA	TINT	0.58	I
G	Larchmont Drive	8		500	$ 230.00	$ 115,000.00	9	TINT	0.76	I
G	Larchmont Drive	8		675	$ 230.00	$ 155,250.00	12	TINT	1.02	I
G	Loretta Avenue	8		200	$ 230.00	$ 46,000.00	4	TINT	0.30	I
G	Montana Avenue	8		900		Existing	NA	TINT	1.36	I
G	Oak Road	8		200	$ 230.00	$ 46,000.00	1	TINT	0.30	I
G	Overview Drive	8		700	$ 230.00	$ 161,000.00	12	TINT	1.06	I
G	Pine Avenue	8		900	$ 230.00	$ 207,000.00	19	TINT	1.36	I
G	Ridge Avenue	8		250	$ 230.00	$ 57,500.00	6	TINT	0.38	I
G	Sand Street	8		250	$ 230.00	$ 57,500.00	4	TINT	0.38	I
G	Twin Lakes Avenue	8		1100	$ 230.00	$ 253,000.00	21	TINT	1.67	I
G	Unnamed Way	8		150	$ 230.00	$ 34,500.00	4	TINT	0.23	I
G	X-C Larchmont Drive	8		250	$ 230.00	$ 57,500.00	2	TINT	0.38	I
G	Area Total			11,275		$ 1,848,750.00	143		18.22	
	Cost per unit					$ 12,928.32				
H (1)	Arnold Road	12	Int.	2475	$ 350.00	$ 866,250.00	33	NLTRPK	5.63	II
H (1)	Acorn Street	8		975	$ 230.00	$ 224,250.00	13	NLTRPK	1.48	II
H (1)	Arnold Road	8		125	$ 230.00	$ 28,750.00	4	NLTRPK	0.19	II
H (1)	Beech Street	8		525	$ 230.00	$ 120,750.00	7	NLTRPK	0.80	II
H (1)	Beechwood Street	8		250	$ 230.00	$ 57,500.00	4	NLTRPK	0.38	II
H (1)	Cape way	8		225	$ 230.00	$ 51,750.00	4	NLTRPK	0.34	II
H (1)	Colonial Road	8		150	$ 230.00	$ 34,500.00	2	NLTRPK	0.23	II
H (1)	Colonial Road	8		600	$ 230.00	$ 138,000.00	12	NLTRPK	0.91	II
H (1)	Cove Road	8		700	$ 230.00	$ 161,000.00	10	NLTRPK	1.06	II
H (1)	Grant Drive	8		600	$ 230.00	$ 138,000.00	10	NLTRPK	0.91	II
H (1)	Holmes Road	8		200	$ 230.00	$ 46,000.00	3	NLTRPK	0.30	II
H (1)	Jade Road	8		850	$ 230.00	$ 195,500.00	17	NLTRPK	1.29	II
H (1)	Johnson Bv	8		1075	$ 230.00	$ 247,250.00	16	NLTRPK	1.63	II
H (1)	Lydia Road	8		50	$ 230.00	$ 11,500.00	2	NLTRPK	0.08	II
H (1)	Lydia Road	8		2000	$ 230.00	$ 460,000.00	37	NLTRPK	3.03	II
H (1)	Myra Road	8		50	$ 230.00	$ 11,500.00	1	NLTRPK	0.08	II
H (1)	Myra Road	8		775	$ 230.00	$ 178,250.00	15	NLTRPK	1.17	II
H (1)	Osceola Avenue	8		150	$ 230.00	$ 34,500.00	3	NLTRPK	0.23	II
H (1)	Osceola Avenue	8		250	$ 230.00	$ 57,500.00	5	NLTRPK	0.38	II
H (1)	Osceola Avenue	8		300	$ 230.00	$ 69,000.00	6	NLTRPK	0.45	II
H (1)	Powhaten Avenue	8		150	$ 230.00	$ 34,500.00	1	NLTRPK	0.23	II
H (1)	Quiet Avenue	8		225	$ 230.00	$ 51,750.00	2	NLTRPK	0.34	II
H (1)	Sunset Avenue	8		275	$ 230.00	$ 63,250.00	5	NLTRPK	0.42	II
H (1)	Sunset Avenue	8		225	$ 230.00	$ 51,750.00	3	NLTRPK	0.34	II
H (1)	Sunset Avenue	8		100	$ 230.00	$ 23,000.00	1	NLTRPK	0.15	II
H (1)	Sunset Avenue	8		175	$ 230.00	$ 40,250.00	2	NLTRPK	0.27	II
H (1)	Tulip Road	8		450	$ 230.00	$ 103,500.00	6	NLTRPK	0.68	II
H (1)	Vera Road	8		750	$ 230.00	$ 172,500.00	14	NLTRPK	1.14	II
H (1)	Area Total			14,675		$ 3,672,250.00	238		24.11	
	Cost per unit					$ 15,429.62				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
H (2)	Briar Point Avenue		P.S.			$ 188,000.00	0	G		II
H (2)	Briar Point Avenue	4	FM	650	$ 110.00	$ 71,500.00	0	G		II
H (2)	West Shore Drive	4	FM	100	$ 110.00	$ 11,000.00	0	G		II
H (2)	Beach Street	8		350	$ 230.00	$ 80,500.00	5	G	0.53	II
H (2)	Beach Street	8		300	$ 230.00	$ 69,000.00	5	G	0.45	II
H (2)	Briar Point Avenue	8		400	$ 230.00	$ 92,000.00	4	G	0.61	II
H (2)	Cook Street	8		300	$ 230.00	$ 69,000.00	2	G	0.45	II
H (2)	Divie Road	8		550	$ 230.00	$ 126,500.00	12	G	0.83	II
H (2)	Florida Avenue	8		450	$ 230.00	$ 103,500.00	7	G	0.68	II
H (2)	Forest Street	8		250	$ 230.00	$ 57,500.00	1	G	0.38	II
H (2)	Vale Street	8		200	$ 230.00	$ 46,000.00	2	G	0.30	II
H (2)	West Shore Drive	8		800	$ 230.00	$ 184,000.00	15	G	1.21	II
H (2)	West Shore Drive	8		1125	$ 230.00	$ 258,750.00	23	G	1.70	II
H (2)	Area Total			5,475		$ 1,357,250.00	76		7.16	
	Cost per unit					$ 17,858.55				
H (3)	Arnold Road	8		650	$ 230.00	$ 149,500.00	11	I	0.98	II
H (3)	Grant Drive	8		700	$ 230.00	$ 161,000.00	13	I	1.06	II
H (3)	Holmes Road	8		925	$ 230.00	$ 212,750.00	15	I	1.40	II
H (3)	Reno Court	8		200	$ 230.00	$ 46,000.00	4	I	0.30	II
H (3)	Area Total		2,475	2475		$ 569,250.00	43		3.75	
	Cost per unit					$ 13,238.37				
I	Harrington Road		P.S.			$ 188,000.00	0			II
I	Arnold Road	4	FM	825	$ 110.00	$ 90,750.00	0			II
I	Harrington Road	4	FM	700	$ 110.00	$ 77,000.00	0			II
I	Arnold Road	8		1550	$ 230.00	$ 356,500.00	22	H1	2.35	II
I	Balsam Road	8		450	$ 230.00	$ 103,500.00	5	H1	0.68	II
I	Crestwood Road	8		100	$ 230.00	$ 23,000.00	1	H1	0.15	II
I	Crestwood Road	8		150	$ 230.00	$ 34,500.00	3	H1	0.23	II
I	Harrington Road	8		900	$ 230.00	$ 207,000.00	16	H1	1.36	II
I	Harrington Road	8		700	$ 230.00	$ 161,000.00	11	H1	1.06	II
I	Larch Road	8		650	$ 230.00	$ 149,500.00	15	H1	0.98	II
I	Larch Road	8		100	$ 230.00	$ 23,000.00	1	H1	0.15	II
I	Larch Road	8		300	$ 230.00	$ 69,000.00	3	H1	0.45	II
I	North Glen Drive	8		650	$ 230.00	$ 149,500.00	13	H1	0.98	II
I	South Glen Drive	8		800	$ 230.00	$ 184,000.00	18	H1	1.21	II
I	View Road	8		300	$ 230.00	$ 69,000.00	4	H1	0.45	II
I	X-C Larch Drive	8		450	$ 230.00	$ 103,500.00	2	H1	0.68	II
I	Area Total			8,625		$ 1,988,750.00	114		10.76	
	Cost per unit					$ 17,445.18				
J (1)	Hopkins Hill Road	18	Int.	1825		Existing	NA	TINT	6.22	II
J (1)	Hopkins Hill Road	12	Int.	1050		Existing	NA	TINT	2.39	II
J (1)	Hopkins Hill Road	10	Int.	700		Existing	NA	TINT	1.33	II
J (1)	Ada Court	8		200	$ 230.00	$ 46,000.00	5	TINT	0.30	II
J (1)	Anglewood Road	8		750	$ 230.00	$ 172,500.00	10	TINT	1.14	II
J (1)	Audrey Court	8		200	$ 230.00	$ 46,000.00	5	TINT	0.30	II
J (1)	Carolyn Street	8		600	$ 230.00	$ 138,000.00	9	TINT	0.91	II
J (1)	Charlotte Street	8		450	$ 230.00	$ 103,500.00	8	TINT	0.68	II
J (1)	Coventry Drive	8		1225	$ 230.00	$ 281,750.00	23	TINT	1.86	II
J (1)	Coventry Drive	8		650	$ 230.00	$ 149,500.00	12	TINT	0.98	II
J (1)	Edna Street	8		150	$ 230.00	$ 34,500.00	4	TINT	0.23	II
J (1)	Haywood Road	8		225	$ 230.00	$ 51,750.00	2	TINT	0.34	II
J (1)	Hopkins Hill Road	8		775		Existing	NA	TINT	1.17	II
J (1)	Johnson Bv	8		500		Existing	NA	TINT	0.76	II
J (1)	King Street	8		200	$ 230.00	$ 46,000.00	5	TINT	0.30	II
J (1)	Lawnwood Road	8		600	$ 230.00	$ 138,000.00	9	TINT	0.91	II
J (1)	Lionel Avenue	8		1000	$ 230.00	$ 230,000.00	20	TINT	1.52	II
J (1)	Marjorie Street	8		475	$ 230.00	$ 109,250.00	8	TINT	0.72	II
J (1)	Morris Street	8		450	$ 230.00	$ 103,500.00	7	TINT	0.68	II
J (1)	Nancy Street	8		300	$ 230.00	$ 69,000.00	4	TINT	0.45	II
J (1)	Nancy Street	8		275	$ 230.00	$ 63,250.00	4	TINT	0.42	II
J (1)	Rosemary Street	8		300	$ 230.00	$ 69,000.00	4	TINT	0.45	II
J (1)	Rosemary Street	8		300	$ 230.00	$ 69,000.00	3	TINT	0.45	II
J (1)	Rosemary Street	8		400	$ 230.00	$ 92,000.00	6	TINT	0.61	II
J (1)	York Drive	8		600	$ 230.00	$ 138,000.00	11	TINT	0.91	II
J (1)	York Drive	8		425	$ 230.00	$ 97,750.00	8	TINT	0.64	II
J (1)	Area Total			14,625		$ 2,248,250.00	167		26.68	
	Cost per unit					$ 13,462.57				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
J (2)	Johnson Bv		P.S.			$ 188,000.00	0			II
J (2)	Johnson Bv	4	FM	750	$ 110.00	$ 82,500.00	0			II
J (2)	Marjorie Street	4	FM	150	$ 110.00	$ 16,500.00	0			II
J (2)	Carlson Street	8		300	$ 230.00	$ 69,000.00	4	J1	0.45	II
J (2)	Johnson Bv	8		450	$ 230.00	$ 103,500.00	7	J1	0.68	II
J (2)	Johnson Bv	8		1000	$ 230.00	$ 230,000.00	9	J1	1.52	II
J (2)	Ledo Road	8		450	$ 230.00	$ 103,500.00	8	J1	0.68	II
J (2)	West lake Drive	8		425	$ 230.00	$ 97,750.00	5	J1	0.64	II
J (2)	X-C West Lake Dr	8		225	$ 230.00	$ 51,750.00	1	J1	0.34	II
J (2)	York Drive	8		1100	$ 230.00	$ 253,000.00	21	J1	1.67	II
J (2)	York Drive	8		100	$ 230.00	$ 23,000.00	2	J1	0.15	II
J (2)	Area Total			4,950		$ 1,218,500.00	57		6.14	
	Cost per unit					$ 21,377.19				
K (1)	Clifton Avenue	8		725	$ 230.00	$ 166,750.00	11	J1	1.10	II
K (1)	Deborah Avenue	8		450	$ 230.00	$ 103,500.00	7	J1	0.68	II
K (1)	Helen Avenue	8		700	$ 230.00	$ 161,000.00	14	J1	1.06	II
K (1)	Helen Avenue	8		1950	$ 230.00	$ 448,500.00	44	J1	2.95	II
K (1)	Laurie Avenue	8		500	$ 230.00	$ 115,000.00	10	J1	0.76	II
K (1)	Linwood Drive	8		750	$ 230.00	$ 172,500.00	15	J1	1.14	II
K (1)	Linwood Drive	8		300	$ 230.00	$ 69,000.00	6	J1	0.45	II
K (1)	Lorraine Avenue	8		1100	$ 230.00	$ 253,000.00	26	J1	1.67	II
K (1)	Marion Avenue	8		200	$ 230.00	$ 46,000.00	3	J1	0.30	II
K (1)	Maude Avenue	8		1050	$ 230.00	$ 241,500.00	24	J1	1.59	II
K (1)	Noella Avenue	8		1300	$ 230.00	$ 299,000.00	21	J1	1.97	II
K (1)	Regis Street	8		150	$ 230.00	$ 34,500.00	3	J1	0.23	II
K (1)	Area Total			9,175		$ 2,110,250.00	184		13.90	
	Cost per unit					$ 11,468.75				
K (2)	Adams Drive	8		1300	$ 230.00	$ 299,000.00	16	J1	1.97	II
K (2)	Clark Mill Street	8		1800	$ 230.00	$ 414,000.00	18	J1	2.73	II
K (2)	Fawn's Court	8		500	$ 230.00	$ 115,000.00	4	J1	0.76	II
K (2)	Garfield Drive	8		700	$ 230.00	$ 161,000.00	10	J1	1.06	II
K (2)	Hancock Drive	8		1000	$ 230.00	$ 230,000.00	15	TINT	1.52	II
K (2)	Hoover Drive	8		450	$ 230.00	$ 103,500.00	6	J1	0.68	II
K (2)	Jefferson Drive	8		1800	$ 230.00	$ 414,000.00	20	TINT	2.73	II
K (2)	Monroe Drive	8		1100	$ 230.00	$ 253,000.00	27	J1	1.67	II
K (2)	Area Total			8,650		$ 1,989,500.00	116		13.11	
	Cost per unit					$ 17,150.86				
L (1)	Clear View Drive	8		500	$ 230.00	$ 115,000.00	8	TINT	0.76	I
L (1)	Forestdale Drive	8		350	$ 230.00	$ 80,500.00	5	TINT	0.53	I
L (1)	Pinehurst Road	8		350	$ 230.00	$ 80,500.00	4	TINT	0.53	I
L (1)	Wendell Avenue	8		650	$ 230.00	$ 149,500.00	7	TINT	0.98	I
L (1)	Whitman Street	8		450	$ 230.00	$ 103,500.00	9	TINT	0.68	I
L (1)	Area Total			2,300		$ 529,000.00	33		3.48	
	Cost per unit					$ 16,030.30				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
L (2)	Bank Street	8		500	$ 230.00	$ 115,000.00	5	TINT	0.76	II
L (2)	Barber Street	8		850	$ 230.00	$ 195,500.00	8	TINT	1.29	II
L (2)	Beaton Street	8		300	$ 230.00	$ 69,000.00	6	TINT	0.45	II
L (2)	Bieler's Lane	8		200	$ 230.00	$ 46,000.00	0	TINT	0.30	II
L (2)	Brentwood Drive	8		400	$ 230.00	$ 92,000.00	8	TINT	0.61	II
L (2)	Cady Street	8		250	$ 230.00	$ 57,500.00	3	TINT	0.38	II
L (2)	Carr Street	8		200	$ 230.00	$ 46,000.00	2	TINT	0.30	II
L (2)	Dell Street	8		325	$ 230.00	$ 74,750.00	8	TINT	0.49	II
L (2)	Ferncroft Avenue	8		500	$ 230.00	$ 115,000.00	9	TINT	0.76	II
L (2)	Ferncroft Avenue	8		375	$ 230.00	$ 86,250.00	5	TINT	0.57	II
L (2)	Harding Street	8		200	$ 230.00	$ 46,000.00	4	TINT	0.30	II
L (2)	Homestead Street	8		50	$ 230.00	$ 11,500.00	1	TINT	0.08	II
L (2)	Hopkins Hill Road	8		550	$ 230.00	$ 126,500.00	8	TINT	0.83	II
L (2)	Ian Street	8		200	$ 230.00	$ 46,000.00	3	TINT	0.30	II
L (2)	Kilburn Avenue	8		250	$ 230.00	$ 57,500.00	2	TINT	0.38	II
L (2)	Kilton Avenue	8		200	$ 230.00	$ 46,000.00	6	TINT	0.30	II
L (2)	Lambert Street	8		350	$ 230.00	$ 80,500.00	4	TINT	0.53	II
L (2)	Lowell Street	8		750	$ 230.00	$ 172,500.00	14	TINT	1.14	II
L (2)	Manor Drive	8		800	$ 230.00	$ 184,000.00	15	TINT	1.21	II
L (2)	Parker Street	8		150	$ 230.00	$ 34,500.00	1	TINT	0.23	II
L (2)	Parker Street	8		600	$ 230.00	$ 138,000.00	9	TINT	0.91	II
L (2)	Potter Street	8		425	$ 230.00	$ 97,750.00	7	TINT	0.64	II
L (2)	Prince Street	8		325	$ 230.00	$ 74,750.00	4	TINT	0.49	II
L (2)	Princess Street	8		300	$ 230.00	$ 69,000.00	4	TINT	0.45	II
L (2)	Prospect Avenue	8		1100	$ 230.00	$ 253,000.00	9	TINT	1.67	II
L (2)	Rathbun Street	8		850	$ 230.00	$ 195,500.00	14	TINT	1.29	II
L (2)	Robbins Drive	8		825	$ 230.00	$ 189,750.00	15	TINT	1.25	II
L (2)	South Main Street	8		775	$ 230.00	$ 178,250.00	15	TINT	1.17	II
L (2)	South Main Street	8		200	$ 230.00	$ 46,000.00	2	TINT	0.30	II
L (2)	South Main Street	8		1950	$ 230.00	$ 448,500.00	40	TINT	2.95	II
L (2)	South Main Street	8		875	$ 230.00	$ 201,250.00	16	TINT	1.33	II
L (2)	South Main Street	8		525	$ 230.00	$ 120,750.00	5	TINT	0.80	II
L (2)	Stone Street	8		850	$ 230.00	$ 195,500.00	17	TINT	1.29	II
L (2)	Sunapee Court	8		1000	$ 230.00	$ 230,000.00	15	TINT	1.52	II
L (2)	Wildwood Street	8		225	$ 230.00	$ 51,750.00	3	TINT	0.34	II
L (2)	Williams Street	8		500	$ 230.00	$ 115,000.00	9	TINT	0.76	II
L (2)	Woburn Street	8		300	$ 230.00	$ 69,000.00	5	TINT	0.45	II
L (2)	Wood Street	8		2000	Existing		NA	TINT	3.03	II
L (2)	Woodland Avenue	8		400	$ 230.00	$ 92,000.00	9	TINT	0.61	II
L (2)	Woodland Avenue	8		300	$ 230.00	$ 69,000.00	5	TINT	0.45	II
L (2)	X-C Ferncrest Avenue	8		1375	$ 230.00	$ 316,250.00	0	TINT	2.08	II
L (2)	Area Total	8		23,100		$ 4,853,000.00	315		35.00	
	Cost per unit					$ 15,406.35				
M	Butternut Drive	8		700	$ 230.00	$ 161,000.00	8	TINT	1.06	III
M	Reservoir Road	8		1700	$ 230.00	$ 391,000.00	23	TINT	2.58	III
M	X-C High School	8		700	$ 230.00	$ 161,000.00	1	TINT	1.06	III
M	Area Total			3,100		$ 713,000.00	32		4.70	
	Cost per unit					$ 22,281.25				
~~N (1)~~	~~Blue Spruce Drive~~	~~8~~		~~750~~	~~Removed~~		~~10~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~Crocus Court~~	~~8~~		~~100~~	~~Removed~~		~~2~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~Lynn Drive~~	~~8~~		~~1050~~	~~Removed~~		~~19~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~Lynn Drive~~	~~8~~		~~200~~	~~Removed~~		~~3~~	~~TINT~~	~~NA~~	~~III~~
N (1)	Noosesneck Hill Road	8		400	$ 230.00	$ 92,000.00	3	TINT	0.61	III
~~N (1)~~	~~Pamela Court~~	~~8~~		~~100~~	~~Removed~~		~~2~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~Sugar Maple Drive~~	~~8~~		~~550~~	~~Removed~~		~~6~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~Sugar Maple Drive~~	~~8~~		~~775~~	~~Removed~~		~~11~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~West View Drive~~	~~8~~		~~650~~	~~Removed~~		~~7~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~Winterberry Drive~~	~~8~~		~~450~~	~~Removed~~		~~6~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~Wisteria Drive~~	~~8~~		~~850~~	~~Removed~~		~~12~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~X-C Lynn Drive~~	~~8~~		~~200~~	~~Removed~~		~~0~~	~~TINT~~	~~NA~~	~~III~~
~~N (1)~~	~~X-C Sugar Maple Drive~~	~~8~~		~~975~~	~~Removed~~		4	~~TINT~~	~~NA~~	~~III~~
N (1)	Area Total			7,050		$ 92,000.00	3		0.61	
	Cost per unit					$ 30,666.67				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
N (2)	~~Nooneneck Hill Road~~		~~P.S.~~			Removed	~~0~~	~~TINT~~		~~III~~
N (2)	~~Nooneneck Hill Road~~	~~6~~	~~FM~~	~~3200~~		Removed	~~0~~	~~TINT~~		~~III~~
N (2)	~~Apple Blossom Lane~~	~~8~~		~~300~~		Removed	~~5~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Apple Blossom Lane~~	~~8~~		~~950~~		Removed	~~13~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Blueberry Lane~~	~~8~~		~~350~~		Removed	~~2~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Blueberry Lane~~	~~8~~		~~700~~		Removed	~~9~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Cherry Blossom Lane~~	~~8~~		~~950~~		Removed	~~14~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Circlewood Drive~~	~~8~~		~~2400~~		Removed	~~31~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Circlewood Drive~~	~~8~~		~~600~~		Removed	~~7~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Huckleberry Road~~	~~8~~		~~350~~		Removed	~~2~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Jack Pine Road~~	~~8~~		~~1100~~		Removed	~~11~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Kingswood Drive~~	~~8~~		~~650~~		Removed	~~9~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Linden Lane~~	~~8~~		~~350~~		Removed	~~2~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Magnolia Lane~~	~~8~~		~~2075~~		Removed	~~30~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Peach Tree Lane~~	~~8~~		~~1150~~		Removed	~~15~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Peninsula Court~~	~~8~~		~~500~~		Removed	~~7~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Plum Tree Lane~~	~~8~~		~~600~~		Removed	~~9~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Red Maple Road~~	~~8~~		~~800~~		Removed	~~10~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Rustic Way~~	~~8~~		~~400~~		Removed	~~2~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Sugar Maple Drive~~	~~8~~		~~550~~		Removed	~~8~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~West View Drive~~	~~8~~		~~1100~~		Removed	~~17~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Winterberry Drive~~	~~8~~		~~450~~		Removed	~~5~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wisteria Drive~~	~~8~~		~~1325~~		Removed	~~17~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wisteria Drive~~	~~8~~		~~200~~		Removed	~~3~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wisteria Drive~~	~~8~~		~~1450~~		Removed	~~22~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wisteria Drive~~	~~8~~		~~350~~		Removed	~~3~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wisteria Drive~~	~~8~~		~~500~~		Removed	~~8~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wolfe Court~~	~~8~~		~~250~~		Removed	~~3~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wood Cove Drive~~	~~8~~		~~2450~~		Removed	~~38~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wood Cove Drive~~	~~8~~		~~650~~		Removed	~~8~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wood Cove Drive~~	~~8~~		~~725~~		Removed	~~8~~	~~TINT~~	~~NA~~	~~III~~
N (2)	~~Wood Cove Drive~~	~~8~~		~~700~~		Removed	~~11~~	~~TINT~~	~~NA~~	~~III~~
N (2)	Area Total			28,125		$ -	~~NA~~		0.00	
	Cost per unit					$ -				
N -1	Linda Drive		P.S.			$ 300,000.00	0	Woodland Manor		II
N -1	Nooseneck Hill Road	4	FM	4000	$ 110.00	$ 440,000.00	0	Woodland Manor		II
N -1	Nooseneck Hill Road	8		2000	$ 230.00	$ 460,000.00	19	Woodland Manor	3.03	II
N -1	Nooseneck Hill Road	8		1500	$ 230.00	$ 345,000.00	12	Woodland Manor	2.27	II
N -1	Nooseneck Hill Road	8		900	$ 230.00	$ 207,000.00	4	Woodland Manor	1.36	II
N -1	Linda Drive	8		900	$ 230.00	$ 207,000.00	16	Woodland Manor	1.36	II
N -1	Linda Drive	8		800	$ 230.00	$ 184,000.00	16	Woodland Manor	1.21	II
N -1	Linda Drive	8		900	$ 230.00	$ 207,000.00	27	Woodland Manor	1.36	II
N -1	Stuart Drive	8		125	$ 230.00	$ 28,750.00	1	Woodland Manor	0.19	II
N -1	Park Lane	8		1100	$ 230.00	$ 253,000.00	31	Woodland Manor	1.67	II
N -1	Grace Avenue	8		350	$ 230.00	$ 80,500.00	4	Woodland Manor	0.53	II
N -1	Lane 1	8		300	$ 230.00	$ 69,000.00	8	Woodland Manor	0.45	II
N -1	Lane 2	8		350	$ 230.00	$ 80,500.00	13	Woodland Manor	0.53	II
N -1	Lane 3	8		350	$ 230.00	$ 80,500.00	13	Woodland Manor	0.53	II
N -1	Lane 4	8		380	$ 230.00	$ 87,400.00	12	Woodland Manor	0.58	II
N -1	Lane 5	8		360	$ 230.00	$ 82,800.00	12	Woodland Manor	0.55	II
N -1	Lane 6	8		400	$ 230.00	$ 92,000.00	16	Woodland Manor	0.61	II
N -1	Lane 7	8		410	$ 230.00	$ 94,300.00	18	Woodland Manor	0.62	II
N -1										
N -1	Area Total			15,125		$ 3,298,750.00	222		16.86	
	Cost per unit					$ 14,859.23				
WW	Pulaski Street	24	Int.	2800		Existing	NA	WW	12.73	I
O (1)	Pulaski Street	24	Int.	1100		Existing	NA	WW	5.00	I
U	Washington Street	24	Int.	5600		Existing	NA	WW	25.45	I
O (1)	Whitford Street	24	Int.	600		Existing	NA	WW	2.73	I
O (1)	X-C R.R. Bed	24	Int.	1375		Existing	NA	WW	6.25	I
WINT	Area Total			11,475		$ -	NA		52.16	
	Cost per unit					$ -				
O (2)	North Street	8		350	$ 230.00	$ 80,500.00	7	WINT	0.53	I
O (2)	Pulaski Street	8		50	$ 230.00	$ 11,500.00	2	WINT	0.08	I
O (2)	Pulaski Street	8		700	$ 230.00	$ 161,000.00	9	WINT	1.06	I
O (2)	South Strete	8		650	$ 230.00	$ 149,500.00	8	WINT	0.98	I
O (2)	Area Total			1750		$ 402,500.00	26		2.65	
	Cost per unit					$ 15,480.77				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
O (3)	~~Fenland Drive~~		~~P.S.~~			Removed		~~WW~~		~~III~~
O (3)	~~Fenland Drive~~	~~4~~	~~FM~~	~~400~~		Removed		~~WW~~		~~III~~
O (3)	~~Roundway Drive~~	~~4~~	~~FM~~	~~250~~		Removed		~~WW~~		~~III~~
O (3)	~~Roundway Drive~~	~~4~~	~~FM~~	~~600~~		Removed		~~WW~~		~~III~~
O (3)	~~Sheffield Avenue~~	~~4~~	~~FM~~	~~500~~		Removed		~~WW~~		~~III~~
O (3)	~~Creighton Place~~	~~8~~		~~600~~		Removed	~~11~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Eileen Drive~~	~~8~~		~~325~~		Removed	~~6~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Fenland Drive~~	~~8~~		~~400~~		Removed	~~6~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Harvest Drive~~	~~8~~		~~400~~		Removed	~~6~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Kathy Avenue~~	~~8~~		~~375~~		Removed	~~7~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Kennington Avenue~~	~~8~~		~~350~~		Removed	~~6~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Kimberly Avenue~~	~~8~~		~~300~~		Removed	~~5~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Roundway Drive~~	~~8~~		~~200~~		Removed	~~4~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Roundway Drive~~	~~8~~		~~225~~		Removed	~~3~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Sheffield Avenue~~	~~8~~		~~225~~		Removed	~~4~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Sheffield Avenue~~	~~8~~		~~125~~		Removed	~~3~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Sidney Street~~	~~8~~		~~125~~		Removed	~~2~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Sophia's Way~~	~~8~~		~~200~~		Removed	~~4~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Wilshire Way~~	~~8~~		~~975~~		Removed	~~16~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Windsor Park Drive~~	~~8~~		~~750~~		Removed	~~15~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Windsor Park Drive~~	~~8~~		~~250~~		Removed	~~3~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Windsor Park Drive~~	~~8~~		~~2000~~		Removed	~~42~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~X C Windsor Park Drive~~	~~8~~		~~950~~		Removed	~~0~~	~~WW~~	~~NA~~	~~III~~
O (3)	~~Area Total~~			~~10,525~~		~~$ -~~	~~NA~~		~~0.00~~	
	~~Cost per unit~~					~~$ -~~				
P	Fairview Avenue	12	Int.	1300		Existing	NA	WINT	2.95	I
P	Read Avenue	12	Int.	1900	$ 350.00	$ 665,000.00	42	WINT	4.32	I
P	Washington Street	12	Int.	500	$ 350.00	$ 175,000.00	10	WINT	1.14	I
P	Whitford Street	12	Int.	200	$ 350.00	$ 70,000.00	1	WINT	0.45	I
P	Alice Street	8		200	$ 230.00	$ 46,000.00	2	WINT	0.30	I
P	Ann Court	8		200	$ 230.00	$ 46,000.00	4	WINT	0.30	I
P	Bates Avenue	8		700	$ 230.00	$ 161,000.00	14	WINT	1.06	I
P	Bates Avenue	8		1300	$ 230.00	$ 299,000.00	25	WINT	1.97	I
P	Cecile Avenue	8		1150	$ 230.00	$ 264,500.00	19	WINT	1.74	I
P	Chopin Street	8		350	$ 230.00	$ 80,500.00	7	WINT	0.53	I
P	Dion Avenue	8		850	$ 230.00	$ 195,500.00	14	WINT	1.29	I
P	Doolittle Street	8		200	$ 230.00	$ 46,000.00	4	WINT	0.30	I
P	Edward Street	8		200	$ 230.00	$ 46,000.00	5	WINT	0.30	I
P	Edward Street	8		1200	$ 230.00	$ 276,000.00	20	WINT	1.82	I
P	Ernest Street	8		200	$ 230.00	$ 46,000.00	4	WW	0.30	I
P	Fairview Avenue	8		850		Existing	NA	WINT	1.29	I
P	Gerald Avenue	8		500	$ 230.00	$ 115,000.00	9	WINT	0.76	I
P	Hazard Street	8		1500	$ 230.00	$ 345,000.00	28	WINT	2.27	I
P	Hope Court	8		200	$ 230.00	$ 46,000.00	3	WINT	0.30	I
P	Justa Avenue	8		300	$ 230.00	$ 69,000.00	5	WINT	0.45	I
P	Knight Street	8		400	$ 230.00	$ 92,000.00	7	WINT	0.61	I
P	MacArthuer Bv	8		1550	$ 230.00	$ 356,500.00	24	WINT	2.35	I
P	Normand Street	8		100	$ 230.00	$ 23,000.00	1	WW	0.15	I
P	Rathbun Street	8		200	$ 230.00	$ 46,000.00	1	WINT	0.30	I
P	Rathbun Street	8		100	$ 230.00	$ 23,000.00	5	WW	0.15	I
P	Raymond	8		300	$ 230.00	$ 69,000.00	7	WINT	0.45	I
P	Sharp Street	8		300	$ 230.00	$ 69,000.00	3	WINT	0.45	I
P	Washington Street	8		1000	$ 230.00	$ 230,000.00	11	WINT	1.52	I
P	Area Total			17,750		$ 3,900,000.00	275		29.85	
	Cost per unit					$ 14,181.82				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
Q	Bennett Street		P.S.			$ 375,000.00	0			II
Q	Bennett Street	6	FM	525	$ 120.00	$ 63,000.00	0			II
Q	Read Avenue	6	FM	275	$ 120.00	$ 33,000.00	0			II
Q	Alex Street	8		425	$ 230.00	$ 97,750.00	5	P	0.64	II
Q	Aline Avenue	8		200		Existing	NA	P	0.30	II
Q	Anderson Avenue	8		325	$ 230.00	$ 74,750.00	8	P	0.49	II
Q	Anderson Avenue	8		200	$ 230.00	$ 46,000.00	4	P	0.30	II
Q	Beaulieu Avenue	8		500	$ 230.00	$ 115,000.00	6	P	0.76	II
Q	Bennett Street	8		325		Existing	NA	P	0.49	II
Q	Bennett Street	8		600	$ 230.00	$ 138,000.00	8	P	0.91	II
Q	Callahan Way	8		625	$ 230.00	$ 143,750.00	4	P	0.95	II
Q	Cardinal Avenue	8		550	$ 230.00	$ 126,500.00	4	P	0.83	II
Q	Doolittle Street	8		800	$ 230.00	$ 184,000.00	14	P	1.21	II
Q	Doolittle Street	8		125	$ 230.00	$ 28,750.00	1	P	0.19	II
Q	Doolittle Street	8		75	$ 230.00	$ 17,250.00	1	P	0.11	II
Q	Doris Avenue	8		350	$ 230.00	$ 80,500.00	5	P	0.53	II
Q	Eisenhower Street	8		275	$ 230.00	$ 63,250.00	1	P	0.42	II
Q	Eisenhower Street	8		400	$ 230.00	$ 92,000.00	3	P	0.61	II
Q	Eisenhower Street	8		250	$ 230.00	$ 57,500.00	1	P	0.38	II
Q	Fairview Avenue	8		1900	$ 230.00	$ 437,000.00	13	P	2.88	II
Q	Fairview Avenue	8		950	$ 230.00	$ 218,500.00	12	P	1.44	II
Q	Gadoury Street	8		500	$ 230.00	$ 115,000.00	3	P	0.76	II
Q	Gadoury Street	8		575	$ 230.00	$ 132,250.00	8	P	0.87	II
Q	Gough Avenue	8		625	$ 230.00	$ 143,750.00	10	P	0.95	II
Q	Greenwood Avenue	8		1075	$ 230.00	$ 247,250.00	12	P	1.63	II
Q	Hope View Street	8		400	$ 230.00	$ 92,000.00	7	P	0.61	II
Q	MacArthur Bv	8		1300	$ 230.00	$ 299,000.00	19	P	1.97	II
Q	MacArthur Bv	8		650	$ 230.00	$ 149,500.00	10	P	0.98	II
Q	Marshall Circle	8		1000	$ 230.00	$ 230,000.00	17	P	1.52	II
Q	Marshall Circle	8		350	$ 230.00	$ 80,500.00	5	P	0.53	II
Q	Michael Court	8		200	$ 230.00	$ 46,000.00	3	P	0.30	II
Q	Morin Avenue	8		500	$ 230.00	$ 115,000.00	7	P	0.76	II
Q	Patton Street	8		1075	$ 230.00	$ 247,250.00	16	P	1.63	II
Q	Philip Street	8		1275	$ 230.00	$ 293,250.00	21	P	1.93	II
Q	Rainville Avenue	8		450	$ 230.00	$ 103,500.00	3	P	0.68	II
Q	Ray Street	8		550	$ 230.00	$ 126,500.00	9	P	0.83	II
Q	Raymond Street	8		150	$ 230.00	$ 34,500.00	3	P	0.23	II
Q	Read Avenue	8		550	$ 230.00	$ 126,500.00	11	P	0.83	II
Q	Read Avenue	8		150		Existing	NA	P	0.23	II
Q	Read Avenue	8		2750	$ 230.00	$ 632,500.00	48	P	4.17	II
Q	Rosella Street	8		400	$ 230.00	$ 92,000.00	6	P	0.61	II
Q	Shippee Avenue	8		100	$ 230.00	$ 23,000.00	2	P	0.15	II
Q	Shippee Avenue	8		100	$ 230.00	$ 23,000.00	2	P	0.15	II
Q	Unnamed Way	8		150	$ 230.00	$ 34,500.00	2	P	0.23	II
Q	Unnamed Way	8		125	$ 230.00	$ 28,750.00	3	P	0.19	II
Q	Yates Avenue	8		925		Existing	NA	P	1.40	II
Q	Youngs Avenue	8		650	$ 230.00	$ 149,500.00	10	P	0.98	II
Q	Area Total			26,250		$ 5,956,500.00	327		38.56	
	Cost per unit					$ 18,215.60				
R	Bee Street	8		450	$ 230.00	$ 103,500.00	8	S	0.68	II
R	Brown Street	8		650	$ 230.00	$ 149,500.00	2	S	0.98	II
R	Card Street	8		750	$ 230.00	$ 172,500.00	10	S	1.14	II
R	Dennis Street	8		75	$ 230.00	$ 17,250.00	1	S	0.11	II
R	Fairview Avenue	8		1475	$ 230.00	$ 339,250.00	20	S	2.23	II
R	Fones Street	8		325	$ 230.00	$ 74,750.00	4	S	0.49	II
R	Harris Avenue	8		600		Existing	NA	WW	0.91	II
R	Hillside Avenue	8		625	$ 230.00	$ 143,750.00	11	S	0.95	II
R	Hillside Avenue	8		500	$ 230.00	$ 115,000.00	10	WW	0.76	II
R	Hoxie Court	8		150	$ 230.00	$ 34,500.00	4	WW	0.23	II
R	Park Avenue	8		675	$ 230.00	$ 155,250.00	14	WW	1.02	II
R	Spencer Avenue	8		200	$ 230.00	$ 46,000.00	4	S	0.30	II
R	Tobnin Street	8		200	$ 230.00	$ 46,000.00	4	S	0.30	II
R	Woodside Avenue	8		350		Existing	NA	S	0.53	II
R	X-C Card Street	8		125	$ 230.00	$ 28,750.00	0	S	0.19	II
R	Yeaton Street	8		550	$ 230.00	$ 126,500.00	8	S	0.83	II
R	Area Total			7,700		$ 1,552,500.00	100		11.67	
	Cost per unit					$ 15,525.00				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
S	Ames Street	12	Int.	500	$ 350.00	$ 175,000.00	7	T	1.14	II
S	Hill Street	12	Int.	850	$ 350.00	$ 297,500.00	11	T	1.93	II
S	Howard Avenue	12	Int.	250	$ 350.00	$ 87,500.00	1	T	0.57	II
S	Lincoln Avenue	12	Int.	650	$ 350.00	$ 227,500.00	7	T	1.48	II
S	Ames Street	8		550	$ 230.00	$ 126,500.00	10	T	0.83	II
S	Brown Street	8		450	$ 230.00	$ 103,500.00	4	T	0.68	II
S	Lincoln Avenue	8		300	Existing		NA	T	0.45	II
S	Lucile Street	8		250	$ 230.00	$ 57,500.00	3	T	0.38	II
S	Mumford Street	8		350	$ 230.00	$ 80,500.00	8	T	0.53	II
S	Mumford Street	8		150	$ 230.00	$ 34,500.00	1	T	0.23	II
S	Mumford Street	8		250	$ 230.00	$ 57,500.00	2	T	0.38	II
S	Mumford Street	8		650	$ 230.00	$ 149,500.00	8	T	0.98	II
S	Notre Dame Street	8		550	$ 230.00	$ 126,500.00	10	T	0.83	II
S	Tyler Street	8		250	$ 230.00	$ 57,500.00	2	T	0.38	II
S	Area Total			6,000		$ 1,581,000.00	74		10.80	
	Cost per unit					$ 21,364.86				
T	Main Street	18	Int.	675	Existing		NA	WW	2.30	III
T	Main Street	15	Int.	200	Existing		NA	WW	0.57	III
T	Main Street	12	Int.	1,800	$ 350.00	$ 630,000.00	14	WW	4.09	III
T	Broad Street	8		675	Existing		NA	WW	1.02	III
T	Elm Street	8		450	$ 230.00	$ 103,500.00	6	WW	0.68	III
T	Garden Street	8		250	$ 230.00	$ 57,500.00	3	WW	0.38	III
T	Harris Street	8		1,600	$ 230.00	$ 368,000.00	23	WW	2.42	III
T	Highland Avenue	8		750	$ 230.00	$ 172,500.00	15	WW	1.14	III
T	Highland Avenue	8		450	$ 230.00	$ 103,500.00	9	WW	0.68	III
T	Lamphear Street	8		425	Existing		NA	WW	0.64	III
T	Mill Street	8		400	$ 230.00	$ 92,000.00	6	WW	0.61	III
T	Potter Court	8		100	$ 230.00	$ 23,000.00	1	WW	0.15	III
T	Potter Court	8		550	$ 230.00	$ 126,500.00	3	WW	0.83	III
T	Summit Avenue	8		150	Existing		NA	WW	0.23	III
T	Area Total			8,475		$ 1,676,500.00	80		15.75	
	Cost per unit					$ 20,956.25				
U (2)	Main Street	12	Int.	3050	Existing		NA	TINT	6.93	II
U (2)	Sandy Bottom Road	12	Int.	1475	Existing		NA	TINT	3.35	II
U (2)	Main Street	8		400	Existing		NA	TINT	0.61	II
U (2)	Newell Court	8		350	Existing		NA	TINT	0.53	II
U (2)	Whipple Court	8		400	Existing		NA	TINT	0.61	II
U (2)	Area Total			5,675		$ -	NA		12.03	
	Cost per unit					$ -				
V	Black Rock Road	12	Int.	3000	$ 350.00	$ 1,050,000.00	49	P	6.82	II
V	Anthony Street	8		800	Existing		NA	WINT	1.21	II
V	Benoit Street	8		1750	$ 230.00	$ 402,500.00	27	WINT	2.65	II
V	Boston Street	8		900	$ 230.00	$ 207,000.00	8	P	1.36	II
V	Boston Street	8		1050	$ 230.00	$ 241,500.00	15	WINT	1.59	II
V	Boston Street	8		2050	Existing		NA		3.11	II
V	Congdon Street	8		650	$ 230.00	$ 149,500.00	8	P	0.98	II
V	Hilldan Street	8		300	$ 230.00	$ 69,000.00	4	P	0.45	II
V	Irene Lane	8		300	$ 230.00	$ 69,000.00	3	WINT	0.45	II
V	Meeting Street	8		1000	$ 230.00	$ 230,000.00	17	WINT	1.52	II
V	Murray Street	8		300	$ 230.00	$ 69,000.00	1	WINT	0.45	II
V	Nancy Court	8		450	$ 230.00	$ 103,500.00	9	P	0.68	II
V	Puritan Avenue	8		850	$ 230.00	$ 195,500.00	9	WINT	1.29	II
V	Union Street	8		100	Existing		NA	WINT	0.15	II
V	Area Total			13,500		$ 2,786,500.00	150		22.73	
	Cost per unit					$ 18,576.67				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
W (1)	Battey Avenue	8		900	$ 230.00	$ 207,000.00	7	WINT	1.36	II
W (1)	Cindy Lane	8		300	$ 230.00	$ 69,000.00	5	WINT	0.45	II
W (1)	Contentment Drive	8		800	Existing		NA	WINT	1.21	II
W (1)	Foster Drive	8		250	$ 230.00	$ 57,500.00	3	WINT	0.38	II
W (1)	Francis Street	8		525	$ 230.00	$ 120,750.00	11	WINT	0.80	II
W (1)	Holden Street	8		825	$ 230.00	$ 189,750.00	9	WINT	1.25	II
W (1)	Knotty Oak Road	8		2950	$ 230.00	$ 678,500.00	53	WINT	4.47	II
W (1)	Long Pond Road	8		4000	$ 230.00	$ 920,000.00	8	WINT	6.06	II
W (1)	Maple Street	8		350	$ 230.00	$ 80,500.00	4	WINT	0.53	II
W (1)	Maple Street	8		1150	$ 230.00	$ 264,500.00	19	WINT	1.74	II
W (1)	Meadow Lane	8		200	$ 230.00	$ 46,000.00	4	WINT	0.30	II
W (1)	Meredith Drive	8		1300	$ 230.00	$ 299,000.00	23	WINT	1.97	II
W (1)	Oak Street	8		275	$ 230.00	$ 63,250.00	2	WINT	0.42	II
W (1)	Park Street	8		275	$ 230.00	$ 63,250.00	1	WINT	0.42	II
W (1)	Pearl Street	8		250	$ 230.00	$ 57,500.00	2	WINT	0.38	II
W (1)	Station Street	8		725	$ 230.00	$ 166,750.00	14	WINT	1.10	II
W (1)	Station Street	8		175	$ 230.00	$ 40,250.00	2	WINT	0.27	II
W (1)	Tero Drive	8		450	$ 230.00	$ 103,500.00	9	WINT	0.68	II
W (1)	Valley Crest Road	8		1225	$ 230.00	$ 281,750.00	24	WINT	1.86	II
W (1)	Area Total			16,925		$ 3,708,750.00	200		25.64	
	Cost per unit					$ 18,543.75				
W (2)	Dawn Lane		P.S.			$ 150,000.00	0	W1		II
W (2)	Dawn Lane	3	FM	450	$ 90.00	$ 40,500.00	0	W1		II
W (2)	Dawn Lane	8		250	$ 230.00	$ 57,500.00	6	W1	0.38	II
W (2)	Long Pond Road	8		350	$ 230.00	$ 80,500.00	6	W1	0.53	II
W (2)	Area total			1,050		$ 328,500.00	12		0.91	
	Cost per unit					$ 27,375.00				
X (1)	Blackrock Road	8		575	$ 230.00	$ 132,250.00	6	V	0.87	III
X (1)	Breezy Lake Drive	8		150	$ 230.00	$ 34,500.00	4	V	0.23	III
X (1)	Breezy Lake Drive	8		900	$ 230.00	$ 207,000.00	16	V	1.36	III
X (1)	Breezy Lake Drive	8		550	$ 230.00	$ 126,500.00	9	V	0.83	III
X (1)	~~Brookfield Road~~	~~8~~		~~450~~	Removed		~~8~~	~~V~~	~~NA~~	~~III~~
X (1)	~~Centennial Street~~	~~8~~		~~1475~~	Removed		~~23~~	~~V~~	~~NA~~	~~III~~
X (1)	~~Country View Drive~~	~~8~~		~~275~~	Removed		~~2~~	~~V~~	~~NA~~	~~III~~
X (1)	David Drive	8		650	$ 230.00	$ 149,500.00	6	V	0.98	III
X (1)	Geravis Street	8		100	$ 230.00	$ 23,000.00	1	V	0.15	III
X (1)	Geravis Street	8		2600	$ 230.00	$ 598,000.00	38	V	3.94	III
X (1)	Knotty Oak Road	8		1575	$ 230.00	$ 362,250.00	23	V	2.39	III
X (1)	Knotty Oak Road	8		1500	$ 230.00	$ 345,000.00	27	W1	2.27	III
X (1)	~~Lacasa Drive~~	~~8~~		~~225~~	Removed		~~2~~	~~V~~	~~NA~~	~~III~~
X (1)	~~Laforge Drive~~	~~8~~		~~1000~~	Removed		~~16~~	~~V~~	~~NA~~	~~III~~
X (1)	Pond View Drive	8		450	$ 230.00	$ 103,500.00	8	V	0.68	III
X (1)	Pond View Drive	8		700	$ 230.00	$ 161,000.00	12	V	1.06	III
X (1)	Regent Street	8		400	$ 230.00	$ 92,000.00	4	W1	0.61	III
X (1)	~~Sheri Drive~~	~~8~~		~~450~~	Removed		~~5~~	~~V~~	~~NA~~	~~III~~
X (1)	~~Sheri Drive~~	~~8~~		~~400~~	Removed		~~7~~	~~V~~	~~NA~~	~~III~~
X (1)	~~Viola Street~~	~~8~~		~~1175~~	Removed		~~20~~	~~V~~	~~NA~~	~~III~~
X (1)	Area Total			15,600		$ 2,334,500.00	154		15.38	
	Cost per unit					$ 15,159.09				
X (2)	White Rock Drive		P.S.			$ 150,000.00	0	X1		III
X (2)	White Rock Drive	3	FM	750	$ 90.00	$ 67,500.00	0	X1		III
X (2)	Walnut Hill Road	8		400	$ 230.00	$ 92,000.00	4	X1	0.61	III
X (2)	White Rock Drive	8		450	$ 230.00	$ 103,500.00	7	X1	0.68	III
X (2)	White Rock Drive	8		650	$ 230.00	$ 149,500.00	10	X1	0.98	III
X (2)	Area Total			2,250		$ 562,500.00	21		2.27	
	Cost per unit					$ 26,785.71				
Y	~~Blackrock Road~~	~~8~~		~~1000~~	Removed		~~8~~	~~V~~	~~NA~~	~~III~~
Y	~~Blackrock Road~~	~~8~~		~~3200~~	Removed		~~38~~	~~Z~~	~~NA~~	~~III~~
Y	~~Country View Drive~~	~~8~~		~~600~~	Removed		~~7~~	~~Z~~	~~NA~~	~~III~~
Y	~~Hawthorne Road~~	~~8~~		~~750~~	Removed		~~9~~	~~Z~~	~~NA~~	~~III~~
Y	~~Hickory Road~~	~~8~~		~~1450~~	Removed		~~22~~	~~Z~~	~~NA~~	~~III~~
Y	~~Hornbeam Road~~	~~8~~		~~1200~~	Removed		~~16~~	~~Z~~	~~NA~~	~~III~~
Y	~~Manning Court~~	~~8~~		~~850~~	Removed		~~11~~	~~Z~~	~~NA~~	~~III~~
Y	~~Sandlewood Court~~	~~8~~		~~750~~	Removed		~~5~~	~~Z~~	~~NA~~	~~III~~
Y	~~Area Total~~			~~9,800~~		$ -	~~NA~~		~~NA~~	
	~~Cost per unit~~					$ -				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
Z (1)	Cedar Street	8		1150	$ 230.00	$ 264,500.00	18	S	1.74	II
Z (1)	Chestnut Street	8		200	$ 230.00	$ 46,000.00	4	S	0.30	II
Z (1)	Chestnut Street	8		200	$ 230.00	$ 46,000.00	2	S	0.30	II
Z (1)	Eleanor Drive	8		75	$ 230.00	$ 17,250.00	2	S	0.11	II
Z (1)	Eleanor Drive	8		225	$ 230.00	$ 51,750.00	4	S	0.34	II
Z (1)	Howard Avenue	8		1625	$ 230.00	$ 373,750.00	18	S	2.46	II
Z (1)	Paulette Drive	8		200	$ 230.00	$ 46,000.00	4	S	0.30	II
Z (1)	Rebecca Street	8		600	$ 230.00	$ 138,000.00	10	S	0.91	II
Z (1)	Area Total			4,275		$ 983,250.00	62		6.48	
	Cost per unit					$ 15,858.87				
Z (2)	~~RR Bed~~		~~P.S.~~			Removed	~~0~~			~~II~~
Z (2)	~~Howard Avenue~~	~~6~~	~~FM~~	~~350~~		Removed	~~0~~	~~Z1~~		~~II~~
Z (2)	~~X-C Howard Avenue~~	~~6~~	~~FM~~	~~450~~		Removed	~~0~~	~~Z1~~		~~II~~
Z (2)	~~Colvin Street~~	~~8~~		~~500~~		Removed	~~4~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Hill Street~~	~~8~~		~~4800~~		Removed	~~66~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Hill Street~~	~~8~~		~~675~~		Removed	~~9~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Howard Street~~	~~8~~		~~250~~		Removed	~~3~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Howard Street~~	~~8~~		~~675~~		Removed	~~12~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Howard Street~~	~~8~~		~~400~~		Removed	~~6~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Leveille Street~~	~~8~~		~~225~~		Removed	~~3~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Morgan Court~~	~~8~~		~~100~~		Removed	~~5~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Oak Street~~	~~8~~		~~200~~		Removed	~~5~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Paulette Drive~~	~~8~~		~~350~~		Removed	~~7~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Pierce Street~~	~~8~~		~~350~~		Removed	~~5~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Pine Street~~	~~8~~		~~450~~		Removed	~~5~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Rebecca Street~~	~~8~~		~~400~~		Removed	~~5~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~X-C Hill Street~~	~~8~~		~~825~~		Removed	~~2~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~X-C Howard Avenue~~	~~8~~		~~450~~		Removed	~~4~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~X-C RR Bed~~	~~8~~		~~400~~		Removed	~~1~~	~~Z1~~	~~NA~~	~~II~~
Z (2)	~~Area Total~~			~~11,850~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
Z (3)	Canyon Drive		P.S.			$ 150,000.00	0			II
Z (3)	Canyon Drive	3	FM	400	$ 90.00	$ 36,000.00	0	Z1		II
Z (3)	Eleanor Drive	3	FM	550	$ 90.00	$ 49,500.00	0	Z1		II
Z (3)	Elmonte Drive	3	FM	250	$ 90.00	$ 22,500.00	0	Z1		II
Z (3)	Canyon Drive	8		400	$ 230.00	$ 92,000.00	8	Z1	0.61	II
Z (3)	Eleanor Drive	8		425	$ 230.00	$ 97,750.00	8	Z1	0.64	II
Z (3)	Elmonte Drive	8		275	$ 230.00	$ 63,250.00	3	Z1	0.42	II
Z (3)	Elmonte Drive	8		350	$ 230.00	$ 80,500.00	6	Z1	0.53	II
Z (3)	Area Total			2,650		$ 591,500.00	25		2.20	
	Cost per unit					$ 23,660.00				
AA (1)	~~Birchwood Lane~~	~~8~~		~~525~~		Removed	~~11~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Black Walnut Drive~~	~~8~~		~~1225~~		Removed	~~20~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Black Walnut Drive~~	~~8~~		~~1250~~		Removed	~~17~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Briarwood Court~~	~~8~~		~~250~~		Removed	~~4~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Clarke Road~~	~~8~~		~~300~~		Removed	~~5~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Clarke Road~~	~~8~~		~~1175~~		Removed	~~15~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Crabapple Court~~	~~8~~		~~250~~		Removed	~~4~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Elmwood Court~~	~~8~~		~~150~~		Removed	~~2~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Forsythia Court~~	~~8~~		~~250~~		Removed	~~5~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Holly Court~~	~~8~~		~~150~~		Removed	~~2~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Honeysuckle Court~~	~~8~~		~~350~~		Removed	~~6~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Labrae Way~~	~~8~~		~~400~~		Removed	~~5~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Mulberry Court~~	~~8~~		~~250~~		Removed	~~4~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Pine Oak Court~~	~~8~~		~~250~~		Removed	~~4~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Poplar Court~~	~~8~~		~~250~~		Removed	~~4~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Red Oak Drive~~	~~8~~		~~1100~~		Removed	~~17~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Red Oak Drive~~	~~8~~		~~750~~		Removed	~~13~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~White Pine Road~~	~~8~~		~~1175~~		Removed	~~14~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~X-C Clarke Road~~	~~8~~		~~750~~		Removed	~~2~~	~~Z2~~	~~NA~~	~~III~~
AA (1)	~~Area Total~~			~~10,800~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
AA (2)	~~Clarke Road~~		~~P.S.~~			Removed		~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Clarke Road~~	~~6~~	~~FM~~	~~1000~~		Removed		~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Barberry Court~~	~~8~~		~~250~~		Removed	~~4~~	~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Clarke Road~~	~~8~~		~~850~~		Removed	~~12~~	~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Clarke Road~~	~~8~~		~~700~~		Removed	~~9~~	~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Glenview Court~~	~~8~~		~~325~~		Removed	~~4~~	~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Juniper Court~~	~~8~~		~~150~~		Removed	~~2~~	~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Red Oak Drive~~	~~8~~		~~850~~		Removed	~~15~~	~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Rosewood Court~~	~~8~~		~~300~~		Removed	~~5~~	~~AA1~~	~~NA~~	~~III~~
AA (2)	~~Wintergreen Court~~	~~8~~		~~250~~		Removed	~~4~~	~~AA1~~	~~NA~~	~~III~~

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
AA (2)	~~Area Total~~			~~4,675~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
AB (1)	~~Chase Road~~	~~8~~		~~400~~		Removed	~~5~~	~~AA2~~	~~NA~~	~~III~~
AB (1)	~~Clarke Road~~	~~8~~		~~200~~		Removed	~~0~~	~~AA2~~	~~NA~~	~~III~~
AB (1)	~~Knotty Oak Lane~~	~~8~~		~~200~~		Removed	~~2~~	~~AA2~~	~~NA~~	~~III~~
AB (1)	~~Knotty Oak Lane~~	~~8~~		~~300~~		Removed	~~4~~	~~AA2~~	~~NA~~	~~III~~
AB (1)	~~Knotty Oak Road~~	~~8~~		~~400~~		Removed	~~4~~	~~AA2~~	~~NA~~	~~III~~
AB (1)	~~Knotty Oak Road~~	~~8~~		~~3900~~		Removed	~~38~~	~~AA2~~	~~NA~~	~~III~~
AB (1)	~~Knotty Oak Road~~	~~8~~		~~1450~~		Removed	~~21~~	~~X~~	~~NA~~	~~III~~
AB (1)	~~Marie Drive~~	~~8~~		~~850~~		Removed	~~11~~	~~X~~	~~NA~~	~~III~~
AB (1)	~~Oak Way~~	~~8~~		~~850~~		Removed	~~11~~	~~X~~	~~NA~~	~~III~~
AB (1)	~~Old Hope Road~~	~~8~~		~~700~~		Removed	~~6~~	~~X~~	~~NA~~	~~III~~
AB (1)	~~Area Total~~			~~9,250~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
AB (2)	~~Knotty Oak Shores~~		~~P.S.~~			Removed		~~AA2~~	~~NA~~	~~III~~
AB (2)	~~Knotty Oak Shores~~	~~3~~	~~FM~~	~~800~~		Removed		~~AA2~~	~~NA~~	~~III~~
AB (2)	~~Knotty Oak Road~~	~~8~~		~~500~~		Removed	~~9~~	~~AA2~~	~~NA~~	~~III~~
AB (2)	~~Knotty Oak Road~~	~~8~~		~~650~~		Removed	~~7~~	~~AA2~~	~~NA~~	~~III~~
AB (2)	~~Knotty Oak Shores~~	~~8~~		~~300~~		Removed	~~6~~	~~AA2~~	~~NA~~	~~III~~
AB (2)	~~Knotty Oak Shores~~	~~8~~		~~1800~~		Removed	~~38~~	~~AA2~~	~~NA~~	~~III~~
AB (2)	~~Knotty Oak Shores~~	~~8~~		~~350~~		Removed	~~7~~	~~AA2~~	~~NA~~	~~III~~
AB (2)	~~Pine Acres Bv~~	~~8~~		~~600~~		Removed	~~8~~	~~AA2~~	~~NA~~	~~III~~
AB (2)	~~X-C Knotty Oak Road~~	~~8~~		~~650~~		Removed	~~5~~	~~AA2~~	~~NA~~	~~III~~
AB (2)	~~Area Total~~			~~5,650~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
AC	~~Chardwood Drive~~	~~8~~		~~600~~		Removed	~~10~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Driftwood Drive~~	~~8~~		~~200~~		Removed	~~2~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Driftwood Drive~~	~~8~~		~~950~~		Removed	~~13~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Glenwood Drive~~	~~8~~		~~200~~		Removed	~~4~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Glenwood Drive~~	~~8~~		~~700~~		Removed	~~10~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Highwood Drive~~	~~8~~		~~2600~~		Removed	~~37~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Highwood Drive~~	~~8~~		~~650~~		Removed	~~8~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Maplewood Drive~~	~~8~~		~~1125~~		Removed	~~10~~	~~X~~	~~NA~~	~~N/A~~
AC	~~right-of-way~~	~~8~~		~~250~~		Removed	~~2~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Station Street~~	~~8~~		~~600~~		Removed	~~9~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Station Street~~	~~8~~		~~750~~		Removed	~~12~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Station Street~~	~~8~~		~~4600~~		Removed	~~45~~	~~X~~	~~NA~~	~~N/A~~
AC	~~X-C Station Street~~	~~8~~		~~625~~		Removed	~~0~~	~~X~~	~~NA~~	~~N/A~~
AC	~~Area Total~~			~~13,850~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
AD	~~Abbott's Crossing Road~~	~~8~~		~~1700~~		Removed	~~27~~	~~AE~~	~~NA~~	~~III~~
AD	~~Alvero Road~~	~~8~~		~~1500~~		Removed	~~18~~	~~AE~~	~~NA~~	~~III~~
AD	~~Cynthia Drive~~	~~8~~		~~1550~~		Removed	~~29~~	~~AE~~	~~NA~~	~~III~~
AD	~~Cynthia Drive~~	~~8~~		~~450~~		Removed	~~7~~	~~AE~~	~~NA~~	~~III~~
AD	~~Francis Court~~	~~8~~		~~150~~		Removed	~~3~~	~~AE~~	~~NA~~	~~III~~
AD	~~Gail Court~~	~~8~~		~~650~~		Removed	~~10~~	~~AE~~	~~NA~~	~~III~~
AD	~~Hopkins Court~~	~~8~~		~~300~~		Removed	~~8~~	~~AE~~	~~NA~~	~~III~~
AD	~~Linda Court~~	~~8~~		~~200~~		Removed	~~4~~	~~AE~~	~~NA~~	~~III~~
AD	~~Lloyd Drive~~	~~8~~		~~1400~~		Removed	~~21~~	~~AE~~	~~NA~~	~~III~~
AD	~~Old Colvintown Road~~	~~8~~		~~1600~~		Removed	~~20~~	~~AE~~	~~NA~~	~~III~~
AD	~~Old Main Street~~	~~8~~		~~150~~		Removed	~~1~~	~~AE~~	~~NA~~	~~III~~
AD	~~Patty Street~~	~~8~~		~~250~~		Removed	~~3~~	~~AE~~	~~NA~~	~~III~~
AD	~~Area Total~~			~~9,900~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
	Industrial Drive		P.S.			Existing	NA	U1	0.00	III
	Flat River Road	4	FM	3487		Existing	NA	U2	0.00	III
AE	Flat River Road	12	Int.	40		Existing	NA	U2	0.09	III
AE	Flat River Road	8		427		Existing	NA	U2	0.65	III
AE	Flat River Road	3	Lw Pres	2050		Existing	NA	U2	1.16	III
AE	Flat River Road	2	Lw Pres	1200		Existing	NA	U2	0.45	III
AE	Flat River Road	1.5	Lw Pres	600		Existing	NA	U2	0.17	III
AE	Industrial Drive	2	Lw Pres	1026		Existing	NA	U2	0.39	III
AE	Walker Lane	1.5	Lw Pres	655		Existing	NA	U2	0.19	III
AE	X-C Flat River Road	2	Lw Pres	2600		Existing	NA	U2	0.98	III
AE	Collier Way	2	Lw Pres	350	$ 90.00	$ 31,500.00	5	U2	0.13	III
AE	First Street	2	Lw Pres	250	$ 90.00	$ 22,500.00	4	U2	0.09	III
AE	Leader Street	2	Lw Pres	450	$ 90.00	$ 40,500.00	4	U2	0.17	III
AE	Second Street	2	Lw Pres	150	$ 90.00	$ 13,500.00	3	U2	0.06	III
AE	Area Total			9,798		$ 108,000.00	16		4.54	
	Cost per unit					$ 6,750.00				

Area	Street Name	Pipe Size (inch)	Type	Sewer Length (feet)	Unit Cost ($ per l.f.)	Total Cost	Lots Served	Flow to Area	I/I Pipeline (inch-mile)	Phase
~~AF~~	~~Boulder Drive~~	~~8~~		~~1000~~		Removed	~~14~~	~~AD~~	~~NA~~	~~III~~
~~AF~~	~~Chandler Drive~~	~~8~~		~~550~~		Removed	~~7~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~Chandler Drive~~	~~8~~		~~1800~~		Removed	~~25~~	~~AD~~	~~NA~~	~~III~~
~~AF~~	~~Colvintown Road~~	~~8~~		~~1450~~		Removed	~~19~~	~~AD~~	~~NA~~	~~III~~
~~AF~~	~~Daniel Drive~~	~~8~~		~~1100~~		Removed	~~15~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~Daniel Drive~~	~~8~~		~~325~~		Removed	~~4~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~Diane Drive~~	~~8~~		~~700~~		Removed	~~13~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~Glacier Way~~	~~8~~		~~100~~		Removed	~~2~~	~~AD~~	~~NA~~	~~III~~
~~AF~~	~~Leuba Road~~	~~8~~		~~3500~~		Removed	~~36~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~Metro Drive~~	~~8~~		~~1700~~		Removed	~~26~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~Stoney Hill Cr~~	~~8~~		~~1025~~		Removed	~~12~~	~~AD~~	~~NA~~	~~III~~
~~AF~~	~~Thompson Cr~~	~~8~~		~~550~~		Removed	~~9~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~X-C Diane Drive~~	~~8~~		~~700~~		Removed	~~2~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~X-C Metro Drive~~	~~8~~		~~425~~		Removed	~~2~~	~~AE~~	~~NA~~	~~III~~
~~AF~~	~~Area Total~~			~~14,925~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
~~AG~~	~~Colvintown Road~~	~~8~~		~~3400~~		Removed	~~50~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Deer Run Drive~~	~~8~~		~~450~~		Removed	~~8~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Deer Run Drive~~	~~8~~		~~450~~		Removed	~~6~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Donna's Way~~	~~8~~		~~400~~		Removed	~~7~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Ivy Drive~~	~~8~~		~~500~~		Removed	~~5~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Sweetwater Drive~~	~~8~~		~~1600~~		Removed	~~19~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Teakwood Drive East~~	~~8~~		~~200~~		Removed	~~3~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Teakwood Drive East~~	~~8~~		~~550~~		Removed	~~8~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Teakwood Drive West~~	~~8~~		~~550~~		Removed	~~10~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Watercress Court~~	~~8~~		~~600~~		Removed	~~11~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Watercress Court~~	~~8~~		~~1350~~		Removed	~~20~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~X-C Teakwood Drive West~~	~~8~~		~~900~~		Removed	~~2~~	~~AF~~	~~NA~~	~~N/A~~
~~AG~~	~~Area Total~~			~~10,950~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
~~AH~~	~~Cedar Street~~	~~8~~		~~650~~		Removed	~~24~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~Oak Street~~	~~8~~		~~300~~		Removed	~~4~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~Pine Street~~	~~8~~		~~750~~		Removed	~~12~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~Pond Street~~	~~8~~		~~325~~		Removed	~~8~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~Shady Valley Road~~	~~8~~		~~825~~		Removed	~~12~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~Shady Valley Road~~	~~8~~		~~1750~~		Removed	~~25~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~Unnamed Way~~	~~8~~		~~250~~		Removed	~~3~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~Unnamed Way~~	~~8~~		~~200~~		Removed	~~4~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~X-C Shady Valley Road~~	~~8~~		~~300~~		Removed	~~0~~	~~ISDS~~	~~NA~~	~~N/A~~
~~AH~~	~~Area Total~~			~~5,350~~		$ -	~~NA~~		~~0.00~~	
	~~Cost per unit~~					$ -				
TOTALS	Area Total					$ 70,003,500.00	4,365			
	Cost per unit					$ 16,037.46				

Phase I	Interceptor	$ 1,120,000.00
(remaining)	Lateral	$ 5,560,250.00
	PS & FM	$ -
	TOTAL	$ 6,680,250.00
Phase II	Interceptor	$ 4,226,250.00
(remaining)	Lateral	$ 44,004,750.00
	PS & FM	$ 3,430,750.00
	TOTAL	$ 51,661,750.00
Phase III	Interceptor	$ 630,000.00
(remaining)	Lateral	$ 9,970,500.00
	PS & FM	$ 953,000.00
	TOTAL	$ 11,553,500.00

FY 2015 PROJECT PRIORITY LIST
PROJECT SUMMARY SHEET

Community: Town of Coventry, RI

Contract Person: Thomas Hoover

Title: Town Manager

Street Address: 1670 Flat River Road

City/State/Zip: Coventry, RI 02816

Telephone No.: 401-822-9185

PROJECT NAME	PROJECTED CONSTRUCTION START DATE	ESTIMATED COST
Lakeside I Sewer Project - Contract 6	Complete	$2,896,000
Lakeside I Sewer Extension - Contract 6A	Complete	$260,000
Main Street and Industrial Drive Sewer Extension –Contract 7	February 2013	$1,100,000
Woodland Sewer System	Complete	$750,000
Rte 3 Woodland Manor to West Greenwich Line	March 2015	$1,770,000
Quidnick Village – Contract 8 Design	Complete	$180,000
Quidnick Village - Contract 8 Construction	March 2018	$4,400,000
Wendell Ave. Sewer Project – Contract 9	March 2019	$750,000
Tiogue School & East Shore Drive - Contract 10	March 2016	$4,410,000
Lakeside Area II – Contract 11	March 2017	$2,300,000
Fast Track Sewer Interceptor (Contracts 1 & 2) Refinance	Projects Complete	$6,485,601
Community Sewer Tie-In Program *	Currently On-Going	$150,000
Huron Pond Sewer Project	March 2019	$2,800,000
Hopkins Hill Road East Sewer Project	March 2020	$2,200,000
Flat River Road Sewer Extension	March 2013	$1,040,000

* Loan Program Through Clean Waters

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2015 Project Priority List

Points	Category	Community	Project Name/Number	Cost ($)
58	10	Charlestown	Community ISDS Repair Program	$ 600,000.00
57	10	North Kingstown	NK Community Septic System Loan Program	$ 300,000.00
56	10	South Kingstown	Community ISDS Repair Program	$ 1,000,000.00
49	10	Tiverton	C-15-001 Community Septic System Repair Program	$ 300,000.00
48	4C, 10	Warwick	Community Sewer Tie-in Loan Fund	$ 150,000.00
46	10	Warwick	Community Septic System Loan Program	$ 300,000.00
45	5	NBC	Phase II CSO Facilities Program Construction & Management*	$ 19,931,855.00
45	5	NBC	Phase II CSO Facilities OF 106†*	$ 5,826,827.00
45	5	NBC	Phase II CSO Facilities OF 027*	$ 12,390,158.00
45	5	NBC	Phase II CSO Facilities OF 037 - North	$ 10,835,301.00
45	5	NBC	Phase II CSO FacilitiesOF 037 - South	$ 11,489,822.00
45	5	NBC	Phase II CSO Facilities OF 037 - West*	$ 10,919,533.00
45	5	NBC	Phase II CSO Facilities WCSOI Main*	$ 78,448,134.00
45	5	NBC	Phase II CSO Facilities SCSOI Main*	$ 23,305,946.00
45	10	Westerly	Community Septic System Loan Program	$ 300,000.00
44	10	Glocester	Community Septic System Loan Program	$ 300,000.00
44	10	Scituate	Implementation of Wastewater Management Plan	$ 25,000.00
42	10	Narragansett	ISDS Management Program	$ 250,000.00
42	11, 12	South Kingstown	TMDL Program Implementation	$ 1,000,000.00
42	11	South Kingstown	Phase II Stormwater Program Compliance	$ 300,000.00
42	4C	Warwick	Greenwood East Sewer Project: WSA Contract #87A	$ 14,800,000.00
42	4C	Warwick	Strawberry Field Rd. Sewer Project II: WSA Contract #77A	$ 961,000.00
42	4C	Warwick	Pilgrim Estates Sewer Project: WSA Contract #90	$ 4,800,000.00
40	10	New Shoreham	Community Septic System Loan Program	$ 300,000.00
39	5, 7	NBC	CSO Phase III	$ 604,654,000.00
37	4C	Warwick	Warwick Neck South Sewer Extension	$ 13,400,000.00
34	11	Narragansett	Narrow River Water Quality Improvement Project Phase IV	$ 3,500,000.00
33	4C, 4D	Warwick	Bayside/Longmeadow I Sewer Projec: WSA Contract #86A	$ 12,000,000.00
32	10	Bristol	On-Site WW Management Plan, Home Owner Loans	$ 300,000.00
31	4C, 4D	Narragansett	Harbour Island Sewers	$ 7,585,600.00
31	2	NBC	BP WWTF Nitrogen Removal Facilities*	$ 42,747,464.00
31	2	Woonsocket	WWTF Improvements	$ 33,000,000.00
29	2	Cranston	Wastewater Treatment Plant Upgrades	$ 25,000,000.00
29	1, 4D	North Kingstown	QDC Infrastructure Upgrades	$ 5,000,000.00
29	2	West Warwick	Phosphorous Removal	$ 11,500,000.00
28	4C, 10	Bristol	Service Connection Loan Program	$ 150,000.00
27	4C	Burrillville	Eastern Village Sewers - Contract 19A-3	$ 2,100,000.00
27	4C, 7	Burrillville	Union/Emerson Sanitary Sewers - Contract 20	$ 1,100,000.00
27	4C	Burrillville	Expansion of Sanitary Sewer System - Contract 21	$ 2,100,000.00
27	4C	Burrillville	Eastern Village Sewers - Contract 19C	$ 2,300,000.00
27	4C, 4D	Burrillville	Eastern Village Sewers - Contract 19B-2 Nasonville	$ 2,800,000.00
27	3B	Newport	Wellington PS & Force Main Improvements	$ 5,000,000.00
26	11	Middletown	Easton's Point Sewer Improvements	$ 3,200,000.00
26	4D	North Kingstown	Newcomb Road Sewer Main Replacement	$ 600,000.00
26	11	South Kingstown	Replacement Street Sweepers	$ 300,000.00
26	2	Warwick	City Share of AWT-Phosphorus Upgrade for West Warwick Treatment Plant	$ 300,000.00
25	7, 4C, 4D	Coventry	Quidnick Village - Contract 8	$ 4,400,000.00
25	11	Cranston	Storm Drain Upgrades	$ 1,000,000.00
25	4C, 10	North Kingstown	Community Tie-in Program	$ 300,000.00
25	4C, 4D	North Kingstown	Post Road North Sewers	$ 6,600,000.00
25	12	Providence Water Supply Board	Scituate Reservoir Watershed Land Acquisition†*	$ 10,000,000.00
25	4C, 4D	South Kingstown	Upper Salt Pond Collection System	$ 2,100,000.00
25	4C, 4D	South Kingstown	Saugatucket Pond (North Road) Sewers	$ 2,300,000.00
25	4C, 10	Tiverton	C-15-002 Community Sewer Tie-in Program	$ 300,000.00
25	4C	Tiverton	C-15-003 Ph 1 Sewers - Robert Gray Area 1 Sewers	$ 1,700,000.00
25	4C	Tiverton	C-15-004 Ph 1 Sewers - Riverside Dr Area Sewers	$ 16,700,000.00
25	4C	Tiverton	C-15-005 Bay Street Area Sewers	$ 3,000,000.00

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2015 Project Priority List

25	4C	Warwick	O'Donnell Hill (East Natick III) Sewer Extension: WSA Contract 69A	$	2,100,000.00
24	11	Barrington	Stormwater Drainage Upgrade/Rehabilitation	$	1,500,000.00
24	11	Middletown	Stormwater BMP Retrofit Project (Easton's Bay)	$	75,000.00
24	2	Warwick	AWT - Phosphorus / Flood Control (WWTF Upgrades): WSA Contract #91	$	21,000,000.00
23	10	Smithfield	Community Septic System Repair Program	$	250,000.00
22	11	Cranston	TMDL Implementation - Eutrophic Ponds	$	250,000.00
22	4C, 4D	Narragansett	Great Island Sewers	$	8,750,300.00
22	1, 7	NBC	BPWWTF Biogas Reuse Energy Project (Design & Construction)†*	$	6,085,000.00
21	3A, 3B	Middletown	Town-wide CIPP Slip-lining & Manhole Rehabilitation Annual Program	$	200,000.00
21	4C	Warwick	Northwest Gorton Pond Sewer Project: WSA Contract #88	$	5,200,000.00
20	3A, 3B	Middletown	Forest Avenue Sewer Relining & Repair	$	2,100,000.00
20	4C	Narragansett	Baltimore/Rhode Island Avenue Sewers	$	1,409,300.00
20	1	NBC	Regulatory Compliance Building (Design & Construction)	$	21,964,220.00
19	11	Newport	Stormwater Infrastructure Improvements	$	3,500,000.00
19	1	Newport	WPCF Upgrades	$	40,000,000.00
19	1	South Kingstown	SK Regional WWTF Septage Receiving Facilities	$	500,000.00
19	4C, 4D	South Kingstown	Curtis Corner Road Interceptor	$	2,200,000.00
19	3B	South Kingstown	South Road Interceptor	$	1,700,000.00
19	4C, 4D	Westerly	Phased Collection System Expansion	$	30,000,000.00
18	10	Cranston	Community ISDS Repair Program	$	200,000.00
18	3A, 3B	Middletown	Aquidneck Avenue Sewer Upgrade	$	465,000.00
18	3A, 3B	Middletown	O'Neill Boulevard Sewer Improvements	$	200,000.00
18	3A, 3B	Middletown	Orangeburg Sewer Main Replacement	$	465,000.00
18	5, 3B	NBC	Field's Point Tunnel Pump Station Improvements	$	663,000.00
18	4C, 4D	Warwick	Bayside/Longmeadow III Sewer Project: WSA Contract #86C	$	5,000,000.00
17	1	Narragansett	Regional WWTF Process Upgrade	$	2,408,431.00
17	4C, 4D	North Kingstown	Shore Acres Wastewater Collection System	$	6,100,000.00
17	4C, 4D	North Kingstown	Post Road South 2 Sewers	$	5,300,000.00
17	8	Richmond	Landfill Closure Cap Compliance	$	45,200.00
17	7	South Kingstown	SK Regional WWTF Phase II Hydraulic Expansion	$	3,600,000.00
16	3A, 7	East Greenwich	Inflow/Infiltration Analysis	$	400,000.00
16	3B	NBC	Douglas Ave./Branch Ave. Interceptor Relief	$	6,202,000.00
16	1	South Kingstown	Regional WWTF Replacement Generator	$	300,000.00
16	1, 7	South Kingstown	SK Regional WWTF Process Upgrades	$	3,700,000.00
16	4C, 4D	Warwick	Bayside/Longmeadow II Sewer Project: WSA Contract #86B	$	5,700,000.00
15	6	Barrington	Sewer System Evaluation Study	$	1,000,000.00
15	3A, 3B	Barrington	Sewer Line Rehabilitation	$	3,500,000.00
15	1	Bristol	WWTF RBCs & Misc. Improvements	$	2,000,000.00
15	11	Burrillville	Croff Road Drainage Improvements	$	100,000.00
15	3B	Lincoln	Major Pump Station Construction - Angell Rd North, Main St, & Kirkbrae	$	1,108,000.00
15	1	Narragansett	Regional WWTF Hydraulic Expansion	$	1,966,374.00
15	3B	West Warwick	Clyde Interceptor	$	1,400,000.00
14	3A, 3B	Bristol	Sewer Cleaning, TV Inspection & Flow Metering	$	100,000.00
14	3B	Newport	Sanitary Sewer Improvements II	$	4,000,000.00
14	3B	Newport	Sanitary Sewer Improvements III	$	4,000,000.00
14	3B	Newport	Sanitary Sewer Improvments IV	$	4,000,000.00
14	4D	North Kingstown	ASQAH Road Sewer Replacement	$	600,000.00
14	4C	Warwick	GAPS (Miscellaneous Sewer Extensions)	$	2,300,000.00
13	1	Bristol	Replacement of Misc. Compost Equipment	$	1,000,000.00
13	7, 4C, 4D	Coventry	Lakeside Area II - Contract 11	$	2,300,000.00
13	7, 4C, 4D	Coventry	East Shore Drive & Tiogue School - Contract 10	$	4,810,000.00
13	1	Narragansett	Scarborough Wastewater Treatment Facilities Upgrade.	$	8,237,000.00
13	1	NBC	Utility Reliability Enhancement for Field's Point Campus	$	703,050.00
13	12	NBC	Bucklin Point Solar Energy	$	7,495,984.00
13	4C	North Kingstown	Mark Drive Sewers	$	3,600,000.00
13	4C	North Kingstown	Pine River Road Sewers	$	1,300,000.00
13	4C, 4D	North Kingstown	Wickford Village Phase 1	$	4,500,000.00
13	4C, 4D	North Kingstown	Wickford Village (W-1) Subarea Sewers	$	15,400,000.00
13	4C, 4D	North Kingstown	Wickford Village (W-2) Subarea Sewers	$	11,900,000.00

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2015 Project Priority List

13	4C, 4D	North Kingstown	Wickford Village (W-3) Subarea Sewers	$	6,900,000.00
13	2, 7	Warren	Wastewater Treatment Facility Improvements	$	25,000,000.00
13	4C	Warwick	Governor Francis Farms III Sewer Project: WSA Contract #85B	$	4,600,000.00
12	8	Barrington	Landfill #3 Closure	$	1,000,000.00
12	8	Barrington	Landfill #4 Closure	$	1,000,000.00
12	3B	Barrington	Legion Way Sewer Repair	$	500,000.00
12	3B	Barrington	Princes Pond Pump Station Comminutor Modifications	$	250,000.00
12	3B	Bristol	Pump Station Improvements: Constitution and Silver Creek	$	2,000,000.00
12	3A, 3B	Bristol	Sewer System Repairs	$	2,500,000.00
12	3A, 6	Bristol	Inflow Source Removal	$	100,000.00
12	1	Burrillville	WWTF - General Improvements and Maintenance Upgrades	$	150,000.00
12	3A	Cranston	Inflow & Infiltration Study Implementation	$	900,000.00
12	3B	Cranston	System Wide Sewer Repair	$	1,400,000.00
12	3A, 6	NBC	NBC Systemwide Inflow Reduction Program	$	900,000.00
12	4C, 4D	Smithfield	Lower Sprague Reservoir (Area)- Indian Run Plat, Totem Pole Trail	$	5,000,000.00
12	4C	Smithfield	Richard St. and Hazel Point Sewers	$	565,000.00
12	4C, 4D	Smithfield	Levesque Dr, Jambray Dr., Dongay Rd, Elna Dr, John Mowry Rd (North) and Brayton Rd. Sewers	$	3,450,000.00
12	4C	Smithfield	Highview and Hilldale Estates Sewers	$	3,775,000.00
12	4C	Smithfield	Green Lake Dr. and Ruff Stone Dr. Sewers	$	855,000.00
12	4C	Smithfield	Friendship Ln., Domin Ave., Potter Ave., Rawson Ave., Sydney St., Myers St., and Ridge Rd Sewers	$	1,235,000.00
12	4C	Smithfield	Fanning Lane Sewers	$	2,850,000.00
12	4C	Smithfield	Elmgrove Ave. (off Sanderson Rd.) Sewers	$	720,000.00
12	4C	Smithfield	North Candy Court Sewers	$	160,000.00
12	4C	Smithfield	Austin Ave, Mapleville Road / Colwell Road Sewers	$	2,420,000.00
12	4C	Smithfield	Cortland Ln, Baldwin Dr, Kimberly Ann Dr, Crabapple Lane and Christopher Dr. Sewers	$	1,500,000.00
11	1	NBC	New IM Facilities	$	6,579,000.00
11	1	NBC	BPWWTF UV Disinfection Alternatives	$	3,000,000.00
11	1	NBC	Facility Electrical Improvements	$	500,000.00
10	3B	Burrillville	Pumping Stations - General Improvements and Maintenance Upgrades	$	500,000.00
10	11, 12	East Greenwich	Sewer Jet/ Vac Truck	$	350,000.00
10	3A, 3B	Middletown	Upper Easton's Point Sewer Improvements	$	4,000,000.00
10	3B	Middletown	Sewer Main Upgrades (Newport/Middletown Line)	$	750,000.00
10	3B	Middletown	Marshall Village Pump Station Replacement	$	675,000.00
10	6	Middletown	SSES Inflow & Infiltration Investigation	$	370,000.00
10	3A, 3B	Middletown	Stockton Drive Collection System	$	900,000.00
10	3B	Middletown	Stockton Drive Pump Station Replacement/Removal	$	600,000.00
10	3B	NBC	Louisquisset Pike Interceptor Replacement	$	2,400,000.00
10	3B	NBC	Interceptor Easements - NBC BVI	$	1,376,000.00
10	3B	NBC	NBC Interceptor Easements	$	5,432,000.00
10	3B	NBC	Rehabilitation of NBC CSO Interceptors	$	6,686,000.00
10	3B	NBC	Providence River Siphon Rehabilitation	$	6,000,000.00
10	3B	NBC	Inspection and Cleaning of CSO Interceptors	$	3,544,000.00
10	3B	Smithfield	Improvements to Town's Pump Stations	$	320,000.00
10	3B	South Kingstown	Kingston Pump Station Replacement Generator	$	300,000.00
10	3B	South Kingstown	Silver Lake/Kingston Pump Station Upgrades	$	500,000.00
10	3B	Warwick	Main Influent Interceptor Repairs	$	800,000.00
10	3B	Warwick	Cedar Swamp Force Main Replacement or Rehab.	$	3,000,000.00
10	2	West Warwick	Advanced WWTP Improvements - Clarifier Addition	$	4,000,000.00
9	2, 7	Burrillville	Phosphorous Removal - Design, Construction	$	4,500,000.00
9	3B	Cranston	Pump Station Safe Capacity Upgrades	$	1,400,000.00
9	1	East Greenwich	Rotating Biological Contractors Rehabilitation	$	4,200,000.00
9	6	NBC	River Model Development	$	468,000.00
9	6	NBC	NBC System-Wide Facilities Planning	$	500,000.00
9	6	NBC	Site Specific Study	$	457,000.00
9	6	NBC	Municipal Sewer Acquisition Impact Study	$	300,000.00
9	1, 3B	New Shoreham	Misc. System Improvements to the Wastewater Treatment Facility & Collection System	$	3,000,000.00

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2015 Project Priority List

9	2	Smithfield	Smithfield Treatment Plant Upgrades - HVAC	$	750,000.00
9	2	Smithfield	Upgrade WWTP's Fire Protection System	$	250,000.00
9	3B	Warwick	Flood Hardening of Oakland Beach Pump Station	$	150,000.00
9	3B	Warwick	Warwick Vet's Force Main Relocation	$	600,000.00
9	3B	Warwick	Flood Hardening of the Knight St. Pump Station	$	150,000.00
8	3B	Newport	Railroad Interceptor Replacement/Rehabilitation	$	5,000,000.00
8	7	Scituate	Hope Village Sewers	$	325,000.00
8	8	Smithfield	Landfill Closure (Ridge Road)	$	4,000,000.00
8	3A	West Warwick	I & I Study	$	500,000.00
8	11	Woonsocket	Ruby St Permeable Paving	$	49,500.00
8	11	Woonsocket	Brier ST Permeable Paving	$	26,000.00
7	6	Barrington	GIS Software	$	10,000.00
7	3B	Barrington	Vactor Truck	$	370,000.00
7	3A, 6	Narragansett	Sand Hill Cove Area I & I Study/Removal	$	200,000.00
7	3A, 3B, 6	Narragansett	Pier Area Flow Improvements	$	100,000.00
7	3B	Narragansett	Bonnet Shores Pumping Station	$	150,000.00
7	3B	Narragansett	Wolf Road Pumping Station	$	55,000.00
7	3B	Narragansett	Mettatuxet Pumping Station	$	95,000.00
7	6	Narragansett	Lake Canonchet/Little Neck Pond (Beach Pond) Water Quality Analysis	$	100,000.00
7	3B	NBC	Interceptor Easements - NBC AVI	$	1,408,000.00
7	3B	NBC	Omega Pump Station Rack Room	$	800,000.00
7	3B	NBC	Moshassuck Valley Interceptor Replacements	$	3,718,000.00
7	3B	NBC	Butler Hospital Sewer Lining OF 027	$	344,555.00
7	6, 3A	Smithfield	Smithfield Infiltration & In-Flow Removal - SSES	$	1,500,000.00
6	3B	Cranston	Sewer Pump Station Flood Proofing	$	500,000.00
5	4C	Woonsocket	Jillson Ave Sewer	$	1,163,315.00
5	4C	Woonsocket	Beausoleil & Mendon Sewer	$	363,149.00
5	4C	Woonsocket	Comstock Court Sewer	$	82,846.00
4	6	Middletown	Westside Pump Station Consolidation Study	$	75,000.00
4	3B	Narragansett	North Interceptor Access Road	$	100,000.00
3	4C	Coventry	Rte. 3 - Woodland Manor to West Greenwich Line Sewers	$	1,970,000.00
			Total	**$**	**1,464,765,864.00**

Conduit Financing Only:

Points	Category	Community	Project Name/Number		Cost ($)
			Total:	**$**	**-**

Not Rated - Project Already Funded/Under Construction/Completed

Points	Category	Community	Project Name/Number		Cost ($)
---	4C	East Greenwich	Howland Farm Sewer Extension	$	600,000.00
---	5	NBC	Floatable Control Facilities for CSO Outfall	$	5,003,030.00
---	5	NBC	Phase II CSO Facilities WCSOI OF 054	$	2,825,000.00
---	5	NBC	Phase II CSO Facilities WCSOI West	$	10,259,272.00
---	5	NBC	Phase II CSO Facilities WCSOI North	$	9,277,000.00
---	5	NBC	Phase II CSO Facilities WCSOI Regulator	$	968,616.00
---	5	NBC	Phase II CSO Facilities SCSOI Regulator Modification	$	736,000.00
---	5	NBC	Resident Services for Phase I - Construction	$	36,220,000.00
---	2	NBC	FPWWTF Nitrogen Removal Upgrade	$	62,397,717.00
---	1,12	NBC	FPWWTF Wind Turbines	$	14,687,547.00
			Total:	**$**	**142,974,182.00**

Not Rated - Not Applicable

Points	Category	Community	Project Name/Number		Cost ($)
---	---	Barrington	Utility Truck	$	70,000.00
---	---	Barrington	Compost Screener	$	300,000.00
			Total:	**$**	**370,000.00**

Rhode Island Department of Environmental Management

Office of Water Resources

Fiscal Year 2015 Project Priority List

Not Rated - Not Eligible

Points	Category	Community	Project Name/Number	Cost ($)
---	11	Burrillville	Stillwater Culvert	$ 500,000.00
			Total:	**$ 500,000.00**
			Grand Total:	**$ 1,608,610,046.00**

RHODE ISLAND DEPARTMENT of ENVIRONMENTAL MANAGEMENT

Office of Water Resources

Fiscal Year 2015 Project Priority List

DESIGN CATEGORY

CATEGORY	NUMBER	DEFINITION
Secondary Treatment	1	Replacement/modifications/additions based on an approved Wastewater Facilities Plan (WWFP) to achieve/maintain secondary treatment
Advanced Treatment	2	Replacement/modifications/additions based on an approved WWFP to achieve/maintain advanced treatment
I/I Correction	3A	Corrective actions in sewer systems identified in an approved I/I Analysis or Sewer System Evaluation Survey
Sewer System Repair	3B	Rehabilitation is extensive repair of existing sewers/pump stations beyond scope of normal maintenance programs. Replacement is construction of parallel sewers/sewers with exact function of sewers to be abandoned. Replacement of pump stations is construction of a new pumping station with the same functions/flow capacity of the old facility. All must be in WWFP
Collectors (Future)	4A	Sewers that will convey flows from future homes, businesses and industries identified in a CCP and approved in a WWFP
Interceptor (Future)	4B	Sewers that will convey flows from one of more Category 4A areas to another interceptor or WWTF
Collectors (Present)	4C	Sewers to convey flows from present homes, businesses, and industries identified in a CCP and approved in a WWFP
Interceptor (Present)	4D	Sewers to convey flows from one of more Category 4C areas to another interceptor WWFP
CSO	5	Combined Sewer treatment/storage/separation per an approved WWFP
Planning	6	Detailed plan determining the need for and feasibility of water pollution abatement project(s)
Design	7	Plans, Specifications, and bidding documents
Non-Point	8	Implementation project per Non-Point Source Plan (SGP # 731)
Estuarine	9	Implementation project per Comprehensive Conservation and Management Plan (SGP # 715)
Onsite Wastewater Treatment Facility (OWTS)	10	Alternative systems, subsurface (OWTS), and Wastewater Management Districts (WWMD) per RIGL 45-24.5
Stormwater	11	Planning & Implementation of municipal stormwater management programs and controls
Other	12	Other water pollution abatement or water quality improvement projects

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Office of Water Resources

Rules and Regulations for State Revolving Fund (SRF) Program

Promulgated: March 4, 1991
Amended: June 1994
September 1997
September 2001

Regulation # 12-190-020

AUTHORITY: These regulations are adopted in accordance with Chapter 42-35 pursuant to Chapter 46-12.2 of the Rhode Island General Laws of 1956, as amended

R.I. DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Office of Water Resources

STATE REVOLVING FUND (SRF) PROGRAM

Rules and Regulations for the
State Revolving Fund (SRF) Program

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Rules and Regulations for the
State Revolving Fund (SRF) Program

Section 1. PURPOSE

The purpose of these State Revolving Fund (SRF) Program regulations is to establish and implement a perpetual revolving loan fund as a source of low-cost financial assistance for water pollution abatement projects which contribute to the removal, curtailment or mitigation of pollution of the waters of the state. Establishment of this program is required and authorized by §46-12.2 of the General Laws of Rhode Island to secure the benefits of Title VI of the federal Clean Water Act for the State of Rhode Island.

Section 2. LEGAL AUTHORITY

The federal Clean Water Act ("CWA") authorized establishment of, and funding for, a capitalization grant program to states for establishing perpetual revolving loan funds as a source of low-cost financing for water pollution abatement projects.

The creation of the Rhode Island Clean Water Finance Agency ("Agency") and the charge to work in conjunction with the Rhode Island Department of Environmental Management ("DEM") to secure the benefit of the CWA Title VI program for Rhode Island was established by Chapter 303 of the Rhode Island Public Laws of 1989. This chapter was codified as Chapter 12.2 of Title 46 of the Rhode Island General Laws (RIGL).

These SRF Program regulations are adopted in accordance with Chapter 42-35 (the Administrative Procedures Act) pursuant to: the requirements of RIGL § 46-12.2; the Director's powers and duties under RIGL Chapters 42-17.1, 46-12.2 and 46-12-3; and the federal requirements of Title VI of the CWA.

These regulations are effective twenty (20) days from the date of filing with the Secretary of State.

Section 3. SUPERSEDED REGULATIONS

These regulations supersede and entirely replace the "Rules and Regulations for the State Revolving Loan Fund (SRF) Program" dated March 1991 and amended June 1994 and September 1997.

Section 4. SEVERABILITY

If any provision of these rules and regulations or the application thereof to any local government unit, person, or circumstance 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.

Section 5. DEFINITIONS

"Agency" means the Rhode Island Clean Water Finance Agency.
"Approved Project" means any project or portion thereof that has been issued a Certificate of Approval by the DEM for financial assistance from the Agency.

"Categorical Exclusion (CE)" means a category of project which do(es) not individually or cumulatively have significant effects on the environment.

"Certificate of Approval (CA)" means the project Certificate of Approval per RIGL § 46-12.2-8. A Certificate of Approval must be issued by DEM prior to disbursement of SRF loan funds by the Agency.

"Chief Executive Officer (CEO)" means the Mayor in any city, the President of the town council in any town and the Executive Director of any authority or commission, unless some other officer or body is designated to perform the functions of a chief executive officer under any bond act or under the provisions of a local charter or other law.

"Clean Water Act (CWA)" means the Federal Water Pollution Control Act, codified at 33 U.S.C., Section 1251 et. seq., as amended.

"Community Comprehensive Plan (CCP)" means a plan prepared pursuant to the Rhode Island Comprehensive Planning and Land Use Regulation Act, RIGL Chapter 45-22.2.

"Comprehensive Conservation and Management Plan (CCMP)" means a plan prepared pursuant to the requirements of Section 320 of the federal Clean Water Act.

"Cost(s)" as applied to any approved project, any or all costs, whenever incurred, approved by DEM, as defined in RIGL 46-12.2-2.

"Cumulative Impact" means the impact on the environment which results from the incremental impact of project(s) when added to other past, present, and reasonably foreseeable future actions or projects, regardless of which agency or person undertakes such other actions or projects.

"DEM" means the Rhode Island Department of Environmental Management.

"Director" means the Director of DEM or his/her designee

"Effects" and "impacts", as used in these regulations, are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, and health, whether direct, indirect, or cumulative. The distinctions are:

(a) Direct effects are caused by project(s) and occur at the same time and place.

(b) Indirect effects are also caused by project(s) and may be later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

(c) Cumulative effects are caused by both the direct and indirect effects of water pollution abatement projects, plus the effects of other projects which are planned in the planning area.

"Environment" shall be interpreted comprehensively to include the natural and physical environment and the

relationship of people with that environment (see the definition of "effects").

"Environmental Assessment (EA)" means a chapter, appendix, or amendment of a Wastewater Facilities Plan or other document that

(a) serves to:

(1) Briefly provide sufficient evidence and analysis of effects of proposed project(s) as a basis for DEM to determine whether to issue a Finding Of No Significant Impact (FONSI) or require an Environmental Impact Statement (EIS) to be prepared ;

(2) Document compliance with state and federal environmental review requirements when no EIS is required;

(3) Facilitate preparation of an EIS when one is necessary;

(b) Shall include:

(1) Brief discussions of the need for the proposed project(s)

(2) Brief discussions of alternatives to recommended project(s) which involve unresolved conflicts concerning alternative uses of available resources

(3) Brief discussions of the environmental impacts of the proposed project(s) and alternatives and outline means to mitigate environmental impacts

(4) Agencies and persons consulted during the environmental assessment, and responses to substantive comments.

"Environmental Impact Statement (EIS)" means a detailed written statement prepared as a supplemental chapter of a Wastewater Facilities Plan or other document if DEM determines the Environmental Assessment identifies significant impacts associated with the preferred alternative project(s). The EIS will address:

(a) The environmental impact(s) of the proposed project(s)

(b) Any detrimental effects on the environment which cannot be avoided should the proposed project(s) be implemented

(c) Alternatives to the proposed project(s) and the environmental impacts of those alternatives

(d) The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity

(e) Any irreversible and irretrievable commitments of resources which would be involved in the project(s) if implemented

"EPA" means the U.S. Environmental Protection Agency.

"Finding of No Significant Impact (FONSI)" means a document prepared by DEM briefly presenting the reasons for determining why project(s) will not have a significant effect on the environment. It shall include the EA and shall note any other environmental documents related to it. The FONSI need not repeat any of the discussion in the EA, but may incorporate it by reference.

"Loan" means a loan as defined in RIGL 46-12.2 by the Agency to a local governmental unit or person for costs of an approved project.

"Loan agreement" means any agreement as defined in RIGL 46-12.2 entered into by the Agency and a local governmental unit or person.
"Local Governmental Unit" means any town, city, district, commission, agency, authority, board or other political subdivision or instrumentality of the state or of any political subdivision thereof responsible for the ownership or operation of a water pollution abatement project including the Narragansett Bay Commission.

"Mitigation" means:

(a) Avoiding an impact altogether by not implementing a certain project or parts of a project

(b) Minimizing an impact by limiting the degree or magnitude of a project and its implementation

(c) Rectifying an impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating an impact over time by preservation and maintenance operations during the life of a project.

(e) Compensating for an impact by replacing or providing substitute resources or environments.

"National Environmental Policy Act (NEPA)" means the National Environmental Policy Act of 1969, codified at 42 U.S.C. 4321 et. seq., as amended

"Non-Point Source (NPS) Management Plan" means a plan, including appendices and/or amendments, prepared pursuant to the requirements of Section 319 of the federal Clean Water Act.

"Person" means any natural or corporate person, including bodies politic and corporate, public departments, offices, agencies, authorities and political subdivisions of the state, corporations, societies, associations and partnerships, and subordinate instrumentalities of any one or more political subdivisions of the state.

"Priority Determination System" means the system by which water pollution abatement projects are rated and ranked by DEM, Office of Water Resources on the basis of environmental benefit and other criteria pursuant to rules and regulations promulgated by DEM as they may be amended from time to time.

"Project" or "water pollution abatement project" means any project that contributes to prevention, removal, curtailment, mitigation of pollution, or to the restoration and/or improvement of the quality of the waters of the state, is consistent with state goals, policies and objectives expressed in the State Guide Plan and adopted elements thereof, and is also consistent with a plan approved pursuant to the requirements of Sections 212 (WWFP), 319 (NPS Plan), or 320 (CCMP) of the federal Clean Water Act.

"Project Priority List (PPL)" means an annual ranked listing based on relative priority ratings of all water pollution abatement projects for which federal or state assistance is requested from DEM's assistance programs.

"RIGL" means the Rhode Island General Laws of 1956, as amended.

"Record of Decision (ROD)" means a document prepared by DEM briefly reviewing the significant effects project(s) will have on the environment. It shall include the EIS and shall note any other environmental documents related to it. Since the EIS is included, the ROD need not repeat any of the discussion in the EIS, but may incorporate it by reference. The ROD will specify mitigation measures necessary to allow a project to proceed.

"Significantly", as used in the DEM environmental review process, means considering both the **context** and **intensity** of impacts, whether beneficial or detrimental.

(a) **Context** means that the significance of the impacts of a project must be analyzed in several contexts such as: the community as a whole (social, economic); the affected region; the affected interests; and the locality. Significance varies with the setting of the proposed project(s). In the case of a site-specific action, such as siting of a wastewater treatment facility, significance would usually depend upon the effects in the locale rather than in the whole planning area. Conversely, extending interceptor and collector sewers to a previously undeveloped portion of the planning area would result in effects on many elements of the environment.

(b) **Intensity** refers to the severity of the impact. The parties responsible for facility planning must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts may be both beneficial and detrimental. A significant effect may exist even if it is believed on balance that the effect will be beneficial.

(2) The degree to which the proposed project(s) affect public health or safety.

(3) Unique characteristics of the geographic area impacted by the project(s) such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

(4) The degree to which the effects of the proposed project(s) on the quality of the environment are likely to be controversial.

(5) The degree to which the possible effects on the environment are uncertain or involve unique or unknown risks.

(6) The degree to which a project may establish a precedent for future projects with similar effects or represents a decision in principle about a future consideration.

(7) Whether the project(s) is related to other projects with individually minor but cumulatively major impacts. Significance exists if it is reasonable to anticipate a cumulatively major impact on the environment. Significance cannot be avoided by terming a project temporary or by breaking it down into small component parts.

(8) The degree to which the project may detrimentally affect districts, sites, highways, structures or objects listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historic resources.

(9) The degree to which the project may detrimentally affect an endangered or threatened species or its habitat that has been determined to be critical under the federal Endangered Species Act of 1973.

(10) Whether an project threatens a violation of federal, state or local law or requirements imposed for the protection of the environment.

"State Guide Plan" shall mean goals, policies, or plan elements for the physical, economic, and social development of the state, adopted by the State Planning Council in accordance with §42-11-10 of the General Laws of Rhode Island, 1956, as amended.

"Title VI" means Title VI of the federal Clean Water Act

"wastewater" means all flows in sanitary or combined sewers and all septage.

"Wastewater Facilities Plan (WWFP)" means a plan prepared pursuant to the requirements of Section 201 of the federal Clean Water Act which is a detailed 20-year wastewater treatment, conveyance, and disposal plan, including an assessment of the environmental impacts of the plan, prepared to meet the statutory and regulatory requirements of the DEM for systems to prevent pollution and the consistency requirements of the Comprehensive Planning and Land Use Regulation Act (RIGL 45-22.2).

"Wastewater Treatment Facility (WWTF)" means any equipment, devices, and systems for preventing, abating, reducing, storing, conveying, treating, separating, recycling, reclaiming, or disposing of septage and flows from sanitary or combined sewers.

"Waters of the state" shall include all surface waters including all waters of the territorial sea, tidewaters, all inland waters of any river, stream, brook, pond or lake, and all ground waters and wetlands of the state of Rhode Island.

Section 6. ELIGIBILITY

All water pollution abatement projects proposed by local governmental units and persons, to the extent permitted by Chapter 46-12.2 of Title 46 of the General Laws, which are consistent with the state's goals, policies, and objectives as expressed in the State Guide Plan and are consistent with a plan approved under either Section 201, 319, or 320 of the federal Clean Water Act are eligible for assistance from the SRF Program. Assistance will be offered and awarded to projects based on ranking of the environmental benefits of the project, readiness to proceed and availability of funds.

Additional eligibility restrictions may apply to certain types of projects funded in whole or in part from funds awarded through Title VI of the Clean Water Act.

Section 7. ENVIRONMENTAL REVIEW

All Section 212 projects funded by the SRF Program must have the environmental impacts of project alternatives analyzed and evaluated as part of facilities planning or reaffirmation of the environmental review of an existing Wastewater Facilities Plan (WWFP). All Section 212 projects will include an Environmental Assessment and, if significant impacts on the environment are identified at any point in the planning process, an Environmental Impact Statement must be prepared. DEM will prepare any FONSI or ROD that is required. DEM shall review and approve all properly documented requests for Categorical Exclusions. DEM can only issue Certificates of Approval for Section 212 design and construction projects identified in a DEM-approved Wastewater Facilities Plan and its associated environmental review. The State Environmental Review Process (SERP) for Section 212 projects is included in these regulations as Appendix #1.

The environmental review requirements for most Section 319 and Section 320 projects will be satisfied when they are consistent with either the NPS Plan or the CCMP. Certain Section 319 and 320 projects with Section 212 attributes may be subject to additional environmental review requirements.

At the request of another state agency, or quasi-state agency, the SERP may be used by the Director to assess the environmental impacts of activities funded through programs other than the SRF program.

Section 8. CERTIFICATE OF APPROVAL PROCESS

A Certificate of Approval for a project must be issued by DEM as the basis for receiving an SRF loan from the

Agency. Applications for a Certificate of Approval will be submitted to the DEM, Office of Water Resources. Requirements for an application are contained in the SRF Loan Application Review Checklist which is included in these regulations as Appendix #2.

Section 9. LOAN PROGRAM

All loan requirements are contained in the Agency's "Loan Policies and Procedures".

Section 10. PROJECT ADMINISTRATION AND AUDIT

Any SRF loan project is subject to periodic site visits for reviews and inspections of the project progress, records, and accounts by either or both DEM and the Agency. All SRF project accounts must be reviewed as a major federal program under the federal Single Audit Act standards during any audit. All project management and fiscal records must be maintained by the borrower for a period of five years following project completion or final financial settlement, whichever is greater.

Section 11. PENALTIES

In cases of non-compliance with conditions of a Certificate of Approval, a warning letter will be sent. Failure to correct or willful non-compliance with Certificate of Approval conditions will result in the issuing of a Notice of Violation by the DEM under the procedure detailed in RIGL 42-17.1-2(u). In addition to the Director's authority to assess administrative penalties for non-compliance under the authority of Chapter 42-17.6, non-compliance with loan award conditions will be a condition of default of the SRF loan, and the local governmental unit or person may be assessed additional penalties by the Rhode Island Clean Water Finance Agency (RICWFA).

APPENDICES:

(1) State Environmental Review Process (SERP)

(2) SRF Loan Application Review Checklist

(3) Requirements Certification for Applicants for All SRF Loans

(4) Requirements Certification for Applicants for SRF Loans with Federal Funds

The foregoing "Rules and Regulations for the State Revolving Fund (SRF) Program", after due notice, are hereby adopted and filed with the Secretary of State this th day of September, 2001, to become effective twenty days thereafter, in accordance with the provisions of Chapters 42-35, 42-17.1 and 46-12 of the General Laws of Rhode Island of 1956, as amended.

Jan H. Reitsma, Director:_____

Public Notice Date: July 13, 2001

Public Hearing date: August 14, 2001

Filed with Secretary of State:_____

Effective Date:_____

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES

STATE REVOLVING FUND (SRF) PROGRAM

Appendix 1: State Environmental Review Process (SERP)

SECTION I. General Process and Background

This State Environmental Review Process (SERP) addresses compliance with the National Environmental Policy Act [NEPA], a requirement of the Clean Water Act [CWA] for all projects funded with the federal portion of the Rhode Island SRF Program. Further, environmental review for natural resources inventories and consistency with the State Guide Plan (SGP) is required for all projects funded by the state portion of the SRF Program. The Rhode Island Comprehensive Planning and Land Use Regulation Act [R.I. General Laws (RIGL) Chapter 45-22.2] requires not only coordination and consistency between state and local planning programs in the development of the Community Comprehensive Plan (CCP), but also consideration of environmental conditions during planning similar in many respects to NEPA.

To be eligible for funding by the SRF, projects must be identified in or consistent with the goals, policies, and objectives of the State of Rhode Island as expressed in the SGP and adopted elements thereof. All projects funded by the SRF must also be consistent with or identified in plans approved pursuant to the requirements of Sections 201, 319, or 320 of the federal Clean Water Act. Section 201 requires a Wastewater Facilities Plan (WWFP), a plan which assesses wastewater conveyance, treatment, and disposal needs for a twenty year planning period. The projects identified for implementation in the approved plan are called Section 212 projects. The Section 319 plan is "Rhode Island's Nonpoint Source (NPS) Management Plan", a plan which identifies projects to mitigate adverse water quality impacts from sources of pollution other than point sources. The Section 320 plan is the "Comprehensive Conservation and Management Plan (CCMP) for Narragansett Bay", a plan which identifies projects, objectives, and strategies for mitigation of pollutant loadings to the Narragansett Bay watershed. This plan has also been adopted as State Guide Plan Element 715.

All WWFPs or WWFP Updates funded by the SRF Program must meet the full federal environmental review requirements. This is necessary because the SRF Program contains both federal and state funds; to insure compliance with environmental consideration and planning consistency requirements under state law; to insure that design and construction projects are eligible for SRF Program loans; and to provide sufficient planning data to properly and efficiently manage the SRF Program for maximum benefit to the state. **The environmental review requirements for most Section 319 and Section 320 projects are satisfied when they are identified in or consistent with either the NPS Plan or the CCMP, respectively. Certain Section 319 and 320 projects with Section 212 attributes may be subject to additional environmental review requirements.**

All WWFPs or WWFP Updates funded by the SRF Program must contain at least an Environmental Assessment (EA). The EA will analyze and evaluate the impacts on the environment of all alternatives considered to address the existing and forecasted needs identified through the WWFP process. All planning assumptions and forecasts used in

the WWFP must be consistent with those used to develop the CCP of the local governmental unit. If significant impacts are identified with the selected alternative, further analysis and evaluation will be required in an Environmental Impact Statement (EIS). Mitigation measures for impacts from the Section 212 project contracts identified in the WWFP will be contained in any Categorical Exclusion (CE), Finding Of No Significant Impact (FONSI), or Record Of Decision (ROD) issued by DEM. Mitigation measures will also be conditions in the Certificates of Approval for design or construction loans, as appropriate. Monitoring compliance or progress toward complying with mitigation measures will be part of the DEM SRF project inspections.

To fund Section 212 projects that are identified in a WWFP for which the environmental determination (CE,

FONSI, or ROD) is greater than five years old, the information and the environmental review findings of the WWFP must be reaffirmed for the projects to be eligible for SRF Program funding. The reaffirmation process requires examination of the current need for, cost of, and environmental impact of already studied projects. If there are no significant changes from the prior WWFP or environmental review, DEM may then approve the reaffirmation request.

In general, Categorical Exclusions for projects should be identified through the wastewater facilities planning process (i.e. WWFPs or WWFP Update). The need for a project, however, prior to being identified in an approved WWFP must be demonstrated and must have no significant environmental impacts. Requests for a CE for projects may be made directly to DEM for approval prior to applying for an SRF loan. **DEM will not approve any CE requests that result in an increase in average daily design flow or a change in treatment method.**

SECTION 2. Local Governmental Unit Responsibility

The local governmental unit is responsible for providing the environmental review information as part of the WWFP required by the SRF program. This is necessary to achieve the intention of NEPA that environmental information is available to public officials and citizens before decisions are made and before actions are taken, and that decisions are based on an understanding of environmental consequences.

The local governmental units must prepare an Environmental Assessment (EA) as part of the WWFP. Comments by all agencies with statutory and/or regulatory authority within the planning area (e.g. Statewide Planning, Coastal Resources Management Council, DEM Wetlands, DEM Groundwater, RI Historical Preservation Commission, U.S. Fish & Wildlife, etc.) must be requested by the local governmental unit as part of the EA process. If the EA does not identify significant impacts from the project(s) identified in the WWFP, DEM will issue a FONSI. If, as a result of the EA, significant impacts are identified, the local governmental unit must prepare an Environmental Impact Statement (EIS). DEM will issue a Record of Decision (ROD) identifying mitigation measures necessary for the project to proceed.

DEM will independently review and evaluate the environmental information provided as part of the WWFP, and issue a CE, FONSI or ROD. Mitigation measures and comments by other agencies must be incorporated in the WWFP and will be reflected in any final determination rendered by the Department.

As part of the Certificate of Approval application process for a Wastewater Facilities Planning loan, DEM will be reviewing the scope of work for consultant services. DEM will require a draft of the WWFP and EA to be submitted for review and comment prior to a public hearing for the document.

SECTION 3. Public Notice and Participation

The local governmental unit must hold at least one public meeting/workshop during the preparation of the WWFP, preferably once the alternatives have been developed and the environmental impacts analyzed. This meeting will explain the Plan of Study and solicit public opinions and concerns. If the impacts identified with the preferred alternative in the EA are significant, the local governmental unit must issue a public notice stating that an EIS is being initiated and that a scoping meeting will be held. When the preferred alternative is identified, the community must hold a public hearing on the draft WWFP and draft EA/EIS. The Final WWFP and EA/EIS submitted to DEM for review and approval must include responses to all substantive public comments.

SECTION 4. Consistency Requirements

For compliance with state law, information used in the WWFP is required to be consistent with the local CCP. The CCP will provide the basic assumptions and data to be used for forecasting: land use and other development and social parameters; cumulative impacts from all projects planned within the project area; natural, cultural, and historical resources inventories; population; zoning; and infrastructure and public services needs. To be approved

by DEM, all WWFPs must be consistent with the local CCP. For DEM SRF Program funding assistance, all Section 212 projects must be identified in a DEM-approved WWFP or meet the requirements for a Categorical Exclusion.

SECTION 5. Legal Procedures

Following the DEM decision to issue a CE, FONSI, ROD, or reaffirmation of a previous decision, DEM will invite public comments for thirty (30) days, or as required by RIGL 42-35, by publishing a notice of the determination made in a paper of statewide circulation and sending notification of such determination to all persons and associations who have advised the DEM that they wish to be noticed. During the public comment period, any interested party may submit written comments and may request a public hearing. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. Public hearings will be held in accordance with the provisions of the R.I. Administrative Procedures Act [RIGL § 42-35]. Following public notice or public hearing, the final determination will be made by the Director.

At the time any final determination is made by the Director, DEM shall issue a response to comments. The response shall briefly describe and respond to all substantive comments raised during the public comment period or during the public hearing. The response to comments shall be made available to the public. Any person aggrieved by a final DEM decision may pursue any legal remedies it may be entitled to under the R.I. Administrative Procedures Act [RIGL § 42-35].

In cases of non-compliance with conditions of a Certificate of Approval, a warning letter will be sent. Failure to resolve the non-compliance through a warning letter will result in the issuing of a Notice of Violation by the DEM under the procedures detailed in RIGL § 42-17.1-2(u). In addition to the Director's authority to assess administrative penalties for non-compliance under the authority of RIGL § 42-17.6, non-compliance with loan award conditions will be a condition of default of the SRF loan, and the local governmental unit may be assessed additional penalties by the R.I. Clean Water Finance Agency.

SECTION 6. State Agency Authority

The Department of Environmental Management is the designated agency responsible for environmental review of water pollution abatement projects under state law.

The Director of the Department of Environmental Management has broad authority to: "supervise and control the protection, development, planning, and utilization of the natural resources of the state, such resources including (but not limited to) water..."[RIGL 42-17.1-2(a)]; "to establish minimum standards for the establishment and maintenance of salutary environmental conditions" [RIGL 42-17.1-2(n)]; and "to develop comprehensive programs for the prevention, control, and abatement of new or existing pollution of the waters of the state" [RIGL 46-12-3(b)]. The Director is also specifically authorized [RIGL 42-17.1-2(s), 46-12-3(r), 46-12.2-8(d)] to issue, amend, revoke, and enforce reasonable rules and regulations necessary to carry out duties assigned by any provision of law, along with the power to assess administrative penalties in accordance with RIGL 42-17.6 for failure to comply [RIGL 42-17.1-2(v)].

In addition to the broad general powers above, the Director is specifically authorized: "to establish minimum standards...relating to the location, design, construction, and maintenance of all sewage disposal systems" [RIGL 42-17.1-(2)(l)]; " to establish minimum standards for permissible types of septage" [RIGL 42-17.1-2(o)]; "to establish minimum standards...for...the design, construction, operation, and maintenance of disposal facilities; and the location of various types of facilities" [RIGL 42-17.1-2(p)]; "To approve...the construction, modification, and operation of discharge systems or any parts thereof and to require the prior submission of plans, specifications, and other data relative to discharge systems and to require that such plans, specifications, and other data be certified by a professional engineer registered in Rhode Island and to inspect such systems either under construction or in operation" [RIGL 46-12-3(j)]; "to approve the operation of treatment facilities" [RIGL 46-12-3(t)]; to "enforce...the standards...for the quality of...water, and the design, construction and operation of all sewage disposal systems"

[RIGL 42-17.1-2(m)].

State law also addresses protection of the environment as part of the comprehensive planning process. All municipalities of the state are currently in the process of developing or amending their CCP to meet the requirements of the Comprehensive Planning and Land Use Regulation Act [RIGL 45-22.2]. This act states: "Comprehensive planning must provide for protection, development, use and management of our land and natural resources" [RIGL 45-22.2-3(A)(3)]; [A goal is]"To promote the protection of the natural...resources of each municipality and the state" [RIGL 45-22.2-3(C)(4)]; "Rhode Island's cities and towns...shall: Plan for future land use which...protects our natural resources" [RIGL 45-22.2-5(A)(1); [The natural and cultural resources element] "Shall provide an inventory of the significant natural resource areas such as water, soils, prime agricultural lands, natural vegetation systems, wildlife, wetlands. aquifers, coastal features, flood plains, and other natural resources and the policies for the protection and management of such areas" [RIGL 45-22.2-6(E)]. The R.I Department of Administration's Division of Planning is responsible for the comprehensive planning process.

STATE REVOLVING LOAN FUND (SRF) PROGRAM

R.I.D.E.M., Office of Water Resources
Certificate of Approval Process

Appendix 2: SRF Loan Application Review Checklist

Applicant _____ Project Name _____

Contact Person _____ Telephone _____

A/E Contact _____ Telephone _____

A. Procurement and Scope of Work **(Section 212, 319, 320 projects)**

1. Certification that the procurement meets all state and local requirements

2. A scope of work for A/E services sufficient to result in an approved project based on official DEM policy/criteria/checklists.

B. Programmatic **(Section 212, 319, 320 projects)**

1. Certification of intent to comply with all applicable provisions of federal and/or state laws (App. 3 and 4).

2. Certified copy of the resolution of the governing body of the local governmental unit directing the CEO to submit an application for an SRF loan.

3. A summary sheet listing total project costs

4. A copy of the project schedule showing the date of completion for significant milestones

C. Environmental Review Process **(Section 212 projects and projects with Section 212 attributes)**

Facility Plan Loan - certifications that: an Environmental Assessment and, if necessary, an Environmental Impact Statement on the Facility Plan will be performed; the facility planning assumptions and forecasts will be consistent with the present and forecasted elements of the local Comprehensive Plan; and the DEM-approved Facility Plan is intended to be adopted as detailed sub-elements of the Services and Utilities and Implementation elements of the local Comprehensive Plan.

Design and Construction Loans: documentation that the project is detailed in a DEM-approved Facility Plan and documentation the project is addressed by a DEM-approved CE or a DEM-issued Finding of No Significant Impact or Record of Decision, including specified mitigation measures for the project.

FOR DEM USE ONLY

1. Is this a project listed on the current Priority List? YES_____ NO_____
2. Is this a Section 212 project which is consistent with the 208/303 Plans? YES_____ NO_____
3. Is this a Section 319 project which is consistent with the NPS Plan? YES_____ NO_____
4. Is this a Section 320 project which is consistent with the CCMP? YES_____ NO_____

COMMENTS: _____
_____
_____
_____

Based on review of the contents of the application package for a loan from the SRF, it is my opinion that all requirements for issuing a Certificate of Approval for an SRF loan have been met.

SIGNED:_____

DATE:_____, 20__

STATE REVOLVING LOAN FUND (SRF) PROGRAM

R.I.D.E.M., Office of Water Resources
Certificate of Approval Process

Appendix 3: Requirements for Applicants for All SRF Loans

As the Chief Executive Officer of the _____, I hereby certify this local governmental unit will comply with the applicable statutory and/or regulatory requirements of the sections of the Rhode Island General Laws of 1956, as amended, cited below as a condition of award of a loan from the Rhode Island State Revolving Loan Fund (SRF) Program jointly administered by the Rhode Island Clean Water Finance Agency and the Rhode Island Department of Environmental Management. This certification is executed on the _____ day of _____, 20___.

_____, CEO, _____of_____

1. § 2-1, Fresh Water Wetlands
2. § 23-23, Air Pollution [R.I. Clean Air Act]
3. § 36-14, Code of Ethics
4. § 37-12, Contractor's Bonds
5. § 37-13, Labor and Payment of Debts by Contractors
6. § 37-14.1, Minority Business Enterprise
7. § 37-16, Public Works Arbitration Act
8. § 38-1, Custody and Protection [of public records]
9. § 38-2, Access to Public Records
10. § 38-3, Public Records Administration
11. § 42-10.1, Public Finance Management Board (debt issuance)
12. § 42-35, Administrative Procedures
13. § 42-45, Historical Preservation Commission (planning coordination)
14. § 42-46, Open Meetings
15. § 42-82, Farmland Preservation Act (eminent domain restrictions)
16. § 42-110, Licensing of Chemical Purchasing (metal finishing pretreatment)
17. § 45-14, Sewage Charges (user charge restrictions)
18. § 45-22.2, Comprehensive Planning and Land Use Regulation Act (planning consistency)
19. § 45-24.5, Wastewater Management Districts (septage management)
20. § 46-12, Water Pollution
21. § 46-12.1, Underground Storage Tanks (fuel tanks at WWTFs)
22. § 46-13, Public Drinking Water Supply (cross-connections, break tanks at WWTFs)
23. § 46-23, Coastal Resources Management Council

STATE REVOLVING LOAN FUND (SRF) PROGRAM

R.I.D.E.M., Office of Water Resources
Certificate of Approval Process

Appendix 4: Requirements for Applicants for SRF Loans with Federal Funds

As the Chief Executive Officer of the _____, I hereby certify this local governmental unit will comply with the applicable statutory requirements of the federal laws cited below as a condition of award of a loan from the Rhode Island State Revolving Loan Fund (SRF) Program jointly administered by the Rhode Island Clean Water Finance Agency and the Rhode Island Department of Environmental Management. This certification is executed on the _____ day of _____, 20_____.

_____, CEO, _____of_____

1. Archeological and Historic Preservation Act of 1974, P.L. 86-523, as amended
2. Clean Air Act, 42 U.S.C. 7506(c)
3. Coastal Barrier Resources Act, 16 U.S.C. 3501 et. seq.
4. Coastal Zone Management Act Pub. L. 92-583, as amended
5. Endangered Species Act, 16 U.S.C. 1531, et. seq.
6. Federal Executive Order 11988, as amended by Executive Order 12148, Floodplain Management
7. Federal Executive Order 11990, Protection of Wetlands
8. Farmland Protection Policy Act, 7 U.S.C. 4201, et. seq.
9. Fish and Wildlife Coordination Act, P.L. 85-624, as amended
10. National Historic Preservation Act of 1966, P.L. 89-665, as amended
11. Safe Drinking Water Act, P.L. 92-523, as amended
12. Wild and Scenic Rivers Act, P.L. 90-542, as amended
13. Demonstration Cities and Metropolitan Development Act of 1966, P.L. 89-754, as amended Executive Order 12372
14. Section 306 of the Clean Air Act and Section 508 of the Clean Water Act, Including Federal Executive Order 11738, Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans
15. Age Discrimination Act, P.L. 94-135, as amended
16. Civil Rights Act of 1964, P.L. 88-352, as amended
17. Section 13 of P.L. 92-500; prohibition against sex discrimination under the federal Clean Water Act
18. Federal Executive Order 11246, Equal Employment Opportunity
19. Federal Executive Orders 11625, 12138, and 12432 Women's and Minority Business Enterprise
20. Section 504 of the Rehabilitation Act of 1973, P.L. 93-112, including Federal Executive Orders 11914 and 11250
21. Uniform Relocation and Real Property Acquisition Act of 1970, P.L. 91-646, as amended
22. Executive Order 12549, Debarment and Suspension
23. Section 129 of the Small Business Administration Reauthorization and Amendment Act of 1988, Pub. L. 100-590
24. Executive Order 13202, Preservation of Open Competition and Government Neutrality Towards Contractor's Labor Relations …

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Office of Water Resources

Rules and Regulations for the Priority Determination System for Federal and State Assistance to Local Governmental Units for Construction of Water Pollution Abatement Projects

November 1983
As Amended: August 1987, June 1991, May 1996, April 1998, August 2003 and August, 2009

Regulation # 12-190-019

AUTHORITY: These regulations are adopted pursuant to Chapters 42-17.1, 42-35, 46-12, and 46-12.2 of the Rhode Island General Laws of 1956, as amended

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

RULES AND REGULATIONS FOR THE PRIORITY DETERMINATION SYSTEM
FOR FEDERAL AND STATE ASSISTANCE TO LOCAL GOVERNMENTAL UNITS
FOR CONSTRUCTION OF WATER POLLUTION ABATEMENT PROJECTS

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STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

RULES AND REGULATIONS FOR THE PRIORITY DETERMINATION SYSTEM FOR FEDERAL AND STATE ASSISTANCE TO LOCAL GOVERNMENTAL UNITS FOR CONSTRUCTION OF WATER POLLUTION ABATEMENT PROJECTS

RULE 1. PURPOSE

The Priority Determination System is designed to achieve optimum water quality management results from the Rhode Island Department of Environmental Management's (DEM) water pollution abatement project construction assistance programs, consistent with the powers and duties of the Department denoted in Chapters 42-17.1, 46-12, and 46-12.2 of the Rhode Island General Laws (RIGL), as amended, and the Federal Water Pollution Control Act [33 U.S.C. Sec. 1251 et. seq., as amended], commonly called the Clean Water Act.

The Priority Determination System describes procedures for annually determining the priority rating and ranking of all categories of identified water pollution abatement projects proposed by local governmental units which may receive federal and/or state funding assistance from any such programs administered by the DEM.

The relative rankings of water pollution abatement projects on the Priority List developed under these regulations will be utilized by the various assistance programs of the DEM, Office of Water Resources. Actual annual assistance awards are determined by the criteria and methodology contained in the rules and regulations for each specific assistance program. These assistance programs may include, but are not limited to, the State Revolving Fund (SRF) and the Interceptor Bond Fund (IBF) account of the Rhode Island Clean Water Act Environmental Trust Fund.

RULE 2. AUTHORITY

These rules and regulations are promulgated pursuant to RIGL Chapter 42-17.1, Environmental Management, RIGL Chapter 46-12, Water Pollution, and RIGL Chapter 46-12.2, Rhode Island Clean Water Finance Agency, in accordance with RIGL Chapter 42-35, Administrative Procedures.

RULE 3. APPLICATION

The terms and provisions of these rules and regulations shall be liberally construed to permit the Department to effectuate the purposes of state law, goals, and policies.

RULE 4. DEFINITIONS

For the purposes of these regulations, the following terms shall have the following meanings:

"Agency" or "RICWFA" means the Rhode Island Clean Water Finance Agency established by RIGL Chapter 46-12.2.

"Areawide Waste Treatment Management Plan (208 Plan)" means the plan prepared by the State pursuant to Section 208 of the Clean Water Act.

"Chief Executive Officer" means the mayor in any city, the president of the town council in any town, or the executive director of any authority or commission unless some other officer or body is designated to perform the functions of a chief executive officer under the provisions of a local charter or other law.

"Clean Water Act (CWA)" means the Federal Water Pollution Control Act, codified at 33 U.S.C Sec. 1251 et seq., as amended.

"Community Comprehensive Plan (CCP)" means a plan prepared pursuant to the Rhode Island Comprehensive Planning and Land Use Regulation Act, Chapter 45-22.2 of the RIGL.

"Comprehensive Conservation and Management Plan (CCMP)" means a plan prepared pursuant to the requirements of Section 320 of the Clean Water Act.

"Construction" means any one or more of the following: Preliminary planning to determine the feasibility of treatment works, engineering, scientific, architectural, legal, fiscal, or economic investigations or studies, surveys, designs, plans, working drawings, specifications, procedures, or other necessary actions, erection, building, acquisition, alteration, rehabilitation, improvement, or extension of treatment works, or the administration, inspection, or supervision of any of the foregoing items.

"Combined Sewer" shall mean a sewer which serves as a sanitary sewer and a storm sewer.

"Combined Sewer Overflow (CSO)" means flow from a combined sewer in excess of the interceptor or regulator capacity that is discharged into a receiving water without going to a WWTF. A CSO occurs prior to reaching a WWTF and is distinguished from bypasses which are intentional diversions of waste streams from any portion of a WWTF.

"Costs" means any or all costs relating to the planning, designing, acquiring, constructing and carrying out and placing in operation a water pollution abatement project including, but not limited to, the following: planning, design, acquisition, construction, expansion, improvement and rehabilitation of facilities; acquisition of real or personal property; demolitions and relocations; labor, materials, machinery and equipment; services of architects, engineers, scientists, environmental and financial experts and other consultants; feasibility studies; rate/cost recovery/user charge studies; borings, survey, and other preliminary engineering costs; plans and specifications; administrative costs; legal costs; all costs related to project financing; and any and all other expenses necessary or incidental to the financing and construction of a water pollution abatement project.

"Department" or "DEM" means the Department of Environmental Management of the state of Rhode Island.

"Director" means the Director of the Rhode Island Department of Environmental Management or any subordinate or subordinates to whom the Director has delegated the powers and duties vested in him or her by Chapters 46-12, 46-12.2, or 42-17.1 of the RIGL, as amended.

"Fiscal Year" means the state of Rhode Island fiscal year: 1 July to 30 June.

"Growth Center" means a designated area, consistent with the state-approved local Community Comprehensive Plan, where compact, mixed-use development is accommodated without depleting a community's natural, historic and cultural resources.

"Infiltration/Inflow (I/I)" means the total flow from both infiltration and inflow without distinguishing the source.

"Landfill" means any site where the disposal of wastes and/or sludge occurs or has occurred by placing them in or on the land, compacting, and covering with a layer of soil.

"Local Governmental Unit" means any city, town, district, commission, agency, authority, board or other political subdivision or instrumentality of the state or of any political subdivision thereof responsible for the ownership or operation of a water pollution abatement project(s), including the Narragansett Bay Water Quality Management District Commission.

"Materials" means product(s) employed in or by-products generated by industrial, commercial, and/or agricultural processes.
"Materials Storage Area" means any pile, impoundment, compound, facility or other area where materials are contained, held or otherwise stored in such a manner which causes, contributes to, or contaminates runoff.

"Nonpoint Source (NPS) Management Plan" means a plan prepared pursuant to the requirements of Section 319

of the Clean Water Act.

"Onsite Wastewater Treatment System (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 sewage collection system.

"Pollution" means the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

"Project" or "Water Pollution Abatement Project" means any project that contributes to the education, removal, curtailment, or mitigation of pollution of the surface waters or groundwater of the state, or the restoration of the quality of said waters, and conforms with any applicable planning document which has been approved and/or adopted. This definition shall be construed to include the planning, design, construction or any other distinct stage or phase of a project.

"Project Priority List (PPL)" means an annual ranked listing based on relative priority ratings of all water pollution abatement projects in all categories for which federal or state assistance is requested from DEM's assistance programs.

"Raw Sewage Discharge" means any discharge to a receiving water of untreated sanitary sewage.

"Runoff" means water that drains from an area as surface flow.

"Sanitary Sewer" means a sewer which conveys wastewater from residences, commercial buildings, industrial plants, and institutions.

"State Guide Plan (SGP)" means goals, policies, or plan elements for the physical, economic, and social development of the state, adopted by the State Planning Council in accordance with Section 42-11-10 of the General Laws of Rhode Island, 1956, as amended.

"Storm Sewer" means a sewer intended to convey only storm waters, surface runoff, street wash waters, and drainage.

"Total Maximum Daily Load (TMDL)" means the amount of a pollutant that may be discharged into a waterbody and still maintain water quality standards. The TMDL is the sum of the individual wasteload allocations for point sources and the load allocations for nonpoint sources and natural background taking into account a margin of safety.

"Underground Storage Tank" means any one or a combination of tanks (including underground pipes connected thereto) which is used to contain an accumulation of petroleum product or hazardous materials, and the volume of which (including the volume of the underground pipes connected thereto) is ten percent (10%) or more beneath the surface of the ground.

"Wastewater Facilities Plan (WWFP)" means a plan prepared pursuant to the requirements of Section 201 of the federal Clean Water Act which is a detailed 20-year wastewater treatment, conveyance, and disposal plan, including an assessment of the environmental impacts of the plan, and which also contains information to meet the statutory and regulatory requirements of the DEM for systems to prevent pollution and the consistency requirements of the Comprehensive Planning and Land Use Regulation Act (RIGL 45-22.2).

"Wastewater Treatment Facility (WWTF)" means any equipment, devices, and systems for preventing, abating, reducing, storing, conveying, treating, separating, recycling, reclaiming, or disposing of sanitary or combined sewage.

"Watershed Action Plan" means a document that identifies watershed goals and management objectives along with specific action items that are needed. The plan is developed in consultation with all key stakeholders within the watershed including, but not limited to, federal, state and local governmental agencies, non-governmental organizations and the private sector.

RULE 5. PROJECT PRIORITY LIST

A project cannot receive funding from any DEM assistance program which utilizes the Priority Determination System unless it is on the approved Project Priority List. The chief executive officer of a local governmental unit must submit to the DEM, Office of Water Resources a letter of intent or equivalent document requesting that the proposed project receive funding from a DEM construction assistance program. To be rated and ranked under the project priority system, the letter of intent for a requested project must include:

(A) Documentation that the requested project is, at a minimum, not inconsistent with: the State Guide Plan; a Community Comprehensive Plan; the Non-Point Source Management Plan; the Areawide Waste Treatment Management Plan or Plans; the Comprehensive Conservation and Management Plan; an approved Wastewater Facilities Plan. **EXCEPTION:** this requirement does not necessarily apply to request for assistance for planning or scientific investigations/studies.

(B) A total costs estimate of all costs relating to the project.

(C) A project description and schedule.

The Director shall annually prepare and promulgate a ranked priority list of all water pollution abatement projects for which assistance has been properly requested.

RULE 6. PROJECT RATING

The Director shall rate each project according to the project rating criteria of Appendix I of these regulations. In order to rate a project, the Director must determine that the project will contribute to achieving the State water quality policy goals and objectives. The numerical scores in Appendix I are based on the following:

(A) The existing conditions that cause the pollution.

(B) The benefits of the proposed project, including improvements in overall efficiency and service.

(C) Improvements to water quality.

(D) Intergovernmental needs, requirements, or mandates identified in: the State Guide Plan; a Community Comprehensive Plan; the Non-Point Source Management Plan; the Areawide Waste Treatment Management Plan; the Comprehensive Conservation and Management Plan; a Special Area Management Plan; an approved Total Maximum Daily Load or Watershed Action Plan, or an approved Wastewater Facilities Plan.

(E) The degree to which a project is ready to proceed.

The Director shall assign points to each project rating criterion based upon the most current information available to him/her, including information received prior to or during the public hearing required under Rule 8 of these regulations.

Point values have been assigned to subcategories based on needs and priorities identified in but not limited to: the State Guide Plan; a Community Comprehensive Plan; the Nonpoint Source Management Plan; the Areawide Waste Treatment Management Plan; the Comprehensive Conservation and Management Plan; DEM Water Quality Regulations; RIDEM Rules and Regulations for Groundwater Quality; and an approved Wastewater Facilities Plan.

The Director shall annually evaluate the rating of each project and make such changes as deemed necessary.

RULE 7. PROJECT RANKING

Projects will be ranked based upon points accumulated under the Rule 6 rating process. The Director shall not place projects on the priority list and shall remove projects from the list when it is determined that the projects will not contribute to achieving applicable state water quality goals, policies, standards, or objectives.

RULE 8. REVIEW AND ADOPTION OF PROJECT PRIORITY LIST

The Director shall hold a public hearing annually on the proposed priority list prior to adopting and filing the final priority list with the Secretary of State.

Public notice of the availability of the proposed list and the place and time of the public hearing shall be published in a newspaper of the State with statewide circulation, or on the Department's website, for at least thirty (30) calendar days, or as required by RIGL 42-35, in advance of the hearing to afford all interested persons reasonable opportunity to submit data, views, or arguments concerning the proposed priority list. The public notice shall indicate the location where copies of the draft priority list may be obtained and/or reviewed by interested parties prior to the hearing.

The Director shall accept written comments on the draft priority list from the time of public notice of availability until seven (7) calendar days following the public hearing. The Director shall consider fully all written and oral submissions respecting the proposed rule, and make any changes deemed necessary to serve the purposes of these regulations.

The Director will adopt a final priority list and file it with the Secretary of State. Upon adoption of the final priority list, if requested to do so by an interested person, the Director will issue a concise statement of the principal reasons for and against its adoption, incorporating therein the reasons for overruling the considerations urged against its adoption. The effective date of the adopted priority list will be twenty (20) days following the filing with the Secretary of State.

The Director shall permanently retain a copy of the priority list hearing record which should include a copy of the final priority list filed with the Secretary of State, the transcript of the public hearing, copies of all comments, and any statement by the Director regarding the comments on or adoption of the final project priority list.

The Director shall include such information in the project priority list for each project as required by the EPA pursuant to the Clean Water Act and guidance issued pursuant thereto.

RULE 9. PROJECT PRIORITY LIST REVISION

As necessary, but no less than annually, the Director shall review the project priority list for changes in estimated project schedules, project costs and/or scope. The Director may propose modification of the project priority list at any time according to these procedures:

(A) Addition to the list: projects can only be added to the list by a public hearing

(B) Removal from the list:

(1) The Director may remove a project completely from the project priority list if is determined: that it is fully funded by other assistance programs; that it is not consistent with an approved WWFP or applicable comprehensive management plan; or that significant deficiencies exist in the project scope of work or costs analysis.

(2) The Director shall notify by certified mail the local governmental unit whose project will be removed and the basis for the removal. The local governmental unit shall have ten (10) calendar days from receipt of the letter to submit evidence to the DEM showing that its project should not be removed.

(3) The Director shall review his/her decision based on the information submitted by the local governmental unit and shall revise his/her decision if deemed necessary.

(4) A local governmental unit whose project is removed after such review by the Director may request that the Director reverse his/her decision to remove the project only if substantial rights of the applicant have been prejudiced because the administrative findings, inferences, conclusions, or decisions are without factual basis or are an unfair interpretation of the rules and regulations.

(C) Revisions of a Clerical Nature: Revisions of a clerical nature require neither a public hearing nor documentation.

RULE 10. SEVERABILITY

If any provision of these Rules and Regulations, or the application thereof to any local governmental unit or circumstances, is held invalid by a court of competent jurisdiction, the validity of the remainder of the Rules and Regulations shall not be affected thereby.

RULE 11. SUPERSEDED RULES AND REGULATIONS

On the effective date of these Rules and Regulations, all previous Rules and Regulations, and any policies regarding the administration and enforcement of the Priority Determination System shall be superseded. However, any enforcement action taken by, or application submitted to, the Department prior to the effective date of these Rules and Regulations shall be governed by the Rules and Regulations in effect at the time the enforcement action was taken, or application filed.

RULE 12. EFFECTIVE DATE

The foregoing "Rules and Regulations for the Priority Determination System for Federal and State Assistance to Local Governmental Units for Construction of Water Pollution Abatement Projects", after due notice, are hereby adopted and filed with the Secretary of State this _____ day of August 2009 to become effective twenty (20) days thereafter, in accordance with the provisions of Chapters 42-17.1, 42-35, 46-12, and 46-12.2 of the General Laws of Rhode Island of 1956, as amended.

_____

W. Michael Sullivan, Ph.D., Director
Department of Environmental Management

Notice Given on: May 14, 2008

Filing Date: _____

Effective Date: _____

APPENDIX I - PROJECT RATING CRITERIA

APPLICANT: _____ PROJECT: _____

			Point Values	Actual Rating	Item #
I.		**EXISTING CONDITIONS CRITERIA †**			
	A.	Direct Raw Sewage Discharge/Sanitary Sewer Overflow	7		A
	B-1	Failing OWTS. - Documented Water Quality Degradation	7		B-1
	B-2	Failing OWTS – Other	3		B-2
	C-1	Untreated/uncontrolled runoff - Documented Water Qual. Degrad. (Pathogen impacts)	5		C-1
	C-2	Untreated/uncontrolled runoff - Documented Water Qual. Degrad. (Non-path. impacts)	3		C-2
	C-3	Untreated/uncontrolled runoff – Other	2		C-3
	D-1	Wastewater Treatment Facility	3		D-1
	D-2	Collection System/Pump Station	1		D-2
	E.	Combined Sewer Overflows	10		E
	F.	Landfill - Closure imminent or closed	3		F
	G-1	Underground Storage Tank – Leaking	3		G-1
	G-2	Underground Storage Tank - Potential to leak (single wall construction)	2		G-2
	H.	Materials Storage Area	3		H
	I-1	Sub-surface Discharge - non-sanitary wastewater	2		I-1
	I-2	Sub-surface Discharge - stormwater only	1		I-2
	J.	Stormwater treatment/management facility	3		J
	L.	Atmospheric Deposition	1		L
	M.	Excessive Flows - exceeds design flow or operational capacity	3		M
		Section I - Total Points		_____	
II.		**PROPOSED PROJECT BENEFITS CRITERIA † ***			
	A.	Project Provides for Resource Conservation/Multiple-use Benefits	5		A
	B.	Regional Project (i.e. project serves more than one community)	3		B
	C-1	Treatment of Septage at Existing WWTF (from outside service area)	3		C-1
	C-2	Treatment of Septage at Existing WWTF (within service area only)	2		C-2
	D.	Operational Reliability Improvement	2		D
	E.	Project helps to alleviate a Sewer Connection/Extension Ban in the area served	5		E
	F.	Demonstration or Pilot Projects	2		F
	G.	Project incorporates pollution prevention/waste minimization techniques	2		G
	H.	Project protects or restores a critical aquatic habitat or resource	3		H
	I.	Project provides technical assistance/public education	2		I
	J.	Project improves permitted discharge from interim to final limits (discharge is presently in compliance with interim limits)	3		J
	K.	Project addresses/prevents water pollution within a growth center	3		K
	L.	Project incorporates energy conservation or other sustainable infrastructure measures	2		L
		Section II - Total Points		_____	
III.		**WATER QUALITY IMPROVEMENT CRITERIA ‡**			
A.		Surface Water Restoration † [Use Integrated 305(b)/303(d) Report]			
	A-1	Project affects a Category 4.A or 4.B waterbody	8		A-1
	A-2	Project affects a Category 5 waterbody	6		A-2
	A-3	Project affects a Category 4.C waterbody	4		A-3
		Subtotal III A		_____	
B.		Surface Water Protection † [Use RIDEM Water Qual. Regs. & 305(b)/303(d) Report]			
	B-1	Project affects an SRPW waterbody	6		B-1
	B-2	Project affects a Category 2 waterbody	4		B-2
		Subtotal III B		_____	

C.	Groundwater Protection Factor [Use Rules and Regulations for Groundwater Quality] †			
C-1	Project affects a Wellhead Protection Area for Community Water System Well	6		C-1
C-2	Project affects an area of GAA Groundwater	4		C-2
C-3	Project affects an area of GA Groundwater	2		C-3
C-4	Project affects an area of GB Groundwater	1		C-4
	Subtotal III C		_____	
	Section III - Total Points		_____	

IV. INTERGOVERNMENTAL NEEDS CRITERIA ††

A.	Project is consistent with Community Comprehensive Plan/State Guide Plan	3		A
B.	Project is consistent with an approved 201 Wastewater Facilities Plan	3		B
C.	Project is consistent with a Special Area Management (SAM) Plan	3		C
D.	Project is consistent with the Areawide Waste Management Plan (208 Plan)	1		D
E.	Project is consistent with the Nonpoint Source Management Plan (319 Plan)	3		E
F.	Project is consistent with the Comp. Conservation and Management Plan (CCMP)	3		F
G.	Project is consistent with TMDL or Watershed Action Plan	3		G
H.	Project is consistent with the Ten Priority Beaches Plan	3		H
I.	Project is consistent with the local Stormwater Management Plan	3		I
G.	Population Served by the Project †			
G-1	1 – 14,999	1		G-1
G-2	15,000 – 49,999	2		G-2
G-3	≥ 50,000	3		G-3
	Section IV - Total Points		_____	

V. READINESS TO PROCEED CRITERIA

A.	Planning †			
A-1	Project Management/Recovery Plan has been approved	2		A-1
A-2	Wastewater Facilities Plan (WWFP) approved or reaffirmed	2		A-2
A-3	Environmental Assessment or Categorical Exclusion Approved	2		A-3
A-4	Lake Management Plan Approved	2		A-4
B.	Design			
B-1	Plans and Specifications approved	2		B-1
C.	Financial/Other ††			
C-1	Local bonding authority approved/ other local funds committed	2		C-1
C-2	Pre-application for SRF Funding complete (i.e. qualified for loan by RICWFA)	2		C-2
C-3	Grant funding has been secured	2		C-3
C-4	Local ordinance/zoning passed in support of the project	2		C-4
	Section V - Total Points		_____	

Footnotes for Table I:

† Select one criterion, at most, for each category. For example, choose A-1, A-2 or neither as applicable.

†† Select each and every criterion which applies

* Points are awarded for projects at the project site if the criterion is included in the proposed project.

‡ For water bodies that are included on the surface water reclamation and protection lists, the highest total point rating under either of those lists must be used, but not both.

APPENDIX II - PROJECT CATEGORIES FOR PRIORITY DETERMINATION SYSTEM

CATEGORY	TYPE	RI#	EPA #	DEFINITION
Secondary Treatment	WWTF	1	1	Replacement/modifications/additions based on an approved WWFP to achieve/maintain secondary treatment
Advanced Treatment	WWTF	2	2	Replacement/modifications/additions based on an approved WWFP to achieve/maintain advanced treatment
I/I Correction	Sewer	3A	3A	Corrective actions in sewer systems identified in an approved I/I Analysis or Sewer System Evaluation Survey
Sewer System Repair	Sewer	3B	3B	Rehabilitation is extensive repair of existing sewers/pump stations beyond scope of normal maintenance programs. Replacement is construction of parallel sewers/sewers with exact function of sewers to be abandoned. Replacement of pump stations is construction of a new pumping station with the same functions/flow capacity of the old facility. All must be in WWFP.
Collectors (Future)	Sewer	4A	4A	Sewers that will convey flows from future homes, businesses and industries identified in a CCP and approved in a WWFP
Interceptor (Future)	Sewer	4B	4B	Sewers that will convey flows from one or more Category 4A areas to another interceptor or WWTF
Collectors (Present)	Sewer	4C	---	Sewers to convey flows from present homes, Businesses, and industries identified in a CCP and approved in a WWFP
Interceptor (Present)	Sewer	4D	---	Sewers to convey flows from one or more Category 4C areas to another interceptor or WWTF
CSO	System	5	5	Combined sewer treatment/storage/separation per an approved WWFP
Planning	System	6	---	Detailed plan determining the need for and feasibility of water pollution abatement project(s)
Design	System	7	---	Plans, Specifications, & bidding documents
Non-Point	Mitig.	8	7	Implementation project per NPS Plan (SGP Element # 731)
Estuarine	Mitig.	9	---	Implementation project per Comprehensive Conservation and Management Plan (SGP Element # 715)
Onsite Wastewater Treatment System (OWTS)	WWTF	10	---	Alternative systems, subsurface (ISDS), and Wastewater Management Districts (WWMD) per RIGL 45-24.5
Stormwater	WWTF	11	6	Planning & Implementation of municipal stormwater management programs and controls
Other	Mitig.	12	---	Other water pollution abatement projects

APPENDIX III – ANNUAL PROJECT PRIORITY LIST

This space reserved for the current Project Priority List

TOWN OF COVENTRY
STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

ORDINANCE NO. ___-___-_____

REGULATIONS GOVERNING THE USE OF PUBLIC AND PRIVATE SEWERS AND DRAINS, PRIVATE SEWAGE DISPOSAL, THE INSTALLATION AND CONNECTION OF BUILDING SEWERS, AND THE DISCHARGE OF WATERS AND WASTE INTO THE PUBLIC SEWER SYSTEM; AND PROVIDING PENALTIES FOR VIOLATIONS THEREOF; IN THE TOWN OF COVENTRY, STATE OF RHODE ISLAND, AND PROVIDENCE PLANTATIONS.

Be it ordained and enacted by the Town Council of the Town of Coventry, State of Rhode Island, as follows:

ARTICLE I - DEFINITIONS

Unless the context specifically indicates otherwise, the meaning of those terms used in these regulations shall be as follows:

1.1 **ACT** (or THE ACT) shall mean the Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C., 1251, et. Seq.

1.2 **BEDROOM** shall mean any room in a residential dwelling which satisfies the following requirements:

a. Greater than seventy (70) square feet in area, which is susceptible to use as a private sleeping area and,

b. Has at least one (1) interior method of entry and egress allowing the room to be closed off from the remainder of the residence and,

c. Is heated living space that is unrestricted for occupancy and,

For assessment purposes only, shall be defined as a unit whose wastewater flow is equal to 115 gallons per day. The basis by which projected daily wastewater flows will be determined are based upon current RIDEM-published Onsite Wastewater Treatment Systems (OWTS) values per establishment. For wastewater flow volumes not stated in the OWTS Regulations, standard engineering values will be used.

1.3 **BEST MANAGEMENT PRACTICES** (or BMPs) shall mean schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to implement the prohibitions listed in Sections 2(11)(A) and 2(11)(B) of 40 CFR 403.5(a)(2) and 40 CFR 403.5(b). BMPs include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage, alternative means (i.e. Management Plans) of complying with, or in place of, certain established pretreatment standards and effluent limits.

1.4 **BETTERMENT ASSESSMENTS** are assessments for properties where private parties have constructed the Town's sewage collection infrastructure and for properties that propose a change in use, or an increase in daily flow.

1.5 **BOD** (denoting Biochemical Oxygen Demand) shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20°C, expressed in milligrams per liter.

1.6 **BUILDING DRAIN** shall mean that part of the lowest piping of a drainage system which receives the discharge from waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer, ending five (5) feet outside the inner face of the building wall.

1.7 **BUILDING SEWER** shall mean the service extension from a building to the public sewer or other place of disposal.

1.8 **COLLECTION SYSTEM** shall mean the equipment, structures and processes used for the collection, transportation, and pumping of sewage.

1.9 **COMMISSION** shall mean the Board of Sewer Commissioners of the Town, if any, appointed pursuant to the Public Laws of Rhode Island, as amended. In the event that there is no such Board of Sewer Commissioners, functions assigned to it hereunder shall be performed by the Town Council. For the avoidance of doubt, the advisory sewer subcommittee of the Town is not the Board of Sewer Commissioners unless the Town Council otherwise expressly provides pursuant to a Resolution or by Ordinance.

1.10 **DEVELOPER** shall mean an individual or group of individuals who are responsible for bringing a project through the development review process and the infrastructure construction to create a new developable lot(s) or area. If the developer is not the owner, they must submit evidence that he/she is acting on behalf of the owner.

1.11 **DIRECTOR OF PUBLIC WORKS** shall mean the Director of Public Works for the Town of Coventry or his/her duly appointed deputy agent or representative.

1.12 **DWELLING** shall mean a house or building consisting of apartments, a group of rooms, or a single room occupied or intended for occupancy as living quarters and consisting of six (6) or less Bedrooms and described as residential property with residential use within the Towns property records.

1.13 **EASEMENT** shall mean land described with a specific use intended for the Town.

1.14 **FLOATABLE OIL** is oil, fat, or grease in a physical state such that it will separate by gravity from wastewater by treatment in an approved pre-treatment facility. A wastewater shall be considered free of floatable oil if it is properly pretreated and the wastewater does not interfere with the collection system.

1.15 **GARBAGE** shall mean the animal and vegetable waste resulting from the handling, preparation, cooking, and serving of foods.

1.16 **INDUSTRIAL WASTES** shall mean the wastewater from industrial (non-residential) processes, trades, or business as distinct from residential (sanitary) wastes.

1.17 **INFECTIOUS WASTE** shall mean waste which contains pathogens with sufficient virulence and quantity so that exposure to the waste by a susceptible host could result in disease. Under this definition, the normal microflors of the body are not classified as infectious. Categories of waste designated as infectious are as follows:

a. "Human Blood, Body Fluids and Blood Products" - means all waste human blood, blood products (such as serum, plasma, and other blood components) and body fluids (such as suction fluid and wound drainage) which exist in non-absorbed liquid form in more than trace quantities.

b. "Contaminated Sharps" - consists of discarded sharps (e.g." hypodermic needles, syringes, Pasteur pipettes, broken glass and scalpel blades) which may have come into contact with infectious agents during use in patient care or in medical research or have been removed from their original sterile container.

c. "Contaminated Animal Carcasses, Body Parts, and Bedding" - refers to carcasses, body parts and bedding of animals that were exposed to pathogens in research and in the production of biologicals or in vivo production of pharmaceuticals,

d. "Discarded Cultures and Stocks of Infectious Agents and Associated Biological" – constitute infectious wastes because pathogenic organisms are present at high concentration in these materials, Included in this category are pathological laboratories and pharmaceutical companies, wastes from the production of biological and discarded live and attenuated vaccines, Also, culture dishes and devices used to transfer, inoculate and mix cultures shall be designated as infectious waste.

e. "Pathological Waste" - consists of tissues, organs, body parts, removed during surgery and autopsy.

1.18 **INTERFERENCE** shall mean a discharge that, alone or in conjunction with a discharge or discharges from other sources, inhibits or disrupts the Publicly Owned Treatment Works (POTW), its treatment processes or operations or its sludge processes, use or disposal; and, therefore, is a cause of a violation of the Town's NPDES permit or of the prevention of sewage sludge use or disposal in compliance with any of the following statutory/regulatory provisions or permits issued thereunder, or any more stringent State or location regulations: Section 405 of the Act; the Solid Waste Disposal Act, including Title II commonly referred to as the Resource Conservation and Recovery Act (RCRA);any State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the Solid Waste Disposal Act; the Clean Air Act; the Toxic Substances Control Act; and the Marine Protection, Research and Sanctuaries Act.

1.19 **LATERAL SEWER** shall mean a sewer that discharges into a main or other sewer.

1.20 **MAY** is permissive.

1.21 **NATURAL OUTLET** shall mean any outlet, including storm sewers, into a wastewater pond, ditch, lake, or other body of surface water or groundwater.

1.22 **NON-RESIDENTIAL** means commercial, industrial, and all other combinations of use, except residential.

1.23 **ONSITE WASTEWATER TREATMENT SYSTEM** (or **OWTS)** shall mean a system approved by the Rhode Island Department of Environmental Management (RIDEM) which provides sanitary sewerage disposal by means other than discharge into a public sewer.

1.24 **ORDINANCE** shall mean the "Sewers Ordinance" herein of the Town of Coventry (Chapter 191, as amended, of the Town Code of Ordinances),

1.25 **OWNER** means any person who alone, or jointly:

a. Has a legal title to any premises, or

b. Has control of any premises, such as an agreement to purchase, agent, executor, administrator, trustee, lessee or guardian of the estate of a holder of a legal title.

1.26 **pH** shall mean the degree of acidity or alkalinity of a solution often expressed as the negative logarithm of the reciprocal of the hydrogen ion concentration. The concentration is the weight of hydrogen ions, in gram equivalents, per liter of solution. Neutral water, for example, has a pH value of 7 and a hydrogen ion concentration of 10-7. pH values of 0 to 7 indicate acidity and from 7 to 14 indicate alkalinity.

1.27 **POLLUTANT** shall mean, but not limited to, any dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water.

1.28 **PRETREATMENT** means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to, or in lieu of, introducing such pollutants into the POTW. This reduction or alteration can be obtained by physical, chemical or biological processes, by process changes or by other means, except by diluting the concentration of the pollutants unless allowed by an applicable pretreatment standard.

1.29 **PUBLIC SANITARY SEWER SYSTEM** shall mean the public system of sanitary sewers installed by the Town of Coventry pursuant to the authority conferred by the Public Laws.

1.30 **PRETREATMENT COORDINATOR** shall mean the representative of the Town who is responsible for administrating the Rules and Regulations of the Non-Residential Users.

1.31 **PRETREATMENT STANDARDS** shall mean all applicable Federal rules and regulations implementing Section 403 of the Act, as well as any non-conflicting State or local standards. In cases of conflicting standards of regulations, the more stringent thereof shall be applied.

1.32 **PRIVATELY OWNED WASTEWATER FACILITY** shall mean collection system(s) and/or wastewater pre-treatment facility (ies) privately-owned by a user and/or association that is connected to a publicly-owned wastewater treatment or collection system.

1.33 **PUBLICLY OWNED TREATMENT WORKS** (or **POTW)** shall mean a treatment works as defined by Section 212 of the Act (33 U.S.C., Section 1292), which is owned by the Town or West Warwick

Regional Wastewater Treatment Facility (WWRWTF). This definition includes any devices or systems used in the collection, storage, treatment, recycling and reclamation of sewage or industrial wastes of a liquid nature and any conveyances which convey wastewater to a treatment plant (also referred to as a public sewer).

1.34 **PUBLIC SEWER** shall mean any portion of the municipal sanitary sewer system in which all owners of abutting properties have equal rights, and which is controlled by municipal authority.

1.35 **RESIDENTIAL** shall mean the use of a dwelling, or building consisting of apartments, a group of rooms, or a single room, occupied or intended for occupancy as living quarters and consisting of six (6) or less Bedrooms and described as residential property with residential use within the Towns property records.

1.36 **RIDEM** shall mean the Rhode Island Department of Environmental Management.

1.37 **Right-Of-Way** (**ROW**) means the perpetual right of the Town of Coventry, its assigns, employees, and assignees to pass over and under the land of another for all reasonable purposes involving Sewage Works to include but not excluding the right to enter upon the land of another at all reasonable times to make repairs, improvements and maintain Sewage Works upon, over, or under the land of another.

1.38 **RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM** (or **RIPDES)** shall mean the Rhode Island system for using, modifying, revoking and re-issuing, terminating, monitoring and enforcing discharge permits and imposing and enforcing pretreatment requirements pursuant to Title 46, Chapter 12 of the General Laws of Rhode Island and the Clean Water Act.

1.39 **SANITARY SEWER** shall mean a conduit that carries liquid and water-carried wastes from residences, commercial buildings, industrial plants, and institutions together with minor quantities of ground water, and surface waters that are not admitted intentionally.

1.40 **SEWAGE** is the used water of a community. Also referred to as "wastewater,"

1.41 **SEWAGE WORKS** shall mean any part of the Town's devices or systems used in the collection, storage, treatment, recycling and reclamation of sewage or industrial wastes of a liquid nature and any conveyances which convey wastewater to a treatment plant (also referred to as Collection System, Public Sanitary Sewer System, Publicly Owned Treatment Works, Public Sewer, Sanitary Sewer, Sewer, Wastewater Facilities, Wastewater Treatment Works).

1.42 **SEWER** shall mean a pipe or conduit that carries wastewater.

1.43 **SHALL** is mandatory.

1.44 **SLUG LOAD OR SLUG DISCHARGE** shall mean any discharge at a flow rate or concentration which could cause a violation of the prohibited discharge standards in Article II of this Ordinance. A Slug Discharge is any discharge of a non-routine, episodic nature including, but not limited to, an accidental spill or a non-customary batch discharge which has a reasonable potential to cause interference of pass-through, or in any other way violates the POTW's regulations, Local Limits or Permit conditions.

1.45 **SUPERINTENDENT** shall mean the Superintendent of Water Pollution Control for the West Warwick Regional Wastewater Treatment Facility or his/her duly authorized deputy, agent, or representative.

1.46 **TOTAL SUSPENDED SOLIDS** (or **SUSPENDED SOLIDS)** shall mean the total suspended matter that floats on the surface of, or is suspended in, water, wastewater, or other liquid, and that is removable by laboratory filtering.

1.47 **TOWN** shall mean the Town of Coventry, Rhode Island or any duly authorized officer, agent, or representative of the Town of Coventry.

1.48 **TOXIC** shall mean any substance listed as toxic under Section 307(a)(1) of the Clean Water Act, as amended, 33 U.S.C. 1251 et. Seq., listed under the Hazardous Substances Right-to-Know Act, R.I.G.S. §28-21-1 et seq., and as may otherwise be designated by the Town.

1.49 **UNPOLLUTED WATER** is water of quality equal to or better than the effluent criteria in effect or water that would not cause violation of receiving water quality standards and would not be benefited by discharge to the sewers and wastewater treatment facilities provided.

1.50 **USER** means any person or entity who discharges or causes or permits the discharge of wastewater into the Town's wastewater facilities.

1.51 **WASTEWATER** shall mean liquid and water-carried industrial wastes and sewage from residential dwellings, commercial buildings, industrial and manufacturing facilities and institutions (whether treated or untreated) which are contributed to the POTW.

1.52 **WASTEWATER FACILITIES** shall mean the structures, equipment, and processes required to collect, transport, and treat domestic and industrial wastes and dispose of the effluent.

1.53 **WASTEWATER TREATMENT WORKS** shall mean an arrangement of devices and structures for treating wastewater, industrial wastes, and sludge. Sometimes used as synonymous with the West Warwick Treatment Facility or "waste treatment plant" or wastewater treatment plant" or "water pollution control plant.

1.54 **WEST WARWICK REGIONAL WASTEWATER TREATMENT FACILITY** (or **WWRWTF**) shall mean the wastewater treatment facility, including an arrangement of devices and structures used for treating wastewater, industrial wastes and sludges, located in West Warwick, RI which was constructed and upgraded to treat wastewater generated in the participating municipalities**.**

ARTICLE II - USE OF PUBLIC SEWERS REQUIRED

2.1 It shall be unlawful for any person to place, deposit, or permit to be placed or deposited in an unsanitary manner on public or private property within the Town of Coventry, or in any area under the jurisdiction of said Town, any human or animal excrement, garbage, or other objectionable waste.

2.2 It shall be unlawful to discharge to any natural outlet within the Town of Coventry, or in any area under the jurisdiction of said Town, any wastewater or other polluted water, except where suitable treatment has been provided in accordance with subsequent provisions of these regulations.

2.3 Except as hereinafter provided, it shall be unlawful for property owners to construct any privy vault, cesspool, septic tank, OWTS, or other facility intended or used for the disposal of wastewater where a public sewer abuts the property line and where permission to enter such sewer can be obtained from the authority having jurisdiction over it.

2.4 The owners of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes, situated within the Town and abutting on any street, alley, or right-of-way in which there is located, a public sewer of the Town, are hereby required at their expense to install suitable toilet facilities therein, and to connect such facilities directly with the proper public sewer in accordance with the provisions of these regulations, within one (1) year after date of receipt of official notice from the Town. Said connections shall be made without exception, unless for reasons as determined by the Town and unless a waiver is granted by the Town Council.

ARTICLE III - ONSITE WASTEWATER TREATMENT SYSTEMS (OWTS)

3.1 When permitted. Where a public sanitary sewer is not accessible and available, the building sewer shall be connected to an OWTS complying with the requirements of the Town and the RIDEM.

3.2 Required approval. Before commencement of construction of an Onsite Wastewater Treatment System, the owner shall first obtain approval from RIDEM. Evidence of such approval shall be filed with the Town.

3.3 Abandoning and filling when public sewer becomes available. When it is determined by the Commission that a public sewer is accessible and available to property served by private sewage disposal means, a direct connection shall be made to the public sewer in accordance with the provisions of this article, and any underground tanks and cesspools shall be cleaned of sludge and filled with clean sand, gravel, or other approved material immediately after connection is made to the public sewer, unless a waiver is granted by the Director of Public Works.

3.4 Operation of Private Disposal Systems. The owner shall operate and maintain private sewage disposal facility or OWTS in a sanitary manner at all times, at no expense to the Town.

3.5 Proper Removal and Disposal. In the maintaining of these OWTS the owner shall be responsible for the proper removal and disposal by the appropriate means of the captured material and shall maintain records of the dates and means of disposal which are subject to review by the Town.

ARTICLE IV - BUILDING SEWERS AND INSTALLATION

4.1 No unauthorized person(s) shall uncover (excavate), make any connections to, or opening into, use, alter, or disturb any public sewer or appurtenance thereof without first obtaining a permit from the Town. Any person proposing a new discharge into the public sewer, a substantial change in the volume or character of pollutants or any change which may affect the potential for a slug discharge into the public sewer shall notify the Town a minimum of ninety (90) days prior to the proposed change or connection. All non-residential users proposing to connect to or to contribute to the POTW shall obtain a permit from the Town before connecting to or contributing to the POTW.

4.2 There shall be two (2) classes of building sewer installation permits: (a) for residential and non-residential service whose sewage flow is less than, or equal to, 10,000 gallons per day; and (b) for service to establishments producing non-residential waste flow or any flow greater than, or equal to, 10,000 gallons per day, In either case, the owner(s) or his/her agent are required to apply, on a form furnished by the Town, for a permit from the Town. The permit application shall be supplemented by plans, specifications, or other information considered pertinent in the judgment of the Town. A permit application fee which shall include all costs associated with the inspection of the building sewer installation shall be paid to the Town at the time the application is filed. Permit application fee shall be levied as adopted from time to time.

4.3 If a building connection from the public sewer to the property has not been provided, all costs and expenses incidental to the installation of the building sewer and connection to the public sewer shall be borne by the owner(s) including the completion of roadway repairs in accordance with the Code of Ordinances of the Town and as determined by the Town. The owner(s) shall indemnify the Town from any loss or damage that may directly or indirectly be occasioned by the installation of the building sewer and the connection to the POTW.

4.4 A separate and independent building sewer shall be provided for every building.

4.5 Existing (old) building sewers may be used in connection with new building construction only when they are tested, examined, and approved by the Director of Public Works, to meet all requirements of the Towns regulations. All expenses relating to such testing and examination shall be the responsibility of the owner/applicant.

4.6 The size, slope, alignment, materials of construction of a building sewer, and the methods to be used in excavating, placing of the pipe, jointing, testing, and backfilling the trench shall conform to the requirements of the Town and the Director of Public Works. At a minimum, all requirements of the Towns Sewer Use Ordinance must be met. In the absence of code provisions or in amplification thereof, the materials and procedures as set forth in appropriate specifications of the American Society of Testing Materials (ASTM) and the Water Environment Federation (WEF) Manual of Practice shall apply.

4.7 Whenever possible, the building sewer may be installed to the building at an elevation below the basement floor. In all buildings in which any building drain is too low to permit gravity flow to the public sewer, the wastewater carried by such building drain shall be pumped by an approved means and discharged to the building sewer.

4.8 No person(s) shall make connection of roof down spouts, foundation drains, areaway drains, or other sources of surface runoff or groundwater, to a building sewer or building drain which in turn is connected directly or indirectly to the public sewer unless such connection is approved by the Director of Public Works and the Superintendent for purposes of disposal of polluted surface drainage.

4.9 The connection of the building sewer to the public sewer shall conform to the requirements of the Town. All such connections shall be made gas tight and water tight and verified by proper testing. Any deviation from the prescribed procedures and materials must be approved by the Director of Public Works before installation.

4.10 The applicant for the building sewer permit shall notify the Director of Public Works when the building sewer is ready for inspection and connection to the public sewer. The connection and testing shall be made under the supervision of the Director of Public Works or his/her representative. All expenses relating to such testing and inspection shall be the responsibility of the owner/applicant.

4.11 Cleanouts shall be installed where the distance from the building to the main sewer is greater than seventy five (75) feet or where bends greater than *22.5* degrees are used in the building sewer. Cleanouts shall be made by installing a "Y" and one-eighth *(1/8)* bends of the same diameter as the building sewer. The cleanouts shall ordinarily be installed at the point of connection between the building sewer and the outside part of the house plumbing system, at curves on the building sewer and on the straight part of the house sewer to the main sewer. The clean out shall be brought up from the building sewer to four (4) inches below ground level and be properly capped. A clean out installed in a paved area or area susceptible to vehicle traffic shall be installed with a cast iron collar and cover. Locations of all cleanouts shall be recorded and provided to the Director of Public Works.

4.12 All excavations for building sewer installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways, and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the Town.

4.13 One backflow valve per building sewer shall be installed prior to connection to the Town's sewer system for all residential dwellings. The quantity of backflow valves necessary for non-residential establishments must be submitted and approved by the Town prior to installation.

4.14 Privately owned sewer collection systems that are physically connected to, and so discharge to, a POTW must comply with Article XIX.

4.15 Low pressure grinder pumps may be permitted. The unit shall consist of a grinder pump, level controls, siphon breaker, check valve and 70 gallon tank. The unit shall be equipped with an electrical quick disconnect plug, a discharge line shut-off valve and a quick disconnect assembly. The alarm/disconnect panel shall contain circuit breakers, an audible and visual alarm transfer switch and generator receptacle. A second check valve shall be provided at the curb stop. Any pump proposed for use is required to be approved by the Town.

ARTICLE V - CONSTRUCTION OF SEWERS BY PRIVATE DEVELOPERS

5.1 Non-residential developments, or residential developments consisting of more than a single dwelling, shall not be approved by the Town of Coventry until the Developer has executed with the Town a permit-agreement as hereinafter provided unless requirement is waived by the Town. Any such permit-agreement shall provide for installation of a sewer system as provided in Article IV and as further provided below:

a. The Developer shall install the lateral sewer in the street and the building sewer from the lateral sewer to the property line. In addition, if the developer is constructing a new dwelling on a parcel, the building sewer shall be extended to connect with the building plumbing. In the case of new street construction, the Developer shall make such installation before surfacing of the street is completed.

b. When an owner of any parcel, or his agent, applies for a building permit, the Building Inspector shall require, as a condition of the issuance of such permit, that said owner or agent show on the plot plan the layout of the future connection from the lateral sewer to the building drain, including the elevation of the building sewer at the street line, elevation of the finished first floor and/or cellar floor, and elevation of the building drain to which the future building sewer would be connected.

c. The Developer shall cap all open ends of the sewer and shall, along with completed as-built plans of the sewer, provide exact ties and elevations so that the capped ends can be readily located.
d. The Town shall approve elevations at each point where the sewers are capped, and the Developer shall design and build the sewer to these elevations. The Town shall provide design capacities for the sewers.

e. Where topography prevents installation of the sewer within the street, the developer shall install the sewer within rights-of-way that shall be of adequate width as determined by the Town and deeded to the Town of Coventry.

f. The Town, in considering the acceptance of a new development for sewer service into the established system of sewers, as hereinbefore defined, shall employ the following as guidelines in determining an acceptable means and/or particular method by which said service may be achieved.

1. When possible, sewer service shall be achieved by gravity means. All proposals will be reviewed by the Town based on the system's capacity to handle additional sewerage and compliance with this Ordinance.

2. If gravity sewer service is not feasible or economical, as determined by the Town, sewer service shall be achieved by extending service to an existing pumping facility within the established system, subject to the Towns normal review process as stated above.

3. If an existing pumping facility is not accessible or feasible under normal engineering standards, as determined by the Town, pressure/force mains with related pumping facilities may be considered by the Town.

a) For new dwellings and/or developments that are inaccessible for gravity sewer service, the Town may consider the acceptance of a pumping facility into the Towns sewer system on a case by case basis. The overall need for such a facility in lieu of other viable options must be proved by the Developer to the satisfaction of the Town prior to the Towns preliminary approval. The pumping facility must be designed and installed under the supervision of an individual licensed as a Registered Professional Engineer in the State of Rhode Island. The work shall be in accordance with the Town standards and shall include all appurtenances necessary to establish a functional and acceptable facility as determined by the Town. Upon preliminary acceptance of a facility, the Town and Developer shall negotiate a permitting agreement whereby the Developer shall pay to the sewer commission, prior to the new system being accepted, a sufficient sum to defray all estimated operational and maintenance costs of the facility for a period of ten (10) years after acceptance. The amount of this payment shall be based on estimates at the time of the proposal as determined and approved by the Town. Said payment shall be in the form of a certified check payable to the Town of Coventry.

b) Proposed pumping facilities servicing new or proposed non-residential developments may be considered for acceptance by the Town. If such pumping facilities are not considered by the Town, the Developer may install a pumping facility, such that the ultimate ownership and operational and maintenance responsibilities of such a facility remain the responsibility of the developer/property owner.

4. If a pumping facility is deemed necessary by the developer and approved by the Town to serve a new development, the Town shall require either that the Developer install said pumping facility and

appurtenant equipment or that the developer pay to the Town of Coventry a sum sufficient to defray the cost of engineering (design, review and inspection), constructing, equipping, and installing said pumping facility. The amount of this payment shall be based on estimates developed by a certified professional engineer registered in the state of Rhode Island and approved by the Town. The payment may be in the form of a certified check payable to the Town of Coventry and such funds shall be used only for the engineering (design, review and inspection), construction, equipping and installation of the pumping facility. This amount is in addition to that designated in Item 3.a above.

5. Upon installation and acceptance by the Town of the pumping facility and appurtenance equipment, the Developer shall deed the site, the facility and equipment to the Town and assign its rights in all warranties and guarantees to the Town. The deed and assignment shall be in a form approved by legal counsel to the Town.

g. If the Developer retains ownership of the pump station and/or collection system, the Developer must comply with Article XIX.

h. The Developer shall be required to include as a part of the capped sewer construction any pipes, pumping stations or other appurtenances which would be required for or would serve areas outside of the development in question, without remediation from the Town.

5.2 A new development for which a permit-agreement is required, as described under subparagraph (5.1) hereof, shall not be approved by the Town until the Developer has submitted a design of the sewers serving said development or has waived the requirement therefore pursuant to subparagraph (5.3) below. Said design shall be prepared by the developer at his expense, shall conform to accepted engineering practices and existing installation requirements, and shall provide for an economical and effective future installation of the sewers. Any rights-of-way called for by such design as approved by the Commission shall be deeded to the Town of Coventry.

5.3 The Town may grant relief from any of the requirements imposed by subparagraph 5.1 above if it determines that the need for the construction or design of sewers is impractical or remote taking into consideration (1) the date upon which the sewers might be connected to the Town wastewater collection system, (2) the estimated cost of construction, and (3) the anticipated need for sewers within the development. Such need shall be determined after consideration of all available information, including any report or evidence submitted by the developer of such proposed development.

5.4 For any development or a portion thereof, with a common sanitary sewer system that is privately owned by an ownership, community or condominium type association or entity and discharges to the Towns POTW, the association or entity of record shall be fully responsible and accountable for the ownership, operation and maintenance of said sanitary sewer system in its entirety, including all regulatory compliance issues related thereto and must comply with Article XIX.

5.5 If a Developer subdivides lots fronting on an existing town road, the Commission may waive the requirement installation of capped sewers serving such lots if it finds such installation to be impracticable, provided that any easements necessary for future sewers installations are dedicated to the Town of Coventry. The Town may by agreement with the Developer provide for immediate or future construction of the capped sewers by the developer as provided herein at their expense. The Town Council is authorized to enter into agreements on behalf of the Town of Coventry with Developers or other owners of land for the engineering (design, review and inspection) and construction of sewers by and at the expense of such

Developers or owners which sewers may become part of the public sewer system under the conditions hereinafter stipulated. The Town Council is empowered to make, from time to time, any necessary regulations stipulating the terms and conditions of said agreement consistent with the provisions of this Ordinance. The conditions under which a permit-agreement may be executed are as follows:

a. The president of the Town Council is authorized to sign on behalf of the Town of Coventry all such agreements when the same have been authorized by said Town Council.

b. The terms and text of an agreement for any particular project under Article V of this Ordinance shall be as approved by the Towns legal counsel.

c. The Town shall specify in the terms of such agreements, or on plans which are made a part thereof, the limits, sizes and grades of the sewers to be built and the nature of and limitations on the waste or liquids to be conveyed. All the terms of and all subsequent amendments to this Ordinance shall be applicable to work done under such agreements.

d. Such agreements shall provide that the full cost of engineering (design, review and inspection), and construction of the sewer and all expenses incidental thereto shall be borne by the Developer or owner who shall, before commencing any work, deposit with the Finance Director of the Town of Coventry a sum deemed by the Town or such engineers as the Town may employ, to be sufficient to defray the cost of preliminary surveys, of the preparation of designs and plans, of other expenses of preliminary engineering, of inspection, supervisory engineering, grade staking, measuring, testing and **all** other expenses of the Town of Coventry incurred prior to or during construction, or during any maintenance period stipulated, including allowances for pension, insurance and similar costs related to payroll. Such agreements shall also provide that, in case said deposit proves to be insufficient at any time during the progress of the work, further deposit shall be made upon notification by the Finance Director of said Town and that, upon acceptance of the sewer, any unspent portion of said deposit shall be returned to the Developer or owner.

e. All such agreements shall provide that the Developer or owner shall assume all risks and hold the Town of Coventry or their agencies harmless from any and all claims for damage arising from the work or its conduct. To secure such risks, adequate liability, property damage and compensation insurance in amounts fixed by the Town shall be required of the Developer or owner who shall furnish proper and acceptable certificates of insurance before starting work.

f. The Town, whenever in its opinion there is possibility of loss by the Town of Coventry by reason of failure of the owner or Developer to complete the work contemplated in the agreement, or any part thereof, or to comply with any maintenance requirements, may require as a part of said agreement that adequate bond or other surety acceptable to the Town of Coventry be submitted to insure completion and maintenance of the work.

g. Such agreements shall require, whenever the work is not in a duly accepted public road, that adequate easements or rights-of-way be conveyed to the Town of Coventry prior to the acceptance of the sewer, the terms of conveyance being subject to the approval of the Towns legal counsel.

h. After certification by the Town or such engineers as the Town may employ, that any sewer constructed under the terms of this Article has been completed in accordance with the plans, specifications, and standards of the Town of Coventry and that the maintenance period fixed in the agreement has expired, and that all roadways, curbs, walks and other surfaces and appurtenances

disturbed by the work have been properly restored, or that adequate security by bond or otherwise has been furnished to assure such restoration, the Town may, by resolution, incorporate said sewer into the Town's wastewater collection system, to become effective as specified in such resolution.

ARTICLE VI - USE OF THE PUBLIC SEWERS

6.1 No person(s) shall discharge or cause to be discharged any unpolluted waters such as storm water, surface water, groundwater, well water, roof runoff, subsurface drainage, swimming pool drainage, condensate, deionized water, or non-contact cooling water to any sewer. Storm water runoff from limited areas, which storm water may be polluted at times, may be discharged to the sanitary sewer only with the permission of the Town.

6.2 Storm water other than that exempted under this Article, and all other unpolluted drainage, shall be discharged to such sewers that are specifically designated as storm sewers or to a natural outlet approved by the Town and other regulatory agencies. Unpolluted cooling water or process waters may be discharged, on approval of the Town, to a storm sewer, or natural outlet.

6.3 No person(s) shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers:

a. Pollutants which create a fire or explosive hazard in the POTW, including but not limited to, waste streams with a closed-cup flashpoint of less than 140°F (60°C) using the test methods specified in 40 CFR 261.21, including any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid, or gas.

b. Any waters containing toxic or poisonous solids, liquids, or gases in sufficient quantity, either singly or by interaction with other wastes, to injure or interface with any waste treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the wastewater treatment plant.

c. Any water or wastes having a pH lower than 6.0 s.u., or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the wastewater facilities.

d. Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the wastewater facilities such as, but not limited to, ashes, bones, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshing's, entrails and paper dishes, cups, milk containers, etc., either whole or ground by garbage grinders.

e. Well Water from residential or non-residential properties. Properties, buildings, or dwellings served by private well will not be permitted to discharge to the sewer collection system, unless a waiver is granted by the Town and a meter, approved by the Town, is installed.

6.4 No person shall discharge or cause to be discharged the following described substances, materials, waters, or wastes if it appears likely in the opinion of the Superintendent that such wastes can harm either the sewers, sewage treatment process, or equipment, have an adverse effect on the receiving stream, or can otherwise endanger life, limb, public property, or constitute a nuisance. In forming his/her opinion as to the acceptability of these wastes, the Town will give consideration to such factors as the quantities of

subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment process, capacity of the sewage treatment plant, degree of treatability of wastes in the sewage treatment plant, and other pertinent factors. The substances prohibited are:

a. Wastewater having a temperature greater than 150°F (65°C), or which will inhibit biological activity in the treatment plant resulting in interference, but in no case, wastewater which causes the temperature at the introduction into the treatment plant to exceed 104°F (40°C).

b. Fats, oils or grease of animal or vegetable origin in concentrations greater than 100 *mg/l.*

c. Any garbage that has not been properly shredded. The installation and operation of any garbage grinder equipped with motor of three-fourths *(3/4)* horsepower (0.76 hp metric) or greater shall be subject to the review and approval of the Town. No non-residential user shall operate a garbage grinder unless specifically approved by the Town and may only be used in conjunction with an in-ground grease interceptor specifically designed to accept such waste.

d. Any waters or wastes containing iron, chromium, copper, zinc, and similar objectionable or toxic substances; or wastes exerting an excessive chlorine requirement, to such degree that any such material received in the composite sewage at the sewage treatment works exceeds the limits established by WWRWTF for such materials.

e. Any waters or wastes containing phenol or other taste or odor producing substances, in such concentrations exceeding limits which may be established by the WWRWTF as necessary, after treatment of the composite sewage to meet the requirements of the State, Federal, or other public agencies with jurisdiction for such discharge to the receiving waters.

f. Wastewater containing any radioactive wastes or isotopes except in compliance with applicable State or Federal regulations.

g. Any waters or wastes having a pH in excess of 10.

h. Materials which exert or cause:

1. Unusual concentration of inert suspended solids (such as, but not limited to, Fullers earth, lime slurries, and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and sodium sulfate).

2. Wastewater which imparts color which cannot be removed by the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions, which consequently imparts color to the treatment plant's effluent, thereby violating West Warwick's RIPDES permit.

3. Unusual BOD, Total Suspended Solids, Total Nitrogen or Total Phosphorus in such quantities as to constitute a significant load on the sewage treatment works. Industrial surcharge requirements will be assessed by the West Warwick Sewer Commission for BOD and Total Suspended Solids greater than 250 mg/l for each parameter. Total Nitrogen in excess of 40 mg/l and Total Phosphorus in excess of 7 mg/l will also be subject to industrial surcharges. Industries exceeding these limitations shall be considered "significant" and shall require permitting by the West Warwick Sewer Commission. Flow reflects each industry's average daily discharge. In the event that

loadings to the WWRWTF approach capacity, the West Warwick Sewer Commission reserves the right to place more stringent limitations on these parameters.

4. Miscellaneous Pollutants Limitations:

a. All permitted industrial facilities shall discharge miscellaneous pollutants only in accordance with the limitations stated in their permits.

b. Facilities subject to these regulations to which permits have not yet been issued shall have, in these permits, permit limitations for miscellaneous pollutants. Permits issued may set limitations that shall not exceed those established in the West Warwick Sewer Use Ordinance.

5. Unusual volume of flow or concentration of wastes constituting a "slug load" as defined herein.

i. Waters or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment process employed, or are amenable to treatment only to such degree that the wastewater treatment works effluent cannot meet the requirements of other agencies having jurisdiction over discharge to the receiving waters.

j. Any noxious or malodorous liquids, gases or solids which either singly or by interaction with other wastes are sufficient to create a public nuisance or hazard to life or are sufficient to prevent entry into the sewers for maintenance and repair.

k. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through.

l. Pollutants which result in the presence of toxic gases, vapors or fumes within the WWRWTF in a quantity that may case acute worker health and safety problems.

m. Trucked or hauled pollutants, except at discharge points designated by the Town.

n. Medical wastes.

o. Detergents, surface-active agents, or other Substances that might cause excessive foaming in the WWRWTF.

6.5 All residential and non-residential users must receive approval from the Town before sewers can be connected to the public sewers.

6.6 If any water or wastes are discharged or are proposed to be discharged to the public sewers, which waters contain the substances or possess the characteristics enumerated in this Article, and which in the judgment of the Superintendent, may have a deleterious effect upon the wastewater facilities, processes, equipment, or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the Superintendent may:

a. Reject the wastes;

b. Require pretreatment to an acceptable condition for discharge to the public sewers;

c. Require control over the quantities and rates of discharge, and/or;
If the Superintendent permits the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the Superintendent and subject to the requirements of all applicable codes, regulations, and laws.

6.7 Grease, oil, and sand interceptors shall be provided when, in the opinion of the Town, they are necessary for the proper handling of liquid wastes containing amounts of grease and oil, or sand; except that such interceptors shall not be required for private living quarters or dwelling units. All such interceptors shall be of a type and capacity approved by the Town, and shall be located as to be readily and easily accessible for cleaning and inspection. In the maintaining of these interceptors, the owner(s) shall be responsible for the proper removal and disposal by appropriate means of the captured material and shall maintain records of the dates, and means of the disposal which are subject to review and approval by the Town. Any removal and handling of the collected materials not performed by owner(s)' personnel must be performed by properly licensed waste disposal firms.
6.8 Where pretreatment or flow-equalizing facilities are provided or required for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner(s) at his/her expense.

6.9 When required by the Town, the owner of any property serviced by a building sewer carrying non-residential wastes shall install a suitable structure together with such necessary meters and other appurtenances in the building sewer to facilitate observations, sampling, and measurement of the wastes. Such structure, when required, shall be accessible and safely located and shall be constructed in accordance with plans approved by the Town. The structure shall be installed by the owner at his/her expense and shall be maintained by him/her so as to be safe and accessible at all times.

The monitoring equipment shall be located and maintained on the user's premises outside of the building. When such a location would be impractical or cause undue hardship on the user, the Town may allow such facility to be constructed in the Public Street or sidewalk area, with the approval of the Town, and located so that it will not be obstructed by public utilities, landscaping, or parked vehicles. When more than one user can discharge into a common sewer, the Town may require installation of separate monitoring equipment for each user.

When there is a significant difference in wastewater constituents and characteristics produced by different operations of a single user, the Town may require that separate monitoring facilities be installed for each separate discharge. Whether constructed on public or private property, the monitoring facilities shall be constructed in accordance with the Towns requirements and all applicable construction standards and specifications.

6.10 All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in these regulations shall be determined in accordance with 40 CFR Part 136. The user must collect wastewater samples using 24-hour flow-proportional composite sampling techniques, unless time-proportional composite sampling or grab sampling is authorized by the Town. Where time-proportional composite sampling or grab sampling is authorized by the Town, the samples must be representative of the discharge. Using protocols (including appropriate preservation) specified in 40 CFR Part 136 and appropriate EPA guidance, multiple grab samples collected during a 24-hour period may be composited prior to the analysis as follows: for cyanide, total phenols and sulfides, the samples may be composited in the laboratory or in the field; for volatile organics and oil and grease, the samples may be composited in the laboratory. Composite samples for other parameters unaffected by the compositing procedures as documented in approved EPA methodologies may be authorized by the Town, as appropriate. In addition, grab samples may be required to show compliance with Instantaneous Limits. Samples for oil and grease,

temperature, pH, cyanide, total phenols, sulfides and volatile organic compounds must be obtained using grab collection techniques. The number of grab samples required will be determined by the Town.

The samples shall be determined at the control manhole provided, or upon suitable samples taken at said control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole to which the public sewer is connected.

ARTICLE VII - PROTECTION FROM DAMAGE

7.1 No person(s) shall maliciously or willfully break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance or equipment which is a part of the wastewater facilities. Any person(s) violating this provision shall be subject to immediate arrest under charge of malicious damage as set forth in the Rhode Island General Laws 1956, as amended.

ARTICLE VIII - POWERS AND AUTHORITY OF INSPECTORS

8.1 The Town and its duly authorized representative(s), bearing proper credentials and identification, shall be permitted to enter all private properties for the purpose of inspection, observation, measurement, sampling, and testing pertinent to discharge to the wastewater facilities in accordance with the provisions of these regulations.

Upon reasonable notice, the Town and their duly authorized representative(s), bearing proper credentials and identification, shall be permitted to enter all non-residential properties for the purpose of inspection, observation, measurement, sampling, and testing pertinent to discharge to the wastewater facilities in accordance with the provisions of these regulations.

Upon reasonable notice, for cause shown, the Town and their duly authorized representative(s), bearing proper credentials and identification, shall be permitted to enter all residential properties for the purpose of inspection, observation, measurement, sampling, and testing pertinent to discharge to the wastewater facilities in accordance with the provisions of these regulations.

8.2 The Town and their duly authorized representative(s) are authorized to obtain information concerning non-residential processes which have a direct bearing on the kind and source of discharge to the wastewater facilities. The information and data on a User obtained from reports, surveys, permit applications, and monitoring programs, and from the Towns inspection and sampling activities, shall be available to the public without restriction, unless the User specifically requests (and is able to demonstrate to the satisfaction of the Town) that the release of such information would divulge information, processes, or methods of production entitled to protection as trade secrets under applicable State law. Any such request must be asserted at the time of submission of the information or data. When requested and demonstrated by the user furnishing a report that such information should be held confidential, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public, but shall be made available immediately upon request to governmental agencies for uses related to the RIPDES Program or Pretreatment Program, and in enforcement proceedings involving the person furnishing the report. Wastewater constituents and characteristics and other effluent data, as defined in 40 CFR 2.302 shall not be recognized as confidential information and shall be made available to the public without restriction.

8.3 The Town and their duly authorized representative(s), bearing proper credentials and identification, shall be permitted to enter all private properties through which the Town holds a duly negotiated easement for the purpose of, but not limited to, inspection, observation, measurement, sampling, repair, and maintenance of any portion of the wastewater facilities lying within said easement. All entry and subsequent work, if any, on said easement, shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property.

The Town and their duly authorized representative(s), bearing proper credentials and identification, shall have the right to enter the premises of any User to determine whether the User is complying with all requirements of this Ordinance and any wastewater discharge permit or order issued hereunder. Users shall allow the Town and their duly authorized representative(s) ready access to all parts of the premises for the purposes of inspection, sampling, records examination and copying, and the performance of any additional duties.

a. Where a User has security measures in force which require proper identification and clearance before entry into its premises, the User shall make necessary arrangements with its security guards so that, upon presentation of suitable identification, the Town and their duly authorized representative(s) shall be permitted to enter without delay for the purposes of performing specific responsibilities.

b. The Town and their duly authorized representative(s) shall have the right to set up on the User's property (or require installation of such devices) as are necessary to conduct sampling and/or metering of the User's operations.

c. The Town and their duly authorized representative(s) may require the User to install monitoring equipment, as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the User at its own expense. All devices used to measure wastewater flow and quality shall be calibrated at least annually to ensure their accuracy.

d. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the User at the written or verbal request of the Town, and shall not be replaced. The costs of clearing such access shall be borne by the User.

e. Unreasonable delays in allowing the Town and their duly authorized representative(s) access to the User's premises shall be a violation of this Ordinance. If the Town and their duly authorized representative(s) have been refused access to a building, structure or property, or any part thereof, and is able to demonstrate probable cause to believe that there may be a violation of this Ordinance, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program of the Town designed to verify compliance with this Ordinance or any permit or order issued hereunder, or to protect the overall public health, safety and welfare of the community, the Town may seek issuance of a search warrant.

ARTICLE IX - PENALTIES

9.1 When the Town finds that User has violated, or continues to violate, any provision of this Ordinance, a permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, the Town may serve upon that User a written Notice of Violation. Within thirty (30) days of the receipt of such notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted by the User to the Town. Submission of such a plan in no way

relieves the User of liability for any violations occurring before or after receipt of the Notice of Violation. Nothing in this section shall limit the authority of the Town to take any action, including emergency actions or any other enforcement action, without first issuing a Notice of Violation.

9.2 Consent Orders: The Town may enter into Consent Orders, assurances of compliance or other similar documents establishing an agreement with any User responsible for non-compliance. Such documents shall include specific actions to be taken by the User to correct the non-compliance within a time period specified by the document. Such documents shall have the same force and effect as the administrative and shall be judicially enforceable.

9.3 Show-Cause Hearing: The Town may order a User which has violated, or continues to violate, any provision of this Ordinance, permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, to appear before the Town and show cause why the proposed enforcement action should not be taken. Notice shall be served on the User specifying the time and place for the meeting, the proposed enforcement action, the reasons for such action, and a request that the User show cause why the proposed enforcement action should not be taken. The notice of the meeting shall be served personally or by registered or certified mail (return receipt requested) at least five (5) days prior to the Hearing. Such notice may be served on any authorized representative of the User. A Show-Cause Hearing shall not be a bar against, or prerequisite for, taking any other action against the User.

9.4 Compliance Orders: When the Town finds that a User has violated, or continues to violate, any provision of this Ordinance, permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, the Town may issue an order to the User responsible for the discharge directing that the Use come into compliance within a specified time. If the User does not come into compliance within the time provided, sewer service may be discontinued unless adequate treatment facilities, devices, or other related appurtenances are installed and properly operated. Compliance orders also may contain other requirements to address the non-compliance, including additional self-monitoring and management practices designed to minimize the amount of pollutants discharged to the sewer. A Compliance Order may not extend the deadline for compliance established for Pretreatment Standard or Requirement, nor does a Compliance Order relieve the User of liability for any violation, including any continuing violation. Issuance of a Compliance Order shall not be a bar against, or prerequisite for, taking any other action against the User.

9.5 Cease and Desist Orders: When the Town finds that a User has violated, or continues to violate, any provision of this Ordinance, permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, or that the User's past violations are likely to recur, the Town may issue an order to the User directing it to cease and desist all such violations and directing the User to:

a. Immediately comply with all requirements; and

b. Take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation, including halting operations and/or terminating the discharge. Issuance of a Cease and Desist Order shall not be a bar against, or prerequisite for, taking any other action against the User.

9.6 Administrative Fees:

a. When the Town finds that a User has violated, or continues to violate, any provision of this Ordinance, permit, or order issued hereunder, or any other Pretreatment Standard or Requirement,

the Town may fine such User an amount not to exceed $25,000. Such fines shall be assessed on a per-violation, per-day basis. In the case of monthly or other long-term average discharge limits, fines shall be assessed for each day during the period of violation.

b. A lien against the User's property shall be sought for unpaid charges, fines and penalties.

c. Users desiring to dispute such fines must file a written request for the Town to reconsider the fine along with full payment of the fine amount within fifteen (15) days of being notified of the fine. Where a request has merit, the town may convene a hearing on the matter. In the event the User's appeal is successful, the payment, together with any interest accruing thereto, shall be returned to the User. The Town may add the costs of preparing administrative enforcement actions, such as notices and orders, to the fine.

d. Issuance of any administrative fine shall not be a bar against, or prerequisite for, taking any other action against the User.

9.7 Emergency Suspensions: The Town may immediately suspend a User's discharge, after informal notice to the User, whenever such suspension is necessary to stop an actual or threatened discharge, which reasonably appears to present, or cause, an imminent or substantial endangerment to the health or welfare of persons. The Town may also immediately suspend a User's discharge, after notice and opportunity respond, that threatens to interfere with the operation of the POTW, or which presents, or may present, an endangerment to the environment.

a. Any User notified of a suspension of its discharge shall immediately stop or eliminate its contribution. I n the event of a User's failure to immediately comply voluntarily with the suspension order, the Town may take such steps as deemed necessary, including immediate severance of the sewer connection, to prevent or minimize damage to the POTW, its receiving stream, or endangerment to any individuals. The Town may allow the User to recommence its discharge when the User has demonstrated to the satisfaction of the Town that the period of endangerment has passed, unless the termination proceedings of this Ordinance are initiated against the User.

b. A User that is responsible, in whole or in part, for any discharge presenting imminent endangerment shall submit a detailed written statement describing the causes of the harmful contribution and the measures taken to prevent any future occurrence to the Town prior to the date of any Show-Cause or Termination Hearing. Nothing in this section shall be interpreted as requiring a hearing prior to any Emergency Suspension under this section.

9.8 Termination of Discharge: Any User who violates this Ordinance, or the following conditions, is subject to discharge termination.

a. Violation of permit conditions;

b. Failure to accurately report the wastewater constituents and characteristics of its discharge;

c. Failure to report significant changes in operations or wastewater volume, constituents and characteristics prior to discharge;

d. Refusal of reasonable access to the User's premises for the purpose of inspection, monitoring, or sampling; or

e. Violation of the Pretreatment Standards. Such User will be notified of the proposed termination of its discharge and be offered an opportunity to show cause under Article 8.1.1 of this Ordinance why the proposed action should not be taken. Exercise of this option by the Town shall not be a bar against, or prerequisite for, taking any other action against the User.

9.9 If the violation is not corrected by timely compliance, the Town may order any person who causes or allows an unauthorized discharge to show cause before the Town why service should not be terminated. A notice shall be served on the offending party, specifying the time and place of a hearing to be held by the Town Council regarding the violation and directing the offending party to show cause before said authority why an order should not be made directing the termination of service. The notice of the hearing shall be served personally or by registered or certified mail (return receipt requested) at least ten (10) days before the hearing. Notice may be made on any agent or officer of a corporation.

9.10 The Town may conduct the hearing and take the evidence, or may designate any of its members or any officer or employee of the Town to:

a. Issue in the name of the Town Council notices of hearings requesting the attendance and testimony of witnesses and the production of evidence relevant to any matter involved in any such hearings.

b. Take the evidence.

c. Transmit a report of the evidence and hearing, including transcripts and other evidence, together with recommendations to the Town for action thereon.

9.11 At any public hearing, testimony taken before the hearing authority or any person designated by it must be under oath and recorded steno graphically. The transcript or any part of the hearing, so recorded, will be made available to any member of the public upon payment of the usual charges.

9.12 After the Town has reviewed the evidence, it may issue an order to the party responsible for the discharge directing that, following a specified time period, the sewer service be discontinued unless adequate treatment facilities, devices or other related appurtenances shall have been installed or existing treatment facilities, devices, or other related appurtenances are properly operated, and such further orders and directives as are necessary and appropriate.

9.13 Any discharge in violation of the substantive provisions of this Ordinance or an order of the Town shall be considered a public nuisance. If any person discharges sewage, non-residential waste or other wastes into the public sewer contrary to the substantive provisions of this Ordinance or any order of the Town, the Town Solicitor may commence an action for appropriate legal and/or equitable relief in the appropriate court.

9.14 The Town will publish an annual list of violators.

9.15 Any person who is found to have violated an Order of the Town who willfully or negligently failed to comply with any provisions of this Ordinance, and the orders, rules, and regulations issued hereunder, shall be fined not less than one hundred dollars ($100) nor more than twenty five thousand dollars ($25,000) for each offense. Each day on which a violation shall occur or continue shall be deemed a separate and distinct offense. In addition to the penalties provided herein, the Town may recover reasonable attorneys' fees, court costs, court reporters' fees, administrative fees, and other expenses of litigation by appropriate

suit of law against the person found to have violated this Ordinance or the Orders, rules and regulations issued hereunder.

ARTICLE X - ENFORCEMENT PROCEDURES

10.1 General. Any owner, person, or user, found in violation of any part of this Ordinance, discharge permit, compliance schedule or order, or any order of the Town shall be subject to enforcement procedures. Such procedures shall include but are not limited to: revocation of permit, suspension of discharge, show cause hearing, Commission Order, legal action and/or penalty costs.

10.2 Compliance Schedule. When the Town finds that a user has violated or continues to violate the Ordinance, permit, or Order issued thereunder, he may issue an Order to the user responsible for the discharge directing that, following a specified time period, sewer service shall be discontinued unless adequate pretreatment facilities, devices, or other related appurtenances have been installed and are properly operated. Orders may also contain such other requirements as might be reasonably necessary and appropriate to address the noncompliance, including installation of pretreatment technology, addition self-monitoring and management practices.

10.3 Permit Revocation,

a. Enforcement Costs. The permittee agrees to reimburse the Town and/or the West Warwick Sewer Commission for the cost of enforcing the permit, including reasonable attorney's fees, if violation of the permit is found by a hearing officer during the course of a show cause hearing or if such decision is appealed, then in court of competent jurisdiction.

b. Damage to Facilities. The permittee agrees to indemnify and hold harmless the Town from and against any liability, loss, cost, expense or actual damage (including reasonable attorney's and accountants' fees incurred in defending or prosecuting any claim for any such liability, loss, cost, expense or damage) suffered by the Town and/or the West Warwick Sewer Commission and caused by discharges from the permittee, either singly or by interaction with other wastes.

c. Violation of any of the following conditions may result in the revocation of a Wastewater Discharge Permit.

1. Failure to accurately and fully report the wastewater volume, constituents, and characteristics of its discharge,

2. Failure to report significant changes in wastewater volume, constituents, or characteristics,

3. Failure to allow Town personnel statutorily authorized access for the purpose of inspection or monitoring,

4. Failure to pay any and all costs,

5. Violation of any condition of a permit or the Ordinance,

6. Failure to correct violations that have already resulted in the suspension of the permit.

7. Failure to adhere to compliance schedule or Order.

10.4 Suspension of Discharge. For of non-residential users the Town or the West Warwick Sewer Commission, may suspend the wastewater service and/or a Wastewater Discharge Permit when such suspension is necessary, in the opinion of the Town or such Commission, in order to stop an actual or threatened discharge which presents or may present an imminent or substantial endangerment to the health or welfare or persons, to the environment or causes interference or pass through to the Collection System or Wastewater Treatment System.

a. Any person notified of a suspension of the wastewater treatment service and/or permit shall immediately stop or eliminate the contribution. In the event of a failure of the person to comply voluntarily with the suspension order, the Town shall take such steps as deemed necessary including immediate severance of the sewer connection, to prevent or minimize damage to the system or endangerment to any individuals. The Town shall reinstate the wastewater treatment service and/or permit upon proof of the elimination of the non-complying discharge. A detailed written statement submitted by the user describing the causes of the harmful contribution and the measures taken to prevent any further occurrence shall be submitted to the Town within 15 days of the date of occurrence.

10.5 Show Cause Hearing.

a. If a violation is not corrected within the time frame mandated by the Town, the Town may order any person who causes or allow an unauthorized discharge to show cause before the Town why service should not be terminated. A notice shall be served on the offending party, specifying the time and place of a hearing to be held by the Town regarding the violation and directing the offending party to show cause before said authority why an order should not be made directing the termination of service. The notice of the hearing shall be served personally or by registered or certified mail (return receipt requested) at least (10) days before the hearing. Service may be made on any agent or officer of a corporation.

b. At any public hearing, testimony taken before the hearing authority, or any person designated by it, must be under oath and recorded steno graphically. The transcript, so recorded, will be made available to any member of the public or any part of the hearing upon payment of the usual charges.

c. After the Town had reviewed the evidence, it may issue an order to the party responsible for the discharge directing that, following a specified time period, the sewer service be discontinued unless adequate treatment facilities, devices or other related appurtenances shall have been installed or existing treatment facilities, devices, or other related appurtenances are properly operated, and such further orders and directives as are necessary and appropriate.

10.6 Legal Action. Any discharge in violation of the substantive provisions of this Ordinance or an Order of the Commission shall be considered a public nuisance. If any person discharges sewage, industrial wastes or other wastes into the Town collection system contrary to the substantive provision of this Ordinance or any Order of the Commission, the Town Solicitor shall commence an action for appropriate legal and/or equitable relief in the Superior Court of this County.

10.7 Penalty Costs. Any person who is found to have violated an Order of the Town, who has failed to comply with any provision of this Ordinance, permit, or Order issued by the Town, shall be fined in accordance with this Ordinance. In addition, the Town may recover reasonable attorneys' fees, court costs,

court reporters' fees, administrative fees, and other expenses of litigation by appropriate suit at law against the person found to have violated this Ordinance, permit, or Order issued by the Town.

ARTICLE XI - APPEALS

11.1 Board of Sewer Appeals. In order that the provisions of this article may be reasonably applied and substantial justice done in instances where unnecessary hardship would result from carrying out the strict letter of this article, the Town Council shall establish a Board of Sewer Appeals. The Board of Sewer Appeals shall consider appeals from decisions of the Board of Sewer Commissioners and shall determine in particular cases whether any deviation from the strict enforcement of this article will violate its intent or jeopardize the public health and safety.

11.2 Procedure. Any person aggrieved by any decision of the Town shall, in addition to any other remedy provided by law, have the right to appeal to the Board of Sewer Appeals within thirty (30) days of the decision appealed from. The Board of Sewer Appeals shall consider the appeal and give the aggrieved person a reasonable opportunity to be heard. The final disposition of the appeal shall be in the form of a resolution reversing, modifying or affirming, the decision appealed from.

ARTICLE XII - SAVING CLAUSE

12.1 If any provision, paragraph, word, section or article of this Ordinance is invalidated by any court or competent jurisdiction, the remaining provisions, paragraphs, words, sections, and articles shall not be affected and shall continue in full force and effect.

ARTICLE XIII - CONFLICT

13.1 All ordinances and parts of ordinances inconsistent or conflicting with any part of this Ordinance are hereby repealed to the extent of such inconsistency or conflict.

ARTICLE XIV - ASSESSMENT

The following procedures have been established in order to recover the cost of sewage works, including but not limited to treatment facilities, planning, design, constructing, managing, operating, and maintaining the wastewater treatment and collection systems. These costs shall be recovered by the collection of assessments. Assessments are subject to change as the associated costs change.

14.1 The Town Council shall, by Ordinance amendment, adopt an assessment charge for real property (improved and unimproved) from time to time. The assessment charges shall be used for the purpose of recovering capital cost of the Town's Sewage Works, including but not limited to, and all or such portion of the Town's share of the capital cost of the WWRWTF against residential and non-residential properties. The assessment charges will be based upon a unit rate per gallon of daily design flow as follows:

14.1.1 Residential Dwelling Rate ($) _____ / Gallon per Day (GPD)
14.1.2 Non-residential Rate ($) _____ / Gallon per Day (GPD)

The unit rates shall be established by the Town Council and shall be available to the public.

14.2 Notwithstanding the foregoing, the Town shall have discretion to defer sewer assessment against parcels of land if the owner of such parcel, within ten (10) years of the date of the sewer assessment, has installed a new septic system, provided that such parcel shall remain subject to assessment and shall begin paying such assessment within ten (10) years from the date of OWTS conformance certified by RIDEM.

14.3 Parcels of real property (improved and unimproved) which are not included in a specific sewered district not yet connected to the POTW, but which, in the future, may connect into the POTW will be charged a sewer assessment, upon connection to said POTW, as outlined in this Article.

14.4 The assessments are as follows:

a. Residential Assessments:

Minimum Assessment: 2 (BR) x 115 GPD/BR x Residential Rate/GPD

Residential Dwellings: #Bedrooms (BR) x 115 GPD/BR x Residential Rate/GPD

Mobile Homes: #Bedrooms (BR) x 115 GPD/BR x Residential Rate/GPD

Residential assessments are limited to properties described as “residential” property with residential use within the Towns property records. All other properties are subject to non-residential assessments, including Multi-unit residential properties with seven (7) or more bedrooms.

b. Non-Residential Assessments:

Minimum Assessment:
200 GPD x Non-Residential Rate/GPD

All Non-Residential Properties with design flows between 0-6000 GPD
Daily Design Flow (GPD) x Non-Residential Rate/GPD

All Other Non-Residential Properties with design flows greater than 6000 GPD:
6000 (GPD) x Non-Residential Rate/GPD + (each gallon over 6000 GPD x 0.70 x Non-Residential Rate/GPD)

The residential assessment shall be based upon a unit rate ($)/daily design flow (GPD), where the daily design flow (GPD) values are established by RIDEM regulations. Each residential assessment will be a minimum assessment per bedroom of 115 GPD, with a minimum 2-bedroom (230 GPD) assessment per property.
The non-residential assessment shall be based upon a unit rate ($)/daily design flow (GPD) for flows below 6,000 GPD. Where the daily design flow (GPD) exceeds 6,000 GPD, a reduced rate ($)/GPD will apply to each additional gallon of daily design flow over 6,000 GPD. All daily design flows are established by RIDEM regulations. All assessments will be in accordance with Article 14.

For example, using a residential rate of $43.48/GPD and a non-residential rate of $80.00/GPD,

A 3-bedroom residential dwelling using 115 GPD/bedroom will translate to:

3 x 115 GPD x $43.48/GPD = $15,000.60

A non-residential facility using 6000 GPD will translate to:
6000 GPD x $80.00/GPD = $480,000.00

A non-residential facility using 7000 GPD will translate to:
6000 GPD x $80.00/GPD + (1000 GPD x 0.70 x $80.00/GPD) = $536,000.00

c. Vacant land shall be assessed and subject to the minimum assessments indicated in this Section. The Town Council may defer assessment charges for vacant land that is restricted and considered undevelopable if, supporting documentation is submitted proving such restriction, and that assessment charges be paid when such property is available for development, and provided a municipal lien be placed upon the property at the time of initial assessment for the initial assessment amount.

14.5 Assessments for real property located outside of the Towns boundaries requesting connection to the POTW shall be subject to assessments indicated in Section 14.4 and 14.7. The parcel owner applying to connect to the POTW shall furnish a bond, at the owner's expense, with surety to the Town of Coventry, on the form furnished by said Town, with the application to connect to Towns sewer system. Assessment charges shall be paid in full prior to connecting to the POTW.

14.6 Assessments for Privately-Built Sewers on Private Property. Notwithstanding any other provisions of this Ordinance, it is hereby determined that sanitary sewer lines built on private property by, and at the expense of, a private party shall be subject to assessments indicated in Section 14.4.

14.7 BETTERMENT ASSESSMENTS shall apply to Assessments for properties serviced by public sewers, which are privately-built, on Public Property and to all properties that propose a change in use, or an increase in daily flow (GPD), after the initial assessment date. Properties that propose a change in use, or an increase in daily flow (GPD) after the initial assessment date, are subject to both initial Assessment and Betterment Assessments.

a. Assessments for Privately-Built Sewers on Public Property. Notwithstanding any other provisions of this Ordinance, it is hereby determined that a public sanitary sewer line built by and at the expense of a private party within an existing or proposed public highway or public right-of-way, in which sanitary sewer is to become the property of the Town, and connected to the POTW, the following Betterment Assessments shall apply.

1. Residential Betterment Assessments:

Minimum Assessment:
2 (BR) x 115 GPD/BR x 0.25 Residential Rate/GPD

Residential Dwellings:
#Bedrooms (BR) x 115 GPD/BR x 0.25 Residential rate/GPD

Mobile Homes:
#Bedrooms (BR) x 115 GPD/BR x 0.25 Residential Rate/GPD

2. Non-Residential Betterment Assessments:

Minimum Assessment:
200 GPD x 0.25 Non-Residential Rate/GPD

All Non-Residential Properties with design flows between 0-6000 GPD (Gallons per Day):
Daily Design Flow (GPD) x 0.25 Non-Residential Rate/GPD

All Other Non-Residential Properties with design flows greater than 6000 GPD (Gallons per Day):
6000 (GPD) x 0.25 Non-Residential Rate/GPD +
(each gallon over 6000 GPD x 0.175 x Non-Residential Rate/GPD)

b. All properties that propose a change in use, or an increase in daily flow, after the initial assessment date shall be subject to a Betterment Assessment as specified in Section 14.7.

c. . Betterment Assessments for all properties that propose a change in use, or an increase in daily flow, after the initial assessment date will be billed as a secondary assessment, in addition to the initial assessment, and shall be based upon the increased flow volume (GPD) only.

14.8 Assessments outlined in 14.7 shall be payable by the parcel owner annually over not more than twenty (20) years, commencing the year following sewer installation, unless otherwise specified. Interest on the unpaid balance shall be six percent (6%), such same rate to apply until the assessment is paid in full. Any assessment may be paid in full at any time. Unpaid assessments shall be liened and foreclosed upon in accordance with the general statutes governing the collection of taxes. Assessments for parcels outside of the Towns boundaries shall be paid in full by the parcel owner prior to connecting to the POTW.

14.9 Sewer Pumps

a. If it is necessary for the property owner to install a grinder pump for an existing property, that is located along the Town's Low Pressure Sewer (LPS), the Town will credit, the residential property assessment charge in the amount of Five Thousand Dollars ($5,000.00), and the non-residential property assessment charge in the amount of Nine Thousand Dollars ($9000.00). If it is necessary to install a grinder pump for an existing residential dwelling that is located in a low lying area along the Towns gravity sewer system the Town will credit the residential assessment charge for that property by the amount of Five Thousand Dollars ($5,000.00). The property owner or agent shall submit a plan proving to the Town, that the property is too low to connect to the Towns gravity system by conventional gravity means. The plan shall identify, at a minimum, the future connection from the lateral sewer to the building, including the elevation of the building sewer at the street line, elevation of the finished first floor, elevation of the top of foundation, elevation of the basement floor, and elevation of the building drain to which the building sewer would be connected. The owner of any parcel requiring a pump will be responsible for the cost of furnishing, installing, operating, maintaining, and servicing any pump that may be required. Any pump proposed for use is required to be approved by the Town. The Town will not provide a pump for any parcel of property.

14.10 Future Sewer users shall be notified by public posting, advertisement, or mail that the users' property will have access to the public sewer use and that such property will be subject to assessment. Future sewer users shall also be notified by public posting, advertisement, or mail when project construction is scheduled to begin and when the public sewer is available to the user for connection. But nothing herein shall be construed to diminish the Town's right to collect or the user's obligation to pay any sewer assessment.

14.11 Assessments collected in excess of the bond indebtedness shall be retained in the Town's Sewer Fund to be used for capital improvements projects. The funds within the Sewer Fund shall be retained in an account for renewal and replacement of capital equipment and/or the reduction of existing and future debt repayment. All assessed funds shall be held in a special revenue account ("Town of Coventry Sewer Fund") under the custody of the Finance Director, Town of Coventry. This fund shall be designated for use by the Town of Coventry for sewer related purposes.

ARTICLE XV - USE CHARGE

15.1 The following annual charges for use of the sewerage system of the Town of Coventry are hereby established, to be paid by every person, firm or corporation whose particular sewer enters into said system.

a. The cost of operation and maintenance of the complete sewer system shall be financed solely from sewer customer charges.

b. A sewer charge shall be levied to each user upon connection to the public sewage system. The service charge shall be based upon the quantity of water used at the premises of the user as measured by the water meter in use thereat, except as otherwise hereinafter provided.

c. For residential and non-residential users, the rates and charges for each billing period shall be determined by each user's annual water use, or design flow (GPD), for that period. The usage rates, charges and fees shall be established from time to time by Town Council Resolution. Assessments shall be established by Ordinance only, per Article XIV. The Council may establish a minimum amount per billing period which all users must pay for which a maximum contribution of wastewater is allowed. The minimum amount per billing period shall be equal to fifty percent (50%) of the design flow (GPD) for that period multiplied by the current rate charges when meter readings from Kent County Water Authority are not available. When meter readings become available, the usage bill for the following period will be adjusted in accordance with section 15d.

d. Property supplied with water service from the Kent County Water Authority shall be subject to wastewater usage charges based upon eighty percent (80%) of the water meter reading as determined by the Kent County Water Authority. Property without service from Kent County Water Authority shall be subject to usage charges of one hundred percent (100%) of the design flow (GPD) unless a Town approved meter is installed and readings are provided to, and verified by, the Town. Meter verification is subject to a minimum charge established by the Town and the Director of Public Works.

e. Non-residential users exceeding the limits set forth herein for BOD and Total Suspended Solids, Total Nitrogen and Total Phosphorus concentrations shall be surcharged with rates established by the West Warwick Sewer Commission.

f. In the event a lot, parcel of land, building or premises discharging sanitary sewage or other liquids into the Town sewage system either directly or indirectly, is not a user of water in the whole supplied by public or private water utility, then, in each such case the consumption shall be set at one hundred percent (100%) of the design flow unless a Town approved meter is installed and readings are provided to, and verified by, the Town. Meter verification is subject to a minimum charge established by the Town and the Director of Public Works. The Town must be notified if and when a property has water service from a well.

g. In the event two or more lots, parcels of real estate residences, dwelling units or buildings discharging sanitary sewage water or other liquids into the sanitary sewage system of the Town are users of water and the quantity of water is measured by a single water meter, then, in each case for billing purposes, the minimum charge for the sewer rates and charges shall be multiplied by the number of lots, parcels or real estate, residences, dwelling units, or buildings served through the single water meter.

h. Charges for the sewage disposal service shall be billed and collected by the Town.

i. Outside Meters: In the event water is used for purposes which do not enter the Town sewage system, including but not limited to water used in pools and sprinkler systems, the owner of such premises may, at his own expense, install such meter as shall be approved by the town and the Director of Public Works for the measurement of water so used in order that a proper allowance may be made, and the sewage service charge reduced accordingly. The Town and the Director of Public Works may set policies and procedures for documentation of outside water usage.

j. The rates and charges may be billed to the tenant or tenants occupying the property serviced, but such billing shall in no way relieve the owner or owners from liability in the event payment is not made as herein required. The owners of property served which are occupied by tenants shall have the right to examine the collection records of the Town for the purpose of determining whether such rates and charges have been paid by such tenants, provided that such examination shall be made at the office in which the records are kept and during the regular business hours of such office.

k. Each charge or service fee levied pursuant to this Ordinance is hereby made a lien upon the corresponding lot, land or premises served by the connection to the sanitary sewage system of the Town. Failure to pay said charge or service fee within the prescribed period of time, such charge or fee shall then be collected as other Town taxes are collected. The official record of the Town shall constitute notice of penalty and of said lien as herein provided.
l. All money collected under the provisions of the Ordinance shall be deposited in a sewage enterprise fund and expenditures from which are to be made only for maintenance, operation, administration, debt service and other related sewage system expenses.

m. The Town, in addition to the other remedies provided by this Ordinance, may institute legal proceedings to collect overdue sewer service charges. Penalties may be added to the original sewer bill for late payment which penalties shall be set by Town Council resolution.

ARTICLE XVI - CHANGES IN THESE REGULATIONS

16.1 These regulations may be rescinded or modified or added to by the Town Council at any time when, in their opinion, such action is for the best interests of the Town of Coventry.

ARTICLE XVII - CONSTRUCTION BY LICENSED DRAIN LAYER ONLY

17.1 Construction of all sewer connections within the Town shall be performed only by drain layers who are licensed in the Town of Coventry and who shall furnish a bond with surety to the Town of Coventry on the form furnished by said Town.

ARTICLE XVIII - LOW PRESSURE SEWERS

18.1 In areas where the Town determines that the expansion of the sewer system through use of gravity sewer lines is impracticable, the Town may authorize the construction of sewer lines which can be used only by means of pressure pumps on the property of individual users. Such lines shall be called low pressure sewers (LPS). Any property along a LPS shall be subject to assessment charges in accordance with Article XIV.

a. Any person who applies for connection to a LPS shall be required to obtain approval from the Town for any pump(s) to be used by that person necessary for connection to the LPS prior to installation. Any pump proposed for use is required to be approved by the Town.

ARTICLE XIX - PRIVATELY OWNED WASTEWATER FACILITIES

19.1 Owners of privately owned wastewater facilities shall maintain the system in good working order and operate as efficiently as possible. Proper operation and maintenance shall include, but not be limited to, effective performance based on facility design, adequate operator staffing and training and adequate laboratory and process controls, including quality assurance procedures as determined to be appropriate by the Town and backup or auxiliary facilities or similar systems to assure compliance or effective performance. Proper operation and maintenance must include emergency procedures and reporting requirements in case of power outages, natural disaster, labor shortage (whether the result of intentional work stoppages or epidemic), equipment failure, acts of terrorism/vandalism or sanitary sewer overflow. Reporting requirements shall include verbal notification to the Director of Public Works and the RIDEM as soon as possible, but not exceeding twenty-four (24) hours of discovery of the event; a written report must be submitted to the Director of Public Works and RIDEM not more than five (5) business days of the event's ending.

19.2 The Owner shall submit (for review and approval by the Town) an Operations and Maintenance Plan describing standards, procedures, and emergency procedures by which the wastewater treatment facility will be staffed, operated and maintained during normal and emergency conditions. Should development of the plan include the practice of engineering, the plan must then be prepared and certified by a Registered Professional Engineer registered in the State of Rhode Island.

19.3 The Owner of a new wastewater treatment facility shall submit an Operations and Maintenance Plan to the Town for review and approval prior to commencement of the construction of the new wastewater treatment facility.

19.4 The Owner of an existing wastewater treatment facility, without an approved plan, must submit to the Town a plan and specifications, for approval by the Town, to comply with the requirements herein within six (6) months of the promulgation of this Ordinance. The contents of the plan shall include, at a minimum, the following:

a. Description and schematics of the entire Wastewater Treatment Facility. This description and schematic must include:

TOWN OF COVENTRY

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

ORDINANCE NO. 05-09-275

REGULATIONS GOVERNING THE USE OF PUBLIC AND PRIVATE SEWERS AND DRAINS, PRIVATE SEWAGE DISPOSAL, THE INSTALLATION AND CONNECTION OF BUILDING SEWERS, AND THE DISCHARGE OF WATERS AND WASTE INTO THE PUBLIC SEWER SYSTEM; AND PROVIDING PENALTIES FOR VIOLATIONS THEREOF; IN THE TOWN OF COVENTRY, STATE OF RHODE ISLAND, AND PROVIDENCE PLANTATIONS.

Be it ordained and enacted by the Town Council of the Town of Coventry, State of Rhode Island, as follows:

ARTICLE I - DEFINITIONS

Unless the context specifically indicates otherwise, the meaning of those terms used in these regulations shall be as follows:

1.1 **ACT** (or **THE ACT**) shall mean the Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C., 1251, et. Seq.

1.2 **BEST MANAGEMENT PRACTICES** (or **BMPs**) shall mean schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to implement the prohibitions listed in Sections 2.1A and 2.1B 40 CFR 403.5(a)(1) and (b). BMPs include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage, alternative means (i.e., management plans) of complying with, or in place of, certain established pretreatment standards and effluent limits.

1.3 **BOD** (denoting Biochemical Oxygen Demand) shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20°C, expressed in milligrams per liter.

1.4 **BUILDING DRAIN** shall mean that part of the lowest piping of a drainage system which receives the discharge from waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer, ending five (5) feet outside the inner face of the building wall.

1.5 **BUILDING SEWER** shall mean the extension from the building to the public sewer or other place of disposal; also called house connection, and is generally a 6-inch pipe.

1.6 **COLLECTION SYSTEM** shall mean the equipment, structures and processes used for the collection, transportation and pumping of sewage.

1.7 **COMMISSION** shall mean the Board of Sewer Commissioners of the Town, if any, appointed pursuant to the Public Laws of Rhode Island, as amended. In the event that there is no such Board of Sewer Commissioners, functions assigned to it hereunder shall be performed by the

Town Council. For the avoidance of doubt, the advisory sewer subcommittee of the Town is not the Board of Sewer Commissioners unless the Town Council otherwise expressly provides pursuant to a Resolution or by Ordinance.

1.8 **DEVELOPER** shall mean an individual or group of individuals who are responsible for bringing a project through the development review process and the infrastructure construction to create a new developable lot(s) or area. If the developer is not the owner, they must submit evidence that he/she is acting on behalf of the owner.

1.9 **DIRECTOR OF PUBLIC WORKS** shall mean the Director of Public Works for the Town of Coventry or his/her duly appointed deputy agent or representative.

1.10 **DWELLING UNIT** shall mean a house, an apartment, a group of rooms, or a single room occupied or intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants have either:

a. Direct access from the outside of the building or through a common hall, or
b. Complete kitchen facilities for the exclusive use of the occupants.

1.11 **EASEMENT** shall mean an acquired legal right for the specific use of land owned by others.

1.12 **EDU**, for assessment purposes, shall be defined as an "equivalent dwelling unit" whose wastewater flow is equal to 345 gallons per day. The basis by which projected daily wastewater flows will be determined are based upon current RIDEM-published Onsite Wastewater Treatment Systems (OWTS) values per establishment. For wastewater flow volumes not stated in the OWTS Regulations, standard engineering values will be used.

1.13 **FLOATABLE OIL** is oil, fat, or grease in a physical state such that it will separate by gravity from wastewater by treatment in an approved pre-treatment facility. A wastewater shall be considered free of floatable oil if it is properly pretreated and the wastewater does not interfere with the collection system.

1.14 **GARBAGE** shall mean the animal and vegetable waste resulting from the handling, preparation, cooking, and serving of foods.

1.15 **INDUSTRIAL WASTES** shall mean the wastewater from industrial processes, trades, or business as distinct from domestic (sanitary) wastes.

1.16 **INFECTIOUS WASTE** shall mean waste which contains pathogens with sufficient virulence and quantity so that exposure to the waste by a susceptible hose could result in disease. Under this definition, the normal microflors of the body are not classified as infectious. Categories of waste designated as infectious are as follows:

a. "Human Blood, Body Fluids and Blood Products" – means all waste human blood, blood products (such as serum, plasma, and other blood components) and body fluids (such as suction fluid and wound drainage) which exist in non-absorbed liquid form in more than trace quantities.

b. "Contaminated Sharps" - consists of discarded sharps (e.g., hypodermic needles, syringes, Pasteur pipettes, broken glass and scalpel blades) which may have come into contact with infectious agents during use in patient care or in medical research or have been removed from their original sterile container.

c. "Contaminated Animal Carcasses, Body Parts, and Bedding" – refers to carcasses, body parts and bedding of animals that were exposed to pathogens in research and in the production of biologicals or in vivo production of pharmaceuticals.

d. "Discarded Cultures and Stocks of Infectious Agents and Associated Biological" – constitute infectious wastes because pathogenic organisms are present at high concentration in these materials. Included in this category are pathological laboratories and pharmaceutical companies, wastes from the production of biological and discarded live and attenuated vaccines. Also, culture dishes and devices used to transfer, inoculate and mix cultures shall be designated as infectious waste.

e. "Pathological Waste" – consists of tissues, organs, body parts, removed during surgery and autopsy.

1.17 **INTERFERENCE** shall mean a discharge that, alone or in conjunction with a discharge or discharges from other sources, inhibits or disrupts the POTW, its treatment processes or operations or its sludge processes, use or disposal; and, therefore, is a cause of a violation of the Town's NPDES permit or of the prevention of sewage sludge use or disposal in compliance with any of the following statutory/regulatory provisions or permits issued thereunder, or any more stringent State or location regulations: Section 405 of the Act; the Solid Waste Disposal Act, including Title II commonly referred to as the Resource Conservation and Recovery Act (RCRA); any State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the Solid Waste Disposal Act; the Clean Air Act; the Toxic Substances Control Act; and the Marine Protection, Research and Sanctuaries Act.

1.18 **LATERAL SEWER** shall mean a sewer that discharges into a main or other sewer and has no other common sewer tributary.

1.19 **MAY** is permissive (see SHALL, 1.39).

1.20 **NATURAL OUTLET** shall mean any outlet, including storm sewers, into a wastewater pond, ditch, lake, or other body of surface or groundwater.

1.21 **ONSITE WASTEWATER TREATMENT SYSTEM** (or **OWTS**) shall mean a system approved by the Rhode Island Department of Environmental Management (RIDEM) which provides sanitary sewerage disposal by means other than discharge into a public sewer.

1.22 **ORDINANCE** shall mean the Sewers Ordinance of the Town of Coventry (Chapter 191 of the Town Code of Ordinances).

1.23 **OWNER** means any person who alone, or jointly:

a. Has a legal title to any premises, or

b. Has control of any premises, such as an agreement to purchase, agent, executor, administrator, trustee, lessee or guardian of the estate of a holder of a legal title.

1.24 **pH** shall mean the degree of acidity or alkalinity of a solution often expressed as the negative logarithm of the reciprocal of the hydrogen ion concentration. The concentration is the weight of hydrogen ions, in gram equivalents, per liter of solution. Neutral water, for example, has a pH value of 7 and a hydrogen ion concentration of 10-7. PH values of 0 to 7 indicate acidity and from 7 to 14 indicate alkalinity.

1.25 **POLLUTANT** shall mean any dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water.

1.26 **PRETREATMENT** means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to, or in lieu of, introducing such pollutants into the POTW. This reduction or alteration can be obtained by physical, chemical or biological processes, by process changes or by other means, except by diluting the concentration of the pollutants unless allowed by an applicable pretreatment standard.

1.27 **PUBLIC SANITARY SEWER SYSTEM** shall mean the public system of sanitary sewers installed by the Town of Coventry pursuant to the authority conferred by the Public Laws.

1.28 **PRETREATMENT COORDINATOR** shall mean the representative of the Town of West Warwick who is responsible for administrating the Rules and Regulations of the Commercial and Industrial Users.

1.29 **PRETREATMENT STANDARDS** shall mean all applicable Federal rules and regulations implementing Section 403 of the Act, as well as any non-conflicting State or local standards. In cases of conflicting standards of regulations, the more stringent thereof shall be applied.

1.30 **PRIVATELY OWNED WASTEWATER TREATMENT FACILITY** shall mean pump station(s), collection system(s) and/or wastewater treatment facility(ies) owned by a user and/or association that is connected to a publicly-owned wastewater treatment or collection system.

1.31 **PUBLICLY OWNED TREATMENT WORKS** (or **POTW**) shall mean a treatment works as defined by Section 212 of the Act (33 U.S.C., Section 1292), which is owned by West Warwick or the Town. This definition includes any devices or systems used in the collection, storage, treatment, recycling and reclamation of sewage or industrial wastes of a liquid nature and any conveyances which convey wastewater to a treatment plant (also referred to as a public sewer).

1.32 **PUBLIC SEWER** shall mean any portion of the municipal sanitary sewer system in which all owners of abutting properties have equal rights, and which is controlled by municipal authority.

1.33 **RIDEM** shall mean the Rhode Island Department of Environmental Management.

1.34 **RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM** (or **RIPDES**) shall mean the Rhode Island system for using, modifying, revoking and re-issuing, terminating, monitoring and enforcing discharge permits and imposing and enforcing pretreatment requirements pursuant to Title 46, Chapter 12 of the General Laws of Rhode Island and the Clean Water Act.

1.35 **SANITARY SEWER** shall mean a conduit that carries liquid and water-carried wastes from residences, commercial buildings, industrial plants, and institutions together with minor quantities of ground water, and surface waters that are not admitted intentionally.

1.36 **SEWAGE** is the used water of a community. The preferred term is "wastewater," 1.47.

1.37 **SEWER** shall mean a pipe or conduit that carries wastewater.

1.38 **SHALL** is mandatory (see MAY, 1.19).

1.39 **SLUG LOAD OR SLUG DISCHARGE** shall mean any discharge at a flow rate or concentration which could cause a violation of the prohibited discharge standards in Article II of this Ordinance. A Slug Discharge is any discharge of a non-routine, episodic nature including, but not limited to, an accidental spill or a non-customary batch discharge which has a reasonable potential to cause interference of pass-through, or in any other way violates the POTW's regulations, Local Limits or Permit conditions.

1.40 **SUPERINTENDENT** shall mean the Superintendent of Water Pollution Control for the West Warwick Regional Treatment Facility or his/her duly authorized deputy, agent, or representative.

1.41 **TOTAL SUSPENDED SOLIDS** (or **SUSPENDED SOLIDS**) shall mean the total suspended matter that floats on the surface of, or is suspended in, water, wastewater, or other liquid, and that is removable by laboratory filtering.

1.42 **TOWN** shall mean the Town of Coventry, Rhode Island or any duly authorized officer, agent, or representative of the Town of Coventry.

1.43 **TOXIC** shall mean any substance listed as toxic under Section 307(a)(1) of the Clean Water Act, as amended, 33 U.S.C. 1251 et. Seq., listed under the Hazardous Substances Right-to-Know Act, R.I.G.S. §28-21-1 et seq., and as may otherwise be designated by the Town.

1.44 **UNPOLLUTED WATER** is water of quality equal to or better than the effluent criteria in effect or water that would not cause violation of receiving water quality standards and would not be benefited by discharge to the sewers and wastewater treatment facilities provided.

1.45 **USER** means any person who discharges or causes or permits the discharge of wastewater into the Town's wastewater facilities.

1.46 **WASTEWATER** shall mean liquid and water-carried industrial wastes and sewage from residential dwellings, commercial buildings, industrial and manufacturing facilities, and institutions (whether treated or untreated) which are contributed to the POTW.

1.47 **WASTEWATER FACILITIES** shall mean the structures, equipment, and processes required to collect, transport, and treat domestic and industrial wastes and dispose of the effluent.

1.48 **WASTEWATER TREATMENT WORKS** shall mean an arrangement of devices and structures for treating wastewater, industrial wastes, and sludge. Sometimes used as synonymous with the West Warwick Treatment Facility or "waste treatment plant" or wastewater treatment plant" or "water pollution control plant."

ARTICLE II - USE OF PUBLIC SEWERS REQUIRED

2.1 It shall be unlawful for any person to place, deposit, or permit to be placed or deposited in an unsanitary manner on public or private property within the Town of Coventry, or in any area under the jurisdiction of said Town, any human or animal excrement, garbage, or other objectionable waste.

2.2 It shall be unlawful to discharge to any natural outlet within the Town of Coventry, or in any area under the jurisdiction of said Town, any wastewater or other polluted water, except where suitable treatment has been provided in accordance with subsequent provisions of these regulations.

2.3 Except as hereinafter provided, it shall be unlawful for property owners to construct or repair any privy vault, septic tank, cesspool, or other facility intended or used for the disposal of wastewater where a public sewer abuts the property line and where permission to enter such sewer can be obtained from the authority having jurisdiction over it.

2.4 The owners of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes, situated within the Town and abutting on any street, alley, or right-of-way in which there is located, a public sewer of the Town, are hereby required at their expense to install suitable toilet facilities therein, and to connect such facilities directly with the proper public sewer in accordance with the provisions of these regulations, or within ninety (90) days after date of receipt of official notice from the Town. Said connections shall be made without exception, unless for reasons as determined by the Town and unless a waiver is granted by the Town Council.

ARTICLE III - ONSITE WASTEWATER TREATMENT SYSTEMS (OWTS)

3.1 When permitted. Where a public sanitary sewer is not accessible and available, the building sewer shall be connected to an OWTS complying with the requirements of the Town and the Rhode Island Department of Environmental Management.

3.2 Required approval. Before commencement of construction of a private sewage disposal system, the owner shall first obtain approval from the Town and the Director of RIDEM. Evidence of such approval shall be filed with the Superintendent.

3.3 Abandoning and filling when public sewer becomes available. When it is determined by the Commission that a public sewer is accessible and available to property served by a private sewage disposal system, a direct connection shall be made to the public sewer in accordance with the provisions of this article, and any septic tanks, cesspools, and similar private sewage disposal facilities shall be cleaned of sludge and filled with clean sand or gravel within one (1) year of the time of connection, or within such other time as may be specified by the Commission.

3.4 Operation of Private Disposal Systems. The owner shall operate and maintain private sewage disposal facilities (OWTS) in a sanitary manner at all times, at no expense to the Town.

3.5 Proper Removal and Disposal. In the maintaining of these OWTS the owner shall be responsible for the proper removal and disposal by the appropriate means of the captured material and shall maintain records of the dates and means of disposal which are subject to review by the Town and Director of Public Works.

ARTICLE IV - BUILDING SEWERS AND INSTALLATION

4.1 No unauthorized person(s) shall uncover (excavate), make any connections to, or opening into, use, alter, or disturb any public sewer or appurtenance thereof without first obtaining a written permit from the Director of Public Works or, in the case of commercial and industrial users only, the West Warwick Sewer Commission. Any person proposing a new discharge into the public sewer, a substantial change in the volume or character of pollutants or any change which may affect the potential for a slug discharge into the public sewer shall notify the Director of Public Works or, in the case of commercial and industrial users only, the West Warwick Sewer Commission, at least ninety (90) days prior to the proposed change or connection. All industrial users proposing to connect to or to contribute to the POTW shall obtain a Wastewater Discharge Permit before connecting to or contributing to the POTW. All existing industries, who currently have a permit to discharge shall obtain a wastewater permit within 90 days after this ordinance is adopted by the Town Council.

4.2 There shall be two (2) classes of building sewer installation permits: (a) for residential and commercial service whose sewage flow is less than 25,000 gallons per day; and (b) for service to establishments producing industrial waste flow or any flow greater than 25,000 gallons per day. In either case, the owner(s) or his/her agent shall make a permit application on a special form furnished by the Town. The permit application shall be supplemented by plans, specifications, or other information considered pertinent in the judgment of the Director of Public Works. A permit application fee which shall include all costs associated with the inspection of the building sewer installation, shall be paid to the Town at the time the application is filed. Permit application fee shall be levied as adopted from time to time.

In addition, commercial and industrial users must also file applications and receive approval from the West Warwick Sewer Commission.

4.3 If a building connection from the public sewer to the property has not been provided, all costs and expenses incidental to the installation of the building sewer and connection to the public sewer shall be borne by the owner(s) including the completion of roadway repairs in accordance with the Code of Ordinances of the Town and as determined by the Director of Public Works. The owner(s) shall indemnify the Town from any loss or damage that may directly or indirectly be occasioned by the installation of the building sewer.

4.4 A separate and independent building sewer shall be provided for every building. A privately owned wastewater treatment facility (collection system) may be allowed at the discretion of the Director of Public Works and the Superintendent.

4.5 Existing (old) building sewers may be used in connection with new building construction only when they are found, on examination and test by the Director of Public Works, to meet all requirements of these regulations. All expenses relating to such examination and testing shall be the responsibility of the applicant.

4.6 The size, slope, alignment, materials of construction of a building sewer, and the methods to be used in excavating, placing of the pipe, jointing, testing, and backfilling the trench shall conform to the requirements of the Director of Public Works acting on behalf of the Town Council and the building and plumbing code or other applicable rules and regulations of the Town. At a minimum, all requirements of the West Warwick Sewer Use Ordinance must be met. In the absence of code provisions or in amplification thereof, the materials and procedures as set forth in appropriate specifications of the American Society of Testing Materials (ASTM) and the Water Environment Federation (WEF) Manual of Practice No. 7 "OPERATION AND MAINTENANCE OF WASTEWATER COLLECTION SYSTEMS" shall apply.

4.7 Whenever possible, the building sewer shall be installed to the building at an elevation below the basement floor. In all buildings in which any building drain is too low to permit gravity flow to the public sewer, the wastewater carried by such building drain shall be pumped by an approved means and discharged to the building sewer.

4.8 No person(s) shall make connection of roof down spouts, foundation drains, areaway drains, or other sources of surface runoff or groundwater, to a building sewer or building drain which in turn is connected directly or indirectly to the public sewer unless such connection is approved by the Director of Public Works and the Superintendent for purposes of disposal of polluted surface drainage.

4.9 The connection of the building sewer to the public sewer shall conform to the requirements of the Director of Public Works on behalf of the Town Council and the building and plumbing code or other applicable rules and regulations of the Town, or the procedures set forth in appropriate specifications of the ASTM and the WEF Manual of Practice No. 7. All such connections shall be made gas tight and water tight and verified by proper testing. Any deviation from the prescribed procedures and materials must be approved by the Director of Public Works before installation.

4.10 The applicant for the building sewer permit shall notify the Director of Public Works when the building sewer is ready for inspection and connection to the public sewer. The connection and testing shall be made under the supervision of the Director of Public Works or his/her representative.

4.11 Cleanouts shall be installed where the distance from the building to the main sewer is greater than seventy five (75) feet or where bends greater than 22½ degrees are used in the building sewer. Cleanouts shall be made by installing a "Y" and one-eighth (1/8) bends of the same diameter as the building sewer. The cleanouts shall ordinarily be installed at the point of connection between the building sewer and the outside part of the house plumbing system, at curves on the building sewer and on the straight part of the house sewer to the main sewer. The clean out shall be brought up from the building sewer to four (4) inches below ground level and be properly capped. Locations of all cleanouts shall be recorded and provided to the Director of Public Works.

4.12 All excavations for building sewer installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways, and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the Town.

4.13 One backflow valve per unit shall be installed prior to connection to the Town's sewer system for all residential and multi-unit dwellings. The quantity of backflow valves necessary for commercial and industrial establishments must be submitted and approved by the Director of Public Works prior to installation.

4.14 Privately owned wastewater treatment facilities that are physically connected to, and so empty into, a Municipal Wastewater Treatment Facility must comply with Article XIX.

4.15 Low pressure grinder pumps shall be manufactured by Environmental One, or equal. The unit shall consist of a grinder pump, level controls, siphon breaker, check valve and 70 gallon high density polyethylene tank. The unit shall be equipped with an electrical quick disconnect plug, a discharge line shut-off valve and a quick disconnect assembly. The alarm/disconnect panel shall contain circuit breakers, an audible and visual alarm transfer switch and generator receptacle. A second check valve shall be provided at the curb stop.

ARTICLE V – CONSTRUCTION OF SEWERS BY PRIVATE DEVELOPERS

5.1 Commercial, industrial or residential developments of more than two housing units shall not be approved by the Town of Coventry until the developer has executed with the Sewer Commissioners a permit-agreement as hereinafter provided unless requirement is waived by the Commissioners as provided in sub-paragraph (c) below. Any such permit-agreement shall provide for installation of a sewer system as provided in Article IV and as further provided below:

a. The developer shall install not only the lateral sewer in the street but also the building sewer from the lateral sewer to the property line. In addition, if the developer is constructing a new home on a lot, the building sewer shall be extended to connect with the building plumbing. In the case of new street construction, the developer shall make such installation before surfacing of the street is completed.

b. When an owner of any lot, or his agent, applies for a building permit, the Building Inspector shall require, as a condition of the issuance of such permit, that said owner or agent show on the plot plan the layout of the future connection from the lateral sewer to the building drain, including the elevation of the building sewer at the street line, elevation of the finished first floor and/or cellar floor, and elevation of the building drain to which the future building sewer would be connected.

c. The developer shall cap all open ends of the sewer and shall, along with completed as-built plans of the sewer, provide exact ties and elevations so that the capped ends can be readily located.

d. The Commission shall provide elevations at each point where the sewers are capped, and the developer shall design and build the sewer to these elevations. The Commission shall provide design capacities for the sewers.

e. Where topography prevents installation of the sewer within the street, the developer shall install the sewer with rights-of-way that shall be of adequate width as determined by the Commission and deeded to the Town of Coventry.

f. The Commission, in considering the acceptance of a new development for sewer service into the established system of sewers, as hereinbefore defined, shall employ the following as guidelines in

determining an acceptable means and/or particular method by which said service may be achieved.

1. Wherever and whenever possible, sewer service shall be achieved by gravity means. All proposals will be reviewed by the Commission based on the system's capacity to handle additional sewerage and compliance with this Ordinance.

2. If gravity sewer service is not feasible, as determined by the Commission, sewer service shall be achieved by extending service to an existing pumping facility within the established system, subject to the Commission's normal review process as stated above.

3. If an existing pumping facility is not accessible or feasible under normal engineering standards, as determined by the Commission, pressure/force mains with related pumping facilities may be considered by the Commission.

   a) For new dwelling units and/or developments that are inaccessible for gravity sewer service, the Commission may consider the acceptance of a pumping facility into the Town's sewer system on a case by case basis. The overall need for such a facility in lieu of other viable options must be proved by the developer to the satisfaction of the Commission prior to the Commission's preliminary approval. The pumping facility must be designed and installed under the supervision of an individual licensed as a Registered Professional Engineer in the State of Rhode Island. The work shall be in accordance with the Commission's standards and shall include all appurtenances necessary to establish a functional and acceptable facility as determined by the Commission. Upon preliminary acceptance of a facility, the Commission and developer shall negotiate a permitting agreement whereby the developer shall pay to the sewer commission, prior to the new system being accepted, a sufficient sum to defray all estimated operational and maintenance costs of the facility for a period of ten (10) years after acceptance. The amount of this payment shall be based on estimates at the time of the proposal as determined and approved by the Commission. Said payment shall be in the form of a certified check payable to the Town of Coventry.

   b) Proposed pumping facilities servicing new or proposed commercial and/or industrial developments shall not be considered for acceptance by the Commission. If required and installed, the ultimate ownership and operational and maintenance responsibilities of such a facility shall remain the responsibility of the property owner.

4. If a pumping facility is deemed necessary by the Commission to serve a new development, the Commission shall require either that the developer install said pumping facility and appurtenant equipment or that the developer pay to the Town of Coventry a sum sufficient to defray the cost of engineering (design, review and inspection), constructing, equipping and installing said pumping facility. The amount of this payment shall be based on estimates developed and approved by the Commission. The payment may be in the form of a certified check payable to the Town of Coventry and such funds shall be used only for the engineering (design, review and inspection), construction, equipping and installation of the pumping facility. This amount is in addition to that designated in Item 3.a above.

5. Upon installation and acceptance by the Commission of the pumping facility and appurtenance equipment, the Developer shall deed the site, the facility and equipment to the Commission and assign its rights in all warranties and guarantees to the Commission. The deed and assignment shall be in a form approved by legal counsel to the Commission.

g. If the Developer retains ownership of the pump station and/or collection system, the Developer must comply with Article XIX.

h. The developer shall be required to include as a part of the capped sewer construction any pipes, pumping stations or other appurtenances which would be required for or would serve areas outside of the development in question, without remediation from the Town.

5.2 A new development for which a permit-agreement is required, as described under subparagraph (5.1) hereof, shall not be approved by the Commission until the Commission has approved a design of the sewers serving said development or has waived the requirement therefore pursuant to subparagraph (5.3) below. Said design shall be prepared by the developer at his expense, shall conform to accepted engineering practices and existing installation requirements, and shall provide for an economical and effective future installation of the sewers. Any rights-of-way called for by such design as approved by the Commission shall be deeded to the Town of Coventry.

5.3 The Commission may grant relief from any of the requirements imposed by subparagraph (a) and (b) above if it determines that the need for the construction or design of sewers is impractical or remote taking into consideration (1) the date upon which the sewers might be connected to the Town wastewater collection system, (2) the estimated cost of construction, and (3) the anticipated need for sewers within the development. Such need shall be determined after consideration of all available information, including any report or evidence submitted by the developer of such proposed development.

5.4 For any development or a portion thereof, consisting of more than a single unit having individual unit ownership, whether residential or commercial, with a common sanitary sewer system that is privately owned by an ownership, community or condominium type association or entity and discharges to the Towns' publicly owned sanitary sewer system, the association or entity of record shall be fully responsible and accountable for the ownership, operation and maintenance of said sanitary sewer system in its entirety, including all regulatory compliance issues related thereto and must comply with Article XIX.

5.5 If a developer subdivides lots fronting on an existing town road, the Commission may waive the requirement installation of capped sewers serving such lots if it finds such installation to be impracticable, provided that any easements necessary for future sewers installations are dedicated to the Town of Coventry. The Commission may by agreement with the developer provide for immediate or future construction of the capped sewers by the developer as provided herein at their expense. The Commission is authorized to enter into agreements on behalf of the Town of Coventry with developers or other owners of land for the engineering (design, review and inspection) and construction of sewers by and at the expense of such developers or owners which sewers may become part of the public sewer system under the conditions hereinafter stipulated. The Commission is empowered to make, from time to time, any necessary regulations stipulating the terms and conditions of said agreement consistent with the provisions of this ordinance. The conditions under which a permit-agreement may be executed are as follows:

a. The Chairman of the Commission is authorized to sign on behalf of the Town of Coventry all such agreements when the same have been authorized by said Commission.
b. The terms and text of an agreement for any particular project under Article V of this ordinance shall be as approved by the Commission's legal counsel.
c. The Commission shall specify in the terms of such agreements, or on plans which are made a part thereof, the limits, sizes and grades of the sewers to be built and the nature of and limitations on the waste or liquids to be conveyed. All the terms of and all subsequent amendments to this Ordinance shall be applicable to work done under such agreements.

d. Such agreements shall provide that the full cost of engineering (design, review and inspection), and construction of the sewer and all expenses incidental thereto shall be borne by the developer or owner who shall, before commencing any work, deposit with the Finance Director of the Town of Coventry a sum deemed by the Commission or such engineers as the Commission may employ, to be sufficient to defray the cost of preliminary surveys, of the preparation of designs and plans, of other expenses of preliminary engineering, of inspection, supervisory engineering, grade staking, measuring, testing and all other expenses of the Town of Coventry incurred prior to or during construction, or during any maintenance period stipulated, including allowances for pension, insurance and similar costs related to payroll. Such agreements shall also provide that, in case said deposit proves to be insufficient at any time during the progress of the work, further deposit shall be made upon notification by the Finance Director of said town and that, upon acceptance of the sewer, any unspent portion of said deposit shall be returned to the developer or owner.

e. All such agreements shall provide that the developer or owner shall assume all risks and hold the Town of Coventry or their agencies harmless from any and all claims for damage arising from the work or its conduct. To secure such risks, adequate liability, property damage and compensation insurance in amounts fixed by the Commission shall be required of the developer or owner who shall furnish proper and acceptable certificates of insurance before starting work.

f. The Commission, whenever in its opinion there is possibility of loss by the Town of Coventry by reason of failure of the owner or developer to complete the work contemplated in the agreement, or any part thereof, or to comply with any maintenance requirements, may require as a part of said agreement that adequate bond or other surety acceptable to the Town of Coventry be submitted to insure completion and maintenance of the work.

g. Such agreements shall require, whenever the work is not in a duly accepted public road, that adequate rights-of-way be conveyed to the Town of Coventry prior to the acceptance of the sewer, the terms of conveyance being subject to the approval of the Commission's legal counsel.

h. After certification by the Commission or such engineers as the Commission may employ, that any sewer constructed under the terms of this Article has been completed in accordance with the plans, specifications, and standards of the Town of Coventry and that the maintenance period fixed in the agreement has expired, and that all roadways, curbs, walks and other surfaces and appurtenances disturbed by the work have been properly restored, or that adequate security by bond or otherwise has been furnished to assure such restoration, the Commission may, by resolution, incorporate said sewer into the Town's wastewater collection system, to become effective as specified in such resolution.

ARTICLE VI - USE OF THE PUBLIC SEWERS

6.1 No person(s) shall discharge or cause to be discharged any unpolluted waters such as storm water, surface water, groundwater, artesian well water, roof runoff, subsurface drainage, swimming pool drainage, condensate, deionized water, or non-contact cooling water to any sewer. Storm water runoff from limited areas, which storm water may be polluted at times, may be discharged to the sanitary sewer only with the permission of the Director of Public Works and the Superintendent.

6.2 Storm water other than that exempted under Article 5.1, and all other unpolluted drainage, shall be discharged to such sewers that are specifically designated as storm sewers or to a natural outlet approved by the Director of Public Works and other regulatory agencies. Unpolluted industrial cooling water or process waters may be discharged, on approval of the Director of Public Works, to a storm sewer, or natural outlet.

6.3 No person(s) shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers:

6.3.1 Pollutants which create a fire or explosive hazard in the POTW, including but not limited to, wastestreams with a closed-cup flashpoint of less than 140°F (60°C) using the test methods specified in 40 CFR 261.21, including any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid, or gas.

6.3.2 Any waters containing toxic or poisonous solids, liquids, or gases in sufficient quantity, either singly or by interaction with other wastes, to injure or interface with any waste treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the wastewater treatment plant.

6.3.3 Any water or wastes having a pH lower than 6.0 s.u., or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the wastewater facilities.

6.3.4 Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the wastewater facilities such as, but not limited to, ashes, bones, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshings, entrails and paper dishes, cups, milk containers, etc., either whole or ground by garbage grinders (in no case greater than ⅜" in any direction).

6.4 No person shall discharge or cause to be discharged the following described substances, materials, waters, or wastes if it appears likely in the opinion of the Superintendent that such wastes can harm either the sewers, sewage treatment process, or equipment, have an adverse effect on the receiving stream, or can otherwise endanger life, limb, public property, or constitute a nuisance. In forming his/her opinion as to the acceptability of these wastes, the Superintendent will give consideration to such factors as the quantities of subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment process, capacity of the sewage treatment plant, degree of treatability of wastes in the sewage treatment plant, and other pertinent factors. The substances prohibited are:

6.4.1 Wastewater having a temperature greater than 150°F (65°C), or which will inhibit biological activity in the treatment plant resulting in interference, but in no case, wastewater which causes the temperature at the introduction into the treatment plant to exceed 104°F (40°C).

6.4.2 Fats, oils or grease of animal or vegetable origin in concentrations greater than 100 mg/l.

6.4.3 Any garbage that has not been properly shredded. The installation and operation of any garbage grinder equipped with motor of three-fourths (3/4) horsepower (0.76 hp metric) or greater shall be subject to the review and approval of the Director of Public Works. No commercial or industrial user shall operate a garbage grinder unless specifically approved by the Director of Public Works and may only be used in conjunction with an in-ground grease interceptor specifically designed to accept such waste.

6.4.4 Any waters or wastes containing iron, chromium, copper, zinc, and similar objectionable or toxic substances; or wastes exerting an excessive chlorine requirement, to such degree that any such material received in the composite sewage at the sewage treatment works exceeds the limits established by West Warwick Sewer Use Ordinance for such materials.

6.4.5 Any waters or wastes containing phenol or other taste or odor producing substances, in such concentrations exceeding limits which may be established by the West Warwick Sewer Use Ordinance as necessary, after treatment of the composite sewage to meet the requirements of the State, Federal, or other public agencies with jurisdiction for such discharge to the receiving waters.

6.4.6 Wastewater containing any radioactive wastes or isotopes except in compliance with applicable State or Federal regulations.

6.4.7 Any waters or wastes having a pH in excess of 10.

6.4.8 Materials which exert or cause:

6.4.8.1 Unusual concentration of inert suspended solids (such as, but not limited to, Fullers earth, lime slurries, and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and sodium sulfate.)

6.4.8.2 Wastewater which imparts color which cannot be removed by the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions, which consequently imparts color to the treatment plant's effluent, thereby violating West Warwick's RIPDES permit.

6.4.8.3 Unusual BOD, Total Suspended Solids, Total Nitrogen or Total Phosphorus in such quantities as to constitute a significant load on the sewage treatment works. Industrial surcharge requirements will be assessed by the West Warwick Sewer Commission for BOD and Total Suspended Solids greater than 250 mg/l for each parameter. Total Nitrogen in excess of 40 mg/l and Total Phosphorus in excess of 7 mg/l will also be subject to industrial surcharges. Industries exceeding these limitations shall be considered "significant" and shall require permitting by the West Warwick Sewer Commission. Flow reflects each industry's average daily discharge. In the event that loadings to the West Warwick Regional Wastewater Treatment Facility approach capacity, the West Warwick Sewer Commission reserves the right to place more stringent limitations on these parameters.

6.4.8.4 Miscellaneous Pollutants Limitations:

a. All permitted industrial facilities shall discharge miscellaneous pollutants only in accordance with the limitations stated in their permits.

b. Facilities subject to these regulations to which permits have not yet been issued shall have, in these permits, permit limitations for miscellaneous pollutants. Permits issued may set limitations that shall not exceed those established in the West Warwick Sewer Use Ordinance.

6.4.8.5 Unusual volume of flow or concentration of wastes constituting a "slug load" as defined herein.

6.4.9 Waters or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment process employed, or are amenable to treatment only to such degree that the wastewater treatment works effluent cannot meet the requirements of other agencies having jurisdiction over discharge to the receiving waters.

6.4.10 Any noxious or malodorous liquids, gases or solids which either singly or by interaction with other wastes are sufficient to create a public nuisance or hazard to life or are sufficient to prevent entry into the sewers for maintenance and repair.

6.4.11 Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through.

6.4.12 Pollutants which result in the presence of toxic gases, vapors or fumes within the West Warwick Regional Wastewater Treatment Facility in a quantity that may case acute worker health and safety problems.

6.4.13 Trucked or hauled pollutants, except at discharge points designated by the Director of Public Works.

6.4.14 Medical wastes, except as specifically authorized by West Warwick in an individual wastewater discharge permit.

6.4.15 Detergents, surface-active agents or other substances that might cause excessive foaming in the West Warwick Regional Wastewater Treatment Facility.

6.5 All non-residential users must receive approval from the West Warwick Sewer Commission before sewers can be connected to the public sewers.

6.6 If any water or wastes are discharged or are proposed to be discharged to the public sewers, which waters contain the substances or possess the characteristics enumerated in this Article, and which in the judgment of the Superintendent, may have a deleterious effect upon the wastewater facilities, processes, equipment, or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the Superintendent may:

6.6.1 Reject the wastes;

6.6.2 Require pretreatment to an acceptable condition for discharge to the public sewers;

6.6.3 Require control over the quantities and rates of discharge, and/or;

If the Superintendent permits the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the Superintendent and subject to the requirements of all applicable codes, regulations, and laws.

6.7 Grease, oil, and sand interceptors shall be provided when, in the opinion of the Superintendent, they are necessary for the proper handling of liquid wastes containing amounts of grease and oil, or sand; except that such interceptors shall not be required for private living quarters or dwelling units. All such interceptors shall be of a type and capacity approved by the Superintendent, and shall be located as to be readily and easily accessible for cleaning and inspection. In the maintaining of these interceptors, the owner(s) shall be responsible for the proper removal and disposal by appropriate means of the captured material and shall maintain records of the dates, and means of the disposal which are subject to review and approval by the Superintendent. Any removal and handling of the collected materials not performed by owner(s)' personnel must be performed by properly licensed waste disposal firms,

6.8 Where pretreatment or flow-equalizing facilities are provided or required for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner(s) at his/her expense.

6.9 When required by the Superintendent, the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable structure together with such necessary meters and other appurtenances in the building sewer to facilitate observations, sampling, and measurement of the wastes. Such structure, when required, shall be accessible and safely located and shall be constructed in accordance with plans approved by the Superintendent. The structure shall be installed by the owner at his/her expense and shall be maintained by him/her so as to be safe and accessible at all times.

The monitoring equipment shall be located and maintained on the industrial user's premises outside of the building. When such a location would be impractical or cause undue hardship on the user, the Town may allow such facility to be constructed in the public street or sidewalk area, with the approval of the Director of Public Works, and located so that it will not be obstructed by public utilities, landscaping, or parked vehicles.

When more than one user can discharge into a common sewer, the Superintendent may require installation of separate monitoring equipment for each user. When there is a significant difference in wastewater constituents and characteristics produced by different operations of a single user, the Superintendent may require that separate monitoring facilities be installed for each separate discharge. Whether constructed on public or private property, the monitoring facilities shall be constructed in accordance with the Superintendent's requirements and all applicable construction standards and specifications.

6.10 All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in these regulations shall be determined in accordance with 40 CFR Part 136. The user must collect wastewater samples using 24-hour flow-proportional composite sampling techniques, unless time-proportional composite sampling or grab sampling is authorized by the Superintendent. Where time-proportional composite sampling or grab sampling is authorized by the Superintendent, the samples must be representative of the discharge. Using protocols (including appropriate preservation) specified in 40 CFR Part 136 and appropriate EPA guidance,

multiple grab samples collected during a 24-hour period may be composited prior to the analysis as follows: for cyanide, total phenols and sulfides, the samples may be composited in the laboratory or in the field; for volatile organics and oil and grease, the samples may be composited in the laboratory. Composite samples for other parameters unaffected by the compositing procedures as documented in approved EPA methodologies may be authorized by the Superintendent, as appropriate. In addition, grab samples may be required to show compliance with Instantaneous Limits. Samples for oil and grease, temperature, pH, cyanide, total phenols, sulfides and volatile organic compounds must be obtained using grab collection techniques. The number of grab samples required will be determined by the Superintendent.

The samples shall be determined at the control manhole provided, or upon suitable samples taken at said control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole to which the public sewer is connected.

ARTICLE VII - PROTECTION FROM DAMAGE

7.1 No person(s) shall maliciously or willfully break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance or equipment which is a part of the wastewater facilities. Any person(s) violating this provision shall be subject to immediate arrest under charge of malicious damage as set forth in the Rhode Island General Laws 1956, as amended.

ARTICLE VIII - POWERS AND AUTHORITY OF INSPECTORS

8.1 The Director of Public Works, the Superintendent and their duly authorized representative(s), bearing proper credentials and identification, shall be permitted to enter all private properties for the purpose of inspection, observation, measurement, sampling, and testing pertinent to discharge to the wastewater facilities in accordance with the provisions of these regulations.

Upon reasonable notice, the Director of Public Works, the Superintendent and their duly authorized representative(s), bearing proper credentials and identification, shall be permitted to enter all commercial and/or industrial properties for the purpose of inspection, observation, measurement, sampling, and testing pertinent to discharge to the wastewater facilities in accordance with the provisions of these regulations.

Upon reasonable notice, for cause shown, the Director of Public Works, the Superintendent and their duly authorized representative(s), bearing proper credentials and identification, shall be permitted to enter all residential properties for the purpose of inspection, observation, measurement, sampling, and testing pertinent to discharge to the wastewater facilities in accordance with the provisions of these regulations.

8.2 The Director of Public Works, the Superintendent or their duly authorized representative(s) are authorized to obtain information concerning industrial processes which have a direct bearing on the kind and source of discharge to the wastewater facilities. The information and data on a User obtained from reports, surveys, wastewater discharge permit applications, individual wastewater discharge permits and monitoring programs, and from the Superintendent's inspection and sampling activities, shall be available to the public without restriction, unless the User specifically requests (and is able to demonstrate to the satisfaction of the Superintendent) that the release of such information would divulge information, processes, or methods of production entitled to protection as trade secrets under applicable State law. Any such request must be asserted at

the time of submission of the information or data. When requested and demonstrated by the User furnishing a report that such information should be held confidential, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public, but shall be made available immediately upon request to governmental agencies for uses related to the RIPDES Program or Pretreatment Program, and in enforcement proceedings involving the person furnishing the report. Wastewater constituents and characteristics and other effluent data, as defined in 40 CFR 2.302 shall not be recognized as confidential information and shall be made available to the public without restriction.

8.3 The Director of Public Works, Superintendent and their duly authorized representative(s), bearing proper credentials and identification, shall be permitted to enter all private properties through which the Town holds a duly negotiated easement for the purpose of, but not limited to, inspection, observation, measurement, sampling, repair, and maintenance of any portion of the wastewater facilities lying within said easement. All entry and subsequent work, if any, on said easement, shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property.

The Director of Public Works, Superintendent and their duly authorized representative(s), bearing proper credentials and identification, shall have the right to enter the premises of any User to determine whether the User is complying with all requirements of this Ordinance and any individual wastewater discharge permit or order issued hereunder. Users shall allow the Director of Public Works, Superintendent and their duly authorized representative(s) ready access to all parts of the premises for the purposes of inspection, sampling, records examination and copying, and the performance of any additional duties.

a. Where a User has security measures in force which require proper identification and clearance before entry into its premises, the User shall make necessary arrangements with its security guards so that, upon presentation of suitable identification, the Director of Public Works, Superintendent and their duly authorized representative(s) shall be permitted to enter without delay for the purposes of performing specific responsibilities.

b. The Director of Public Works, Superintendent and their duly authorized representative(s) shall have the right to set up on the User's property (or require installation of) such devices as are necessary to conduct sampling and/or metering of the User's operations.

c. The Director of Public Works, Superintendent and their duly authorized representative(s) may require the User to install monitoring equipment, as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the User at its own expense. All devices used to measure wastewater flow and quality shall be calibrated at least annually to ensure their accuracy.

d. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the User at the written or verbal request of the Director of Public Works or Superintendent, and shall not be replaced. The costs of clearing such access shall be borne by the User.

e. Unreasonable delays in allowing the Director of Public Works, Superintendent and their duly authorized representative(s) access to the User's premises shall be a violation of this Ordinance.

If the Director of Public Works, Superintendent and their duly authorized representative(s) have been refused access to a building, structure or property, or any part thereof, and is able to demonstrate probable cause to believe that there may be a violation of this Ordinance, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program of the Town or West Warwick designed to verify compliance with this Ordinance or any permit or order issued hereunder, or to protect the overall public health, safety and welfare of the community, the Director of Public Works may seek issuance of a search warrant.

ARTICLE IX - PENALTIES

9.1 When the Director of Public Works or the Superintendent finds that User has violated, or continues to violate, any provision of this Ordinance, an individual wastewater discharge permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, the Director of Public Works or Superintendent may serve upon that User a written Notice of Violation. Within thirty (30) days of the receipt of such notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted by the User to the Director of Public Works or Superintendent. Submission of such a plan in no way relives the User of liability for any violations occurring before or after receipt of the Notice of Violation. Nothing in this section shall limit the authority of the Director of Public Works or Superintendent to take any action, including emergency actions or any other enforcement action, without first issuing a Notice of Violation.

9.1.1 Consent Orders: The Director of Public Works or the Superintendent may enter into Consent Orders, assurances of compliance or other similar documents establishing an agreement with any User responsible for non-compliance. Such documents shall include specific actions to be taken by the User to correct the non-compliance within a time period specified by the document. Such documents shall have the same force and effect as the administrative and shall be judicially enforceable.

9.1.2 Show-Cause Hearing: The Director of Public Works or the Superintendent may order a User which has violated, or continues to violate, any provision of this Ordinance, an individual wastewater discharge permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, to appear before the Director of Public Works or Superintendent and show cause why the proposed enforcement action should not be taken. Notice shall be served on the User specifying the time and place for the meeting, the proposed enforcement action, the reasons for such action, and a request that the User show cause why the proposed enforcement action should not be taken. The notice of the meeting shall be served personally or by registered or certified mail (return receipt requested) at least five (5) days prior to the Hearing. Such notice may be served on any authorized representative of the User. A Show-Cause Hearing shall not be a bar against, or prerequisite for, taking any other action against the User.

9.1.3 Compliance Orders: When the Director of Public Works or the Superintendent finds that a User has violated, or continues to violate, any provision of this Ordinance, an individual wastewater discharge permit or order issued hereunder, or any other Pretreatment Standard or Requirement, the Director of Public Works or the Superintendent may issue an order to the User responsible for the discharge directing that the Use come into compliance within a specified time. If the User does not come into compliance within the

time provided, sewer service may be discontinued unless adequate treatment facilities, devices, or other related appurtenances are installed and properly operated. Compliance orders also may contain other requirements to address the non-compliance, including additional self-monitoring and management practices designed to minimize the amount of pollutants discharged to the sewer. A Compliance Order may not extend the deadline for compliance established for Pretreatment Standard or Requirement, nor does a Compliance Order relieve the User of liability for any violation, including any continuing violation. Issuance of a Compliance Order shall not be a bar against, or prerequisite for, taking any other action against the User.

9.1.4 Cease and Desist Orders: When the Director of Public Works or the Superintendent finds that a User has violated, or continues to violate, any provision of this Ordinance, an individual wastewater discharge permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, or that the User's past violations are likely to recur, Director of Public Works or the Superintendent may issue an order to the User directing it to cease and desist all such violations and directing the User to:

a. Immediately comply with all requirements; and

b. Take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation, including halting operations and/or terminating the discharge. Issuance of a Cease and Desist Order shall not be a bar against, or prerequisite for, taking any other action against the User.

9.1.5 Administrative Fees:

a. When the Director of Public Works or the Superintendent finds that a User has violated, or continues to violate, any provision of this Ordinance, an individual wastewater discharge permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, the Director of Public Works or the Superintendent may fine such User an amount not to exceed $25,000. Such fines shall be assessed on a per-violation, per-day basis. In the case of monthly or other long-term average discharge limits, fines shall be assessed for each day during the period of violation.

b. A lien against the User's property shall be sought for unpaid charges, fines and penalties.

c. Users desiring to dispute such fines must file a written request for the Director of Public Works or the Superintendent to reconsider the fine along with full payment of the fine amount within fifteen (15) days of being notified of the fine. Where a request has merit, the Director of Public Works or the Superintendent may convene a hearing on the matter. In the event the User's appeal is successful, the payment, together with any interest accruing thereto, shall be returned to the User. The Director of Public Works or the Superintendent may add the costs of preparing administrative enforcement actions, such as notices and orders, to the fine.

d. Issuance of any administrative fine shall not be a bar against, or prerequisite for, taking any other action against the User.

9.1.6 Emergency Suspensions: The Director of Public Works or the Superintendent may immediately suspend a User's discharge, after informal notice to the User, whenever such suspension is necessary to stop an actual or threatened discharge, which reasonably appears to present, or cause, an imminent or substantial endangerment to the health or welfare of persons. The Director of Public Works or the Superintendent may also immediately suspend a User's discharge, after notice and opportunity respond, that threatens to interfere with the operation of the POTW, or which presents, or may present, an endangerment to the environment.

a. Any User notified of a suspension of its discharge shall immediately stop or eliminate its contribution. I n the event of a User's failure to immediately comply voluntarily with the suspension order, the Director of Public Works or the Superintendent may take such steps as deemed necessary, including immediate severance of the sewer connection, to prevent or minimize damage to the POTW, its receiving stream, or endangerment to any individuals. The Director of Public Works or the Superintendent may allow the User to recommence its discharge when the User has demonstrated to the satisfaction of the Director of Public Works or the Superintendent that the period of endangerment has passed, unless the termination proceedings of this Ordinance are initiated against the User.

b. A User that is responsible, in whole or in part, for any discharge presenting imminent endangerment shall submit a detailed written statement describing the causes of the harmful contribution and the measures taken to prevent any future occurrence to the Director of Public Works or the Superintendent prior to the date of any Show-Cause or Termination Hearing.

Nothing in this section shall be interpreted as requiring a hearing prior to any Emergency Suspension under this section.

9.1.7 Termination of Discharge: Any User who violates the following conditions is subject to discharge termination.

a. Violation of individual wastewater discharge permit conditions;

b. Failure to accurately report the wastewater constituents and characteristics of its discharge;

c. Failure to report significant changes in operations or wastewater volume, constituents and characteristics prior to discharge;

d. Refusal of reasonable access to the User's premises for the purpose of inspection, monitoring, or sampling; or

e. Violation of the Pretreatment Standards.

Such User will be notified of the proposed termination of its discharge and be offered an opportunity to show cause under Article 8.1.1 of this Ordinance why the proposed action should not be taken. Exercise of this option by the Director of Public Works or the

Superintendent shall not be a bar against, or prerequisite for, taking any other action against the User.

9.2 If the violation is not corrected by timely compliance, the Town may order any person who causes or allows an unauthorized discharge to show cause before the Town Council why service should not be terminated. A notice shall be served on the offending party, specifying the time and place of a hearing to be held by the Town Council regarding the violation and directing the offending party to show cause before said authority why an order should not be made directing the termination of service. The notice of the hearing shall be served personally or by registered or certified mail (return receipt requested) at least ten (10) days before the hearing. Notice may be made on any agent or officer of a corporation.

9.3 The Town Council may conduct the hearing and take the evidence, or may designate any of its members or any officer or employee of the Town to:

9.3.1 Issue in the name of the Town Council notices of hearings requesting the attendance and testimony of witnesses and the production of evidence relevant to any matter involved in any such hearings.

9.3.2 Take the evidence.

9.3.3 Transmit a report of the evidence and hearing, including transcripts and other evidence, together with recommendations to the Town Council for action thereon.

9.4 At any public hearing, testimony taken before the hearing authority or any person designated by it, must be under oath and recorded stenographically. The transcript or any part of the hearing, so recorded, will be made available to any member of the public upon payment of the usual charges.

9.5 After the Town Council has reviewed the evidence, it may issue an order to the party responsible for the discharge directing that, following a specified time period, the sewer service be discontinued unless adequate treatment facilities, devices or other related appurtenances shall have been installed or existing treatment facilities, devices, or other related appurtenances are properly operated, and such further orders and directives as are necessary and appropriate.

9.6 Any discharge in violation of the substantive provisions of this ordinance or an order of the Town Council shall be considered a public nuisance. If any person discharges sewage, industrial wastes or other wastes into the public sewer contrary to the substantive provisions of this ordinance or any order of the Town Council, the Town Solicitor may commence an action for appropriate legal and/or equitable relief in the appropriate court.

9.7 The Town Council will publish an annual list of violators.

9.8 Any person who is found to have violated an Order of the Town Council or who willfully or negligently failed to comply with any provisions of this Ordinance, and the orders, rules, and regulations issued hereunder, shall be fined not less than one hundred dollars ($100) nor more than twenty five thousand dollars ($25,000) for each offense. Each day on which a violation shall occur or continue shall be deemed a separate and distinct offense. In addition to the penalties provided herein, the Town may recover reasonable attorneys' fees, court costs, court reporters' fees, and

other expenses of litigation by appropriate suit of law against the person found to have violated this Ordinance or the Orders, rules and regulations issued hereunder.

ARTICLE X – ENFORCEMENT PROCEDURES

10.1 General. Any owner, person, user or significant industrial user found in violation of any part of this Ordinance, discharge permit, compliance schedule or order, or any order of the Town shall be subject to enforcement procedures. Such procedures shall include but are not limited to: revocation of permit, suspension of discharge, show cause hearing, Commission Order, legal action and/or penalty costs.

10.2 Compliance Schedule. When the Superintendent finds that a user has violated or continues to violate the Ordinance or a permit or Order issued thereunder, he may issue an Order to the user responsible for the discharge directing that, following a specified time period, sewer service shall be discontinued unless adequate pretreatment facilities, devices, or other related appurtenances have been installed and are properly operated. Orders may also contain such other requirements as might be reasonably necessary and appropriate to address the noncompliance, including installation of pretreatment technology, addition self-monitoring and management practices.

10.3 Permit Revocation.

10.3.1 ENFORCEMENT COSTS. The permittee agrees to reimburse the Town and/or the West Warwick Sewer Commission for the cost of enforcing the permit, including reasonable attorney's fees, if violation of the permit is found by a hearing officer during the course of a show cause hearing or if such decision is appealed, then in court of competent jurisdiction.

10.3.2 DAMAGE TO FACILITIES. The permittee agrees to indemnify and hold harmless the Town from and against any liability, loss, cost, expense or actual damage (including reasonable attorney's and accountants' fees incurred in defending or prosecuting any claim for any such liability, loss, cost, expense or damage) suffered by the Town and/or the West Warwick Sewer Commission and caused by discharges from the permittee, either singly or by interaction with other wastes.

10.3.3 Violation of any of the following conditions may result in the revocation of a Wastewater Discharge Permit.

a. Failure to accurately and fully report the wastewater volume, constituents, and characteristics of its discharge.
b. Failure to report significant changes in wastewater volume, constituents, or characteristics.
c. Failure to allow Town personnel statutorily authorized access for the purpose of inspection or monitoring.
d. Failure to pay any and all costs.
e. Violation of any condition of a permit or the Ordinance.
f. Failure to correct violations that have already resulted in the suspension of the permit.
g. Failure to adhere to compliance schedule or Order.

10.4 Suspension of Discharge. The Town or, in the case of commercial and industrial users only, the West Warwick Sewer Commission, may suspend the wastewater service and/or a Wastewater Discharge Permit when such suspension is necessary, in the opinion of the Town or (as applicable) such Commission, in order to stop an actual or threatened discharge which presents or may present an imminent or substantial endangerment to the health or welfare or persons, to the environment or causes interference or pass through to the Collection System or Wastewater Treatment System.

10.4.1 Any person notified of a suspension of the wastewater treatment service and/or a Wastewater Discharge Permit shall immediately stop or eliminate the contribution. In the event of a failure of the person to comply voluntarily with the suspension order, the Town shall take such steps as deemed necessary including immediate severance of the sewer connection, to prevent or minimize damage to the system or endangerment to any individuals. The Town shall reinstate the Wastewater Discharge and/or the wastewater service upon proof of the elimination of the non-complying discharge. A detailed written statement submitted by the user describing the causes of the harmful contribution and the measures taken to prevent any further occurrence shall be submitted to the Town within 15 days of the date of occurrence.

10.5 Show Cause Hearing.

10.5.1 If a violation is not corrected within the time frame mandated by the Town or the West Warwick Sewer Commission, the Director of Public Works may order any person who causes or allow an unauthorized discharge to show cause before the Commission why service should not be terminated. A notice shall be served on the offending party, specifying the time and place of a hearing to be held by the Commission regarding the violation and directing the offending party to show cause before said authority why an order should not be made directing the termination of service. The notice of the hearing shall be served personally or by registered or certified mail (return receipt requested) at least (10) days before the hearing. Service may be made on any agent or officer of a corporation.

10.5.2 At any public hearing, testimony taken before the hearing authority or any person designated by it, must be under oath and recorded stenographically. The transcript, so recorded, will be made available to any member of the public or any part of the hearing upon payment of the usual charges.

10.5.3 After the Commission had reviewed the evidence, it may issue an order to the party responsible for the discharge directing that, following a specified time period, the sewer service be discontinued unless adequate treatment facilities, devices or other related appurtenances shall have been installed or existing treatment facilities, devices, or other related appurtenances are properly operated, and such further orders and directives as are necessary and appropriate.

10.6 Legal Action. Any discharge in violation of the substantive provisions of this Ordinance or an Order of the Commission shall be considered a public nuisance. If any person discharges sewage, industrial wastes or other wastes into the Town collection system contrary to the substantive provision of this Ordinance or any Order of the Commission, the Town Solicitor shall commence an action for appropriate legal and/or equitable relief in the Superior Court of this County.

10.7 Penalty Costs. Any person who is found to have violated an Order of the Town Council or who has failed to comply with any provision of a discharge permit issued by the Town, or provision of this Ordinance, and the orders, rules and regulations issued hereunder, shall be fined in accordance with Section 8-42, SUMMARY OF PENALTIES. In addition, the Town may recover reasonable attorneys' fees, court costs, court reporters' fees and other expenses of litigation by appropriate suit at law against the person found to have violated this Ordinance or the orders, rules, regulations, and permits issued by the Town.

ARTICLE XI - APPEALS

11.1 Board of Sewer Appeals. In order that the provisions of this article may be reasonably applied and substantial justice done in instances where unnecessary hardship would result from carrying out the strict letter of this article, the Town Council shall serve as a Board of Sewer Appeals. The Board of Sewer Appeals shall consider appeals from decisions of the Board of Sewer Commissioners and shall determine in particular cases whether any deviation from the strict enforcement of this article will violate its intent or jeopardize the public health and safety.

11.2 Procedure. Any person aggrieved by any decision of the Board of Sewer Commissioners shall, in addition to any other remedy provided by law, have the right to appeal to the Board of Sewer Appeals within thirty (30) days of the decision appealed from. The Board of Sewer Appeals shall consider the appeal and give the aggrieved person a reasonable opportunity to be heard. The final disposition of the appeal shall be in the form of a resolution reversing, modifying or affirming, the decision appealed from.

ARTICLE XII – SAVING CLAUSE

12.1 If any provision, paragraph, word, section or article of this Ordinance is invalidated by any court or competent jurisdiction, the remaining provisions, paragraphs, words, sections, and articles shall not be affected and shall continue in full force and effect.

ARTICLE XIII - CONFLICT

13.1 All ordinances and parts of ordinances inconsistent or conflicting with any part of this Ordinance are hereby repealed to the extent of such inconsistency or conflict.

ARTICLE XIV - ASSESSMENT

The following procedures have been established in order to recover the cost of construction, operating and maintaining the wastewater collection system. These costs shall be recovered by the collection of assessments.

14.1 The Town Council shall, by Ordinance, adopt an assessment charge for real property (improved and unimproved) from time to time. The assessment charges shall be used for the purpose of recovering capital cost of the Town's sewage facilities and all or such portion of the Town's share of the capital cost of the Regional Wastewater Treatment Facility against residential, commercial and industrial properties.

14.2 Notwithstanding the foregoing, the Town shall have discretion to defer sewer assessment against parcels of land if the owner of such parcel, within seven (7) years of the date of the sewer assessment, has installed a new septic system, provided that such parcel shall remain subject to assessment and shall begin paying such assessment at least seven (7) years from the date of initial assessment.

14.3 Parcels of real property (improved and unimproved) which are not included in a specific sewered district not yet connected to the Town's sewer system, but which, in the future, may connect into the public sewer system will be charged a sewer assessment as outlined in Section 14.4 unless the property has been included in a specific assessment district.

14.4 The assessments are as follows:

14.4.1 **Residential Assessments:**

Single Family Homes	$12,900 per housing unit
Two Family (Duplex) Homes	$12,900 per housing unit
Multi-Family Homes, Condominiums and Apartments	$12,900 per housing unit
Mobile Homes	$6,600 per housing unit

14.4.2 **Non-Residential Assessments:**

Minimum Assessment	$12,900 per property
Commercial Properties (includes Condominiums)	$60 per $1,000 property valuation
Industrial Properties (includes Condominiums)	$60 per $1,000 property valuation
Hospital, Nursing and Convalescent Homes	$6,600 per bed
All Other Properties (includes Public and Quasi-Public Properties	$60 per $1,000 property valuation

14.4.3 Vacant land shall be assessed at the time improvements are made to the parcel.

14.4.4 All of the assessment amounts specified in this Section 14.4 shall be automatically increased on an annual basis by an amount equal to the increase in the Consumer Price Index for the previous year. The Town's finance director shall determine the Consumer Price Index for each year and adjust the assessments accordingly. In no event shall the assessment amounts be reduced due to any annual decline in the Consumer Price Index.

14.5 **Assessments for Privately-Built Sewers.** Notwithstanding any other provisions of this Ordinance, it is hereby determined that sanitary sewer lines built by and at the expense of a private party shall pay the following betterment assessment.

14.5.1 For each parcel of land which abuts a public highway or a highway which by general use is generally believed to be a public highway or a right-of-way, or a private road in which

sanitary sewer lines are installed by a private party and which are connected to the public sanitary system, the following betterment assessments shall apply.

14.5.2 **Residential Assessments:**

Single Family Homes	$12,900 per housing unit
Two Family (Duplex) Homes	$12,900 per housing unit
Multi-Family Homes, Condominiums and Apartments	$12,900 per housing unit
Mobile Homes	$6,600 per housing unit

14.5.3 **Non-Residential Assessments:**

Minimum Assessment	$12,900 per property
Commercial Properties (includes Condominiums)	$60 per $1,000 property valuation
Industrial Properties (includes Condominiums)	$60 per $1,000 property valuation
Hospital, Nursing and Convalescent Homes	$6,600 per bed
All Other Properties (includes Public and Quasi-Public Properties	$60 per $1,000 property valuation

14.5.4 Vacant land shall be assessed at the time improvements are made to the parcel.

14.5.5 All of the assessment amounts specified in this Section 14.5 shall be automatically increased on an annual basis by an amount equal to the increase in the Consumer Price Index for the previous year. The Town's finance director shall determine the Consumer Price Index for each year and adjust the assessments accordingly. In no event shall the assessment amounts be reduced due to any annual decline in the Consumer Price Index.

14.6 Assessments outlined in 14.4 and 14.5 shall be payable by the parcel owner annually over not more than twenty (20) years, commencing the year following sewer installation. Interest on the unpaid balance shall be eight percent (8%), such same rate to apply until the assessment is paid in full. Any assessment may be paid in full at any time. Unpaid assessments shall be liened and foreclosed upon in accordance with the general statutes governing the collection of property tax.

14.7 **Future Sewer Assessment.**

14.7.1 The assessment program for future sewered districts will be structured so that each assessment includes principal and interest amount. The interest shall be eight percent (8%), such same rate to apply until the assessment is paid in full. The principal and interest payments shall be due over a twenty-year term. A participant can choose to pay the entire remaining principal balance during that period without any interest penalty. In addition, a participant may make other periodic principal payments throughout the term of the bond, if so desired. Unpaid assessments shall be liened and foreclosed upon in accordance with the general statutes governing the collection of taxes.

14.7.2 The future sewer district assessment cost is calculated by establishing the final project cost (construction, administration, legal services and borrowing fees) which is then divided by the actual number of EDUs contained in the district. The assessment for the residential

users shall be as follows: 1 EDU charge per single family unit; for each additional attached unit there shall be an additional 0.5 EDU charge; condominiums shall be charged 1 EDU per condominium unit. The assessment for the commercial and industrial users within the district shall be based upon an Equivalent Dwelling Unit (EDU). The EDUs will equate each commercial and industrial user to a single family residential user. An EDU defined herein shall be as a unit whose wastewater flows are equal to 345 gallons per day. This equivalent flow of 345 gallons per day shall be divided by commercial or industrial user flows to establish the specific number of EDUs. Fractional EDUs are rounded to the nearest whole number. The minimum EDU charge is one. For example, a commercial facility using 930 gallons per day will translate to 2.7 (or 3) EDUs.

14.7.3 Vacant residential land shall be assessed as one single family residential user (1 EDU). If, at the time the vacant land is developed and those improvements result in greater than a single family residence, the Town will re-assess that property. The additional assessment shall be imposed for a twenty (20) year period.

14.7.4 Vacant commercial and industrial lands shall be assessed as one single family residential user (1 EDU). Once the property is developed, the Town shall re-assess that property and establish a new EDU value. The new EDU value shall be imposed for a twenty (20) year period.

14.7.5 Notwithstanding the foregoing, the Town shall have discretion to defer sewer assessments against parcels of land if the owner of such parcel, within seven (7) years of the date of the sewer assessment, has installed a new septic system, provided that such parcel shall remain subject to assessment and shall begin paying such assessment at least seven (7) years from the date of initial assessment.

14.7.6 Notwithstanding anything to the contrary in this Section 14.7, the assessments calculated and payable under this Section 14.7 shall not be less than the base assessment amounts specified in Sections 14.4 and 14.5 above. To the extent that the assessment calculated pursuant to Section 14.7 is lower than it would have been had it been calculated pursuant to Section 14.4 or Section 14.5 above, the higher assessment shall apply.

14.7.7 Ramblewood Estates. In consideration of the easement granted to the Town by the Ramblewood Estates Housing Cooperative Corporation on September 29, 2006 and recorded March 5, 2007 in the Town's land evidence records, the assessment for each owner of property with mobile homes on Lane D (but only on Lane D) in the Ramblewood Estates shall not be due or payable until such owner is connected to the Town sewer system, at which time such owner shall pay the then applicable assessment as set forth in Section 14.4 or Section 14.5, as applicable. For the avoidance of doubt, this Section 14.7.7 shall not apply to any other owners of property with mobile homes in the Ramblewood Estates; it shall only apply to owners of property with mobile homes on Lane D in the Ramblewood Estates. All owners of property with mobile homes in the Ramblewood Estates not located on Lane D shall be responsible for any applicable sewer assessments pursuant to the general provisions of this Article 14.

14.8 If the Town finds it necessary to install (where proposed low pressure sewer is being created or a dwelling that is located in a low lying area along a gravity sewer system) grinder pumps as part of the future project area, the Town will provide one grinder pump unit to each developed parcel at no

cost to the dwelling owner. The availability of the grinder pump shall remain in effect up to one year of the project acceptance. For an undeveloped parcel, the Town will provide a credit to be determined by the Commission at the time the parcel is improved. The installation of the grinder pump is the responsibility of the dwelling owner. The operation and maintenance of the grinder pump system shall be the responsibility of the dwelling owner. The owner shall obtain a service contract from a qualified firm to provide operation and maintenance to the system and a copy of the service contract shall be submitted with the permit application in order to receive an approval to connect to the sanitary system. The owner shall provide emergency power to the grinder pump system during power outages. The Town is not responsible to provide emergency power or to provide maintenance to the grinder pump system(s). The owner will be responsible for the replacement of the pump if the need arises.

14.9 Assessments collected in excess of the bond indebtedness shall be retained in the Town's Sewer Fund to be used for capital improvements projects. The funds within the Sewer Fund shall be retained in an account for renewal and replacement of capital equipment and/or the reduction of existing and future debt repayment.

14.10 All assessed funds shall be held in a special revenue account ("Town of Coventry Sewer Fund") under the custody of the Finance Director, Town of Coventry. This fund shall be designated for use by the Town of Coventry for sewer related purposes.

ARTICLE XV – USE CHARGE

15.1 The following annual charges for use of the sewerage system of the Town of Coventry are hereby established, to be paid by every person, firm or corporation whose particular sewer enters into said system.

15.1.1 The cost of operation and maintenance of the complete sewer system shall be financed solely from sewer customer charges.

15.1.2 A sewer charge shall be levied to each customer upon connection to the public sewage system. The service charge shall be based upon the quantity of water used at the premises of the customer as measured by the water meter in use thereat, except as otherwise hereinafter provided.

15.1.3 For domestic and commercial users, the rates and charges for each billing period shall be determined by each user's annual water use. The usage rates, charges and fees shall be established from time to time by Town Council Resolution. (Assessments shall be established by Ordinance only, per Article XIV.) The Council may establish a minimum amount per billing period which all customers must pay for which a maximum contribution of wastewater is allowed.

15.1.4 The wastewater usage shall be based upon eighty percent (80%) of the water meter reading as determined by the Kent County Water Authority

15.1.5 Industrial users exceeding the limits set forth herein for BOD and Total Suspended Solids, Total Nitrogen and Total Phosphorus concentrations shall be surcharged with rates established by the West Warwick Sewer Commission.

15.1.6 In the event a lot, parcel of land, building or premises discharging sanitary commercial or industrial sewage or other liquids into the Town sewage system either directly or indirectly, is not a user of water in the whole supplied by public or private water utility, then, in each such case the consumption shall be set at 10,000 cubic feet per year unless a meter is installed and readings are provided to and verified by the Town. The Director of Public Works must be notified if and when a property is connected to a well.

15.1.7 In the event two or more lots, parcels of real estate residences, dwelling units or buildings discharging sanitary sewage water or other liquids into the sanitary sewage system of the Town are users of water and the quantity of water is measured by a single water meter, then, in each case for billing purposes, the minimum charge for the sewer rates and charges shall be multiplied by the number of lots, parcels or real estate, residences, dwelling units or buildings served through the single water meter.

15.1.8 Charges for the sewage disposal service shall be billed and collected by the Town.

15.1.9 Outside Meters: In the event water is used for purposes which do not enter the Town sewage system, including but not limited to water used in pools and sprinkler systems, the owner of such premises may, at his own expense, install such meter as shall be approved by the Director of Public Works for the measurement of water so used in order that a proper allowance may be made, and the sewage service charge reduced accordingly. The Director of Public Works may set policies and procedures for documentation of outside water usage.

15.1.10 The rates and charges may be billed to the tenant or tenants occupying the property serviced, but such billing shall in no way relieve the owner or owners from liability in the event payment is not made as herein required. The owners of property served which are occupied by tenants shall have the right to examine the collection records of the Town for the purpose of determining whether such rates and charges have been paid by such tenants, provided that such examination shall be made at the office in which the records are kept and during the regular business hours of such office.

15.1.11 Each charge or service fee levied pursuant to this Ordinance is hereby made a lien upon the corresponding lot, land or premises served by the connection to the sanitary sewage system of the Town. Failure to pay said charge or service fee within the prescribed period of time, such charge or fee shall then be collected as other Town taxes are collected. The official record of the Town shall constitute notice of penalty and of said lien as herein provided.

15.1.12 All money collected under the provisions of the Ordinance shall be deposited in a sewage enterprise fund and expenditures from which are to be made only for maintenance, operation, administration, debt service and other related sewage system expenses.

15.1.13 The Town, in addition to the other remedies provided by this Ordinance may institute legal proceedings to collect overdue sewer service charges. Penalties may be added to the original sewer bill for late payment which penalties shall be set by the Town Council by resolution.

ARTICLE XVI- CHANGES IN THESE REGULATIONS

16.1 These regulations may be rescinded or modified or added to by the Town Council at any time when, in their opinion, such action is for the best interests of the Town of Coventry.

ARTICLE XVII- CONSTRUCTION BY LICENSED DRAIN LAYER ONLY

17.1 Construction of all sewer service connections within the Town of Coventry shall be performed only by drain layers who are licensed by the Town of Coventry and who shall furnish a bond with surety to the Town of Coventry on the form furnished by said Town.

ARTICLE XVIII- LOW PRESSURE SEWERS

18.1 In areas where the Town Council determines that the expansion of the sewer works through use of gravity sewer lines is impracticable, the Town may authorize the construction of sewer lines which can be used only by means of pressure pumps on the property of individual users. Such lines shall be called low pressure sewers (LPS). Any person whose property connects to a LPS shall be assessed in the same manner, and at the same rate as a property owner who abuts a gravity line on a town street or highway.

18.1.1 Any person who applies for connection to a LPS shall be required to obtain approval from the Town of any pumps to be used by that person necessary for connection to the LPS.

ARTICLE XIX – PRIVATELY OWNED WASTEWATER TREATMENT FACILITIES

19.1 Owners of privately owned wastewater treatment facilities shall maintain the system in good working order and operate as efficiently as possible. Proper operation and maintenance shall include, but not be limited to, effective performance based on facility design, adequate operator staffing and training and adequate laboratory and process controls, including quality assurance procedures as determined to be appropriate by the Board and backup or auxiliary facilities or similar systems to assure compliance or effective performance. Proper operation and maintenance must include emergency procedures and reporting requirements in case of power outages, natural disaster, labor shortage (whether the result of intentional work stoppages or epidemic), equipment failure, acts of terrorism/vandalism or sanitary sewer overflow. Reporting requirements shall include verbal notification to the Director of Public Works and the RIDEM as soon as possible, but not exceeding twenty-four (24) hours of discovery of the event; a written report must be submitted to the Director of Public Works, the Superintendent and RIDEM not more than five (5) business days of the event's ending.

19.2 The Owner shall submit (for review and approval by the Director of Public Works and the Superintendent) an Operations and Maintenance Plan describing standards and procedures by which the wastewater treatment facility will be staffed, operated and maintained during normal and emergency conditions. Should development of the Plan include the practice of engineering, the Plan must then be prepared and certified by a Registered Professional Engineer registered in the State of Rhode Island.

19.3 The Owner of a new wastewater treatment facility shall submit an Operations and Maintenance Plan to the Director of Public Works for review and approval prior to commencement of the construction of the new wastewater treatment facility.

19.3 The Owner of an existing wastewater treatment facility without an approved Plan must submit for approval a Plan necessary to comply with the requirements herein within six (6) months of the promulgation of this Ordinance.

19.4 The contents of the Plan shall include, at a minimum, the following:

a. Description and schematics of the entire Wastewater Treatment Facility. This description and schematic must include:

1) Sewer line maps of the collection system, which will include, but not be limited to, the overall service area, pipe, diameter, distances between centers of manholes, slope or direction of flow, and the locations of the system's components (i.e., pump station).

2) A summary of all design criteria, including capacity calculations for the Wastewater Treatment Facility.

3) A site plan depicting the location of the buildings, utilities and property line. The plan shall be formatted in geodetic coordinates (NAVD 1983, NAD1988). The as-built plans shall be submitted electronically in AutoCAD format 2000 or later and in paper format with an original stamp. The plan shall include the entire collection system to the municipal system. Such systems may include a private system not owned by the owner of the connection collection system. All easements must also be indicated on the plan.

b. Descriptions of, and detailed operating procedures for, pump station and/or treatment processes and major and essential equipment, including sampling and monitoring equipment (if required).

c. A preventative maintenance plan for the pump station, collection system or Treatment Facility.

d. A list of supplies and essential spare parts necessary to be kept on site for normal and emergency use throughout the wastewater treatment facility.

e. A staffing plan, whether the positions are full- or part-time, and required Grade of Licensure, as stated by any rules and regulations promulgated by the Rhode Island Board of Certification of Operators of Wastewater Treatment Facilities.

f. A security system.

g. Emergency procedures and reporting requirements in case of power outages, natural disaster, labor shortage, equipment failure, acts of terrorism/vandalism or sanitary sewer overflow. Reporting requirements shall include verbal notification to the Rhode Island Department of Environmental Management, the Town, and the Superintendent, if applicable, as soon as possible but not exceeding twenty-four (24) hours of discovery of the event; a written report must be submitted not more than five (5) business days of the event's ending.

h. Emergency contact information shall be posted on or near the pump station so as to be visible from a public access area. A contact list must also be provided to the Director of Public Works and the Superintendent which shall include: Owner's contact information, facilities contact

person information, monitoring service contact information, contract services contact information and preferred vendor's information and any other contact which may be required to mitigate or control a sewer overflow.

i. A monitoring plan for force main systems which includes, at a minimum, redundant level control and failure notification. An hour meter is required for each pump.

ARTICLE XX

20.1 These regulations shall be in full force and effect from and after its passage, approval, recording, and publication as provided by law.

PROPOSED BY:/s/ Laura Flanagan

POSTED BY TOWN CLERK: April 30, 2009

INTRODUCED: COUNCIL MEETING HELD ON: May 18, 2009

ADVERTISED IN: Kent County Daily Times on June 19, 2009

HEARD DATE: July 6, 2009

DULY ADOPTED ON: July 6, 2009

FIRST AMENDED AND RESTATED

INTERMUNICIPAL AGREEMENT FOR WASTEWATER SERVICES BETWEEN THE TOWN OF WEST WARWICK AND THE TOWN OF COVENTRY

THIS AGREEMENT made this 20th day of JULY A. D. 19 99 by and between the TOWN of WEST WARWICK, a municipal corporation of the State of Rhode Island, by and through the WEST WARWICK SEWER COMMISSION, hereinafter collectively referred to as "WEST WARWICK," and the TOWN of COVENTRY, a municipal corporation of the State of Rhode Island, hereinafter referred to as "COVENTRY."

WITNESSETH:

WHEREAS, WEST WARWICK has constructed and has in operation a municipal wastewater treatment plant and other appurtenant facilities, located in WEST WARWICK, to collect, treat and dispose of the wastewater for the residents of WEST WARWICK, as well as portions of COVENTRY, WARWICK, SCITUATE, CRANSTON AND WEST GREENWICH; and

WHEREAS, the Federal government is empowered under Public Law 95-217, as amended, to make Federal grants for the construction of public treatment works, and to impose conditions on the award of such grants; and

WHEREAS, WEST WARWICK has accepted State and Federal grants for the construction of public wastewater treatment works, and must abide by the applicable State and Federal laws, rules and regulations; and

WHEREAS, WEST WARWICK wastewater treatment operation is regulated by Rhode Island Pollutant Discharge Elimination System Permit No. RI 0100153; and

WHEREAS, the State and Federal grants received by WEST WARWICK reflect inclusion of wastewater flows from COVENTRY as the basis for the design of the funded facilities as a condition of said grants; and

WHEREAS, WEST WARWICK and COVENTRY mutually agree it is in the best interest of both municipalities and the State of Rhode Island to enter into an Agreement whereby WEST WARWICK would receive, treat and dispose of wastewater from COVENTRY; and

WHEREAS, wastewater collection and disposal is a mutual problem involving financing, construction, operation and maintenance of facilities; and

WHEREAS, WEST WARWICK and COVENTRY have previously entered into an Agreement for "Sewer Construction and Sewage Disposal," dated November 28, 1983, and a supplemental Agreement regarding

"Payments Owed by the Town of COVENTRY to the Town of WEST WARWICK for Sewer Construction Costs," dated October 6, 1994; and

WHEREAS, certain modifications and/or additions have been made to the wastewater collection and treatment facilities of WEST WARWICK in order to collect and treat the wastewater from COVENTRY; and

WHEREAS, additional modifications are required to be made to the wastewater collection system in order to convey wastewater from COVENTRY; and

WHEREAS, the aforementioned previously executed Agreements only address the secondary upgrade to the status of the Regional Project, and

WHEREAS, Rhode Island Department of Environmental Management (RIDEM) developed a Consent Agreement (No. 90-6679) which mandated that the WEST WARWICK treatment system shall be upgraded to produce an effluent quality of a tertiary level. These improvements have been dictated by the need to improve the quality of the Pawtuxet River to Class C waters; and

WHEREAS, COVENTRY is obligated to share in the capital cost of the required upgrades which have been deemed necessary by RIDEM and WEST WARWICK. Percentage of COVENTRY'S share is presented in Appendix "A"; and

WHEREAS, WEST WARWICK and COVENTRY are authorized by law to enter into contracts with each other for the purpose of aiding in the prevention or abatement of water pollution and/or to make mutually suitable arrangements for the disposal of wastewater;

WHEREAS, COVENTRY, as a participating municipality has or is in the process of fulfilling its financial obligation and WEST WARWICK has fulfilled its obligations to expand their wastewater treatment facility as provided in the previous agreement dated November 28, 1983; and

WHEREAS an amendment to the original agreement dated November 28, 1983 is necessary in order to address the financial obligations to meet the requirements of RIDEM Consent Agreement (No. 90-6679) as well as updating the procedural issues in administration of the agreement before and after the completion of the project; and

WHEREAS, the acceptance and execution of this Amendment, represents the acknowledgment of the parties that the obligations of COVENTRY, as a participating municipality, and the Town of WEST WARWICK as set forth in the original agreement have been met and this amendment is intended to redefine the procedure issues to be followed by COVENTRY, as a participating community and as such, upon execution of this agreement the prior agreement dated November 28, 1983 will become null and void and of no further force and effect.

NOW, THEREFORE, in consideration of these premises and the mutual undertaking of the parties hereto, the parties agree as follows:

1. DEFINITIONS AND REPRESENTATIONS

1.1 For all purposes of this Agreement and amendments thereto, the following listed terms shall have the meanings set forth below:

A. "Average Daily Flow" shall mean the total annual volume of wastewater recorded at a metering station or other point divided by the number of days in the year.

B. "Biochemical Oxygen Demand" (BOD) means the quantity of oxygen utilized in the biochemical oxidation of organic matter under the standard laboratory procedure of five (5) days, at 20 degrees C expressed in terms of weight and concentration (milligrams per liter).

C. "Building Service Connection" shall mean the service extension from a residential, commercial, industrial or other building to the public sewer (or other place of disposal), also called a house connection. This is generally a 4 inch or 6 inch diameter pipe.

D. "Capital Cost" shall mean the costs of planning, design, financing, and construction of wastewater works, including but not limited to engineering and legal fees, easements and other interests in real estate, and amortization costs.

E. "Class C Waters" shall mean waters that are suitable for fish, shellfish and wildlife habitat; suitable for recreational boating and industrial cooling; good aesthetic values.

F. "COVENTRY Flow" means the amount of wastewater flowing from COVENTRY into the WEST WARWICK System as determined by Article 4 hereof.

G. "COVENTRY Interceptor Areas" are as defined in COVENTRY's approved Facilities Plan.

H. "COVENTRY O & M Share" means that portion of the annual cost of operation and maintenance, determined in accordance with Article 4 hereof.

I. "COVENTRY Project Share" means and is limited to the amount of the total project costs allocated to COVENTRY in accordance with the percentages of each item of the project cost listed on Appendix "A".

J. "COVENTRY System" means the sanitary sewer interceptor lines, lateral sewer lines and other appurtenances located, or to be located in the Town of COVENTRY which are intended to convey wastewater from sources in COVENTRY to the WEST WARWICK System.

K. "Disposal" shall mean the disposition of wastewater or sludge by WEST WARWICK after treatment by its wastewater treatment plant.

L. "Domestic Wastes" means liquid wastes:

(i) From the noncommercial preparation, cooking, and handling of food; or

(ii) Containing human excrement and similar matter from the sanitary conveniences of dwellings, commercial buildings, industrial facilities, and institutions. It shall not contain groundwater, storm water, surface water, or cooling water or industrial wastewater.

M. "Dwelling Unit" shall mean a house, an apartment, a group of rooms, or a single room occupied or intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants have either:

(i) Direct access from the outside of the building or through a common hall; and/or

(ii) Complete kitchen facilities for the exclusive use of the occupants.

N. "Easement" shall mean a legal right for specific use of land owned by others.

O. "Fiscal year" means the annual accounting period commencing July 1 and ending June 30 of each year. The fiscal year is denoted by the calendar year in which the fiscal year ends (i.e., FY96 ends in June 1996).

P. "Holding Tank Waste" means the wastewater from a domestic Individual Sewerage Disposal System.

Q. "Industrial Wastewater" means the liquid wastes resulting from the processes employed in industrial, manufacturing, trade, or business establishments, as distinct from domestic wastes.

R. "Infiltration" shall mean the water entering a sewer system from the ground through such means as defective pipe, pipe joints, connections or manhole walls. Infiltration does not include and is distinguished from inflow.

S. "Inflow" shall mean the water discharged to a sewer system (including service connections) from such sources as roof leaders, cellar, yard, and area drains; foundation drains; cooling water discharges; drains from springs and swampy areas; manhole covers; cross-connection from sewers; catch basins; stormwater runoff; street wash waters; and drainage in general. Infiltration/inflow is the total quantity of water entering a sewer system from both infiltration and inflow.

T. "Maximum Daily Flow" shall mean the highest total volume measured at a metering station or other point over a continuous twenty-four hour period.

U. "Measured Wastewater Flow" means the total unadjusted flow volume recorded at flow metering devices, referred to in Article 4 hereof.

V. "Monthly Average" shall mean the total volume or quantity for a calendar month divided by the number of days in that month.

W. "Net Capital Cost" shall mean the capital cost after deduction of federal and state grants and other capital income such as earnings on the investment of bond proceeds.

X. "North Branch Interceptor" means an underground interceptor sewer collecting wastewater from the northeast area of COVENTRY, as well as parts of CRANSTON and SCITUATE, running parallel to the North Branch of the Pawtuxet River, and transporting said wastewater to the WEST WARWICK system at the town line on Main Street (Route 115).

Y. "Operation and Maintenance Costs" or "O & M Costs" includes the total annual expenses actually incurred by WEST WARWICK in the operation and maintenance of the Regional Wastewater Treatment Facilities pursuant to a budget covering the categories of annual operating and maintenance costs described in Article 4 hereof.

Z. "Participating Municipality" means any one of the following municipal corporations: WEST WARWICK, COVENTRY, SCITUATE, WEST GREENWICH, CRANSTON and WARWICK. The term "Participating Municipalities" is the collective designation for more than one Participating Municipality.

AA. "Peak Hourly Flow" shall mean the highest volume of wastewater recorded at a metering station or other point over a continuous sixty minute period.

AB. "Person" shall include an individual, trust, firm, joint stock company, corporation (including a quasi-government corporation), partnership, association, syndicate, municipality, municipal or state agency, fire district, club, non-profit agency or any subdivision, commission, department, bureau, agency or department of state of federal government (including quasi-government corporation) or of any interstate body.

AC. "Pretreatment" shall mean the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater to an acceptable state prior to or in lieu of discharging or otherwise introducing such pollutants into a water pollution control facility. The reduction or alteration can be obtained by physical, chemical, or biological processes, except as prohibited by Title 40, Code of Federal Regulations, Section 403,6(d).

AD. "Pretreatment Standards" means all applicable Federal rules and regulations implementing section 403 of the Act, as well as any nonconflicting State or local standards. In cases of conflicting standards or regulations, the more stringent thereof shall be applied.

AE. "Regional Interceptors" shall mean the interceptor sewers that will service the Participating Municipalities in WEST WARWICK. They are the Maisie Quinn Interceptor, Upper Maisie Quinn Interceptor, Maisie Quinn Connecting Sewer, Clyde Interceptor, Natick Relief Sewer and Natick Interceptor, COVENTRY North Branch, COVENTRY New London Turnpike.

AF. "Regional Project(s)" shall mean the development, design and construction work performed in connection with upgrading and expanding the existing WEST WARWICK wastewater

collection and treatment system to transport, treat and dispose of wastewater from COVENTRY and other Participating Municipalities.

AG. "Regional Pumping Stations" shall mean pumping stations which service the Participating Municipalities that are located in WEST WARWICK. They are the Clyde Pumping Station and Glen Drive Pumping Station.

AH. "Regional System" shall mean those portions of the WEST WARWICK system which handle wastewater from COVENTRY and WEST WARWICK.

AI. "Regional Wastewater Treatment Facility" shall mean the wastewater treatment facility, including an arrangement of devices and structures used for treating wastewater, industrial wastes and sludges, located in WEST WARWICK which was constructed and upgraded to treat wastewater generated in the Participating Municipalities.

AJ. "Reserve Capacity" shall mean the hydraulic limits based upon the flow presented in Exhibit A and the associated organic load for Domestic Waste for BOD and total suspended solids of 250 mg/l each.

AK. "Rhode Island Department of Environmental Management" (RIDEM) shall mean the State agency which administers and regulates wastewater discharges.

AL. "Rhode Island Pollutant Discharge Elimination System" (RIPDES) means the Rhode Island system for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing discharge permits and imposing and enforcing pretreatment requirements pursuant to Title 46, Chapter 12 of the General Laws of Rhode Island and the Clean Water Act.

AM. "Sanitary Sewer" shall mean a sewer which carries sewage and to which storm, surface, and groundwater are not intentionally admitted.

AN. "Septage Waste" means the wastewater from a domestic Individual Sewage Disposal System.

AO. "Sewage" shall mean a combination of the water-carried wastes from residences, business buildings, institutions and industrial establishments.

AP. "Shall" is mandatory; "May" is permissive.

AQ. "Significant Industrial User" (SIU) means any industrial user of the Participating Municipalities wastewater treatment system whose flow exceeds:

(i) An average of 25,000 gallons per day of process wastewater to the wastewater treatment system (excluding sanitary, non-contact cooling or boiler blowdown wastewater); or

(ii) Five (5) percent or more of the average dry weather hydraulic or organic capacity of the wastewater treatment system; or

(iii) Whose wastewater concentration of BOD and total suspended solids exceeds 250 mg/l; or

(iv) A federal EPA categorical industry; or

(v) Industries with sanitary or non-toxic discharges using solvents, toxic chemicals and/or hazardous chemicals that could potentially be discharged into the sewers.

AR. "Sludge" shall mean waste containing varying amounts of solid contaminants removed from water, sanitary sewer, wastewater or industrial wastes by physical, chemical and biological treatment.

AS. "Storm Drain" (sometimes termed "storm sewer") shall mean a sewer which carries storm and surface waters and drainage, but excludes sewage and industrial wastes, other than unpolluted cooling water.

AT. "Storm Water" means any flow occurring during or immediately following any form of natural precipitation and resulting therefrom.

AU. "Total Flow" means the total amount of wastewater flowing into the WEST WARWICK system, and includes the wastewater contributed to such system by the Participating Communities.

AV. "Total Suspended Solids" means the total suspended matter that floats on the surface of, or is suspended in, wastewater, or other liquids, and which is removable by laboratory filtering.

AW. "Toxic Waste" shall mean any substance listed as toxic under section 307(a)(1) of the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., listed under the Hazardous Substances Right-to-Know Act, R.I.G.L. §28-21-1 et seq., and as may otherwise be designated by the town.

AX. "User Charges" shall mean charges levied in proportion to the use of wastewater works. As required by State Law and by regulations promulgated by the U.S. Environmental Protection Agency, such charges must, to the extent possible, distribute operation and maintenance (including replacement and necessary additional requirements) cost to each user in proportion to the user's contribution to the total loading of the wastewater works, where construction of such works may have been financed in part by a Federal grant.

AY. "Wastewater" means the liquid and water-carried industrial or domestic wastes from dwellings, commercial buildings, industrial facilities, and institutions, together with any groundwater, surface water, and storm water that may be present, whether treated or untreated, which is discharged into or permitted to enter the Town's wastewater treatment system.

AZ. "Wastewater Treatment System or Wastewater Treatment Facility" means any devices, facilities, structures, equipment or works owned or used by the Participating Municipalities for the purpose of the transmission, storage, treatment, domestic or industrial wastes, including intercepting sewer, outfall sewers, sewage collection systems, pumping, power, and other equipment and their appurtenances, extensions, improvements, remodeling, additions, and alterations thereof; elements essential to provide standby treatment units and clear well facilities; and any work, including site acquisition of the land that will be an integral part of the treatment process or is used for ultimate disposal of residues from such treatment.

BA. "WEST WARWICK System" means the existing WEST WARWICK wastewater collection and treatment system that are not part of the Regional Project.

2. GENERAL AGREEMENT

2.1 WEST WARWICK agrees to receive for treatment and disposal, subject to such limitations and exceptions as provided for in this Agreement, all wastewater emanating from within COVENTRY, including all industrial and commercial wastewater. WEST WARWICK agrees to reserve 2.25 million gallons per day of the total capacity of both liquid and solid treatment with an equivalent or organic loading of 4700 pounds per day of BOD and total suspended solids, in the collection and disposal system for COVENTRY for the duration of this Agreement.

2.2 COVENTRY agrees to construct and maintain, at its own cost, the sewer collection system, including collector and interceptor sewers, pumping facilities and sewer force mains, within COVENTRY required to convey wastewater to the WEST WARWICK sewer system, except as provided for in this Agreement.

2.3 COVENTRY agrees to pay it share of the cost to upgrade the interceptor sewers and pumping stations located in WEST WARWICK. COVENTRY'S share shall be based upon a percentage of the total average daily flow of the regional wastewater flow as presented in Appendix A.

2.4 The COVENTRY sewer system shall connect with and into the WEST WARWICK sewer system at the following locations along the COVENTRY-WEST WARWICK town line:

A. the existing sewer on Main Street (Route 115);
B. a proposed sewer on Pulaksi Street;
C. the existing sewer on Tiogue Avenue (Route 3), North Road Terrace;
D. the existing sewer on New London Turnpike;
E. at other lesser points of connection where existing sewers enter WEST WARWICK, including but not limited to: Washington Street (Route 117), Harris Avenue, Park Avenue, Hebert Street, and Ames Street; and
F. at other points which are mutually agreed upon, where WEST WARWICK sewers are capable of handling additional flows. Negotiation of these points shall be in accordance with the requirements set forth in other section of this Agreement.

2.5 There are certain wastewater sources located in COVENTRY which are presently connected to the WEST WARWICK wastewater collection system. Such sources may continue to discharge wastewater to WEST WARWICK. (This provision does not include sources of wastewater covered under separate Agreements, as described in Article 11 hereof.)

2.6 For the design and construction of the North Branch Interceptor, COVENTRY shall enter into separate Agreements with the Town of SCITUATE and the City of CRANSTON.

3. PROJECT COSTS AND PAYMENT

3.1 Prior to execution of this Agreement, WEST WARWICK has completed work on upgrading and expanding the Regional Wastewater Treatment Facility to provide secondary wastewater treatment for an average daily flow of 7.89 million gallons per day of wastewater from all sources tributary to the facility. In addition, WEST WARWICK has begun work on upgrading and expanding portions of its wastewater collection system addition, including the East Natick Interceptor, portions of the Maisie Quinn Interceptor, the Clyde Pumping Station and Force Main and portions of the Clyde Interceptor, which will transport wastewater from COVENTRY to the Regional Wastewater Treatment Facility. This work included provisions for treating and disposing of an average daily wastewater flow 2.25 million gallons per day and an organic concentration of BOD and total suspended solids of 4700 pounds per day from COVENTRY.

3.2 Prior to execution of this Agreement, COVENTRY has paid to WEST WARWICK a total of approximately $1,200,427 for its share of project costs for the secondary upgrade/expansion of the WEST WARWICK wastewater facilities. In addition, on October 6, 1994, COVENTRY and WEST WARWICK entered into an Agreement whereby COVENTRY would pay to WEST WARWICK an additional $501,000 for its share of these project costs. The sum of these amounts ($1,701,427) represents COVENTRY'S cost to meet the secondary treatment requirements to accommodate for the reserved capacity of 2.25 million gallons per day (average daily flow) and an organic load of BOD and total suspended solids of 4700 pounds per day, as well as its share of all facilities planning costs for the Tertiary Treatment Project currently being proposed for the Regional Wastewater Treatment Facility.

3.3 On 28 February 1999, the Rhode Island Department of Environmental Management approved an amendment to the Tertiary Treatment Facilities Plan. The average design flow is 10,500,000 gallons per day of wastewater from all sources tributary to the facility. COVENTRY's wastewater contribution to the Tertiary Facility shall remain at 2.25 million gallons per day and an organic concentration of BOD and total suspended solids of 4700 pounds per day.

3.4 WEST WARWICK is currently completing the planning of a Tertiary Treatment Project, which will upgrade the Regional Wastewater Treatment Facility to provide advanced wastewater treatment and improve the quality of the effluent discharged to the Pawtuxet River. COVENTRY was given a final copy of the Tertiary Facilities Plan which outlines the estimated costs to design, construct and operate the proposed improvements, including the anticipated amount of any Federal and/or State grants and loan assistance to be received; the proposed wastewater flows to be used in design of the improvements; and the calculated COVENTRY share of such project costs.

3.5 WEST WARWICK is required by the Tertiary Consent Agreement RI 90-6679 to have a preliminary design report issued within six (6) months of DEM approval of the Facilities Plan, twelve (12) months later have fifty-percent design plans, and six (6) months to complete one hundred percent design plans.

3.6 Project costs for the Tertiary Treatment Project, and any other Regional Project projects, shall include the total cost of construction and equipment, the cost of design, engineering and supervisory costs, inspection, legal costs, costs of acquiring real and personal property in WEST WARWICK for said treatment facilities, fiscal costs, financing costs, and all other costs of establishing the project and making it ready for operation, including the cost of borrowing in anticipation of Federal and/or State aid. The Net Capital Cost shall be the project cost less any State and/or Federal aid received.

3.7 COVENTRY shall be responsible for its share of the Net Capital Costs of such Regional Projects follows:

$$\frac{\text{(Net Capital Cost of the Project)} \times \text{(COVENTRY'S Design Flow)}}{\text{(Total Facility Design Flow)}}$$

COVENTRY's Design Flow for each facility shall be the wastewater flow from COVENTRY tributary to the particular Regional Project facility.

3.8 COVENTRY shall pay its share of the design cost within thirty (30) days of the execution of the design contract. If there are any changes to the final design fee due to Addenda, the appropriate adjustments will be made at the conclusion of the design. COVENTRY will be invoiced, and within forty-five (45) days shall remit payment to WEST WARWICK

3.9 At the completion of the design phase, COVENTRY shall be given the option to pay its local share of the construction cost either in a lump sum payment based upon the bid price at the start of the construction phase or monthly, plus interest. The interest shall be based upon WEST WARWICK interest cost to offset the lag State and Participating Communities reimbursement. At the conclusion of the construction phase, adjustments will be made to reflect any change orders.

3.10 The amount of such progress payments made by COVENTRY to WEST WARWICK shall not exceed ninety-eight percent (98%) of the amount calculated as due from COVENTRY, with the remaining two percent (2%) being paid upon project completion. Monthly payments will be fifteen (15) days of receipt of such statements. If payment is not received within that time frame, WEST WARWICK will assess an additional one and one half percent (1½%) interest per month from the date of the invoice.

3.11 Upon completion of the Tertiary Treatment Project or other Regional Projects, and receipt by COVENTRY of a certificate from the WEST WARWICK Treasurer's Office certifying such completion and showing the final amounts paid by WEST WARWICK and COVENTRY on account of the Regional Project, COVENTRY will pay the balance of the COVENTRY share, within thirty (30) days of the receipt of such certificate.

A. The certificate of Project Completion shall include the certification by the authorized representative for WEST WARWICK and the consulting engineer for the project. Such certificate shall not be issued prior to substantial completion of the project and use of the project facilities is approved by the appropriate Federal and/or State regulatory agencies.

B. The final amount to be paid to WEST WARWICK on account of any Regional Project shall be verified by an dependent auditor selected by COVENTRY, at its own cost, if such an audit is determined to be necessary. This end of project audit will be conducted on behalf of COVENTRY within twelve (12) months of the final payment to WEST WARWICK.

C. The final project costs to be paid by COVENTRY and WEST WARWICK shall be subject to the final audit prepared on behalf of the Federal and/or State regulatory agencies funding the project(s).

4. OPERATION AND MAINTENANCE

4.1 WEST WARWICK shall continue to accept wastewater flows from all sources in COVENTRY which are currently discharging to the WEST WARWICK system. WEST WARWICK shall accept wastewater from new collection facilities in COVENTRY if capacity is available at the Wastewater Treatment Facility in the Regional Interceptor and Pumping Station, up to the reserved capacity identified hereinbefore, upon at least thirty (30) days notice from COVENTRY of completion of such wastewater collection facilities.

4.2 WEST WARWICK agrees to provide adequate and qualified operating personnel for the Regional Wastewater Treatment Facility, wastewater collection system and all components thereof.

4.3 The annual cost for operation and maintenance of the Regional Wastewater Treatment Facility shall be the basis of the operation and maintenance charge. The cost shall include wages, fringe benefits, maintenance, repairs, chemicals, utility costs, equipment rentals and replacements, administration costs and other costs related to the operation of the Regional Wastewater Treatment Facility. However, the annual O & M costs (a) shall not include any principal, interest or other charges in connection with any indebtedness incurred by WEST WARWICK, and (b) shall not include any WEST WARWICK expenses not directly attributable to, and included in, such annual budget of the Regional Wastewater Treatment Facility.

A. Any and all revenue generated at or by the operation of the Regional Wastewater Treatment Facility and wastewater collection system, including but not limited to: septage receiving/treatment fees; revenues from sale of composted sludge; and Federal, State and/or regional funding for operation and maintenance, or for any use of the facilities; shall be applied to the annual operation and maintenance budget, thereby reducing the operation and maintenance costs.

4.4 In March of each calendar year, COVENTRY shall provide a list of new ownership by plat and lot.

4.5 In May of each calendar year, WEST WARWICK shall prepare a budget for the upcoming fiscal year for operation and maintenance of the Regional Wastewater Treatment Facility. Copies of the budget shall be distributed to COVENTRY no later than June 1 of each year, such that COVENTRY may plan its user charge billings accordingly.

4.6 For the purposes of determining the "COVENTRY O & M share", the total measured (or estimated) wastewater flow from COVENTRY shall be determined based on the following methodology:

A. Wastewater flows shall be determined based on water use records. Wastewater flows shall be eighty percent (80%) of the water use for the properties, based on water meter records provided by Kent County Water Authority, billed directly to the properties by WEST WARWICK. COVENTRY users not connected to a public water supply will be billed at the fixed consumption established by WEST WARWICK.

B. Significant Industrial Users shall be billed directly by WEST WARWICK in accordance with WEST WARWICK'S Sewer Ordinance based upon flow excess concentration of organic loadings (BOD and total suspended solids).

4.7 WEST WARWICK shall maintain adequate records showing wastewater flow, capital costs, operation and maintenance costs and computation of the amount due from COVENTRY. Such records, as well as all parts of the regional wastewater collection and treatment system, shall be open and available for inspection by representatives of COVENTRY upon request.

4.8 No charges shall be billed to COVENTRY for annual operation and maintenance of the Regional Wastewater Treatment Facility or the WEST WARWICK system for any portion of the COVENTRY reserve capacity which is not being used by COVENTRY. No charges shall be assessed to COVENTRY for operation and maintenance of the WEST WARWICK local wastewater collection system.

5. ASSESSMENTS

5.1 Any parcel of land located in COVENTRY, from which the building service connection can conveniently and economically be tied directly into a sewer line located in, owned and maintained by WEST WARWICK, shall be allowed to do so upon receiving written permission from both COVENTRY and WEST WARWICK. Consistent with the WEST WARWICK Sewer Ordinance, these parcels shall be assessed a sewer assessment by COVENTRY and shall be considered a part of COVENTRY'S sewer capacity.

5.2 Any parcel of land located in COVENTRY from which the building service connection is tied directly to a sewer line located in, owned and maintained by WEST WARWICK, and any parcel located in COVENTRY, shall be assessed an annual sewer user charge by WEST WARWICK. This annual sewer user charge shall be based on water use records, as used for and at the same rates as if the parcel was located in WEST WARWICK.

5.3 Any Significant Industrial User located in COVENTRY shall be assessed directly by WEST WARWICK in accordance with the WEST WARWICK Ordinance and Pretreatment Program for annual permit fees and excess concentrations of BOD and total suspended solids. In the event that the metering devices are not installed or the SIU is connected directly to a WEST WARWICK line, WEST WARWICK shall also assess them for flow.

5.4 All parcels located in COVENTRY which are connected to the sewer collection system, except those parcels presently being assessed by WEST WARWICK as mutually agreed upon, shall be assessed a sewer assessment by COVENTRY based on the Sewer Ordinance adopted by COVENTRY.

5.5 The amount of any sewer assessments collected by WEST WARWICK from properties located in COVENTRY which were improperly collected and from which the building service connection is not tied directly into a sewer line located in, owned and maintained by WEST WARWICK shall be credited the individual and notify the owner of COVENTRY'S assessment plans. COVENTRY has one year from the date of each annual assessment to file an appeal stating the conditions why WEST WARWICK is not entitled to that assessment. WEST WARWICK will credit a maximum of one (1) year's fees to the individual.

6. REGULATIONS OF OPERATION

6.1 The Participating Municipalities shall comply with the Sewer Ordinances and Industrial Pretreatment Program as may be adopted by WEST WARWICK as amended. COVENTRY shall delegate to WEST WARWICK, through adoption of an Industrial Pretreatment ordinance, the enforcement of industrial pretreatment of wastes to insure wastewater is acceptable to meet local, State and Federal standards. The Regional Wastewater Treatment Facility shall be operated in such a manner that the effluent discharge into the Pawtuxet River complies with applicable State and Federal standards.

6.2 In exercising the foregoing reservations, permissions and rights of WEST WARWICK with respect to COVENTRY, WEST WARWICK agrees that it will not impose any standard or requirement which would be arbitrary, discriminatory or unreasonable or would treat the participant or users of the COVENTRY system on a different basis than is applicable to users similarly situated in WEST WARWICK or any other participating municipality.

6.3 WEST WARWICK and COVENTRY agree to maintain complete and accurate books and records concerning all matters relative to this Agreement and the performance thereof, to retain the same for a period of at least seven (7) years following the fiscal year to which such books and records relate, and to permit the agents, accountants and other duly authorized representatives of the other party to have access to all such books and records during reasonable business hours for the purpose of examining any of the same and making extracts or copies thereof. WEST WARWICK and COVENTRY agree to make available to the representatives and agents of the other party, all facilities and equipment related to the wastewater system of each, especially all meters, metering devices and records.

7. ALTERATIONS, ADDITIONS AND EXPANSION

7.1 WEST WARWICK may be required to alter, add or expand the Regional Wastewater Treatment Facility or Regional Interceptors as a result of DEM requirement or failure of the present components, or to meet the needs of Participating Municipalities. WEST WARWICK shall notify the Participating Municipalities affected by this action. The cost for these modifications shall be shared in accordance with Article 3.

7.2 When combined flows from the Participating Municipalities reaches eighty percent (80%) of the designed capacity of the Regional Wastewater Treatment Facility for a ninety (90) day period, or when the individual flow of any of the Participating Municipalities reaches 80% of their respective design capacity for a ninety (90) day period, WEST WARWICK shall cause a new projection of wastewater flows from the Participating Municipalities to be made. The Project Management Committee shall then determine the amount of expansion capacity for treatment facilities necessary, if any, to serve the Participating Municipalities. Before any expansion of capacity is made or before any major capital alteration or change in treatment is planned, the parties shall first negotiate and agree upon appropriate changes in the terms of this Agreement to assist with such expansion or changes and the method of financing the same. The method of financing shall provide for project costs to be shared proportionately by the Participating Municipalities, in the proportion of the increased design capacities provided by the expansion for the respective municipality.

7.3 If after completion of the Regional Project, improvements, alterations or additions (hereinafter "improvements") of a capital nature which do not increase the capacity of the Regional Wastewater Treatment Facility are deemed necessary, WEST WARWICK shall notify COVENTRY and the other Participating Municipalities of the nature of the improvements and other factors. COVENTRY and the other Participating Municipalities will be responsible for their proportional share.

7.4 If COVENTRY anticipates a major increase of flow as a result of new development, whether commercial, industrial or residential, which will cause COVENTRY'S need for capacity to exceed the capacity (hydraulic and/or organic) reserved through this Agreement, it may petition WEST WARWICK to increase its capacity. WEST WARWICK shall determine the amount of capacity available, the capacity the participant requires, the capacity of sewer lines to handle this increased flow and the cost required to purchase this capacity. Cost shall be based on:

$$\frac{\text{(Additional Capacity to be purchased)} \times \text{(Total local cost of design \& construction)}}{\text{(Total capacity of WWTF)}}$$

7.5 If COVENTRY determines that it will not require the entire reserve capacity (hydraulic and organic) as set forth in this Agreement, and another Participating Municipality (or other person acceptable to WEST WARWICK) can be found who is in need of a portion of this unused capacity, COVENTRY may petition WEST WARWICK to transfer, sell, assigns or lease that portion of its reserved capacity to a Participating Municipality or third party upon such terms and conditions as COVENTRY shall deem acceptable. WEST WARWICK shall determine the amount of reserve capacity COVENTRY has available and the capacity of sewer lines to handle this increased flow.

In no event shall COVENTRY transfer, sell, assigns or lease more than ten (10%) percent of its reserve capacity in any calendar year to any Participating Municipality or third party. Any and all monies received by COVENTRY as a result of any such transfer, sale, assignment or letting shall be placed in a separate account to be used solely for server associated debt retirement, maintenance and repairs of wastewater collection facilities located within the Town of COVENTRY and/or maintenance and repairs to individual septic disposal systems.

The amount of COVENTRY'S reserved capacity and the amount paid for such capacity shall be calculated as of the date of the transfer of the capacity. This Agreement shall be amended to make the appropriate provisions for such a decrease in COVENTRY's flows.

8. CONSTRUCTION OF THE COVENTRY SYSTEM IN WEST WARWICK

8.1 Completion of the COVENTRY system requires the installation of a section of interceptor pipeline, hereinafter referred to as the Washington Interceptor, in WEST WARWICK. The Washington Interceptor will be located in Pulaski Street and/or Robinson Way, between the COVENTRY-WEST WARWICK town line and the South Branch of the Pawtuxet River, and will connect to the existing 30 inch diameter Maisie Quinn Interceptor at Pulaski Street on the eastern side of the South Branch of the Pawtuxet River.

8.2 COVENTRY will, at its expense, construct the Washington Interceptor, including portions of the pipeline in WEST WARWICK. Copies of the plans and specifications for such construction shall be provided to WEST WARWICK prior to executing a construction contract, for review and approval by WEST WARWICK. WEST WARWICK agrees to cooperate with COVENTRY and its agents and contractors for the purpose of enabling such construction to proceed without delay and will promptly provide or obtain all such licenses, permits and approvals as may be necessary for the construction.

8.3 COVENTRY will require any construction contract for work in WEST WARWICK to include provisions requiring the contractor to maintain liability insurance in which COVENTRY, WEST WARWICK and their respective agents shall be named as additional insured with limits of coverage not less than $5,000,000.

8.4 The completed Washington Interceptor located in COVENTRY shall be owned, operated and maintained by COVENTRY, at its expense. COVENTRY hereby gives to WEST WARWICK, at no cost, the portion of the Washington Interceptor located in WEST WARWICK. WEST WARWICK shall operate and maintain that portion of the interceptor.

8.5 WEST WARWICK agrees not to impose any restrictions, requirements or costs upon the construction, operation and maintenance of the Washington Interceptor, which are different than those restrictions, requirements or costs which are imposed on sewers constructed and maintained by WEST WARWICK.

8.6 Prior to the construction of interceptors within COVENTRY, WEST WARWICK must determine if the Regional Interceptors are adequate to handle the additional flow. If the Regional Interceptor(s) is(are) inadequate to handle the increased flow, COVENTRY, WEST WARWICK and the Regional

Participants must agree to a time frame for the upgrading prior to the construction of any interceptors within WEST WARWICK.

8.7 In the future, COVENTRY and WEST WARWICK may mutually agree to allow COVENTRY to construct other portions of its sewer system in WEST WARWICK. In such case the conditions shall be similar to those agreed to herein for the construction of the Washington Interceptor.

9. PROJECT MANAGEMENT COMMITTEE

9.1 There is hereby established a Project Management Committee. The purpose of this Committee is to oversee the Regional Project which shall entail the development of engineering plans, specifications and construction arrangements; the review of any change orders during construction; the development of policies and program that shall be applicable to all participating municipalities; and the review of any proposed improvements, additions or changes in the Regional Project. The Committee shall consist of a representative of each Participating Municipality.

9.2 The Committee will be chaired by the WEST WARWICK representative. Vacancies will be filled in the manner as original appointees. Each member shall have a weighted vote based upon the percentage of its reserved capacity. Meetings of the Committee shall be held as necessary during the development and construction of any upgrade, and quarterly thereafter, and at the call of the Chairperson to carry out the duties of the Committee. The Committee may appoint advisors who may attend and participate in all meetings except that they shall not be counted for a quorum, nor vote on Committee actions.

9.3 WEST WARWICK will act as the contracting and management agent (Owner) for the Regional Project and its Town Council acting as the Sewer Commission, will sign all contracts, advertise all bids, supervise construction and be liable for any violation of EPA or DEM Rules and Regulations.

10. SEPTAGE

10.1 WEST WARWICK agrees to accept residential septic tank and/or cesspool waste (septage) generated within the boundaries of COVENTRY for treatment. WEST WARWICK agrees to make every effort to accept all septage from COVENTRY as the process permits.

10.2 If at any time the amount of septage which the regional wastewater treatment facility is capable of accepting and treating is limited, WEST WARWICK will accept septage generated from the Participating Municipalities, in preference to septage generated in other communities.

10.3 The charge for accepting and treating septage shall be reasonable and based on the cost for providing such services set by the WEST WARWICK Sewer Commission.

11. MISCELLANEOUS CLAUSES

11.1 Notwithstanding any other provision of this Agreement, COVENTRY shall not be required to observe or perform any obligation under this Agreement unless WEST WARWICK shall have obtained and

made available to COVENTRY all necessary easements, licenses, permits and approvals as required by Federal, State and local entities for completion of the regional project and COVENTRY'S wastewater collection system.

11.2 No failure or delay in performance of this wastewater disposal Agreement by either party shall be deemed to be a breach thereof when such failure or delay is occasioned by or due to any act of God, strikes, lockouts, wars, riots, epidemics, explosions, sabotage, breakage or accident to machinery or lines of pipe, the binding order of a Court or governmental authority, or any other cause, whether of the kind herein enumerated or otherwise, not within the control of the party involved.

11.3 Agreement shall be reviewed annually by both parties hereto with the intention that any inequity which may arise or any error discovered be corrected through negotiations.

11.4 If any section, subsection, sentence, clause, phrase or portion of this Agreement is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct and independent provision, and such holding shall not affect the validity of the remaining portions hereof.

11.5 A copy of the final construction plans and specifications, a copy of Federal and State Grant applications and offers, a copy of all contracts, a copy of all regulatory agency project inspection reports, a copy of all regulatory agency project inspection reports, a copy of the final construction cost audit shall be sent to and filed with the Town Clerk of COVENTRY and the Town Clerk of WEST WARWICK for record purposes, within forty-five (45) days of completion.

11.6 There is at present Agreement between WEST WARWICK and Woodland Manor Associates which is not now part of this Intermunicipal Agreement. Through this contract an average daily flow of 200,000 gallons per day is set aside for sewer users in the service area. No change or alteration in the Woodland Manor Agreement, no increase in flow nor any additional usage of said line shall be made by Woodland Manor Associates unless a new Agreement is made between WEST WARWICK, COVENTRY and said Woodland Manor Associates. It is understood that the capacity granted to Woodland Manor Associates is not part of the COVENTRY reserve capacity under this Agreement (Appendix B).

11.7 There is at present an Agreement between WEST WARWICK and the state of Rhode Island and Providence Plantations (State) which is not now part of this Agreement. Through this contract a minimum of 320,000 gallons per day of average flow and a maximum of 800,000 gallons per day of average flow is set aside for sewer users in the service area, which includes out-of-town users. COVENTRY is, through this contract, an out-of-town user; therefore, residential, business and industrial users located within COVENTRY's boundaries may use this sewer. It is agreed that a residential, business or industrial user who wishes to use this sewer shall be allowed to do so in accordance with the intermunicipal Agreement between WEST WARWICK and COVENTRY. Further, no change or alteration in the Agreement between the State and WEST WARWICK, no increase in flow or any additional usage of said line shall be made unless a. new Agreement is made between WEST WARWICK, COVENTRY and the State (Appendix C).

enumerated or any matter requiring negotiation or Agreement herein then the following procedures shall be followed:

A. The Chief Administrative Officers of WEST WARWICK and COVENTRY shall discuss the issue or issues informally with the hope that the issue or issues will be resolved through the informal discussions. Said informal discussions will be conducted as soon as practicable but in no event later than fifteen (15) days after receipt of a written request for the scheduling of such an informal discussion.

B. If the Chief Administrative Officers of WEST WARWICK and COVENTRY are unable to resolve the issue or issues informally, then notice shall be given immediately forwarded to the legislative bodies of WEST WARWICK and COVENTRY who shall conduct informal joint discussions with the hope that the issue or issues will be resolved. These informal discussions between the legislative bodies of the respective towns shall take place as soon as practicable but in no event later than fifteen (15) days after receipt of said notice.

C. If the issue(s) are not resolved by informal discussion, either WEST WARWICK or COVENTRY may request, at any time subsequent to the expiration of sixty (60)days from the date of the commencement of the first informal discussions as set forth in subparagraph (A) above, a joint public meeting of the legislative bodies of WEST WARWICK and COVENTRY. Within fourteen (14) days of receipt of such request, a joint meeting of the legislative bodies of WEST WARWICK and COVENTRY shall be held to discuss the issue(s).

D. If the issue or issues are not resolved within ten (10) days after the joint public meeting of the legislative bodies of WEST WARWICK and COVENTRY, then, in that event, either WEST WARWICK or COVENTRY may request that the unresolved issue or issues be submitted to arbitration. Within seven (7) days after arbitration has been requested, WEST WARWICK and COVENTRY shall each select and name one arbitrator and shall immediately thereof notify each other in writing of the name and address of the person so selected. The two (2) arbitrators so selected and named shall, within ten (10) days from and after the selection, agree upon and select and name a third arbitrator. If within said ten (10) days the arbitrators are unable to agree upon the selection of a third arbitrator, such third arbitrator shall be selected in accordance with the rules and procedures of the American Arbitration Association. Whether the third arbitrator is selected by Agreement or under the rules and procedures of the American Arbitration Association, the said third arbitrator shall not be a resident of the State of Rhode Island. The arbitration procedures shall be conducted in accordance with the rules and procedures of the American Arbitration Association. The decision of the arbitration panel shall be final and binding upon WEST WARWICK and COVENTRY.

IN WITNESS WHEREOF the parties have caused this Agreement to be executed by their respective fully authorized officers and their corporate seals affixed hereto the day and year first above written.

TOWN OF WEST WARWICK

Robert B. Moorehead

Town Council

TOWN OF COVENTRY

Town Council

APPENDIX A
PERCENTAGE OF CONSTRUCTION COST

Interceptor	West Warwick	Coventry	West Greenwich	Scituate	Cranston	Warwick
Maisie Quinn	41%	56%	3%			
Maisie Quinn Relief	54%	34%	8%			4%
Clyde Interceptor & Pumping Station	63%	32%		4%	1%	
Natick Interceptor	58%	35%	2%	0.5%	0.2%	4.3%
Treatment Facility & East Natick Interceptor	72.72%	21.43%	1.28%	.74%	1.07%	2.77%

PERCENTAGE OF DESIGN COST

Treatment Facility & East Natick Interceptor	72.72%	21.43%	1.28%	.74%	1.07%	2.77%

TOWN OF COVENTRY

RESOLUTION

OF THE

TOWN COUNCIL

NO. 05-03-2203

BE IT RESOLVED by the Town Council of the Town of Coventry that the Town Council President and Town Manager are hereby authorized to execute the attached Addendum to the Intermunicipal Agreement for Wastewater Services between the Town of Coventry and the Town of West Warwick.

PASSED AND ADOPTED this 3rd day of February. 2003.

APPROVED Ronald S. Wood
Council President

ATTEST: Roberta H. Johnson, CMC
Town Clerk

A certified true copy

ATTEST: Roberta H. Johnson, CMC
Roberta H. Johnson, CMC
Town Clerk

February 5, 2003

TOWN OF WEST WARWICK

RESOLUTION

OF

TOWN COUNCIL

ACTING AS A SEWER COMMISSION

NO. SC2003-07

SUBJECT: ADDENDUM TO THE INTERMUNICIPAL AGREEMENT WITH COVENTRY

BE IT RESOLVED by the Town of West Warwick Town Council, Acting as a Sewer Commission, that the Town Council President and Town Manager are hereby authorized to execute the attached Addendum to the Intermunicipal Agreement for Wastewater Services between the Town of Coventry and the Town of West Warwick.

PASSED AND APPROVED ON THIS 18th DAY OF FEBRUARY 2003.

APPROVED: Bernard F. Magiera
BERNARD F. MAGIERA, TOWN COUNCIL PRESIDENT

ATTEST:
DAVID D. CLAYTON, TOWN CLERK

ADDENDUM TO THE INTERMUNICIPAL AGREEMENT
FOR WASTEWATER SERVICES
BETWEEN THE TOWN OF COVENTRY AND THE TOWN OF WEST WARWICK

THIS AGREEMENT is made this 3 day of February, 2003, by and between the Town of Coventry ("Coventry") and the Town of West Warwick ("West Warwick"), both municipalities within the State of Rhode Island.

WHEREAS, on July 20, 1999, the parties hereto entered into an Intermunicipal Agreement for Wastewater Services ("Intermunicipal Agreement"), under which Coventry shall utilize the wastewater treatment facility located in and operated by West Warwick, pursuant to various terms and conditions set forth in said Intermunicipal Agreement; and

WHEREAS, pursuant to and as part of the terms and conditions of the Intermunicipal Agreement, Coventry has agreed to pay its share of the costs and expenses associated with the enlargement and modernization of the wastewater treatment facility and regional collection system; and

WHEREAS, pursuant to the Intermunicipal Agreement, Coventry has agreed to pay West Warwick its share of the costs and expenses for the advanced wastewater treatment upgrade ("AWT project"); and

WHEREAS, West Warwick agrees to request a loan from the Rhode Island Clean Water Finance Agency ("CWFA") for both its share and Coventry's share of the AWT project costs; and

WHEREAS, the parties desire to enter into an agreement for the payment by Coventry for its share of the AWT project; and

WHEREAS, it is agreed by the parties that this Agreement for payment shall be made and become an Addendum to the July 20, 1999 Intermunicipal Agreement.

NOW THEREFORE, in consideration of the foregoing, it is hereby mutually agreed as follows:

1. The current estimated AWT project cost (construction and engineering) less available grant funds is $21,721,264.

2. Coventry's share of the estimated AWT project expenses is $4,654,867 which represents 21.43 % of the total cost.

3. At the conclusion of the construction phase of the AWT project, adjustments will be made to reflect all final costs.

4. Coventry agrees to pay and West Warwick agrees to accept payment for Coventry's share of the actual AWT project costs plus any interested assessed by CWFA in the manner and amounts dictated by the loan repayment schedule as set forth by CWFA (*estimated debt service schedule attached*). The final debt service schedule will be provided from CWFA at the conclusion of the construction project.

5. Coventry agrees pay West Warwick its share of the CWFA loan payment via an electronic transfer of funds into the designated West Warwick bank account at least two (2) days prior to the loan payment date as set forth by CWFA.

6. It is agreed that receipt of the total annual debt service payments for Coventry's share of the AWT project costs plus interest over the entire term of the loan shall close the Coventry account for payment of its share of the AWT project.

7. In the event Coventry fails to make the payments as set forth herein, then in such event, the parties acknowledge that West Warwick may take whatever remedial action is available to it in order to enforce the collection of the monies due and to recover all costs and damages incurred in collecting the debt. West Warwick may also assesses and recover delinquent interest to the maximum amount allowable by law. Remedial action may include, but is not limited to, legal action and the denial of future sewer tie-ins by Coventry to the West Warwick Regional Wastewater Treatment Facility.

8. Except as set forth herein, all other terms and conditions set forth in the July 20, 1999 Intermunicipal Agreement remain in full force and effect.

9. The parties agree that this signing this Agreement have the authority as vested in them by a vote of or as Council Members of their respective communities.

TOWN OF COVENTRY

BY: _____
TOWN MANAGER

BY: Ronald S. Wood
TOWN COUNCIL PRESIDENT

BY: Roberto H. Johnson, CMC
TOWN CLERK

TOWN OF WEST WARWICK

BY: _____
TOWN MANAGER

BY: _____
TOWN COUNCIL PRESIDENT

BY: _____
TOWN CLERK

TOWN OF COVENTRY

RESOLUTION

OF THE

TOWN COUNCIL

NO.

RESOLUTION OF THE TOWN OF COVENTRY
AUTHORIZING EXECUTION AND DELIVERY OF
AN ADDENDUM TO THE INTERMUNICIPAL AGREEMENT
FOR WASTEWATER SERVICES BY AND BETWEEN THE
TOWN OF COVENTRY AND THE TOWN OF WEST WARWICK

WHEREAS, pursuant to the Intermunicipal Agreement for Wastewater Services between the Town of West Warwick and the Town of Coventry dated July 20, 1999 (the "Intermunicipal Agreement"), the Town of West Warwick is undertaking the advanced wastewater treatment project (the "AWT Project"), a Regional Project, as defined in the Intermunicipal Agreement; and

WHEREAS, the Town of Coventry has agreed to pay 21.43% of the costs of Regional Projects under the Intermunicipal Agreement; and

WHEREAS, the parties desire to memorialize their agreement with respect to the sharing of costs for the AWT Project; and

WHEREAS, the parties executed an Addendum to the Intermunicipal Agreement on February 3, 2003; and

WHEREAS, the Town of West Warwick has requested and obtained a loan from the Rhode Island Clean Water Finance Agency ("RICWFA") for the AWT Project Costs; and

WHEREAS, in connection with the loan from the RICWFA, the parties seek to amend and restate their agreement with respect to the sharing of costs for the AWT Project;

NOW, THEREFOR, BE IT RESOLVED by the Town Council of the Town of Coventry, that the Town Manager, the Town Council President and the Town Clerk are authorized, empowered and directed, on behalf of the Town of Coventry to execute and deliver an Amended and Restated Addendum to the Intermunicipal Agreement with respect to sharing the cost of the AWT Project in substantially the form attached hereto or with such changes, omissions, insertions or revisions as said officers shall approve.

This Resolution shall take effect upon its passage.

PASSED AND ADOPTED this 14th day of July 2003

APPROVED Ronald D. Wood
President

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ATTEST: Roberta A. Johnson CMC
Town Clerk

TOWN OF WEST WARWICK

RESOLUTION

OF

TOWN COUNCIL

ACTING AS A SEWER COMMISSION

NO. SC2003-44

SUBJECT: ADDENDUM TO THE INTERMUNICIPAL AGREEMENT WITH COVENTRY

BE IT RESOLVED by the Town of West Warwick Town Council, Acting as a Sewer Commission, that the Town Council President and Town Manager are hereby authorized to execute the attached Addendum to the Intermunicipal Agreement for Wastewater Services between the Town of Coventry and the Town of West Warwick.

A TRUE COPY
ATTEST:
Janet Lanni
SEWER COMMISSION CLERK

PASSED AND APPROVED ON THIS 19th DAY OF AUGUST 2003.

APPROVED: _____
JEANNE-MARIE DIMASI, TOWN COUNCIL PRESIDENT

ATTEST: _____
DAVID D. CLAYTON, TOWN CLERK

AMENDED AND RESTATED ADDENDUM TO THE INTERMUNICIPAL AGREEMENT FOR WASTEWATER SERVICES BETWEEN THE TOWN OF COVENTRY AND THE TOWN OF WEST WARWICK

THIS AGREEMENT is made this 19th day of AUGUST, 2003, by and between the Town of Coventry ("Coventry") and the Town of West Warwick ("West Warwick"), both municipalities within the State of Rhode Island.

WHEREAS, on July 20, 1999, the parties hereto entered into an Intermunicipal Agreement for Wastewater Services ("Intermunicipal Agreement"), which document contains the understandings and agreements of the parties as they relate to the present and continued use by Coventry and its residents of the West Warwick Treatment Facility and the present and continued services to be provided by West Warwick for this use; and

WHEREAS, pursuant to and as part of the terms and conditions of the Intermunicipal Agreement, Coventry has agreed to pay its share of the costs and expenses associated with the enlargement and modernization of the wastewater treatment facility and regional collection system; and

WHEREAS, pursuant to the Intermunicipal Agreement, in order to assist the Town of West Warwick in providing for advanced wastewater treatment services for the Town of Coventry, Coventry has agreed to pay West Warwick for a share of the costs and expenses for the advanced wastewater treatment upgrade ("AWT project"), a Regional Project as defined in the Intermunicipal Agreement; and

WHEREAS, Coventry and West Warwick executed an Addendum to the Intermunicipal Agreement on February 3, 2003 to memorialize their agreement with respect to the sharing of costs of the AWT Project; and

WHEREAS, West Warwick has requested a loan from the Rhode Island Clean Water Finance Agency ("RICWFA") for the AWT project costs; and

WHEREAS, in connection with the loan from the RICWFA, the parties desire to amend and restate their agreement relating to the payment by Coventry for its share of the AWT project; and

WHEREAS, it is agreed by the parties that this Agreement for payment shall be made and become an Addendum to the July 20, 1999 Intermunicipal Agreement and shall amend and restate the Addendum dated February 3, 2003.

NOW THEREFORE, in consideration of the foregoing, it is hereby mutually agreed as follows:

1. The current estimated AWT project cost (construction and engineering) less available grant funds is $21,721,264.

2. Coventry's share of the estimated AWT project expenses is $4,654,867 which represents 21.43 % of the total cost.

3. At the conclusion of the construction phase of the AWT project, adjustments will be made to reflect all final costs.

4. In consideration of the improvements to the wastewater treatment facility and its benefits to the citizens of Coventry, Coventry agrees to pay and West Warwick agrees to accept payment for Coventry's share of the actual AWT project costs plus any financing costs assessed by RICWFA to West Warwick in the manner and amounts dictated by West Warwick's loan repayment schedule as set forth by RICWFA (*estimated debt service schedule attached*). The final debt service schedule will be provided from RICWFA at the conclusion of the construction project. It is hereby agreed that such payments are not intended to be a debt of Coventry.

5. Coventry agrees pay West Warwick its share of West Warwick's RICWFA loan payment via an electronic transfer of funds into the designated West Warwick bank account at least two (2) days prior to the loan payment date as set forth by RICWFA.

6. It is agreed that receipt of the total annual debt service payments for Coventry's share of the AWT project costs plus financing costs over the entire term of the loan shall close the Coventry account for payment of its share of the AWT project.

7. In the event Coventry fails to make the payments as set forth herein, then in such event, the parties acknowledge that West Warwick may take whatever remedial action is permitted by the Intermunicipal Agreement in order to enforce the collection of the monies due. Remedial action may include, but is not limited to, the denial of future sewer tie-ins by Coventry to the West Warwick Regional Wastewater Treatment Facility.

8. Section 12.2 of the July 20, 1999 Intermunicipal Agreement is amended to read as follows:

   12.2 This Agreement shall commence upon its execution. This document contains the understandings and agreements of the parties as they relate to the present and continued use by COVENTRY and its residents of the WEST WARWICK Treatment Facility and the present and continued services to be

provided by WEST WARWICK for this use. Accordingly, this Agreement shall remain in full force and effect for a period of forty (40) years from its effective date of July 20, 1999, unless and until it is amended by the mutual consent of all parties.

9. This Agreement is authorized and entered into pursuant to the laws of Rhode Island, including, but not limited to, Rhode Island General Laws § 46-12.2-10, Chapter 2005 of the Public Laws of 1920, as amended, and Chapter 330 of the Public Laws of 1997 in connection with financial assistance provided by the RICWFA. Coventry does hereby pledge and assign its wastewater system revenues pursuant to Rhode Island General Laws § 46-12.2-10(v) in order to secure its obligations in connection with financial assistance provided by the RICWFA.

10. This contract shall be recorded in the office of the Coventry Town Clerk, and West Warwick shall be entitled to the benefits of Section 21 of Chapter 2005 of the Public Laws of 1920, as amended.

11. Except as set forth herein, all other terms and conditions set forth in the July 20, 1999 Intermunicipal Agreement remain in full force and effect.

12. The parties agree that in signing this Agreement that they have the authority as vested in them by a vote of or as Council Members of their respective communities.

TOWN OF COVENTRY

By: _____
TOWN MANAGER

By: _____
TOWN COUNCIL PRESIDENT

By: _____
TOWN CLERK

TOWN OF WEST WARWICK

By: _____
TOWN MANAGER

By: _____
TOWN COUNCIL PRESIDENT

By: _____
TOWN CLERK

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Rhode Island Clean Water Finance Agency
Water Pollution Control Revolving Fund Revenue Bonds
Series 2003A Bonds

Loan Debt Service
Coventry - $4,643,000 Federal Direct Loan
(Loan Through West Warwick)

Date	Principal	Loan Rate	Interest	Fees @ 0.500%	Total Fees & Interest	Net Fees & Interest	Total Debt Service	Annual Debt Service	0% Program Requirement
06/05/03									
9/1/2003			1,623.98	712.27	2,336.25	2,336.25	2,336.25	2,336.25	1,623.98
3/1/2004			11,685.59	5,125.25	16,810.84	16,810.84	16,810.84		11,685.59
9/1/2004			21,522.87	9,439.84	30,962.71	30,962.71	30,962.71	47,773.55	21,522.87
3/1/2005			26,317.88	11,542.91	37,860.79	37,860.79	37,860.79		26,317.88
9/1/2005	244,000.00	0.490%	26,465.15	11,607.50	38,072.65	38,072.65	282,072.65	319,933.44	26,465.15
3/1/2006			25,867.35	10,997.50	36,864.85	36,864.85	36,864.85		25,867.35
9/1/2006	244,000.00	0.590%	25,867.35	10,997.50	36,864.85	36,864.85	280,864.85	317,729.70	25,867.35
3/1/2007			25,147.55	10,387.50	35,535.05	35,535.05	35,535.05		25,147.55
9/1/2007	244,000.00	0.710%	25,147.55	10,387.50	35,535.05	35,535.05	279,535.05	315,070.10	25,147.55
3/1/2008			24,281.35	9,777.50	34,058.85	34,058.85	34,058.85		24,281.35
9/1/2008	244,000.00	0.810%	24,281.35	9,777.50	34,058.85	34,058.85	278,058.85	312,117.70	24,281.35
3/1/2009			23,293.15	9,167.50	32,460.65	32,460.65	32,460.65		23,293.15
9/1/2009	244,000.00	0.920%	23,293.15	9,167.50	32,460.65	32,460.65	276,460.65	308,921.30	23,293.15
3/1/2010			22,170.75	8,557.50	30,728.25	30,728.25	30,728.25		22,170.75
9/1/2010	244,000.00	1.020%	22,170.75	8,557.50	30,728.25	30,728.25	274,728.25	305,456.50	22,170.75
3/1/2011			20,926.35	7,947.50	28,873.85	28,873.85	28,873.85		20,926.35
9/1/2011	244,000.00	1.100%	20,926.35	7,947.50	28,873.85	28,873.85	272,873.85	301,747.70	20,926.35
3/1/2012			19,584.35	7,337.50	26,921.85	26,921.85	26,921.85		19,584.35
9/1/2012	244,000.00	1.140%	19,584.35	7,337.50	26,921.85	26,921.85	270,921.85	297,843.70	19,584.35
3/1/2013			18,193.55	6,727.50	24,921.05	24,921.05	24,921.05		18,193.55
9/1/2013	244,000.00	1.180%	18,193.55	6,727.50	24,921.05	24,921.05	268,921.05	293,842.10	18,193.55
3/1/2014			16,753.95	6,117.50	22,871.45	22,871.45	22,871.45		16,753.95
9/1/2014	244,000.00	1.220%	16,753.95	6,117.50	22,871.45	22,871.45	266,871.45	289,742.90	16,753.95
3/1/2015			15,265.55	5,507.50	20,773.05	20,773.05	20,773.05		15,265.55
9/1/2015	244,000.00	1.260%	15,265.55	5,507.50	20,773.05	20,773.05	264,773.05	285,546.10	15,265.55
3/1/2016			13,728.35	4,897.50	18,625.85	18,625.85	18,625.85		13,728.35
9/1/2016	244,000.00	1.290%	13,728.35	4,897.50	18,625.85	18,625.85	262,625.85	281,251.70	13,728.35
3/1/2017			12,154.55	4,287.50	16,442.05	16,442.05	16,442.05		12,154.55
9/1/2017	244,000.00	1.330%	12,154.55	4,287.50	16,442.05	16,442.05	260,442.05	276,884.10	12,154.55
3/1/2018			10,531.95	3,677.50	14,209.45	14,209.45	14,209.45		10,531.95
9/1/2018	244,000.00	1.360%	10,531.95	3,677.50	14,209.45	14,209.45	258,209.45	272,418.90	10,531.95
3/1/2019			8,872.75	3,067.50	11,940.25	11,940.25	11,940.25		8,872.75
9/1/2019	244,000.00	1.390%	8,872.75	3,067.50	11,940.25	11,940.25	255,940.25	267,880.50	8,872.75
3/1/2020			7,176.95	2,457.50	9,634.45	9,634.45	9,634.45		7,176.95
9/1/2020	244,000.00	1.430%	7,176.95	2,457.50	9,634.45	9,634.45	253,634.45	263,268.90	7,176.95
3/1/2021			5,432.35	1,847.50	7,279.85	7,279.85	7,279.85		5,432.35
9/1/2021	244,000.00	1.450%	5,432.35	1,847.50	7,279.85	7,279.85	251,279.85	258,559.70	5,432.35
3/1/2022			3,663.35	1,237.50	4,900.85	4,900.85	4,900.85		3,663.35
9/1/2022	244,000.00	1.470%	3,663.35	1,237.50	4,900.85	4,900.85	248,900.85	253,801.70	3,663.35
3/1/2023			1,869.95	627.50	2,497.45	2,497.45	2,497.45		1,869.95
9/1/2023	251,000.00	1.490%	1,869.95	627.50	2,497.45	2,497.45	253,497.45	255,994.90	1,869.95
3/1/2024			-	-	-	-	-		
9/1/2024			-	-	-	-	-		
3/1/2025			-	-	-	-	-		
9/1/2025			-	-	-	-	-		
3/1/2026			-	-	-	-	-		
9/1/2026			-	-	-	-	-		
	4,643,000.00		637,443.67	247,677.77	885,121.44	885,121.44	5,528,121.44	5,528,121.44	637,443.67

RHODE ISLAND CLEAN WATER FINANCE AGENCY

LOAN POLICIES AND PROCEDURES

COMMUNITY SEPTIC SYSTEM LOAN PROGRAM

REVISED - MARCH, 2005

AUTHORITY: Policies and Procedures adopted in accordance to Title VI of the Federal Clean Water Act and Chapter 46-12.2 of the General Laws of Rhode Island.

RHODE ISLAND CLEAN WATER FINANCE AGENCY

LOAN POLICIES AND PROCEDURES

for the

COMMUNITY SEPTIC SYSTEM LOAN PROGRAM

I. PURPOSE: These Loan Policies and Procedures of the Rhode Island Clean Water Finance Agency (Agency) have been established to govern the lending activities between the Agency and local governmental units in the state of Rhode Island in connection with a Community Septic System Loan Program (CSSLP) under and pursuant to Title VI of the Federal Clean Water Act and Chapter 46-12.2 of the General Laws of Rhode Island as amended.

II. 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 Chapter 46-12.2 of the General Laws of Rhode Island as amended.

III. FINANCIAL ASSISTANCE: The objective of these Loan Policies and Procedures is to provide financial assistance to local governmental units to initiate a program of septic system repair in their community. The CSSLP is a source of funds to provide subsequent loans to homeowners for the repair or replacement of failed or failing septic systems or substandard systems within areas identified in the local government unit's On-site Wastewater Management Plan.

The RICWFA 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) will be the loan servicer on the subsequent homeowner loans. RI Housing will: accept applications from homeowners; coordinate payments to septic system installers/homeowners; collect repayments from homeowners; credit the homeowner repayments to the principal payment responsibility of the local governmental unit; and make monthly reports to both the Agency and the local governmental unit.

IV. LOAN APPLICATION: Request for financing under the Community Septic System Loan Program should be submitted in writing by the chief executive officer of the local governmental unit to the Executive Director of the Agency. No particular form of application shall be required but the written request should generally include:

1) A projection of the estimated need for repair or replacement of failed or failing system 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 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 homeowner 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 RICWFA.

4) A description of the overall operation of the local governmental unit 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. 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 for the Community Septic System Loan Program.

6) Such other information as will support a finding by the Agency that committing to the loan will not have an adverse impact on the finances of the Agency or its other borrowers.

V. LOAN APPROVAL PROCESS: Subject to availability of Agency funds and to prioritization by DEM of programs as outlined in the communities' On-site Wastewater Management Plans, loans will be approved by the Board of Directors of the Agency for any eligible local governmental unit. The local governmental unit will provide a general obligation pledge, note in fully marketable form, or other assurance deemed appropriate by the Agency 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:

1) sources of revenue and financial liquidity;
2) historical and projected financial operating results;
3) present and future debt service requirements;
4) impact of dedicated user fees and/or general revenues;
5) socioeconomic conditions and trends; and
6) effects of legal structure and any regulatory control.

VI. TERMS AND CONDITIONS: The homeowner repayment stream will be credited towards the community's responsibility for repayment of the principal portion of the CSSLP loan.

1) Rate - The subsequent loans to homeowners will carry a rate equivalent to 2% which will include all homeowner fees to be distributed as follows:

RI Housing	1.0%	Homeowner Loan Origination Fee
	0.5%	Homeowner Loan Service Fee
RICWFA	.5%	Community Loan Service Fee
	2.0%	Total CSSLP Rate

(CSSLP loan rates are subject to periodic changes as per Section X of this document.)

2) 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.

3) Amortization - The loan repayments from the homeowners will provide the principal and interest repayments to the Agency. As the primary borrower, the local government unit is responsible for any shortfall or default in the repayments from the homeowners. 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. RI Housing will collect payments from the homeowners and make principal and interest payments to the Agency on behalf of the local governmental unit.

4) 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 or any other negative financial impact to the Agency.

5) Security - Loans will have a pledge of (a) general revenues; and/or (b) may be secured by any revenues or other assets which the Agency deems appropriate to protect the interest of the other participants in the loan programs of the Agency, other creditors of the Agency, bondholders, or the finances of the Agency. The obligations of the Borrower may be subject to and dependent upon appropriations being made by the Borrower for such purposes.

6) Loan Advances - The local governmental unit will indicate in written form an estimate of its yearly requirement for septic system or substandard system repairs. As loans to homeowners are originated, the Agency 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/homeowners for approved project costs.

7) Community Specific Criteria for Homeowner Loans - The community may apply specific homeowner loan criteria such as; number of estimates needed from licensed septic system installers; 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 homeowner CSSLP rate of 2% 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 homeowners to repair or replace the failed septic 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.

8) Ineligible Project Costs - The funding of group or cluster septic system projects is not allowed under the CSSLP. Septic system projects on commercially owned property are not allowed under the CSSLP. Homeowner loans will be used for septic system repair or replacement only. CSSLP loans cannot be used for bathroom or kitchen improvements, additions or remodeling.

VII. REPORTING REQUIREMENTS: Community borrowers will be required to provide information to the Agency during the life of the loan. Required information includes:

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

2) A copy of its Annual Audited Financial Statements in accordance with Generally Accepted Government Accounting Standards annually within 180 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 financed by the loan.

4) Other information or reports that the Agency deems appropriate.

VIII. LOAN DOCUMENTS: The terms and conditions of each loan will be evidenced by a 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 Agency enabling act.

IX. COMPLIANCE WITH STATE AND FEDERAL LAW: Recipients (the community) of loans must comply with all applicable state and federal laws and regulations.

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

_____

Anthony B. Simeone, Executive Director

Public Notice Date: March 21, 2005
Public Hearing Date: April 11, 2005
Filed With Secretary of State: April 13, 2005
Effective Date: May 3, 2005

Woodland Manor
Wastewater Pump Station Evaluation

Town of Coventry

Coventry, Rhode Island

December 2013

FUSS & O'NEILL

317 Iron Horse Way, Suite 204
Providence, RI 02908

FUSS & O'NEILL

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Wastewater Pump Station Evaluation
Town of Coventry, Rhode Island

Appendices

End of Report

A - Budgetary Opinion of Capital Cost
B - Overall Woodland Sewer System Map
C - Existing Gorman Rupp Pump Information
D - Testing Raw Data

FUSS & O'NEILL

1 Executive Summary

Fuss & O'Neill was retained by the Town of Coventry, RI in October 2013 to perform evaluations of the major components of the existing private pump station and a flow meter station to identify existing defects and potential future repairs for the system.

Woodland Manor Pump Station

Based on a review of the limited existing data, visual inspection of the major mechanical, electrical and structural components of the Woodland Manor wastewater pump station, ultrasonic bearing testing, megger testing and thermographic imaging of the pumps, Fuss & O'Neill recommends the following improvements:

- Site re-grading, removal of stained/contaminated soil and backfill with new soil (further evaluation me be required)
- Repair roof flashing and membrane
- Replace steel door to storage closet
- Prep and repaint walls and slab
- Provide hoist foundation and Crane for equipment removal
- Provide new valves and pressure gauges
- Provide new heater, dehumidifier and exhaust fan
- Rebuild existing pumps as required
- Replace existing sump pump
- Replace existing with new electrical equipment
- Replace existing diesel generator set and concrete pad with a new automatic transfer switch (ATS)
- New control panel and programming
- New Bioxide double-walled tank and chemical feed pump for odor control
- Provide shredder (bypass pumping)
- Replace corroded suction piping within the wet well

The budgetary level opinion of cost for the improvements to the Woodland Pump Station in 2013 dollars ranges from:

Short Term Improvements	$140,000 to $214,000 (within the first year)
Long Term Improvements	$153,000 to $233,000

Detailed opinion of cost information is provided in *Appendix A*.

Flow Meter Station

Flow Meter Station located off Tiogue Avenue was inspected visually, and following upgrades are recommended:

- New Autodialer
- Alarm programming
- Control and telephone service wiring (alarms) improvements

The budgetary level opinion of cost for the improvements to the Flow Meter Station ranges from $4,300 to $6,500. Detailed opinion of cost information is provided in *Appendix A*.

2 Introduction

The Town of Coventry, Rhode Island is in the process of transferring ownership of a private pump station and two force mains to the Town. The Woodland Manor pump station is a "suction-lift" style facility installed in the late 1970s or early 1980s. The effluent from Woodland Manor is conveyed through a 10-inch PVC force main approximately 18,000 feet to its terminus at a manhole in a congested area in Tiogue Avenue.

There is a 6-inch force main located on Reservoir Road that convey wastewater from the Westwood Estates pump station to the Woodland sewer force main at intersection of Reservoir Road and Tiogue Avenue, approximately 3,000 feet from the pump station. Town is interested to purchasing this 6-inch force main in the Reservoir Road right of way.

There is an existing flow meter station located along the sewer force main at the intersection of Tiogue Avenue and Darton Street in the Town of Coventry. See overall Woodland Sewer System Map in *Appendix B*.

3 Project Understanding

Fuss & O'Neill was hired by the Town of Coventry to conduct an evaluation of the major components of the existing private pump station and a flow meter station to identify existing defects and potential future repairs for the systems.

It's our understanding that the Town, prior to taking ownership of the Woodland pump station and two force main systems (10-inch and 6-inch), was interested in an evaluation of the major components of the existing pump station. The focus of the evaluation was on equipment that would be costly to repair or replace in the future. We understand the Town would like to purchase these two force mains in order to expand their sewer system.

Fuss & O'Neill provided the following services for the pump station system evaluations:

- Conducted visual observation of pumps and piping components during several pumping events.
- Visually evaluated and assessed the standby generator at Woodland Manor Station
- Visually evaluated electrical, HVAC, telemetry and controls systems and switch gear.
- Visually evaluated the condition of alarms, level control, and lighting.
- Conducted megger tests, ultrasonic bearing tests and vibration monitoring for the existing pumps at each facility

- Performed thermographic imaging for each of the pumps to ascertain potential areas of excessive friction.
- Observed the building and site for structural defects, deficiencies and potential concerns.
- Observed the flowmeter manhole and pipe materials.
- Conducted cursory hydraulic capacity testing on each of the pumps based on the pressure gauge readings within the pump station and correlated with readings at the flowmeter located at the discharge pipe to obtain pump flow and head.
- Prepared an evaluation summary report with a list of recommendations for the facility
- Prepared a budgetary level opinion of cost

The following sections describe the results of the investigation and evaluation of the existing conditions at the pump station and the flow meter station. It also provides recommendations and a budgetary level opinion of cost for the short term (within the first year) and long term recommended improvements.

3.1 Evaluation Criteria

Existing condition of the pump station were evaluated based on standards presented in:

- TR-16: Guides for the Design of Wastewater Treatment Works, by the New England Interstate Water Pollution Control Commission, 2011.
- NFPA 820: Standard for Fire Protection in Wastewater Treatment and Collection Facilities, 2008.
- 10 States Standards: Recommended Standards for Wastewater Facilities, 2004 Edition.

Physical evaluations were conducted to examine the conditions of the existing wastewater pumping equipment, piping, and instrumentation. Site conditions and structural features were also documented to determine if improvements were necessary.

4 Existing Facilities

4.1 Woodland Manor Pump Station

The Woodland Manor Pump Station (pictured) is a private sewer pump station located at 22 Woodland Drive in Coventry, Rhode Island. The facility collects wastewater flows from the Woodland Manor apartment complex and the commercial users in the area. See overall Woodland Sewer System Map in *Appendix B.*

Woodland Manor Pump Station

The Pump Station site consists of an underground wet well, a pump/control building, and an emergency generator with a fuel tank. The system also has a Bioxide tank (975 gallons) for odor control outside of the building.

4.1.1 Existing Conditions Assessment

4.1.1.1 Civil Site Features

The pump station is located in a fenced in area. The chain link fence has a minimum height of 5 feet 6 inches tall and an average height of at least 6 feet 0 inches tall. A locked, gated vehicular entrance to the site is located on the north side of the site. The fence is in fair condition with localized areas of rusting and one minorly bent corner post.

Generator Fuel Tank

Pump Station Fencing

In general, the ground slopes towards the rear of the site (from north to south); however, there are minor soil settlements throughout the site. Much of the soil along the west side of the building is level or slopes towards the building. This does not allow for provide positive drainage away from the building. This condition can allow rainwater to accumulate against the foundation and may allow water to migrate through the foundation wall into the building.

Oil from the generator has spilled onto the soil immediately adjacent to the generator on the south side of the generator pad. The extent of this spill is not known at this time and may extend beneath the existing generator pad. Further investigation of the soils around the pad should be completed to determine if additional contamination is present and if remediation is necessary.

4.1.1.2 Pump Station Building

The existing pump station is a single-story concrete masonry block (CMU) building with a footprint of approximately 22 feet by 22 feet. The mean roof height of the building is 12 feet above grade and the finished floor elevation is approximately 5 feet below grade creating a space with an overall interior height of approximately 17 feet from finished floor to roof. A 5 foot 8 inch by 5 foot 8 inch storage closet, accessed by a door on the east side of the station is

Pump Station Building

located in the northeast corner of the building. The roofing system consists of a ballasted single-ply membrane. The roof appears to pitch toward the west side of the building, where it is drained by a scupper and downspout. Rainwater exits the downspout on the ground surface in the vicinity of the building.

There is an electric unit heater, dehumidifier and sump pump within the pump station building. Also, there is a potable water supply inside the building that seems in good condition and includes the following:

Pump Station Water System

Pump Station

- Neptune Water Meter
- Double Check Valve Assembly (backflow preventer)
- Air Release Valve
- Isolation Ball Valves
- Water Expansion Tank
- Pipe Drain/Hose Bibb
- ¾ inch Copper Pipe

4.1.1.3 Pump Station Wet well

The wet well is constructed of cast-in-place concrete. Wet wells are utilized for storing wastewater flows prior to pump operation, allowing for proper pumping and level control, maintaining sufficient submergence of the pump suction inlet, preventing excessive deposition of solids, and providing ventilation of incoming sewer gases. Dependent upon the size and use of the facility, the installation of pump protection (shredder) in the wet well is generally recommended to protect pumps from clogging.

Pump Station Wet Well

The wet well dimension and storage volume is unknown. There is a 30-inch manhole cover on top with a steel access ladder.

The wet well floats have been replaced with an air bubbler system (levels are usually used to control pump operation). The pumps typically perform in a lead lag arrangement where two pumps are pumping in series each time. All pumps can operate at the same time if the wet well levels increase to the "High- High" level. When this occurs, all four pumps would be activated.

4.1.1.4 Structural/ Architectural

The pump station building is generally in good condition; however, we observed some minor deficiencies that can lead to future problems if not corrected. The observed deficiencies include:

- The concrete beam forming the western edge of the storage closet floor is in fair to poor condition. About 50% of the vertical surface on the western face of the concrete beam is spalling. At this time, none of the layers have fallen off; therefore, we were unable to determine the depth of the spalling.
- The concrete slab forming the storage closet floor is in fair condition. Over 50% of the floor surface has spalled, deeper than 1-inch in some areas.
- The steel frame and bottom of steel door that provides access to the storage room is rusted.
- Some of the roof flashing on the east side of the building is missing and one piece is displaced.
- The roof scupper is clogged with leaves and the downspout is not adequately connected to the scupper or to the extension leader on the ground.
- A section of the roof membrane along the edge of the roof adjacent to the scupper appears to be coming loose, which may be allowing water to enter the building in that area. The ceiling of the pump station was water stained in the vicinity of this deficiency.
- The exterior concrete masonry unit (CMU) walls were cracked, primarily in joints between blocks, in a few locations throughout the perimeter of the building. The cracks were minor in nature (hairline).
- The paint is peeling from the underside of the storage closet slab, the beams supporting the storage closet slab and the bottoms of the outside and inside faces of the storage closet walls.

Pump Station Wall and Ceiling

4.1.1.5 Mechanical Systems

There are four Gorman-Rupp self-priming centrifugal sewage pumps that are arranged in sets of two in series. When two pumps are arranged in series, their resulting pump performance curve is obtained by adding their heads at the same flow rate. All four are identically sized. See *Appendix C* for existing G-R information and pump curves.

Original design information pertaining to the pumps was not available. Therefore, pump capacity was estimated during the site visit. One of the pressure gauges (#1B) during pumping showed 45 psi (104 feet), the head of 52 feet for each pump was determined based on this reading (104'/2 = 52'). Two of the four existing pressure gauges were not working;

A flow of 240 gpm was obtained when monitoring the flows documented from the existing flow meter. Each set of pumps ran for approximately 3-4 minutes every 40 minutes on an alternating basis at the time of survey. The characteristics for the pumps are summairzed in **Table 4-1** below.

G-R Pumps in Series

Table 4-1: Woodland Manor Pump Station

Number of Pumps	4 (two sets of pumps in series)
Pump Model (#1A, 1B & 2B)	Gorman-Rupp T6A3-B
Pump Model (#2A)	Gorman-Rupp T6A60-B
Pump Capacity	240 gpm @ 52 feet (104'/2)
Pump Motor Size	40 HP, 60 HZ
Power	3 Phase
Voltage	460
Discharge Size	6 inches

Based on the Gorman-Rupp information obtained, the pumps have been replaced in the past, and the last dates of supply that G-R had are as follows:

Pump #1A	1995
Pump #1B	2000
Pump #2A	1998
Pump #2B	1980

The Gorman-Rupp centrifugal sewage pumps draw in wastewater from the wet well. Suction inlet piping is extended through the pre-cast concrete walls of the wet well using 6-inch DI piping. A isolation valve is installed on each suction line to allow operators to isolate each pump in series for maintenance. The discharge line on each series consists of a 6-inch ductile iron piping that incorporates a check valve, air relief valve and isolation valve. Pumps discharges are connected by a wye inside the

building. The discharge piping then increases to 8-inch diameter with a flow meter and a gate valve. The piping then penetrates the wall going out to the system.

The check valves have been replaced and appear to be in good condition. One of the air relief valves also has apparently been replaced and is in good condition. The isolation valves are original and need to be replaced. There are four pressure gauges installed to monitor the suction and discharge pressures, only one is working properly and the other three needs to be replaced.
The building has a sump pump that is operational, but needs to be replaced with a larger capacity pump to handle the expected flows. There were signs of water accumulated on the pump station floor on the day of the inspection. There is no chain hoist or crane for removal of pumps and motors for maintenance, overhaul, and replacement.

Sump Pump

G-R Pumps in Series

4.1.1.6 Pump Testing

On October 16th 2013 observation, testing and data collection of the pumps was completed using predictive maintenance test equipment to evaluate their condition. The pumps were observed under load with ultrasonic and thermal test gear, as well as tested off line with an electrical insulation tester (megger test). A visual inspection was performed on pump lubricating oil. Electrical controls were assessed for evidence of arc flash and related labeling. A brief explanation of the test(s) follows. Pump test summaries and data are included in Section 4.1.2.4 and in *Appendix D*.

- Ultrasonic bearing testing was performed to assess the condition of the pump and motor bearings, as well as to look for abnormal friction and wearing conditions. This form of testing provides both quantitative and qualitative data on bearing condition, and lubrication state. This testing allows the analyst to perform spectrum analysis in both the fast Fourier transform (FFT) and time domain as would be done in vibration testing. For most equipment ultrasonic testing will pick up problems sooner than vibration testing. For these reasons, ultrasonic testing was performed as well as vibration testing. Another benefit of this type of testing is it allows the analysts to listen to a representation of frequencies normally above the range of human hearing (20 K hertz – 100 K hertz) to hear bearing defects, rubbing, and lubrication problems which cannot be heard with a stethoscope, or normal audio amplification. Pump bearing test data did not uncover any major bearing defects.

- A thermographic imaging system (Infrared camera) was used to look for abnormal heating patterns in the electric motors and pumps. Thermography converts infrared heat radiation, invisible to the human eye, to visible images. The thermographic image represents the coldest object in the frame as black, and the warmest object as white much like a film negative. These images are reviewed to look for abnormal and excessive heating patterns that would result from electrical and mechanical defects in the equipment.

- Electrical insulation testing (Megger testing) was performed at the motor control centers to evaluate the motor winding insulation, as well as the motor power conductor condition from the motor control center to the motor. This testing measures the resistance of the insulation with a test voltage equal to or greater than what would be applied under operating conditions to look for a weakness, or break down of the insulation system that could lead to a short and failure of the motor.

- Oil condition in all four pumps was looked at visually to assess the condition and look for contaminates (dirt, moisture, metal, etc..) indicative of poor maintenance, infiltration or failing components.

The results of the testing are described in Section 4.1.2.4

4.1.1.7 Odor Control System

The Siemens Bioxide system was installed in 2006 and includes a control unit and one chemical pump inside the building. The existing 975 gallon tank is located outside the building in a concrete containment dike that was already in place for a previous chemical used. It was not supplied by Siemens.

The concrete containment dike is 78 inches square with a 7 inch side wall height. The containment area is not sized properly to handle the entire chemical spillage volume from the tank. The containment dike has a floor drain pipe into the wet well.

The tank fill line is outside of the dike and potential leakage from a tanker hose connection, pumping, and disconnection would not be contained within the containment dike.

Bioxide Control/Pump

Bioxide Chemical Tank

4.1.1.8 Electrical Power/Generator

The pump station electrical service entrance is underground from a padmount transformer on site. The transformer is owned by National Grid, the power company. The power consumption meter is mounted on the transformer enclosure. The electrical service is rated at 225 Amps, 480Y/277 Volts, three-phase, 4-wire.

The pump station was built in the early 1980's. The electrical equipment is original to the station construction and consists of a main circuit breaker, automatic transfer switch, panelboards, transformer and motor control center.

The main breaker is rated at 225 Amps, 3-phase. The enclosed circuit breaker and was manufactured by ITE and is in good physical condition.

The automatic transfer switch was manufactured by Westinghouse Electric and is rated at 225 Amps, 480Y/277 Volts, three-phase, and is a 3 pole, dual breaker style transfer switch. The automatic transfer switch is wired with 300 MCM, Type THW aluminum wire, which is rated for 230 Amps. The wire is terminated to the transfer switch with "Mac-Adapter" high pressure aluminum adapters, which provide better aluminum cable connections. The enclosure is rusted and all the feeder connectors are corroded. The overall condition of the transfer switch is poor.

There are two panelboards. The first panelboard is an 18 pole, main breaker type, rated at 225 Amps, 480Y/277 Volts, three-phase, 4-wire. The second panelboard, which is fed through a 7.5 kVA step-down transformer, is an 18 pole main breaker type, rated at 100 Amps, 120/240 Volts, single phase, 3-wire. The panelboards were manufactured by ITE Gould and are Type CDP. The transformer was manufactured by Westinghouse Electric. This equipment is in fair to good condition.

Interior lighting is vapor-tight fluorescent lighting. Exterior lighting is wall-pack type HID. The lighting is in good condition.

There is a 3 kW, 208 Volt, single-phase electric unit heater, which is mounted on the ceiling near the entrance door and is in good condition.

There is a fire alarm system and intrusion alarm security system with exterior cameras. The fire alarm system is connected to the security system. The systems are in good condition.
The stand-by generator was manufactured by Consolidated Power Systems. The generator is an exterior enclosed unit, driven by a Detroit Diesel engine. The generator is rated for 135kW, 480Y/277 Volts, three-phase, 4-wire. The generator has 995 hours of operation.

P.S. Building Lighting / Alarm

The condition of the generator is poor.

- The generator enclosure is rusting and difficult to latch the doors.

- There is an engine oil leak, which is not uncommon with Detroit Diesel engines, which has covered the entire side of the engine and concrete pad.

Generator

The fuel tank for the generator is located next to the generator. The tank is a single wall steel tank (approximately 1,000 gallons) on a concrete pad (5 foot x 12 foot).

Fuel lines are exposed steel pipe on the tank and they are connected to the generator underground without any secondary containment system. The tank is in fair physical condition, but does not meet Code for fuel containment.
Based on the condition of the generator, testing of the generator is not warranted.

Generator Fuel Tank

4.1.1.9 Control System

The motor control center is located in the Pump Station floor level and was manufactured by Allen-Bradley and is a Model 2100, rated at 600 Amps, 600 Volts, 3-phase. The motor control center was modified by Gorman Rupp Pump Company to include the pump controls. The motor control center consists of four motor starter sections and a pump control section. The enclosure is severely rusted. The condition of the motor control center is poor.

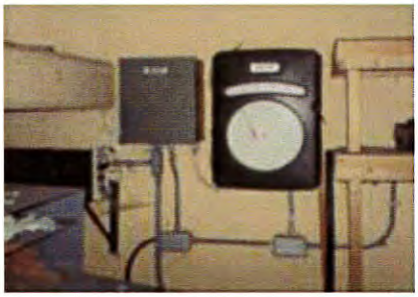
The pump control section was manufactured by Gorman Rupp and consists of Hand-Off-Auto selector switches, elapse time meters, and control function status pilot lights. The system is in good condition.

Each pump is a two stage unit with a first and second stage motor. The pumps are controlled by the Siemens bubbler system.

The pump motors are 40 horsepower, 230/460 Volts, 3-phase, 1755 RPM. The motor full load amps based on the nameplate is 47.5 Amps at 460 Volts.


Motor Control Cabinet (MCC)

The station flow is measured by a magnetic flowmeter at the discharge pipe, manufactured by Brooks located inside the pump station building. Flow measurement is recorded on a BIF round chart meter. At the time of site visit the chart recorder was not operating properly.

Flow Meter and Chart Recorder

4.1.2 Deficiencies & Rehabilitation Needs

Based on our visual inspection and evaluation of the pump station building and equipment, we recommend the following improvements and upgrades to address the deficiencies and issues that were identified:

4.1.2.1 Civil Site Features

- Re-grade the site around the building to direct the flow of water away from the foundation. Fill in depressed areas throughout the site with new topsoil. Re-seed all affected areas once grading and filling are complete.
- The oil spill will need to be investigated further to determine if there is contamination present. If found, the area should be cleaned, including removal and proper disposal of the contaminated soils. Clean fill should be installed and the area re-seeding.

4.1.2.1 Pump Station Wet Well

During the visual observation it was noticed there was an excessive amount of debris, rags, plastics and grease that have accumulated in the wet well which could clog the pumps and valves. Based on the daily log, maintenance staff stated that they have to regularly clean and unclog check valves, air release valves and isolation valves. FG Lees, the maintenance plumber for the station, stated that they used to clean the wet well quarterly. The following is recommended for wet well improvements:

Suction Pipe in Wet Well

- Clean wet well immediately
- Replace corroded suction piping within the wet well
- Install a shredder unit at the upstream sewer manhole to prevent large or stringy objects in the wastewater flow from potentially clogging and damaging the pumps.
- Install screens on the wet well exhaust vent piping to eliminate access for rodents and birds.

4.1.2.2 Structural/ Architectural

- Remove all spalling and loose concrete from the face of the beam in the storage closet. Repair the beam with a cementitious repair material, such as SikaTop 123 Plus, that is specified for use on vertical surfaces.
- Remove all spalling and loose concrete from the storage closet floor. Install a new self-leveling, cementitious topping mortar, such as Sika MonoTop 611, to patch and level the floor.
- Replace the steel door accessing the storage closet.
- Replace and repair the roof flashing as required around the perimeter of the building.
- Clean out the debris from the roof scupper and re-attach the downspout.
- Repair the roof membrane to ensure an adequate seal along the perimeter of the roof.
- The interior walls and underside of the storage closet slab should be repainted.
- Provide hoist system to support removal of pumps and motors for maintenance, overhaul, and replacement.

Roof Scupper

Storage Closet

4.1.2.3 Mechanical Systems

- Replace pressure gauges on the suction and discharge piping for pump #2A & #2B.
- Replace pressure gauges on the suction and discharge piping for pump #1A.
- Remove and replace the sump pump within the pump station with a larger system that can handle larger flows.
- Replace original isolation valves
- Repair or replace Mag-Meter chart recorder if continual recording of flows is desired
- Provide pump rotating assembly (wear plate, seals, bearings and cover plate, necessary O-rings and gaskets for pump rebuild)
    - Rebuild pumps as needed.

4.1.2.4 Pump Testing Results

- All pump motor bearing ultrasonic test results indicated bearings require lubrication as soon as possible to prevent further damage. See *Appendix D, Exhibit 1* for ultrasound test results and comments.
- Pump motor 1B and 2B bearings showed minor defects and early stage bearing failure frequencies during ultrasonic testing (Note: given the duty cycle of the pumping operations, the bearings could last several years with these types of defects). See *Appendix D, Exhibits 2 and 3* for spectral analysis of motor 1B and 2B bearing defects. We recommend re-lubricating the bearings and regular ultrasonic, and or vibration monitoring as part of a predictive maintenance strategy.
- Motor winding insulation (megger) test results suggest motor windings are all serviceable at this time. Trending over time would give a better indication of the condition. Comparable readings on all four motors indicate motor insulation is currently in good condition. See *Appendix D, Exhibit 4* for insulation (Megger) test results. We recommend annual insulation testing as part of a preventive predictive maintenance strategy.
- Thermal survey did not uncover abnormal heating patterns in the pumping equipment. (Not conclusive - Each set of pumps ran 3-4 minutes approximately every 40 minutes on a rotating basis at time of survey. This is not adequate for heat buildup. It is also important to note that abnormal heating patterns often do not manifest until late stages of failure). See *Appendix D, Exhibit 5* for thermal results.
- Pump lubricating oil observations showed lube to be in good condition (sight glass, and samples grabbed from fill ports). Lube appeared to be clean and contamination free on all four pumps. This is a good indication that the oil changes have been performed on schedule and the bearings and seals are in good condition. The one exception was that Pump 2B appeared to be overfilled. An unsuccessful attempt was made at the time of the survey to drain a small amount from the bottom drain plug to make sure water did not leak in and displace the lubrication (did not detect contamination at the sight glass). We do recommend that this be performed to confirm, and to drain the unit to the proper level and monitored to prevent damage.
- Review of electrical documents at the site, and lack of Arc Flash labeling on the electrical gear suggests that an Arc Flash assessment has not been completed, and the site is not currently in

compliance with N.F.P.A 70E. We recommend that an Arc Flash study, and short circuit calculations on site electrical gear be performed to assure that short circuit energy falls within N.F.P.A. 70E tabular method guidelines. Appropriate labeling of site equipment as required by N.F.P.A. 70e and possible training if needed should also be included.

In general, the pumps appear to have been replaced, and/or overhauled in the past few years and appear to be in good condition with the exceptions noted above. Motor life for this type of motor and application it typically 15 to 20 years before overhaul, or replacement. Typically, the life can be extended by many years for less than fifty percent of the cost of a new one with a bearing replacement, and a recoating of the winding insulation by a qualified motor shop as long as this is done before failure. Though it is possible this motor overhaul has been performed in the past, there is no indication in the maintenance log at the site that this has been done.

4.1.2.5 Odor Control System

- Provide a second (redundant) chemical injection pump for the Bioxide system.
- Provide a new double walled high density polyethylene chemical storage tank
- Relocate the fill line within the concrete containment area to prevent any potential leakage from the tanker escaping the containment area.

4.1.2.6 Electrical Power/Generator

- The electrical system components are over 30 years old, which is beyond the design life of the equipment. The rust on much of the equipment and visible corrosion on wire connections makes its safe operation questionable. Based on the physical condition and age of the pump station equipment, the system should be completely replaced.
- The generator's condition is poor. Based on the oil leaks observed and the physical condition of the generator and enclosure, the system should be completely replaced.
- The generator fuel storage system does not meet the current Code in regard to containment requirements.

4.1.2.7 Control System

- The electrical control system components are over 30 years old, which is beyond the design life of the equipment. The rust on much of the equipment and visible corrosion makes its safe operation questionable. Based on the physical condition and age of the pump control equipment the system should be completely replaced.
- There is no remote monitoring system in place.
- A new Instrumentation/Control System Panel should be considered. The new control system should be PLC based with an Operator Interface Panel (OIT) and with remote monitoring/alarm functions. At a minimum, an auto dialer for alarms should be considered. An enhancement to consider would be a full SCADA system, which would be more expensive.

4.2 Force Main

4.2.1 Existing Conditions Assessment

The force main from the Woodland Manor Pump Station building connects to the 10-inch PVC, gasketed joint force main at Nooseneck Hill Road and runs approximately three miles east to Tiogue Avenue (Rhode Island State Route 3) and discharges into the City of West Warwick's gravity sewer manhole located at the Town Line.

There is an existing flow meter station located along the sewer force main at the intersection of Tiogue Avenue and Darton Street in the Town of Coventry.

The force main in the Reservoir Road is a 6-inch force main that convey wastewater from the Westwood Estates pump station to the Woodland sewer force main at intersection of Reservoir Road and Tiogue Avenue.

4.2.2 Deficiencies & Rehabilitation Needs

We were not able to evaluate the discharge manhole during the site visit; however we have contacted the pump station maintenance operator and talked to Rick Lees of FG Lees and asked some questions about the force main. He stated that within 20 +/_ years there have been couple of leaks and only 2-3 breaks of the force main. Two of the breaks were man made during construction.

At this point, based on the anecdotal information provided by Rick Lees, we assume the force main is in a good condition, free of debris and does not require cleaning or replacing.

4.3 Flow Meter Station

4.3.1 Existing Conditions / Electrical Power

The force main flow meter station consists of a service entrance/control enclosure and a meter manhole. The control system was manufactured by Boydco Inc.

The control enclosure was manufactured by APX and is constructed of sheet aluminum and aluminum framing. The enclosure includes a service entrance panelboard, flow meter system panel and electric strip heaters.

The service entrance/control enclosure is fed underground from a nearby National Grid Utility Pole, #45. The electric service meter is mounted on the exterior of the enclosure which connects to the service entrance panelboard. The service is single phase, 3-wire and is rated for 100 Amps, 120/240

Volts, s. The service entrance panelboard is a main circuit breaker, 12 pole load center, with a 100 Amp main breaker. The system is grounded to a ground rod in the base of the enclosure.

The flow meter system, manufactured by Thermo Scientific, is a Model SX40 and is a dual frequency doppler clamp-on flow element. It is strapped onto the force main in the manhole.

Flow Meter Manhole

Flow Meter Control

The electrical control system components are in good condition. There was a totalized flow of 240,175,520 gallons but no flow during our observation. There was no flow totalizer at the Woodland Pump Station to compare values.

4.3.2 Deficiencies & Rehabilitation Needs

- There are no deficiencies or rehabilitation needs for the electrical system.

4.3.2.1 Control System

- There is no remote monitoring of flow or alarms to a central monitoring station.
- A security system (intrusion alarm) should be considered for the service/control enclosure.

5 Budgetary Opinion of Cost

The opinion of capital cost for the improvements to the existing pump station include a 25% engineering and miscellaneous. Once the costs were developed, a range of -15% to 30% was presented since the cost is budgetary and the improvements proposed have only been conceptualized. The budgetary level opinion of cost is $343,000 for the Woodland Pump Station and $5,000 for the flow meter station (See Table 5-1). Detailed information related to these costs is included in *Appendix A*.

TABLE 5-1 OPINION OF COST SUMMARY

PUMP STATION NO.	PUMP STATION NAME	TOTAL COST
1	Woodland Pump Station Improvements	
1a	Short Term Improvements (Within a fist year)	$131,300
	Engineering & Miscellaneous (25%)	$32,800
	Subtotal	**$164,000**
	Range -15% to +30% ($140,000 to $214,000) Rounded	
1b	Long Term Improvements	$143,200
	Engineering & Miscellaneous (25%)	$35,800
	Subtotal	**$179,000**
	Range -15% to +30% ($153,000 to $233,000) Rounded	
	SUBTOTAL WOODLAND PUMP STATION	**$343,000**
2	Flow Meter Station Improvements	$4,000
	Engineering & Miscellaneous (25%)	$1,000
	SUBTOTAL FLOW METER STATION	**$5,000**
	Range -15% to +30% ($4,300 to $6,500)	

FUSS & O'NEILL

Appendix A

Budgetary Opinion of Capital Cost

FUSS & O'NEILL, INC.

317 Iron Horse Way, Suite 204
Providence, RI 02908

ORDER OF MAGNITUDE OPINION OF COST		DATE PREPARED 12/2/2013	SHEET 1 OF 5
PROJECT :	Evaluation Report on Pump Station	BASIS :	
LOCATION :	Coventry, RI		
DESCRIPTION:	**Summary Opinion of Cost**		
PROJECT NO. :	20131072.A10	ESTIMATOR : FMD	CHECKED BY :

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s') methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM NO.	ITEM DESCRIPTION	UNIT MEAS.	NO. UNITS	Total Cost Short Term	Total Cost Long Term
	Summary Sheet				
1	**Woodland Pump Station**				
	Civil/Site	LS	1	$5,500	$2,500
	Structural/architectural	LS	1	$1,214	$15,000
	Mechanical	LS	1	$15,600	$73,700
	Electrical	LS	1	$109,000	$52,000
	Subtotal			$131,314	$143,200
	25% Engineering & Miscellaneous			$32,829	$35,800
	Woodland Pump Station Subtotal			**$164,143**	**$179,000**
	Total Budgetary Opinion of Construction Cost		**Range - 15%**	**$140,000**	**$153,000**
			Range + 30%	**$214,000**	**$233,000**
2	**Flow Meter Station**				
	Electrical/Control	LS	1		$4,000
	25% Engineering & Miscellaneous				$1,000
	Flow Meter Station				**$5,000**
	Total Budgetary Opinion of Construction Cost		**Range - 15%**		**$4,300**
			Range + 30%		**$6,500**

NOTE:
The Budgetary opinion of Cost has an accuracy of +30%, -15% (i.e., the estimate could be 30% greater or 15% less than the actual cost).

FUSS & O'NEILL, INC.
317 Iron Horse Way, Suite 204
Providence, RI 02908

ORDER OF MAGNITUDE OPINION OF COST		DATE PREPARED 12/2/2013	SHEET 2 OF 5
PROJECT :	Evaluation Report on Pump Station	BASIS :	
LOCATION :	Coventry, RI		
DESCRIPTION:	**Site & Structural Upgrades**		
PROJECT NO. :	20131072.A10	ESTIMATOR : KAB	CHECKED BY : JJL

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s') methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM NO.	ITEM DESCRIPTION	UNIT MEAS.	NO. UNITS	PER UNIT	Total Cost Short Term	Total Cost Long Term
Woodland Pump Station						
	Site Improvements					
	Re-grade Site	L.S.	1	$2,000		$2,000
	Re-seed	L.S.	1	$500		$500
	Remove and Dispose of Contaminated Soil	L.S.	1	$5,000	$5,000	
	Backfill New Soil	L.S.	1	$500	$500	
	Subtotal				**$5,500**	**$2,500**
	Structural/Architectural Improvements					
	Temporarily Relocate Electrical Conduits	L.S.	1	$400		$400
	Patch Beam (incl. prep. and material)	S.F.	10	$86		$857
	Patch Slab (incl. prep. and material)	S.F.	32	$28		$896
	Replace Steel Door to storage closet	L.S.	1	$3,000		$3,000
	Repair Roof Flashing	L.F.	44	$6	$242	
	Clean out Scupper and Repair Downspout	L.S.	1	$400	$400	
	Repair Roof Membrane	L.F.	88	$7	$572	
	Prep Walls and Slab	S.F.	2,000	$0.23		$460
	Repaint Walls and Slab	S.F.	2,000	$0.67		$1,340
	Hoist Foundation	L.S.	1	$2,500		$2,500
	Hoist (Jib Crane)	L.S.	1	$5,000		$5,000
	Subtotal				**$1,214**	**$15,000**
	25% Engineering & Miscellaneous				**$1,679**	**$4,375**
	TOTAL COST (ROUNDED TO NEAREST $1,000)				**$9,000**	**$22,000**

Notes: Removal and disposal of oil contaminated soil is a guess. Limits of contaminated soil are unknown and can be significantly larger. Contamination may extend beneath the generator, which will require more work.

FUSS & O'NEILL, INC.

317 Iron Horse Way, Suite 204
Providence, RI 02908

ORDER OF MAGNITUDE OPINION OF COST		DATE PREPARED 11/15/2013	SHEET 3 OF 5
PROJECT :	Evaluation Report on Pump Station	BASIS :	
LOCATION :	Coventry, RI		
DESCRIPTION:	**Mechanical Upgrades**		
PROJECT NO. :	20131072.A10	ESTIMATOR : FMD	CHECKED BY : KAM

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s') methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM NO.	ITEM DESCRIPTION	UNIT MEAS.	NO. UNITS	PER UNIT	Total Cost Short Term	Total Cost Long Term
Woodland Pump Station						
	Mechanical Improvements					
	Pump Rotating Assembly*(for rebuild)	E.A.	4	$5,000	$5,000	$15,000
	Isolation Valves	E.A.	4	$1,800		$7,200
	Pressure Gauge	E.A.	3	$200	$600	
	Piping within wet well	L.S.	1	$1,500		$1,500
	Sump Pump	E.A.	1	$2,000	$2,000	
	Bioxide System (chemical tank, pump, controls)	L.S.	1	$25,000		$25,000
	Shredder (bypass pumping)	E.A.	1	$25,000		$25,000
	Cleaning Wetwell	L.S.	1	$8,000	$8,000	
	Subtotal				**$15,600**	**$73,700**
	25% Engineering & Miscellaneous				**$3,900**	**$18,425**
	TOTAL COST (ROUNDED TO NEAREST $1,000)				**$19,500**	**$93,000**

NOTE:

* Pump T6A rotating assembly includes; wear plate, seals, bearings and cover plate, with necessary O-rings and gaskets

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Providence, RI 02908

ORDER OF MAGNITUDE OPINION OF COST		DATE PREPARED 11/4/2013	SHEET 4 OF 5
PROJECT :	Evaluation Report on Pump Station	BASIS : R.S. Means Costs 2008 with adjustment for inflation	
LOCATION :	Coventry, RI		
DESCRIPTION:	**Electrical Upgrades**		
PROJECT NO. :	20131072.A10	ESTIMATOR : DNL	CHECKED BY : KMS

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s') methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

ITEM NO.	ITEM DESCRIPTION	UNIT MEAS.	NO. UNITS	PER UNIT	Total Cost Short Term	Total Cost Long Term
Woodland Pump Station						
	Electrical Upgrades					
	New Underground Secondary Service Wiring	LF	15	$90	$1,350	
	New Service Main Breaker	EA	1	$3,800	$3,800	
	New Automatic Transfer Switch	EA	1	$7,800	$7,800	
	New 480Y/277 Volt Panelboard	EA	1	$3,500	$3,500	
	Service Distribution Panelboard Feeder Wiring	LF	10	$90	$900	
	New 120/240 Volt Panelboard	EA	1	$1,825	$1,825	
	Panelboard Feeder Wiring	LF	10	$30	$302	
	Grounding System	EA	1	$250	$250	
	New Diesel Generator Set with Base Tank	EA	1	$44,000	$44,000	
	New Generator Feeder	LF	75	$45	$3,375	
	New Generator Control Wiring	LF	75	$16	$1,200	
	New Control Panel and Programming	EA	1	$25,000		$25,000
	New Level Transducer w/ cable	EA	1	$1,500		$1,500
	Float System (back-up)	EA	3	$250		$750
	New Flow Meter	EA	1	$3,000		$3,000
	Instrumentation Wiring	LF	50	$24		$1,175
	Control Wiring	LF	50	$15		$725
	Motor Control Center	EA	1	$36,000	$36,000	
	Motor Feeders	LF	80	$17		$1,320
	Motor Disconnect Switches	EA	4	$360		$1,440
	Pump Motor Connections	EA	4	$250		$1,000
	New Pump Station Interior Lighting	EA	6	$150		$900
	New Pump Station Exterior Lighting	EA	4	$300		$1,200
	New Wiring Devices	EA	5	$125		$625
	New Electric Heater	EA	2	$575		$1,150
	New Dehumidifier	EA	1	$750		$750
	New Exhaust Fan	EA	1	$2,500		$2,500
	Equipment Connections	EA	5	$65		$325
	Power Wiring	LF	650	$12		$7,800
	Telephone Service Wiring (Alarms)	LF	50	$8		$375
	Electrical Demolition	MH	40	$80	$3,200	
	Excavation/Backfill and Restoration	LS	1	$1,000	$1,000	
	Subtotal				**$109,000**	**$52,000**
	25% Engineering & Miscellaneous				$27,250	$13,000
	TOTAL COST (ROUNDED TO NEAREST $1,000)				**$137,000**	**$65,000**

Notes: **This is a conceptual cost estimate and only includes items directly related to electrical work.**

FUSS & O'NEILL, INC.

317 Iron Horse Way, Suite 204
Providence, RI 02908

ORDER OF MAGNITUDE OPINION OF COST		DATE PREPARED 12/2/2013	SHEET 5 OF 5
PROJECT :	Evaluation Report on Pump Station	BASIS : R.S. Means Costs 2008 with adjustment for inflation	
LOCATION :	Coventry, RI		
DESCRIPTION:	**Electrical Upgrades**		
PROJECT NO. :	20131072.A10	ESTIMATOR : DNL	CHECKED BY : KMS

Since Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s') methods of determining prices, or over competitive bidding or market conditions, Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

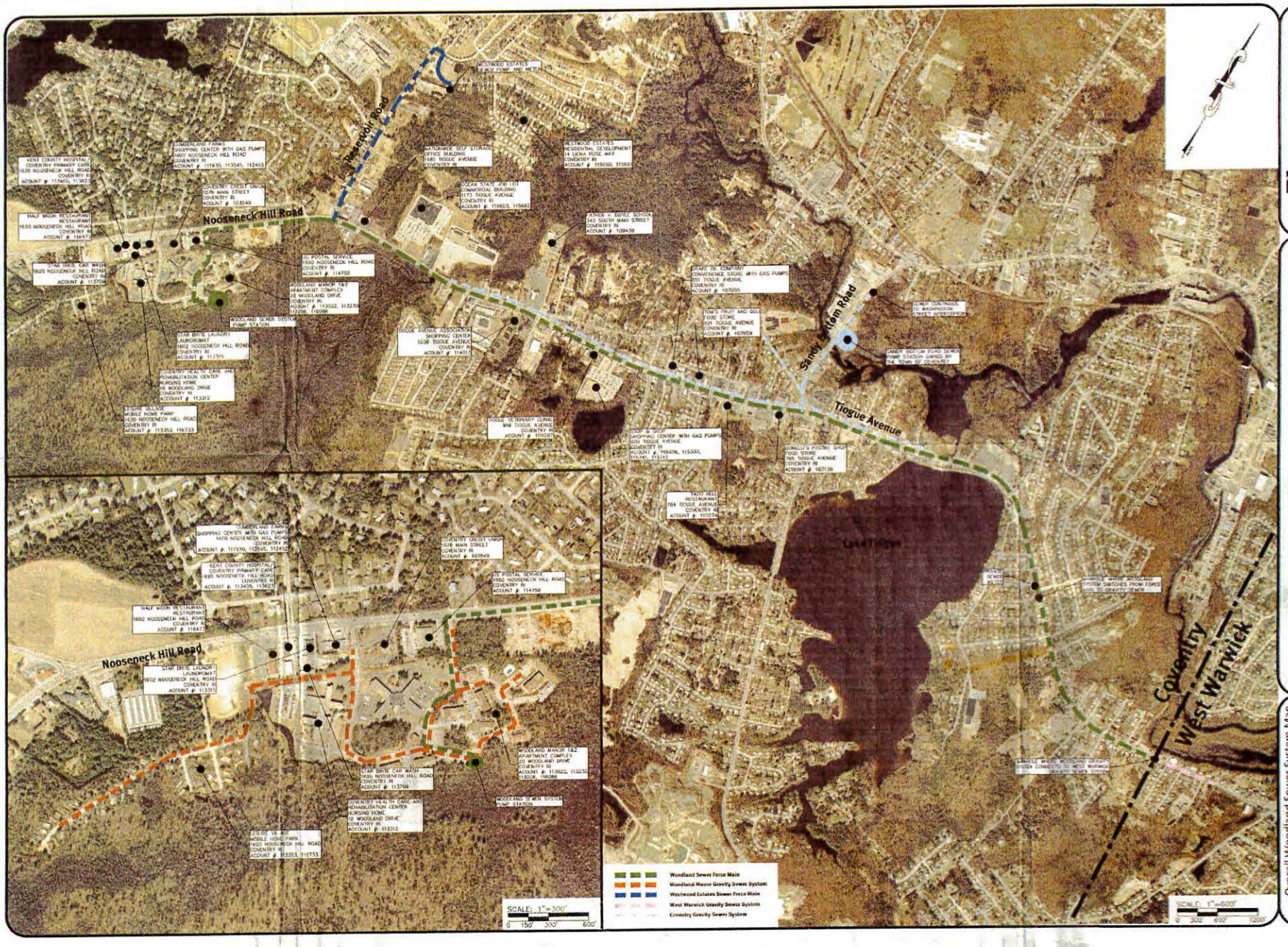
ITEM NO.	ITEM DESCRIPTION	UNIT MEAS.	NO. UNITS	PER UNIT	TOTAL COST
Forced Main Flow Meter					
	Electrical Upgrades				
	New Auto Dialer	EA	1	$2,500	$2,500
	Alarm Programming	LS	1	$500	$500
	Control Wiring	LF	10	$15	$145
	Telephone Service Wiring (Alarms)	LF	30	$18	$525
	Subtotal				**$4,000**
	25% Engineering & Miscellaneous				$1,000
	TOTAL COST (ROUNDED TO NEAREST $1,000)				**$5,000**

Notes: **This is a conceptual cost estimate and only includes items directly related to electrical work.**

FUSS & O'NEILL

Appendix B

Overall Woodland Sewer System Map



DiPrete Engineering

Engineers • Planners • Surveyors

Overall Woodland Sewer System Map

Woodland Sewer System

Woodland Manor Improvement Association

SHEET 1 OF 2

FUSS & O'NEILL

Appendix C

Existing Gorman-Rupp (G-R) Pumps

DS

OM-01046--OB07
February 14, 1983
Rev. O 06-13-08

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WITH PARTS LIST

GORMAN-RUPP PUMPS

T SERIES PUMPS

MODELS

T6A3-B

INCLUDING: /F

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
www.grpumps.com
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA Printed in U.S.A.

Page Intentionally Left Blank

Register your new
Gorman-Rupp pump online at
www.grpumps.com
Valid serial number and e-mail address required.

RECORD YOUR PUMP MODEL AND SERIAL NUMBER

Please record your pump model and serial number in the spaces provided below. Your Gorman-Rupp distributor needs this information when you require parts or service.

Pump Model: _____

Serial Number: _____

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

INTRODUCTION

Thank You for purchasing a Gorman-Rupp pump. **Read this manual** carefully to learn how to safely install and operate your pump. Failure to do so could result in personal injury or damage to the pump. This Installation, Operation, and Maintenance manual is designed to help you achieve the best performance and longest life from your Gorman-Rupp pump.

This pump is a T Series, semi-open impeller, self-priming centrifugal model with a suction check valve. The pump is designed for handling liquids containing large entrained solids and slurries. The basic material of construction is gray iron, with ductile iron impeller and steel wearing parts.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for every aspect of each specific application. Therefore, it is the responsibility of the owner/installer of the pump to ensure that applications not addressed in this manual are performed **only** after establishing that neither operator safety nor pump integrity are compromised by the installation. Pumps and related equipment **must** be installed and operated according to all national, local and industry standards.

If there are any questions regarding the pump or its application which are not covered in this manual or in other literature accompanying this unit, please contact your Gorman-Rupp distributor, or:

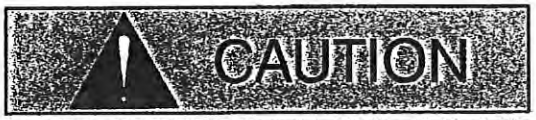
The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901–1217
Phone: (419) 755–1011
or:
Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7
Phone: (519) 631–2870

For information or technical assistance on the power source, contact the power source manufacturer's local dealer or representative.

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

Immediate hazards which WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.

Hazards or unsafe practices which COULD result in severe personal injury or death. These instructions describe the procedure required and the injury which could result from failure to follow the procedure.



Hazards or unsafe practices which COULD result in minor personal injury or product or property damage. These instructions describe the requirements and the possible damage which could result from failure to follow the procedure.

NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

SAFETY – SECTION A

This information applies to T Series basic pumps. Gorman-Rupp has no control over or particular knowledge of the power source which will be used. Refer to the manual accompanying the power source before attempting to begin operation.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the owner/installer's responsibility to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised by the installation.

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect or lock out the power source to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.
6. Vent the pump slowly and cautiously.
7. Drain the pump.

This pump is designed to handle liquids containing large entrained solids or slurries. Do not attempt to pump volatile, corrosive, or flammable materials which may damage the pump or endanger personnel as a result of pump failure.

After the pump has been positioned, make certain that the pump and all piping connections are tight, properly supported and secure before operation.

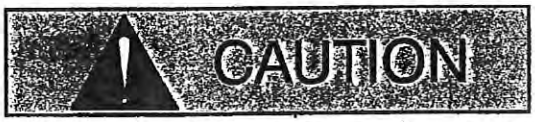
Do not operate the pump without the guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Vapor pressure within the pump can cause parts being disengaged to be ejected with great force. Allow the pump to completely completely cool before servicing.

Do not operate the pump against a closed discharge valve for long periods of time. If operated against a closed discharge valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment. Suction and discharge hoses and piping must be removed from the pump before lifting.

Do not attempt to disengage any part of an overheated pump unit. Vapor pressure within the pump casing can eject these parts with great force when they are disengaged. Allow the pump to completely cool before servicing it.



Pumps and related equipment must be installed and operated according to all national, local and industry standards.

Overheated pumps can cause severe burns and injury. If overheating of the pump occurs:

1. **Stop the pump immediately.**
2. **Allow the pump to completely cool.**
3. **Refer to instructions in this manual before restarting the pump.**

INSTALLATION – SECTION B

Review all SAFETY information in Section A.

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect, position, and arrange the pump and piping.

Most of the information pertains to a standard **static lift application** where the pump is positioned above the free level of liquid to be pumped.

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to **50%** of the maximum permissible operating pressure as shown on the pump performance curve.

For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Pump Dimensions

See Figure 1 for the approximate physical dimensions of this pump.

OUTLINE DRAWING

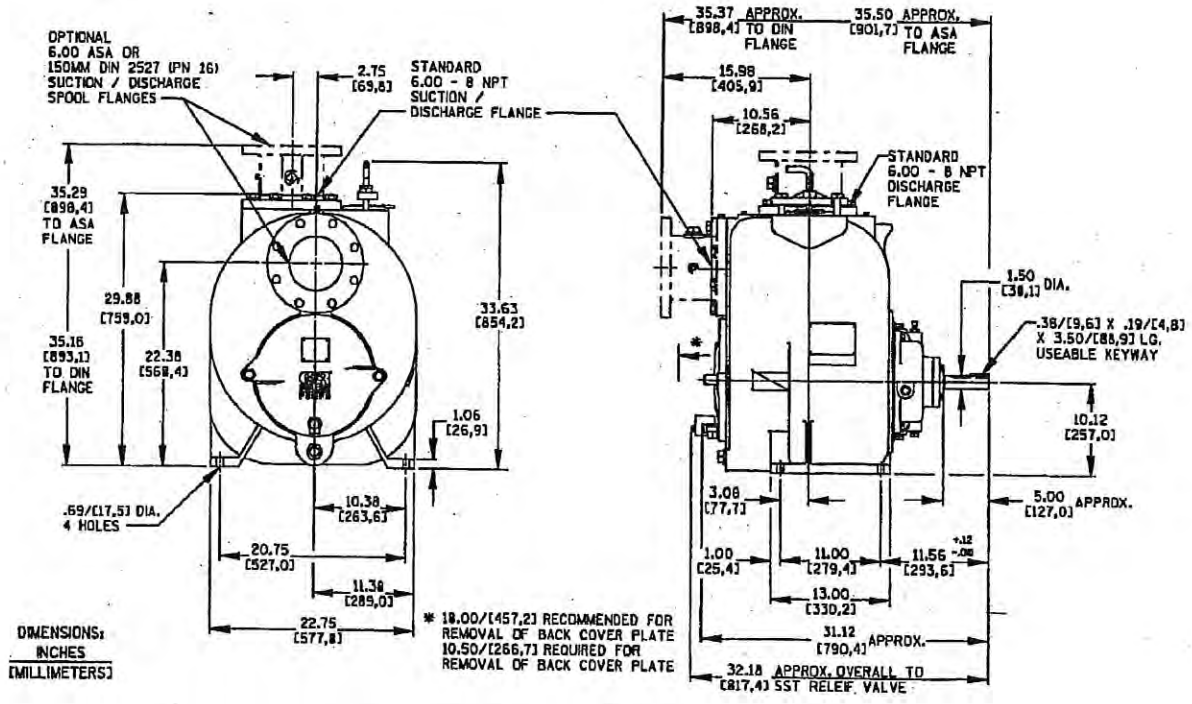


Figure 1. Pump Model T6A3-B, Including /F

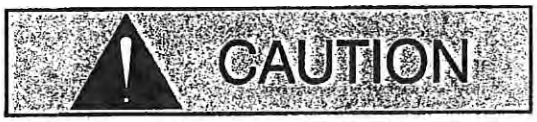
PREINSTALLATION INSPECTION

The pump assembly was inspected and tested before shipment from the factory. Before installation, inspect the pump for damage which may have occurred during shipment. Check as follows:

a. Inspect the pump for cracks, dents, damaged threads, and other obvious damage.

b. Check for and tighten loose attaching hardware. Since gaskets tend to shrink after drying, check for loose hardware at mating surfaces.

c. Carefully read all warnings and cautions contained in this manual or affixed to the pump, and perform all duties indicated. Note the direction of rotation indicated on the pump. Check that the pump shaft rotates counterclockwise when facing the impeller.



Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Refer to **ROTATION** in **OPERATION**, Section C.

d. Check levels and lubricate as necessary. Refer to **LUBRICATION** in the **MAINTENANCE AND REPAIR** section of this manual and perform duties as instructed.

e. If the pump and power source have been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.

If the maximum shelf life has been exceeded, or if anything appears to be abnormal, contact your Gorman-Rupp distributor or the factory to determine the repair or updating policy. **Do not** put the pump into service until appropriate action has been taken.

POSITIONING PUMP

Lifting

Pump unit weights will vary depending on the mounting and drive provided. Check the shipping tag on the unit packaging for the actual weight, and use lifting equipment with appropriate capacity. Drain the pump and remove all customer-installed equipment such as suction and discharge hoses or piping before attempting to lift existing, installed units.

The pump assembly can be seriously damaged if the cables or chains used to lift and move the unit are improperly wrapped around the pump.

Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation.

The pump may have to be supported or shimmed to provide for level operation or to eliminate vibration.

Clearance

When positioning the pump, allow a minimum clearance of **18 Inches (457 mm)** in front of the back cover to permit removal of the cover and easy access to the pump interior.

SUCTION AND DISCHARGE PIPING

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve and operating range shown on Page E-1 to be sure your overall application allows pump to operate within the safe operation range.

Materials

Either pipe or hose maybe used for suction and discharge lines; however, the materials must be

compatible with the liquid being pumped. If hose is used in suction lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is not recommended.

Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts and/or couplings.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines not less than 18 inches (457,2 mm) from the suction and discharge ports and install the lines. Installation closer to the pump may result in erratic readings.

SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets.

Strainers

If a strainer is furnished with the pump, be certain to use it; any spherical solids which pass through a strainer furnished with the pump will also pass through the pump itself.

If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

This pump is designed to handle up to 3-inch (76,2 mm) diameter spherical solids.

Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe dope. The pipe dope should be compatible with the liquid being pumped.

Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to 1 1/2 times the diameter of the suction line.

If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance 1 1/2 times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least 3 times the diameter of the suction pipe.

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 2 shows recommended minimum submergence vs. velocity.

NOTE

The pipe submergence required may be reduced by installing a standard pipe increaser fitting at the end of the suction line. The larger opening size will reduce the inlet velocity. Calculate the required submergence using the following formula based on the increased opening size (area or diameter).

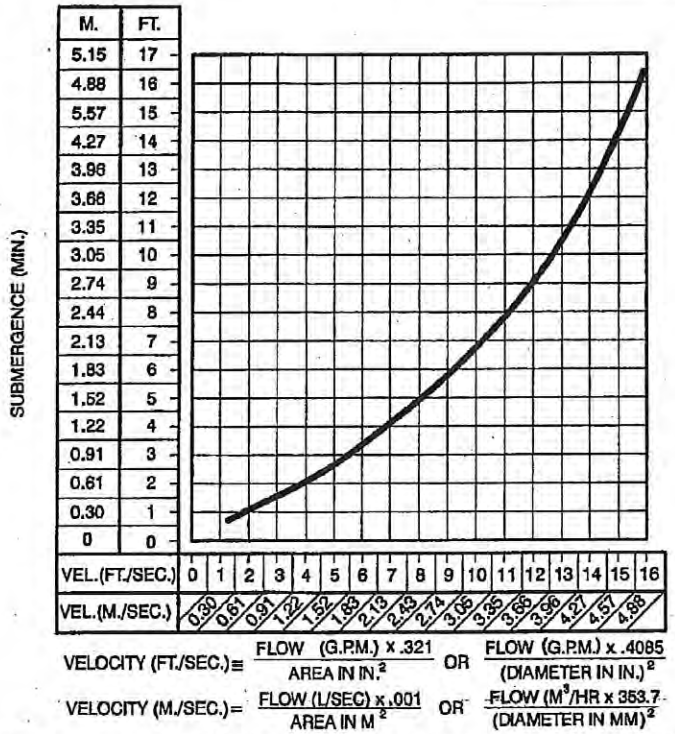


Figure 2. Recommended Minimum Suction Line Submergence vs. Velocity

DISCHARGE LINES

Siphoning

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

Valves

If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe to minimize friction losses. Never install a throttling valve in a suction line.

With high discharge heads, it is recommended that a throttling valve and a system check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

CAUTION

If the application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

Bypass Lines

Self-priming pumps are not air compressors. During the priming cycle, air from the suction line must be vented to atmosphere on the discharge side. If the discharge line is open, this air will be vented through the discharge. However, if a check valve has been installed in the discharge line, the discharge side of the pump must be opened to atmospheric pressure through a bypass line installed between the pump discharge and the check valve. A self-priming centrifugal pump **will not prime** if there is sufficient static liquid head to hold the discharge check valve closed.

NOTE

The bypass line should be sized so that it does not affect pump discharge capacity; however, the bypass line should be at least 1 inch in diameter to minimize the chance of plugging.

In **low discharge head applications** (less than 30 feet or 9 meters), it is recommended that the bypass line be run back to the wet well, and located 6 inches below the water level or cut-off point of the low level pump. In some installations, this bypass line may be terminated with a six-to-eight foot length of 1 1/4 inch I.D. **smooth-bore** hose; air and liquid vented during the priming process will then agitate the hose and break up any solids, grease, or other substances likely to cause clogging.

CAUTION

A bypass line that is returned to a wet well must be secured against being drawn into the pump suction inlet.

It is also recommended that pipe unions be installed at each 90° elbow in a bypass line to ease disassembly and maintenance.

In **high discharge head applications** (more than 30 feet), an excessive amount of liquid may be bypassed and forced back to the wet well under the full working pressure of the pump; this will reduce overall pumping efficiency. **Therefore, it is recommended that a Gorman-Rupp Automatic Air Release Valve be installed in the bypass line.**

Gorman-Rupp Automatic Air Release Valves are reliable, and require minimum maintenance. See **AUTOMATIC AIR RELEASE VALVE** in this section for installation and theory of operation of the Automatic Air Release Valve. Consult your Gorman-Rupp distributor, or contact the Gorman-Rupp Company for selection of an Automatic Air Release Valve to fit your application.

If the installation involves a flooded suction such as a below-ground lift station. A pipe union and manual shut-off valve may be installed in the bleed line to allow service of the valve without shutting down the station, and to eliminate the possibility of flooding. If a manual shut-off valve is installed **anywhere** in the air release piping, it **must** be a full-opening ball type valve to prevent plugging by solids.

DANGER!

If a manual shut-off valve is installed in a bypass line, it must not be left closed during operation. A closed manual shut-off valve may cause a pump which has lost prime to continue to operate without reaching prime, causing dangerous overheating and possible explosive rupture of the pump casing. Personnel could be severely injured.

Allow an over-heated pump to cool before servicing. Do not remove plates, covers, gauges, or fittings from an overheated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use cau-

tion when removing the plug to prevent injury to personnel from hot liquid.

AUTOMATIC AIR RELEASE VALVE

When properly installed, a Gorman-Rupp Automatic Air Release Valve will permit air to escape through the bypass line and then close automatically when the pump is fully primed and pumping at full capacity.

WARNING!

Some leakage (1 to 5 gallons [3.8 to 19 liters] per minute) will occur when the valve is fully closed. Be sure the bypass line is directed back to the wet well or tank to prevent hazardous spills.

Consult the manual accompanying the Air Release Valve for additional information on valve installation and performance.

Air Release Valve Installation

The Automatic Air Release Valve must be independently mounted in a horizontal position between the pump discharge port and the inlet side of the discharge check valve (see Figure 3). The inlet opening in the Air Release Valve is equipped with standard 1-inch NPT pipe threads.

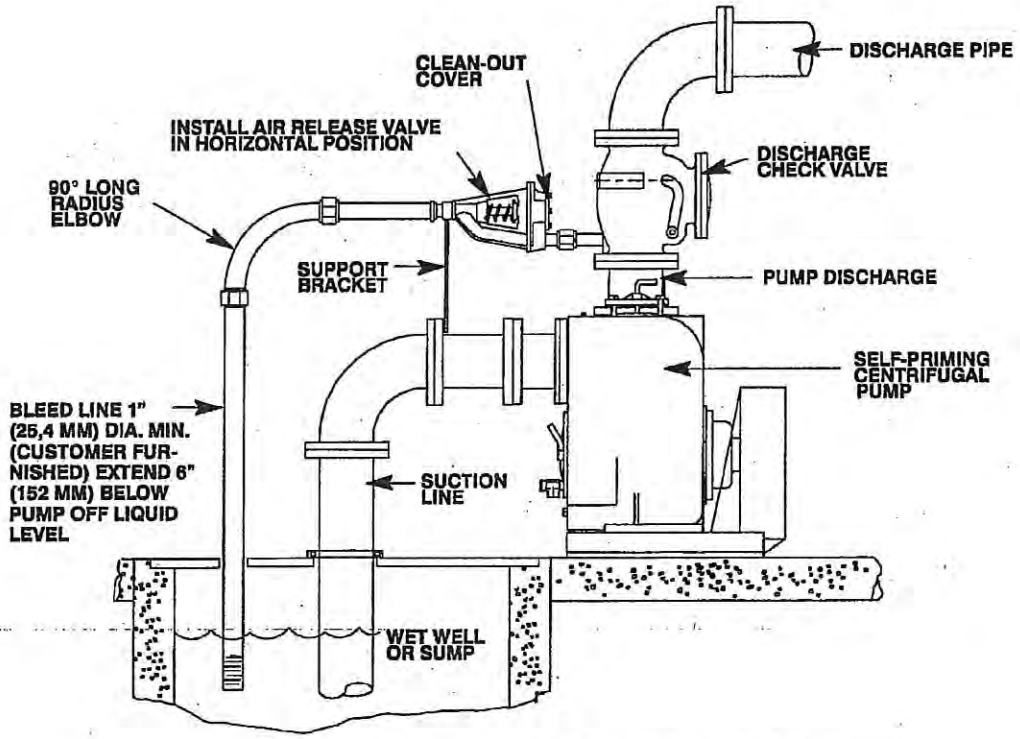


Figure 3. Typical Automatic Air Release Valve Installation

Connect the valve outlet to a bleed line which slopes back to the wet well or sump. The bleed line must be the same size as the outlet opening or larger, depending on which Air Release Valve is being used. If **piping** is used for the bleed line, avoid the use of elbows whenever possible.

NOTE

*For multiple pump installations, it is recommended that each Air Release Valve be fitted with an independent bleeder line directed back to the wet well. If multiple Air Release Valves are installed in a system, **do not** direct bleeder lines to a common manifold pipe. Contact your Gorman-Rupp distributor or the Gorman-Rupp Company for information about installation of an Automatic Air Release Valve for your specific application.*

ALIGNMENT

The alignment of the pump and its power source is critical for trouble-free mechanical operation. In either a flexible coupling or V-belt driven system, the driver and pump must be mounted so that their shafts are aligned with and parallel to each other. It is imperative that alignment be checked after the pump and piping are installed, and before operation.

NOTE

Check **Rotation,** *Section C, before final alignment of the pump.*

When mounted at the Gorman-Rupp factory, driver and pump are aligned before shipment. Misalignment will occur in transit and handling. Pumps **must** be checked and realigned before operation. Before checking alignment, tighten the foundation bolts. The pump casing feet and/or pedestal feet, and the driver mounting bolts should also be tightly secured.

WARNING!

When checking alignment, disconnect the power source to ensure that the pump will remain inoperative.

CAUTION

Adjusting the alignment in one direction may alter the alignment in another direction. check each procedure after altering alignment.

Coupled Drives

When using couplings, the axis of the power source must be aligned to the axis of the pump shaft in both the horizontal and vertical planes. Most couplings require a specific gap or clearance between the driving and the driven shafts. Refer to the coupling manufacturer's service literature.

Align spider insert type couplings by using calipers to measure the dimensions on the circumference of the outer ends of the coupling hub every 90°. The coupling is in alignment when the hub ends are the same distance apart at all points (see Figure 4A).

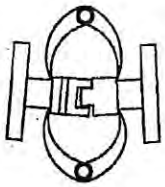


Figure 4A. Aligning Spider-Type Couplings

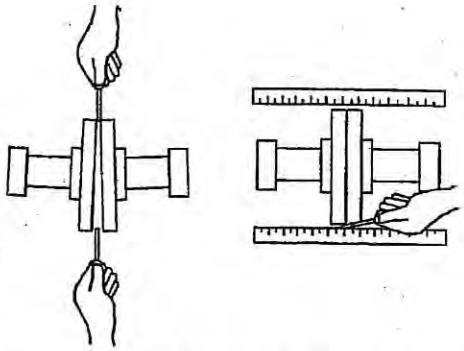


Figure 4B. Aligning Non-Spider Type Couplings

Align non-spider type couplings by using a feeler gauge or taper gauge between the coupling halves every 90°. The coupling is in alignment when the hubs are the same distance apart at all points (see Figure 4B).

Check parallel adjustment by laying a straightedge across both coupling rims at the top, bottom, and side. When the straightedge rests evenly on both halves of the coupling, the coupling is in horizontal parallel alignment. If the coupling is misaligned, use a feeler gauge between the coupling and the straightedge to measure the amount of misalignment.

V-Belt Drives

When using V-belt drives, the power source and the pump must be parallel. Use a straightedge along the sides of the pulleys to ensure that the pulleys are properly aligned (see Figure 4C). In drive systems using two or more belts, make certain that the belts are a matched set; unmatched sets will cause accelerated belt wear.

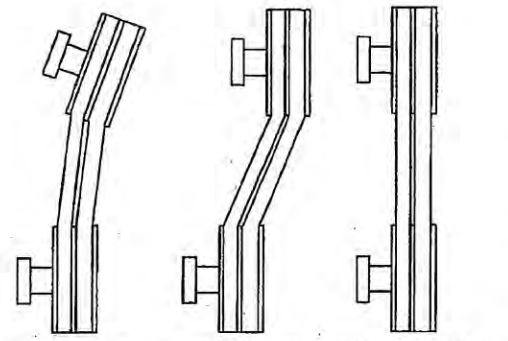


Figure 4C. Alignment of V-Belt Driven Pumps

Tighten the belts in accordance with the belt manufacturer's instructions. If the belts are too loose, they will slip; if the belts are too tight, there will be excessive power loss and possible bearing failure. Select pulleys that will match the proper speed ratio; overspeeding the pump may damage both pump and power source.

DANGER!

Do not operate the pump without the guard in place over the rotating parts. exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

DRIVE BELT TENSIONING

General Rules of Tensioning

For new drive belts, check the tension after 5, 20 and 50 hours of operation and re-tension as required (see the following procedure for measuring belt tension). Thereafter, check and re-tension if required monthly or at 500 hour intervals, whichever comes first.

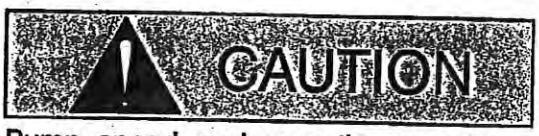
Ideal drive belt tension is the **lowest** tension at which the belt will not slip under peak load conditions. Do not over-tension drive belts. Over-tensioning will shorten both drive belt and bearing life. Under-tensioning will cause belt slippage. Always keep belts free from dirt, grease, oil and other foreign material which may cause slippage.

OPERATION – SECTION C

Review all SAFETY Information in Section A.

Follow the instructions on all tags, labels and decals attached to the pump.

This pump is designed to handle liquids containing large entrained solids and slurries. Do not attempt to pump volatile, corrosive, or flammable liquids which may damage the pump or endanger personnel as a result of pump failure.

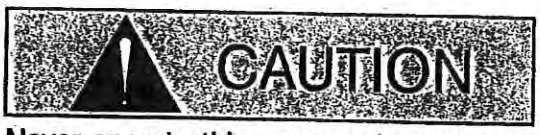


Pump speed and operating conditions must be within the performance range shown on page E-1.

PRIMING

Install the pump and piping as described in **INSTALLATION.** Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see **LUBRICATION** in **MAINTENANCE AND REPAIR).**

This pump is self-priming, but the pump should never be operated unless there is liquid in the pump casing.



Never operate this pump unless there is liquid in the pump casing. The pump will not prime when dry. extended operation of a dry pump will destroy the seal assembly.

Add liquid to the pump casing when:

1. The pump is being put into service for the first time.
2. The pump has not been used for a considerable length of time.
3. The liquid in the pump casing has evaporated.

Once the pump casing has been filled, the pump will prime and reprime as necessary.

After filling the pump casing, reinstall and tighten the fill plug. Do not attempt to operate the pump unless all connecting piping is securely installed. Otherwise, liquid in the pump forced out under pressure could cause injury to personnel.

To fill the pump, remove the pump casing fill cover or fill plug in the top of the casing, and add clean liquid until the casing is filled. Replace the fill cover or fill plug before operating the pump.

STARTING

Consult the operations manual furnished with the power source.

Rotation

The correct direction of pump rotation is counterclockwise when facing the impeller. The pump could be damaged and performance adversely affected by incorrect rotation. If pump performance is not within the specified limits (see the curve on page E-1), check the direction of power source rotation before further troubleshooting.

If an electric motor is used to drive the pump, remove V-belts, couplings, or otherwise disconnect the pump from the motor before checking motor rotation. Operate the motor independently while observing the direction of the motor shaft, or cooling fan.

If rotation is incorrect on a three-phase motor, have a qualified electrician interchange any two of the three phase wires to change direction. If rotation is incorrect on a single-phase motor, consult the literature supplied with the motor for specific instructions.

OPERATION

Lines With a Bypass

If a Gorman-Rupp Automatic Air Release Valve has been installed, the valve will automatically open to allow the pump to prime, and automatically close after priming is complete (see **INSTALLATION** for Air Release Valve operation).

If the bypass line is open, air from the suction line will be discharged through the bypass line back to the wet well during the priming cycle. Liquid will then continue to circulate through the bypass line while the pump is in operation.

Lines Without a Bypass

Open all valves in the discharge line and start the power source. Priming is indicated by a positive reading on the discharge pressure gauge or by a quieter operation. The pump may not prime immediately because the suction line must first fill with liquid. If the pump fails to prime within five minutes, stop it and check the suction line for leaks.

After the pump has been primed, partially close the discharge line throttling valve in order to fill the line slowly and guard against excessive shock pressure which could damage pipe ends, gaskets, sprinkler heads, and any other fixtures connected to the line. When the discharge line is completely filled, adjust the throttling valve to the required flow rate.

Do not operate the pump against a closed discharge throttling valve for long periods of time. If operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 160° F (71° C). Do not apply it at a higher operating temperature.

Overheating can occur if operated with the valves in the suction or discharge lines closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the pump casing with cool liquid.

Allow an over-heated pump to cool before servicing. Do not remove plates, covers, gauges, or fittings from an overheated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.

As a safeguard against rupture or explosion due to heat, this pump is equipped with a pressure relief valve which will open if vapor pressure within the pump casing reaches a critical point. If overheating does occur, stop the pump immediately and allow it to cool before servicing it. **Approach any overheated pump cautiously.** It is recommended that

the pressure relief valve assembly be replaced at each overhaul, or any time the pump casing overheats and activates the valve. **Never** replace this valve with a substitute which has not been specified or provided by the Gorman-Rupp Company.

Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop. If a vacuum suction gauge has been installed, monitor and record the readings regularly to detect strainer blockage.

Never introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or damage to the equipment. If backflushing is absolutely necessary, liquid pressure **must** be limited to 50% of the maximum permissible operating pressure shown on the pump performance curve.

Pump Vacuum Check

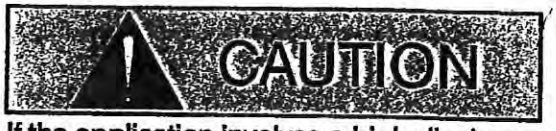
With the pump inoperative, install a vacuum gauge in the system, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches (508,0 mm) or more of mercury. If it does not, check for air leaks in the seal, gasket, or discharge valve.

Open the suction line, and read the vacuum gauge with the pump primed and at operation speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

STOPPING

Never halt the flow of liquid suddenly. If the liquid being pumped is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly.

On engine driven pumps, reduce the throttle speed slowly and allow the engine to idle briefly before stopping.



If the application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

After stopping the pump, lock out or disconnect the power source to ensure that the pump will remain inoperative.

Do not operate the pump against a closed discharge throttling valve for long periods of time. If operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

Cold Weather Preservation

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approximately one minute; this will remove any remaining liquid that could freeze the pump rotating parts. If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump from completely draining, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

BEARING TEMPERATURE CHECK

Bearings normally run at higher than ambient temperatures because of heat generated by friction.

Temperatures up to 160°F (71° C) are considered normal for bearings, and they can operate safely to at least 180°F (82° C).

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the housing. Record this temperature for future reference.

A sudden increase in bearing temperature is a warning that the bearings are at the point of failing to operate properly. Make certain that the bearing lubricant is of the proper viscosity and at the correct level (see **LUBRICATION** in **MAINTENANCE AND REPAIR**). Bearing overheating can also be caused by shaft misalignment and/or excessive vibration.

When pumps are first started, the bearings may seem to run at temperatures above normal. Continued operation should bring the temperatures down to normal levels.

TROUBLESHOOTING – SECTION D

Review all SAFETY Information in Section A.

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Lock out or disconnect the power source to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Not enough liquid in casing.	Add liquid to casing. See **PRIMING.**
	Suction check valve contaminated or damaged.	Clean or replace check valve.
	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Suction lift or discharge head too high.	Check piping installation and install bypass line if needed. See **INSTALLATION.**
	Strainer clogged.	Check strainer and clean if necessary.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Strainer clogged.	Check strainer and clean if necessary.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct submergence as needed.
	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.
	Impeller clogged.	Free impeller of debris.
	Pump speed too slow.	Check driver output; check belts or couplings for slippage.
	Discharge head too high.	Install bypass line.
	Suction lift too high.	Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high.	Check driver output; check that sheaves or couplings are correctly sized.
	Discharge head too low.	Adjust discharge valve.
	Liquid solution too thick.	Dilute if possible.
	Bearing(s) frozen.	Disassemble pump and check bearing(s).
PUMP CLOGS FREQUENTLY	Liquid solution too thick.	Dilute if possible.
	Discharge flow too slow.	Open discharge valve fully to increase flow rate, and run power source at maximum governed speed.
	Suction check valve or foot valve clogged or binding.	Clean valve.
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.
	Pumping entrained air.	Locate and eliminate source of air bubble.
	Pump or drive not securely mounted.	Secure mounting hardware.
	Impeller clogged or damaged.	Clean out debris; replace damaged parts.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature regularly to monitor any increase.
	Low or incorrect lubricant.	Check for proper type and level of lubricant.
	Suction and discharge lines not properly supported.	Check piping installation for proper support.
	Drive misaligned.	Align drive properly.

PREVENTIVE MAINTENANCE

Since pump applications are seldom identical, and pump wear is directly affected by such things as the abrasive qualities, pressure and temperature of the liquid being pumped, this section is intended only to provide general recommendations and practices for preventive maintenance. Regardless of the application however, following a routine preventive maintenance schedule will help assure trouble-free performance and long life from your Gorman-Rupp pump. For specific questions concerning your application, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Record keeping is an essential component of a good preventive maintenance program. Changes in suction and discharge gauge readings (if so equipped) between regularly scheduled inspections can indicate problems that can be corrected before system damage or catastrophic failure occurs. The appearance of wearing parts should also be documented at each inspection for comparison as well. Also, if records indicate that a certain part (such as the seal) fails at approximately the same duty cycle, the part can be checked and replaced before failure occurs, reducing unscheduled down time.

For new applications, a first inspection of wearing parts at 250 hours will give insight into the wear rate for your particular application. Subsequent inspections should be performed at the intervals shown on the chart below. Critical applications should be inspected more frequently.

Preventive Maintenance Schedule

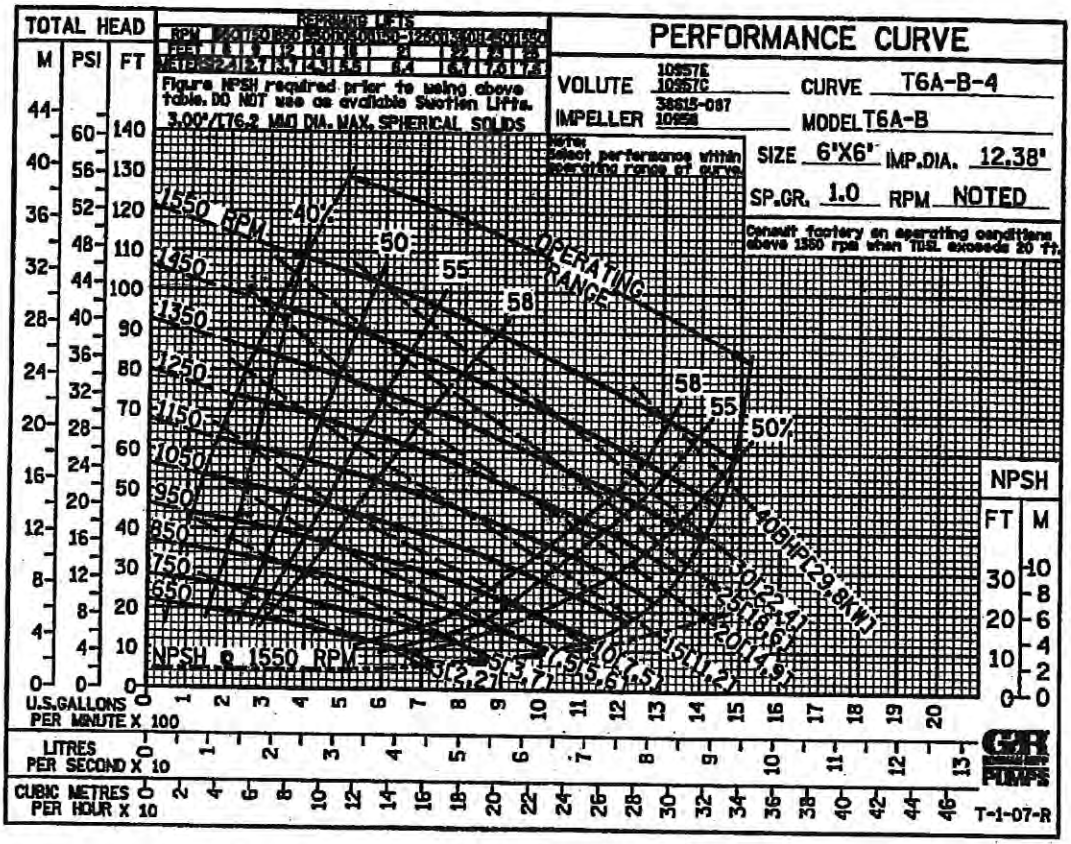
Item	Service Interval*				
	Daily	Weekly	Monthly	Semi-Annually	Annually
General Condition (Temperature, Unusual Noises or Vibrations, Cracks, Leaks, Loose Hardware, Etc.)	I				
Pump Performance (Gauges, Speed, Flow)	I				
Bearing Lubrication		I			R
Seal Lubrication (And Packing Adjustment, If So Equipped)		I			R
V-Belts (If So Equipped)			I		
Air Release Valve Plunger Rod (If So Equipped)			I	C	
Front Impeller Clearance (Wear Plate)				I	
Rear Impeller Clearance (Seal Plate)				I	
Check Valve					I
Pressure Relief Valve (If So Equipped)					C
Pump and Driver Alignment					I
Shaft Deflection					I
Bearings					I
Bearing Housing					I
Piping					I
Driver Lubrication – See Mfgr's Literature					

Legend:
I = Inspect, Clean, Adjust, Repair or Replace as Necessary
C = Clean
R = Replace

* Service interval based on an intermittent duty cycle equal to approximately 4000 hours annually. Adjust schedule as required for lower or higher duty cycles or extreme operating conditions.

PUMP MAINTENANCE AND REPAIR – SECTION E

MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.



* **STANDARD PERFORMANCE FOR PUMP MODEL T6A3-B, Including /F**

*Based on 70° F (21° C) clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be difference due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify performance or part numbers.

CAUTION

Pump speed and operating condition points must be within the continuous performance range shown on the curve.

SECTION DRAWING

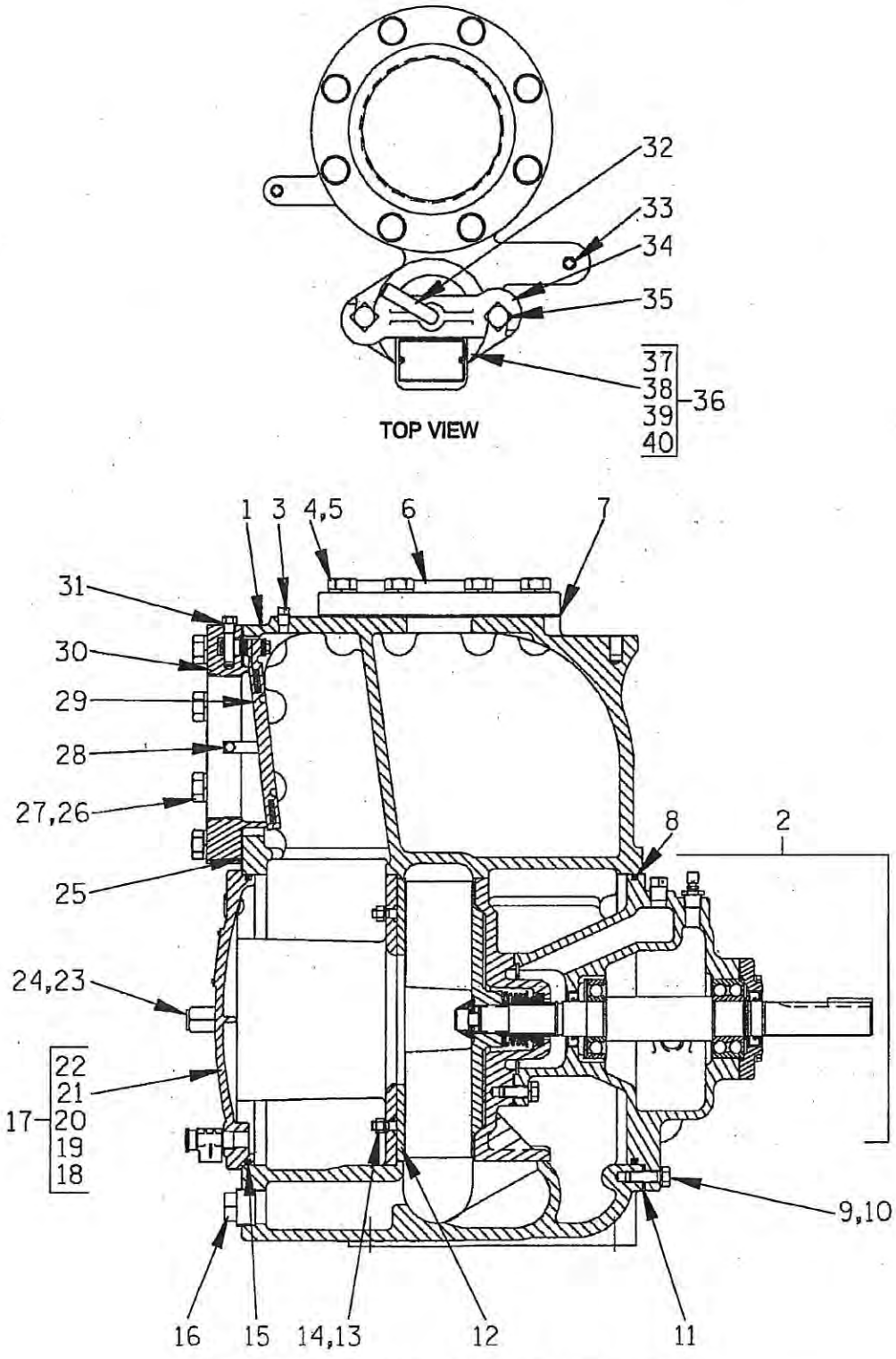


Figure 1. Pump Model T6A3–B, Including /F

PARTS LIST
Pump Model T6A3–B, Including /F
(From S/N 740693 Up)

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify part numbers.

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1	PUMP CASING	10957C	10010	1
2 *	REPAIR ROTATING ASSY	10956F	---	1
*	REPAIR ROTATING ASSY (WW MODEL ONLY)	44163–243	---	1
*	REPAIR ROTATING ASSY (WWS MODEL ONLY)	44163–202	---	1
3	PIPE PLUG	P04	15079	1
4	HEX HD CAPSCREW	B1208	15991	8
5	LOCKWASHER	J12	15991	8
6	DISCHARGE FLANGE	1758	10010	1
7 *	DISCH FLANGE GSKT	25113–036	---	1
8 *	ROTATING ASSY O-RING	S1678	---	1
9	HEX HD CAPSCREW	B0808	15991	4
10	LOCKWASHER	J08	15991	4
11 *	ROT ASSY SHIM SET	13131	17040	4
12 *	WEAR PLATE ASSY	46451–723	24150	1
13	LOCKWASHER	J06	15991	4
14	HEX NUT	D06	15991	4
15 *	BACK COVER O-RING	S1676	---	1
16	CASING DRAIN PLUG	P20	10009	1
17	BACK CVR PLATE ASSY	42111–905	---	1
18	–DRIVE SCREW	BM#04–03	17000	4
19	–WARNING PLATE	2613EV	13990	1
20	–PRESS RELIEF VALVE	26862–005	---	1
21	–BACK COVER PLATE	NOT AVAILABLE		1
22	–WARNING DECAL	38816–302	---	1
23	STUD	C1211	15991	2
24	BACK COVER NUT	31871–073	15000	2
25 *	GASKET	11402G	19370	1
26	HEX HD CAPSCREW	B1211	15991	8
27	LOCKWASHER	J12	15991	8
28	PIPE PLUG	P04	15079	1
29 *	SUCT CHK VALVE ASSY	46411–064	---	1
30	SUCTION FLANGE	11402	10010	1
31	CHECK VALVE PIN	11645	17010	1
32	CLAMP BAR SCREW	31912–009	15000	1
33	PIPE PLUG	P04	15079	1
34	CLAMP BAR	38111–004	11010	1
35	MACHINE BOLT	A1014	15991	2
36	FILL COVER ASSY	42111–344	---	1
37	–DRIVE SCREW	BM#04–03	17000	2
38	–FILL COVER PLATE	NOT AVAILABLE		1
39	–WARNING PLATE	38816–097	13990	1
40 *	–GASKET	50G	19210	1
NOT SHOWN:				
	NAME PLATE	38818–040	13990	1
	DRIVE SCREW	BM#04–03	17000	4
	LUBE DECAL	11421	---	1
	SUCTION STICKER	6588AG	---	1
	DISCHARGE STICKER	6588BJ	---	1
	PRIMING STICKER	6588AH	---	1
	WARNING DECAL	2613FE	---	1
	ROTATON DECAL	2613M	---	1
OPTIONAL:				
	DISASSEMBLY TOOL	48711–020	---	1
	/F FLANGE KIT	48213–041	---	1
	–SUCTION	11402A	10010	1
	–DISCHARGE	11402B	10010	1
	/FM METRIC FLANGE KIT	48213–078	---	1
	–SUCTION	38642–502	10000	1
	–DISCHARGE	38642–503	10000	1
	WEAR PLATES:			
	–SPA ALLOY	46451–729	24160	1
	–TUNGSTEN CARBIDE	46451–728	2415D	1
	–STAINLESS STEEL	46451–723	1718H	1
	CASING HEATERS:			
	–120V	47811–004	---	1
	–240V	47811–005	---	1
	CHECK VALVE ASSYS:			
	–NEO SOLID TYPE	46411–019	---	1
✓	–VITON SOLID	46411–078	---	1
✓	–VITON BLOW–OUT	46411–088	---	1
	PRESS RELIEF VALVES:			
	–SEWAGE TYPE	46431–628	---	1
	–STAINLESS STEEL	46431–629	---	1
	HI TEMP SHUT–DOWN KITS:			
	–145°F	48313–186	---	1
	–130°F	48313–256	---	1
	–120°F	48313–257	---	1
	HI TEMP SHUT–DOWN THERMOSTAT KIT 145°F	48313–172	---	1
	AIR RELEASE VALVES:			
	–10# COMP SPRING	GRP33–07A	---	1
	–25# COMP SPRING	GRP33–07	---	1
	–50# COMP SPRING	GRP33–07B	---	1
	A/R VALVE MTG KIT	46331–515	---	1
	ROTATING ASSY AND BACK COVER O-RING			
✓	–VITON	25154–454	---	1

* INDICATES PARTS RECOMMENDED FOR STOCK
✓ KALREZ® AND VITON™ ARE PRODUCTS OF THE DUPONT CORP
★ AFLAS® IS A PRODUCT OF THE 3M CORP

SECTION DRAWING

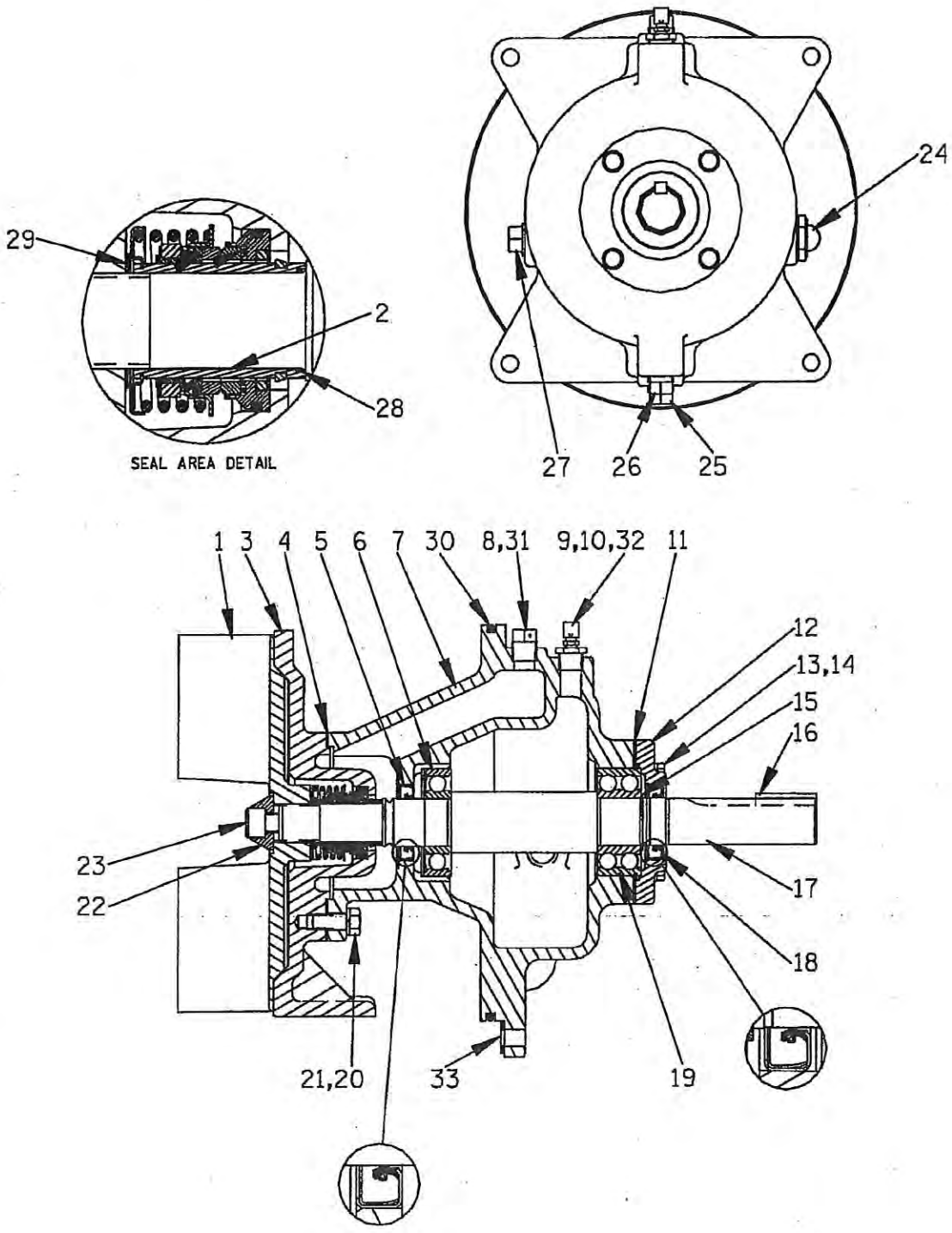


Figure 2. 10956F Repair Rotating Assembly

PARTS LIST
10956F Repair Rotating Assembly

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1 *	IMPELLER	10958	11010	1
2 *	SEAL ASSEMBLY	46513–150	---	1
3	SEAL PLATE	11837E	10010	1
4 *	SEAL PLATE GASKET	10959G	20000	1
5 *	BEARING CAP OIL SEAL	S1352	---	1
6 *	INBOARD BALL BEARING	23276–009	---	1
7	BEARING HOUSING	10959B	10010	1
8	VENTED PLUG	4823A	15079	1
9	AIR VENT	S1530	---	1
10	RED PIPE BUSHING	AP0802	15079	1
11 **	BEARING CAP GASKET	38683–248	18000	1
12	BEARING CAP	38322–215	10010	1
13	HEX HD CAPSCREW	B0605	15991	4
14	LOCKWASHER	J06	15991	4
15	BRG RETAINING RING	S244	---	1
16 *	SHAFT KEY	N0612	15990	1
17 *	IMPELLER SHAFT	10529	16040	1
18 *	INBOARD OIL SEAL	S1352	---	1
19 *	OUTBRD BALL BEARING	S1040	---	1
20	HEX HD CAPSCREW	B0805 1/2	15991	4
21	LOCKWASHER	J08	15991	4
22	IMPELLER WASHER	10278	15030	1
23	SOCKET HD CAPSCREW	DM1004S	15991	1
24	SIGHT GAUGE	S1471	---	1
25	SEAL CAV DRAIN PLUG	P08	15079	1
26	BRG HSG DRAIN PLUG	P08	15079	1
27	PIPE PLUG	P12	15079	1
28 *	O-RING	25154–022	---	REF
29 *	IMPELLER ADJ SHIM SET	37J	17090	REF
30 *	ROTATING ASSY O-RING	S1676	---	1
31	SHIPPING PLUG	11495B	15079	1
32	SHIPPING PLUG	11495B	15079	1
33 *	ROT ASSY ADJ SHIM SET	13131	17040	4
NOT SHOWN:				
	ROTATION DECAL	2613M	---	1
	INSTRUCTION TAG	6588U	---	1
OPTIONAL:				
	IMP CLEAN-OUT KIT	48783–003	---	1
	STAINLESS STEEL PARTS:			
	IMP SHAFT LESS SLEEVE	10529B	1706H	1
	SPACER WASHER (FOR SST SHAFT)	38329–040	17130	1
	SEAL ASSY	112364D	---	1
	IMPELLERS:			
	–ADI	10958	1102H	1
	–TUNG CARB COATED	10958A	11000	1
	SEAL PLATES:			
	–(TUNG CARB COATED)	11837F	10010	1
	–ADI	11837E	1102H	1
	SEAL ASSEMBLIES			
†	–STD MECHANICAL	12384A	---	1
†	–PERMALON COATED	46512–150	---	1
	METAL BELLOWS MECH SEAL ASSY			
	SEAL PLATE	38272–242	10010	1
	SEAL SLEEVE ASTL	11876B	16000	1
	SPACER WASHER	38329–040	17130	1
✓	–(VITON OR EQUAL)	46512–147	---	1
✓	–(KALREZ)	46512–142	---	1
†	MECHANICAL SEAL SHAFT SLEEVE	11876A	16000	1
† ★	AFLAS SEAL (W/SST SLEEVE OR SOLID SST SHAFT)	46512–194	---	1
	ROTATING ASSEMBLY AND BACK COVER O-RINGS:			
✓	–VITON	25154–454	---	1

* INDICATES PARTS RECOMMENDED FOR STOCK

** FOR PUMPS WITH SERIAL NUMBERS BELOW 884836, ORDER 10530G/18000 BEARING CAP GASKET. IF BOTH BEARING CAP AND GASKET MUST BE REPLACED, ORDER PARTS LISTED ABOVE.

† OPTIONAL MECHANICAL SEAL(S) MUST BE USED WITH MECHANICAL SEAL SHAFT SLEEVE OR SOLID SST SHAFT.

✓ KALREZ® AND VITON™ ARE PRODUCTS OF THE DUPONT CORP.

★ AFLAS® IS A PRODUCT OF THE 3M CORP.

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

Review all SAFETY Information in Section A.

Follow the instructions on all tags, label and decals attached to the pump.

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the sectional views (see Figures 1 and 2) and the accompanying parts lists.

As described on the following pages, this manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that **only** safe, established maintenance procedures are used, and that any procedures not addressed in this manual are performed **only** after establishing that neither personal safety nor pump integrity are compromised by such practices.

Many service functions may be performed by draining the pump and removing the back cover assembly. If major repair is required, the piping and/or power source must be disconnected. The following instructions assume complete disassembly is required.

Before attempting to service the pump, disconnect or lock out the power source and take precautions to ensure that it will remain inoperative. Close all valves in the suction and discharge lines.

For power source disassembly and repair, consult the literature supplied with the power source, or contact your local power source representative.

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Disconnect or lock out the power source to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment.

Back Cover And Wear Plate Removal

(Figure 1)

The wear plate (12) is easily accessible and may be serviced by removing the back cover assembly (17). Before attempting to service the pump, remove the pump casing drain plug (16) and drain the pump. Clean and reinstall the drain plug.

Remove the back cover nuts (24) and pull the back cover and assembled wear plate from the pump casing (1). Inspect the wear plate, and replace it if badly scored or worn. To remove the wear plate, disengage the hardware (13 and 14).

Inspect the back cover O-ring (15) and replace it if damaged or worn.

Suction Check Valve Removal

(Figure 1)

If the check valve assembly (29) is to be serviced, remove the check valve pin (31), reach through the back cover opening and pull the complete assembly from the suction flange (30).

NOTE

Further disassembly of the check valve is not required since it must be replaced as a complete unit.

Individual parts are not sold separately.

Rotating Assembly Removal

(Figure 2)

The rotating assembly may be serviced without disconnecting the suction or discharge piping; however, the power source must be removed to provide clearance.

The impeller (1) should be loosened while the rotating assembly is still secured to the pump casing. Before loosening the impeller, remove the seal cavity drain plug (25) and drain the seal lubricant. This will prevent the oil in the seal cavity from escaping when the impeller is loosened. Clean and reinstall the seal cavity drain plug.

Immobilize the impeller by wedging a block wood between the vanes and the pump casing, and remove the impeller capscrew and washer (22 and 23).

Install a lathe dog on the drive end of the shaft (17) with the "V" notch positioned over the shaft keyway.

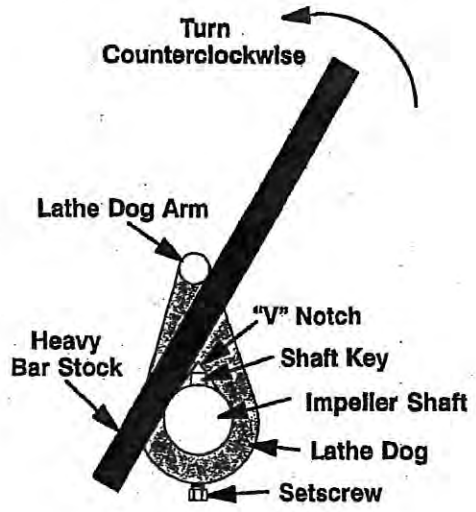


Figure 3. Loosening Impeller

With the impeller rotation still blocked, see Figure 3 and use a long piece of heavy bar stock to pry against the arm of the lathe dog in a counterclockwise direction (when facing the drive end of the shaft). **Use caution** not to damage the shaft or keyway. When the impeller breaks loose, remove the lathe dog and wood block.

NOTE

Do not remove the impeller until the rotating assembly has been removed from the pump casing.

(Figure 1)

Remove the hardware (9 and 10) securing the rotating assembly to the pump casing. Separate the rotating assembly by pulling straight away from the pump casing.

NOTE

An optional disassembly tool is available from the factory. If the tool is used, follow the instructions packed with it. A similar tool may be assembled using 1/2-inch pipe (schedule 80 steel or malleable iron) and a standard tee (see Figure 4). All threads are 1/2-inch NPT. ***Do not pre-assemble the tool.***

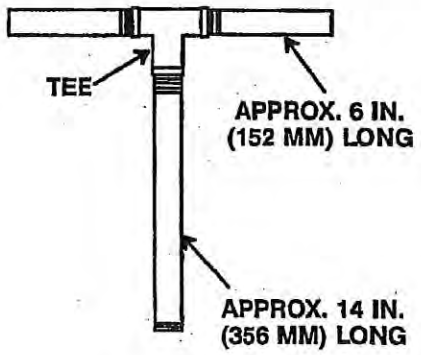


Figure 4. Rotating Assembly Tool

To install the tool, remove the air vent (9, Figure 2) from the bearing housing, and screw the longest length of pipe into the vent hole until fully engaged. Install the tee, and screw the handles into the tee. Use caution when lifting the rotating assembly to avoid injury to personnel or damage to the assembly.

Remove the bearing housing O-ring (8).

Impeller Removal

(Figure 2)

With the rotating assembly removed from the pump casing, unscrew the impeller from the shaft.

Use caution when unscrewing the impeller; tension on the shaft seal spring will be released as the impeller is removed. Inspect the impeller and replace if cracked or badly worn.

Remove the impeller adjusting shims (29); tie and tag the shims, or measure and record their thickness for ease of reassembly.

Seal Removal

(Figure 2)

Slide the integral shaft sleeve and rotating portion of the seal off the shaft as a unit.

Use a pair of stiff wires with hooked ends to remove the stationary element and seat.

An alternate method of removing the stationary seal components is to remove the hardware (20 and 21) and separate the seal plate (3) and gasket (4) from the bearing housing (7). Position the seal plate on a flat surface with the impeller side down. Use a wooden dowel or other suitable tool to press on the back side of the stationary seat until the seat, O-rings, and stationary element can be removed.

Remove the shaft sleeve O-ring (28).

If no further disassembly is required, refer to **Seal Installation**.

Shaft and Bearing Removal and Disassembly

(Figure 2)

When the pump is properly operated and maintained, the bearing housing should not require disassembly. Disassemble the shaft and bearings **only** when there is evidence of wear or damage.

Shaft and bearing disassembly in the field is not recommended. These operations should be performed only in a properly-equipped shop by qualified personnel.

Remove the bearing housing drain plug (26) and drain the lubricant. Clean and reinstall the drain plug.

Disengage the hardware (13 and14) and slide the bearing cap (12) and oil seal (18) off the shaft.Remove the bearing cap gasket (11), and press the oil seal from the bearing cap.

Place a block of wood against the impeller end of the shaft and tap the shaft and assembled bearings (6 and 19) from the bearing housing.

After removing the shaft and bearings, clean and inspect the bearings **in place** as follows.

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place.** It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

Clean the bearing housing, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage and replace as necessary.

Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Clean the bearings thoroughly in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.

Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. **DO NOT** spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

Rotate the bearings by hand to check for roughness or binding and inspect the bearing balls. If ro-

tation is rough or the bearing balls are discolored, replace the bearings.

The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the bearing housing. Replace the bearings, shaft, or bearing housing if the proper bearing fit is not achieved.

If bearing replacement is required, remove the outboard bearing retaining ring (15), and use a bearing puller to remove the bearings from the shaft.

Press the inboard oil seal (5) from the bearing housing.

Shaft and Bearing Reassembly and Installation (Figure 2)

Clean the bearing housing, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage as necessary.

Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Inspect the shaft for distortion, nicks or scratches, or for thread damage on the impeller end. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

Position the inboard oil seal (5) in the bearing housing bore with the lip positioned as shown in Figure 2. Press the oil seal into the housing until the face is **just flush** with the machined surface on the housing.

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place.** It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

NOTE

Position the inboard bearing (6) on the shaft with the shielded side toward the impeller end of the shaft. Position the outboard bearing (19) on the shaft with the integral retaining ring on the bearing O.D. toward the drive end of the shaft.

The bearings may be heated to ease installation. An induction heater, hot oil bath, electric oven, or hot plate may be used to heat the bearings. Bearings should **never** be heated with a direct flame or directly on a hot plate.

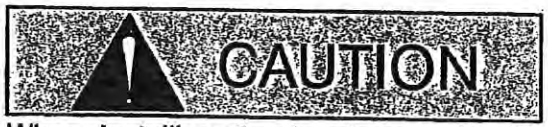
NOTE

*If a hot oil bath is used to heat the bearings, both the oil and the container must be **absolutely** clean. If the oil has been previously used, it must be **thoroughly** filtered.*

Heat the bearings to a uniform temperature **no higher than** 250°F (120°C), and slide the bearings onto the shaft, one at a time, until they are fully seated. This should be done quickly, in one continuous motion, to prevent the bearings from cooling and sticking on the shaft.

After the bearings have been installed and allowed to cool, check to ensure that they have not moved away from the shaft shoulders in shrinking. If movement has occurred, use a suitable sized sleeve and a press to reposition the bearings against the shaft shoulders.

If heating the bearings is not practical, use a suitable sized sleeve, and an arbor (or hydraulic) press to install the bearings on the shaft.



When installing the bearings onto the shaft, **never** press or hit against the outer race, balls, or ball cage. Press **only** on the inner race.

Secure the outboard bearing on the shaft with the bearing retaining ring (15).

Slide the shaft and assembled bearings into the bearing housing until the retaining ring on the outboard bearing seats against the bearing housing.

CAUTION

When installing the shaft and bearings into the bearing bore, push against the outer race. **Never** hit the balls or ball cage.

Press the outboard oil seal (18) into the bearing cap (12) with the lip positioned as shown in Figure 2. Replace the bearing cap gasket (11), and secure the bearing cap with the hardware (13 and 14). **Be careful** not to damage the oil seal lip on the shaft keyway.

Install the bearing housing O-ring (30).

Lubricate the bearing housing as indicated in **LUBRICATION.**

Seal Installation

(Figures 2, 5, 6 and 7)

WARNING!

Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Clean the seal cavity and shaft with a cloth soaked in fresh cleaning solvent. Inspect the stationary seat bore in the seal plate for dirt, nicks and burrs, and remove any that exist. The stationary seat bore **must** be completely clean before installing the seal.

CAUTION

A new seal assembly should be installed **any time** the old seal is removed from the pump. Wear patterns on the finished faces cannot be realigned during reassembly. Reusing an old seal could result in premature failure.

To ease installation of the seal, lubricate the shaft sleeve O-ring and the external stationary seat O-ring with a very **small** amount of light lubricating oil. See Figure 5 for seal part identification.

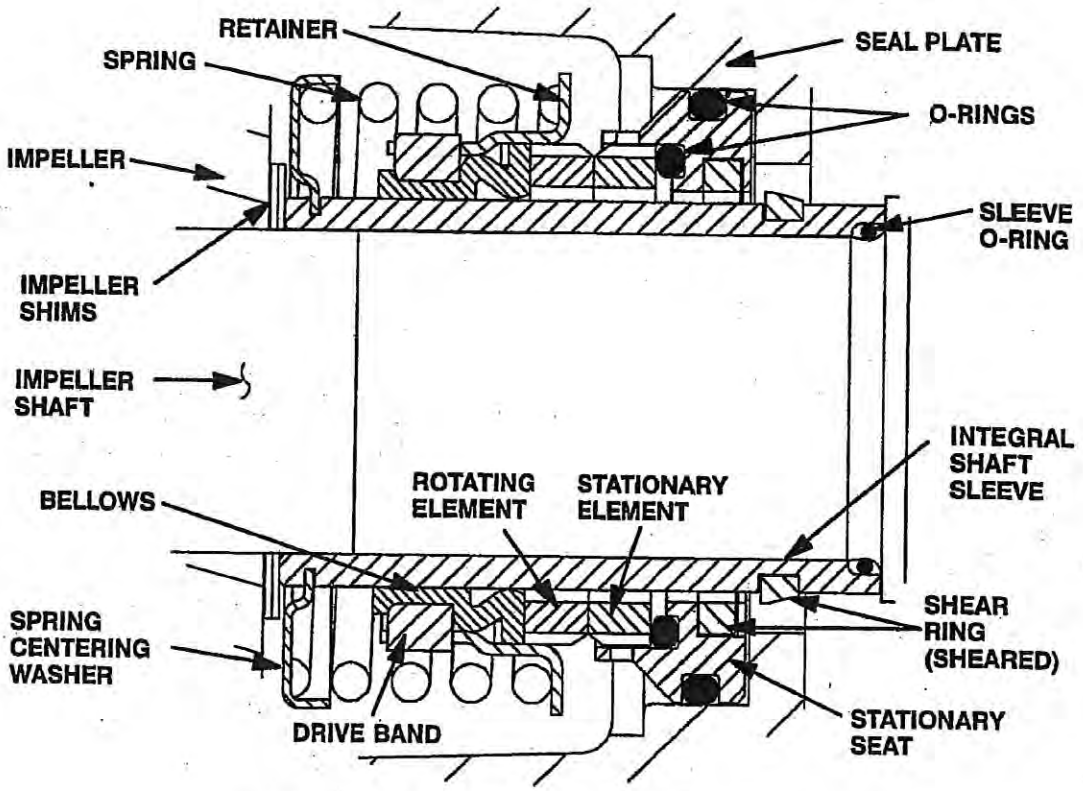


Figure 5. 46513–150 Cartridge Seal Assembly

CAUTION

This seal is not designed for operation at temperatures above 160°F (71°C). Do not use at higher operating temperatures.

If the seal plate was removed, install the seal plate gasket (4). Position the seal plate over the shaft and secure it to the intermediate with the hardware (20 and 21).

To prevent damaging the shaft sleeve O-ring (28) on the shaft threads, stretch the O-ring over a piece of tubing 1-1/4 I.D. x 1-1/2 O.D. x 2-inches long (32 mm x 38 mm x 51 mm). Slide the tube over the shaft threads, then slide the O-ring off the tube and onto the shaft. Remove the tube, and continue to slide the O-ring down the shaft until it seats against the shaft shoulder.

When installing a new cartridge seal assembly, remove the seal from the container, and remove the mylar storage tabs, if so equipped, from between the seal faces.

CAUTION

New cartridge seal assemblies may be equipped with mylar storage tabs between the seal faces. If so equipped, these storage tabs **must** be removed before installing the seal.

Lubricate the external stationary seat O-ring with light oil. Slide the seal assembly onto the shaft until the external stationary seat O-ring engages the bore in the seal plate.

Clean and inspect the impeller as described in **Impeller Installation and Adjustment.** Install the full set of impeller shims (29) provided with the seal, and screw the impeller onto the shaft until it is seated against the seal (see Figure 6).

Continue to screw the impeller onto the shaft. This will press the stationary seat into the seal plate bore.

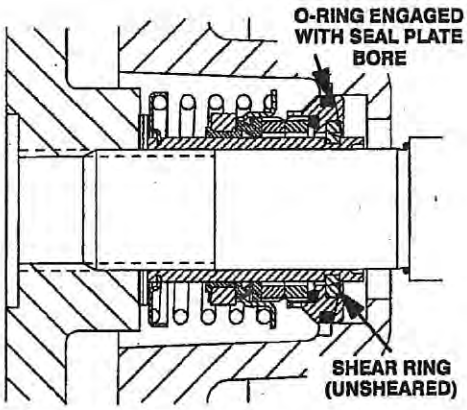


Figure 6. Seal Partially Installed

NOTE

A firm resistance will be felt as the impeller presses the stationary seat into the seal plate bore.

As the stationary seat becomes fully seated, the seal spring compresses, and the shaft sleeve will break the nylon shear ring. This allows the sleeve to slide down the shaft until seated against the shaft shoulder. Continue to screw the impeller onto the shaft until the impeller, shims, and sleeve are fully seated against the shaft shoulder (see Figure 7).

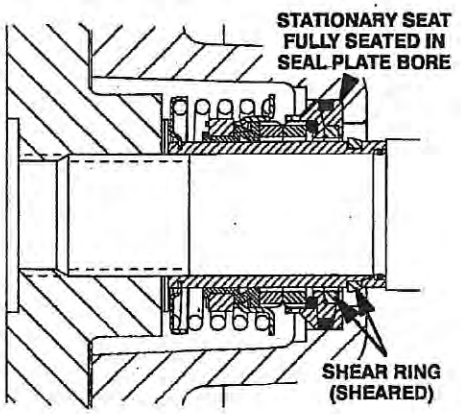


Figure 7. Seal Fully Installed

Measure the impeller-to-seal plate clearance, and remove impeller adjusting shims to obtain the proper clearance as described in **Impeller Installation and Adjustment.**

If necessary to reuse an old seal in an emergency, carefully separate the rotating and stationary seal faces from the bellows retainer and stationary seat.

CAUTION

A new seal assembly should be installed **any time** the old seal is removed from the pump. Wear patterns on the finished faces cannot be realigned during reassembly. Reusing an old seal could result in premature failure.

Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate precision finished faces; even fingerprints on the faces can shorten seal life. If necessary, clean the faces with a non-oil based solvent and a clean, lint-free tissue. Wipe **lightly** in a concentric pattern to avoid scratching the faces.

Carefully wash all metallic parts in fresh cleaning solvent and allow to dry thoroughly.

CAUTION

Do not attempt to separate the rotating portion of the seal from the shaft sleeve when reusing an old seal. The rubber bellows will adhere to the sleeve during use, and attempting to separate them could damage the bellows.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. Inspect the integral shaft sleeve for nicks or cuts on either end. If any components are worn, or the sleeve is damaged, replace the complete seal; **never mix old and new seal parts.**

Install the stationary seal element in the stationary seat. Press this stationary subassembly into the seal plate bore until it seats squarely against the bore shoulder. A push tube made from a piece of plastic pipe would aid this installation. The I.D. of

the pipe should be slightly larger than the O.D. of the shaft sleeve.

Slide the rotating portion of the seal (consisting of the integral shaft sleeve, spring centering washer, spring, bellows and retainer, and rotating element) onto the shaft until the seal faces contact.

Proceed with **Impeller Installation and Adjustment.**

Impeller Installation

(Figure 2)

Inspect the impeller, and replace it if cracked or badly worn. Inspect the impeller and shaft threads for dirt or damage, and clean or dress the threads as required.

CAUTION

The shaft and impeller threads **must** be completely clean before reinstalling the impeller. Even the slightest amount of dirt on the threads can cause the impeller to seize to the shaft, making future removal difficult or impossible without damage to the impeller or shaft.

Install the same thickness of impeller adjusting shims (29) as previously removed. Apply 'Never-Seez' or equivalent to the shaft threads and screw the impeller onto the shaft until tight.

NOTE

*At the slightest sign of binding, immediately back the impeller off, and check the threads for dirt. **Do not** try to force the impeller onto the shaft.*

A clearance of .025 to .040 inch (0,64 to 1,02 mm) between the impeller and the seal plate is recommended for maximum pump efficiency. Measure this clearance, and add or remove impeller adjusting shims as required.

NOTE

If the rotating assembly has been installed in the pump casing, this clearance may be measured by reaching through the priming port with a feeler gauge.

NOTE

*Proceed with **Rotating Assembly Installation** before installing the impeller capscrew and washer (22 and 23). The rotating assembly must be installed in the pump casing in order to torque the impeller capscrew.*

After the rotating assembly is installed in the pump casing, coat the threads of the impeller capscrew (23) with 'Never-Seez' or equivalent compound, and install the impeller washer (22) and capscrew; torque the capscrew to 90 ft. lbs. (1080 in. lbs. or 12,4 m. kg.).

Rotating Assembly Installation

(Figure 1)

NOTE

If the pump has been completely disassembled, it is recommended that the suction check valve and back cover assembly be reinstalled at this point. The back cover assembly must be in place to adjust the impeller face clearance.

Install the bearing housing and lubricate it with light grease. Ease the rotating assembly into the pump casing using the installation tool. **Be careful** not to damage the O-ring.

Install the four sets of rotating assembly adjusting shims (11) using the same thickness as previously removed. Secure the rotating assembly to the pump casing with the hardware (9 and 10). **Do not** fully tighten the capscrews until the back cover has been reinstalled and the impeller face clearance has been set.

A clearance of .010 to .020 inch (0,25 to 0,51 mm) between the impeller and the wear plate is also recommended for maximum pump efficiency. This clearance can be obtained by removing an equal amount of shims from each rotating assembly shim set until the impeller scrapes against the wear plate when the shaft is turned. After the impeller scrapes, add approximately .015 inch (0,4 mm) of shims to each shim set.

NOTE

An alternate method of adjusting this clearance is to

reach through the suction port with a feeler gauge and measure the gap. Add or subtract rotating assembly shims accordingly.

Suction Check Valve Installation

(Figure 1)

Inspect the check valve assembly (29), and replace it if badly worn.

NOTE

The check valve assembly must be replaced as a complete unit. Individual parts are not sold separately.

Reach through the back cover opening with the check valve (29), and position the check valve adaptor in the mounting slot in the suction flange (30). Align the adaptor with the flange hole, and secure the assembly with the check valve pin (31).

NOTE

If the suction or discharge flanges were removed, replace the respective gaskets, apply 'Permatex Aviation No. 3 Form-A-Gasket' or equivalent compound to the mating surfaces, and secure them to the pump casing with the attaching hardware.

Back Cover Installation

(Figure 1)

If the wear plate (12) was removed for replacement, carefully center it on the back cover and secure it with the hardware (13 and 14). The wear plate **must** be concentric to prevent binding when the back cover is installed.

Replace the back cover O-ring (15), and lubricate it with a generous amount of No. 2 grease. Clean any scale or debris from the contacting surfaces in the pump casing that might interfere or prevent a good seal with the back cover. Slide the back cover assembly into the pump casing. Be sure the wear plate does not bind against the impeller.

NOTE

To ease future disassembly, apply a film of grease or 'Never-Seez' on the back cover shoulder, or any surface which contacts the pump casing. This action will reduce rust and scale build-up.

Secure the back cover assembly by tightening the back cover nuts (24) evenly. **Do not** over-tighten the hand nuts; they should be just tight enough to ensure a good seal at the back cover shoulder. Be sure the wear plate does not bind against the casing.

PRESSURE RELIEF VALVE MAINTENANCE

(Figure 1)

The back cover is equipped with a pressure relief valve (20) to provide additional safety for the pump and operator (refer to **Liquid Temperature And Overheating** in **OPERATION**).

It is recommended that the pressure relief valve assembly be replaced at each overhaul, or any time the pump overheats and activates the valve. **Never** replace this valve with a substitute which has not been specified or provided by the Gorman-Rupp Company.

Periodically, the valve should be removed for inspection and cleaning. When reinstalling the relief valve, apply 'Loctite Pipe Sealant With Teflon No. 592', or equivalent compound, on the relief valve threads. Position the valve as shown in Figure 1 with the discharge port pointing down.

Final Pump Assembly

(Figure 1)

Install the shaft key (16, Figure 2) and reconnect the power source. Be sure to install any guards used over the rotating members.

Do not operate the pump without the guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

Install the suction and discharge lines and open all valves. Make certain that all piping connections are tight, properly supported and secure.

Be sure the pump and power source have been properly lubricated, see **LUBRICATION.**

Remove the fill cover assembly (36) and fill the pump casing with clean liquid. Reinstall the fill cover and tighten it. Refer to **OPERATION,** Section C, before putting the pump back into service.

LUBRICATION

Seal Assembly

(Figure 2)

Before starting the pump, remove the vented plug (8) and fill the seal cavity with approximately 40 ounces (1,4 liters) of SAE No. 30 non-detergent oil, or to a level just below the tapped vented plug hole. Clean and reinstall the vented plug. Maintain the oil at this level.

Bearings

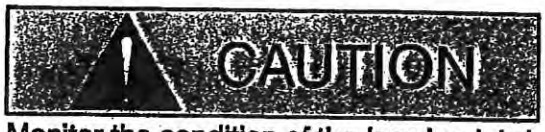
(Figure 2)

The bearing housing was fully lubricated when shipped from the factory. Check the oil level regularly through the sight gauge (24) and maintain it at the middle of the gauge. When lubrication is required, add SAE No. 30 non-detergent oil through the hole for the air vent (9). **Do not** over-lubricate. Over-lubrication can cause the bearings to overheat, resulting in premature bearing failure.

NOTE

The white reflector in the sight gauge must be positioned horizontally to provide proper drainage.

Under normal conditions, drain the bearing housing once each year and refill with approximately 32 ounces (1 liter) clean oil. Change the oil more frequently if the pump is operated continuously or installed in an environment with rapid temperature change.



Monitor the condition of the bearing lubricant regularly for evidence of rust or moisture condensation. This is especially important in areas where variable hot and cold temperatures are common.

For cold weather operation, consult the factory or a lubricant supplier for the recommended grade of oil.

Power Source

Consult the literature supplied with the power source, or contact your local power source representative.

THE GORMAN-RUPP COMPANY AND GORMAN-RUPP OF CANADA LIMITED 12 MONTH LIMITED WARRANTY

EXTENT AND DURATION OF WARRANTY

Coverage: The Gorman-Rupp Company or Gorman-Rupp of Canada Limited (herein individually referred to as "GR") each individually warrant that its products and parts shall be free from defects in material and workmanship for twelve (12) months from the date of purchase by the original end user.

Exceptions: This Limited Warranty shall not apply to the following products and parts: engines, motors, trade accessories and other products, components or materials not manufactured by GR. With respect to submersible pumps, the pump and motor are an integral unit and are therefore warranted as a unit. However, with respect to the electrical components in submersible pumps, this warranty is valid **only** when electrical controls for the pump have been specified and/or provided by GR. Wear and tear on any product resulting from normal use is not covered by this Limited Warranty.

LIMITATIONS

GR'S SOLE AND EXCLUSIVE WARRANTY WITH RESPECT TO ITS PRODUCTS AND PARTS IS THIS LIMITED WARRANTY. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER EXPRESS AND/OR IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.

EXCLUSIVE REMEDY AND DAMAGES

The sole and exclusive remedy for breach of this Limited Warranty by GR, and the entire extent of its liability for such breach or for damages arising and/or resulting from the use of the products and parts covered by this Limited Warranty shall be as follows:

1. **Repair or replacement:** If inspection shows that any GR product or part covered under this LimitedWarranty is defective in materials or workmanship, GR shall repair or replace the defective product or part at its option, without charge. You must have properly installed, maintained and used the product or part claimed to be defective in accordance with the maintenance schedule and/or manual which comes with the product. *No allowance will be made for labor, transportation or other charges incurred by you in connection with such repair or replacement.*

2. **To obtain the above remedy:**

   a) Immediately notify GR at the address below of the claimed defect in materials or workmanship and provide the serial number or date code of the product and/or part and provide a copy of the invoice or bill of sale referencing the product and/or part by no later than the expiration date of the Limited Warranty period.

   b) GR will advise whether inspection of the product and/or part will be necessary and whether and how repair or replacement will be effected. If inspection by GR is necessary, the product or part must be sent freight prepaid to GR at the address stated below. Return shipment of the repaired product or part will be F.O.B. the address stated below.

3. **Damages:** GR's liability for damages for breach of this Limited Warranty shall not exceed the amount of the purchase price of the product or part in respect to which damages are claimed. **IN NO EVENT SHALL GR BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES FOR BREACH OF THIS LIMITED WARRANTY OTHER THAN AS STATED HEREIN.**

   Some states do not allow the exclusion or limitation of incidental or consequential damages. Accordingly, the above may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from state to state and province to province.

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CW

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October 20, 1983
Rev. K 06-19-08

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WITH PARTS LIST

GORMAN-RUPP PUMPS

T SERIES PUMPS

MODELS

T6A60-B

INCLUDING: /F, /FM

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
www.grpumps.com
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA Printed in U.S.A.

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Register your new
Gorman-Rupp pump online at
www.grpumps.com

Valid serial number and e-mail address required.

RECORD YOUR PUMP MODEL AND SERIAL NUMBER

Please record your pump model and serial number in the spaces provided below. Your Gorman-Rupp distributor needs this information when you require parts or service.

Pump Model: _____

Serial Number: _____

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INTRODUCTION

Thank You for purchasing a Gorman-Rupp pump. **Read this manual** carefully to learn how to safely install and operate your pump. Failure to do so could result in personal injury or damage to the pump. This Installation, Operation, and Maintenance manual is designed to help you achieve the best performance and longest life from your Gorman-Rupp pump.

This pump is a T Series, semi-open impeller, self-priming centrifugal model with a suction check valve. The pump is designed for handling liquids containing large entrained solids and slurries. The basic material of construction is gray iron, with ductile iron impeller and steel wearing parts.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for every aspect of each specific application. Therefore, it is the responsibility of the owner/installer of the pump to ensure that applications not addressed in this manual are performed **only** after establishing that neither operator safety nor pump integrity are compromised by the installation. Pumps and related equipment **must** be installed and operated according to all national, local and industry standards.

If there are any questions regarding the pump or its application which are not covered in this manual or in other literature accompanying this unit, please contact your Gorman-Rupp distributor, or:

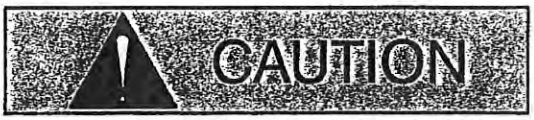
The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901–1217
Phone: (419) 755–1011
or:
Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7
Phone: (519) 631–2870

For information or technical assistance on the power source, contact the power source manufacturer's local dealer or representative.

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

Immediate hazards which WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.

Hazards or unsafe practices which COULD result in severe personal injury or death. These instructions describe the procedure required and the injury which could result from failure to follow the procedure.



Hazards or unsafe practices which COULD result in minor personal injury or product or property damage. These instructions describe the requirements and the possible damage which could result from failure to follow the procedure.

NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

SAFETY – SECTION A

This information applies to T Series basic pumps. Gorman-Rupp has no control over or particular knowledge of the power source which will be used. Refer to the manual accompanying the power source before attempting to begin operation.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the owner/installer's responsibility to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised by the installation.

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect or lock out the power source to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.
6. Vent the pump slowly and cautiously.
7. Drain the pump.

This pump is designed to handle liquids containing large entrained solids or slurries. Do not attempt to pump volatile, corrosive, or flammable materials which may damage the pump or endanger personnel as a result of pump failure.

After the pump has been positioned, make certain that the pump and all piping connections are tight, properly supported and secure before operation.

Do not operate the pump without the guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Vapor pressure within the pump can cause parts being disengaged to be ejected with great force. Allow the pump to completely completely cool before servicing.

Do not operate the pump against a closed discharge valve for long periods of time. If operated against a closed discharge valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment. Suction and discharge hoses and piping must be removed from the pump before lifting.

Do not attempt to disengage any part of an overheated pump unit. Vapor pressure within the pump casing can eject these parts with great force when they are disengaged. Allow the pump to completely cool before servicing it.

Pumps and related equipment must be installed and operated according to all national, local and industry standards.

Overheated pumps can cause severe burns and injury. If overheating of the pump occurs:

1. **Stop the pump immediately.**
2. **Allow the pump to completely cool.**
3. **Refer to instructions in this manual before restarting the pump.**

INSTALLATION – SECTION B

Review all SAFETY Information in Section A.

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect, position, and arrange the pump and piping.

Most of the information pertains to a standard **static lift application** where the pump is positioned above the free level of liquid to be pumped.

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to **50%** of the maximum permissible operating pressure as shown on the pump performance curve.

For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Pump Dimensions

See Figure 1 for the approximate physical dimensions of this pump.

OUTLINE DRAWING

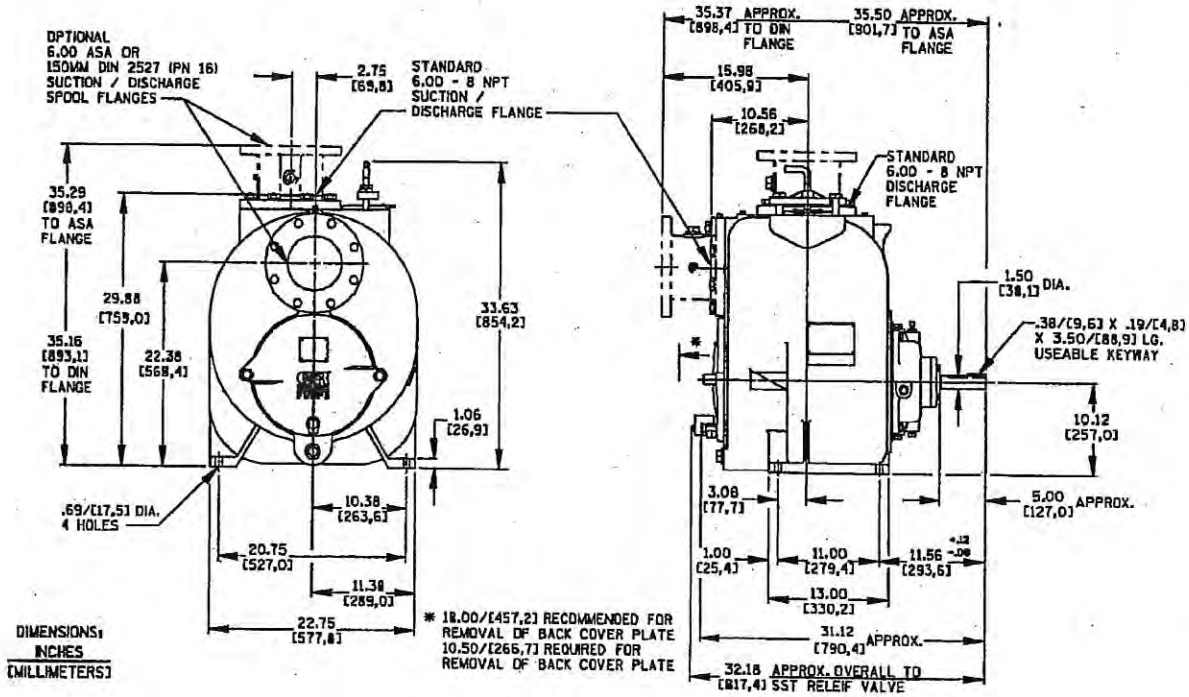


Figure 1. Pump Model T6A60-B, Including /F and /FM

PREINSTALLATION INSPECTION

The pump assembly was inspected and tested before shipment from the factory. Before installation, inspect the pump for damage which may have occurred during shipment. Check as follows:

a. Inspect the pump for cracks, dents, damaged threads, and other obvious damage.

b. Check for and tighten loose attaching hardware. Since gaskets tend to shrink after drying, check for loose hardware at mating surfaces.

c. Carefully read all warnings and cautions contained in this manual or affixed to the pump, and perform all duties indicated. Note the direction of rotation indicated on the pump. Check that the pump shaft rotates counterclockwise when facing the impeller.

Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Refer to **ROTATION** in **OPERATION**, Section C.

d. Check levels and lubricate as necessary. Refer to **LUBRICATION** in the **MAINTENANCE AND REPAIR** section of this manual and perform duties as instructed.

e. If the pump and power source have been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.

If the maximum shelf life has been exceeded, or if anything appears to be abnormal, contact your Gorman-Rupp distributor or the factory to determine the repair or updating policy. **Do not** put the pump into service until appropriate action has been taken.

POSITIONING PUMP

Lifting

Pump unit weights will vary depending on the mounting and drive provided. Check the shipping tag on the unit packaging for the actual weight, and use lifting equipment with appropriate capacity. Drain the pump and remove all customer-installed equipment such as suction and discharge hoses or piping before attempting to lift existing, installed units.

The pump assembly can be seriously damaged if the cables or chains used to lift and move the unit are improperly wrapped around the pump.

Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation.

The pump may have to be supported or shimmed to provide for level operation or to eliminate vibration.

Clearance

When positioning the pump, allow a minimum clearance of **18 inches (457 mm)** in front of the back cover to permit removal of the cover and easy access to the pump interior.

SUCTION AND DISCHARGE PIPING

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve and operating range shown on Page E-1 to be sure your overall application allows pump to operate within the safe operation range.

Materials

Either pipe or hose maybe used for suction and discharge lines; however, the materials must be

compatible with the liquid being pumped. If hose is used in suction lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is not recommended.

Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts and/or couplings.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines not less than 18 inches (457,2 mm) from the suction and discharge ports and install the lines. Installation closer to the pump may result in erratic readings.

SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets.

Strainers

If a strainer is furnished with the pump, be certain to use it; any spherical solids which pass through a strainer furnished with the pump will also pass through the pump itself.

If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

This pump is designed to handle up to 3-inch (76,2 mm) diameter spherical solids.

Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe dope. The pipe dope should be compatible with the liquid being pumped.

Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to 1 1/2 times the diameter of the suction line.

If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance 1 1/2 times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least 3 times the diameter of the suction pipe.

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 2 shows recommended minimum submergence vs. velocity.

NOTE

The pipe submergence required may be reduced by installing a standard pipe increaser fitting at the end of the suction line. The larger opening size will reduce the inlet velocity. Calculate the required submergence using the following formula based on the increased opening size (area or diameter).

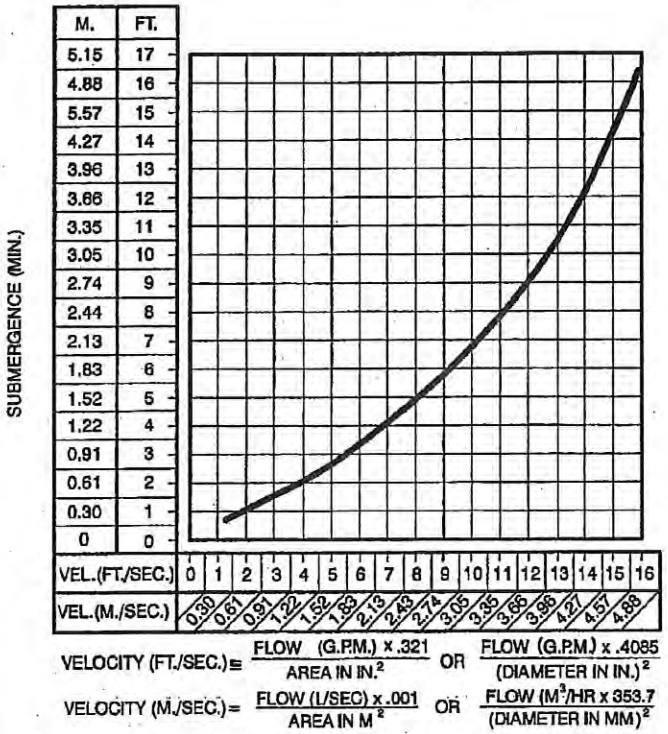


Figure 2. Recommended Minimum Suction Line Submergence vs. Velocity

DISCHARGE LINES

Siphoning

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

Valves

If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe to minimize friction losses. Never install a throttling valve in a suction line.

With high discharge heads, it is recommended that a throttling valve and a system check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

CAUTION

If the application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

Bypass Lines

Self-priming pumps are not air compressors. During the priming cycle, air from the suction line must be vented to atmosphere on the discharge side. If the discharge line is open, this air will be vented through the discharge. However, if a check valve has been installed in the discharge line, the discharge side of the pump must be opened to atmospheric pressure through a bypass line installed between the pump discharge and the check valve. A self-priming centrifugal pump **will not prime** if there is sufficient static liquid head to hold the discharge check valve closed.

NOTE

The bypass line should be sized so that it does not affect pump discharge capacity; however, the bypass line should be at least 1 inch in diameter to minimize the chance of plugging.

In **low discharge head applications** (less than 30 feet or 9 meters), it is recommended that the bypass line be run back to the wet well, and located 6 inches below the water level or cut-off point of the low level pump. In some installations, this bypass line may be terminated with a six-to-eight foot length of 1 1/4 inch I.D. **smooth-bore** hose; air and liquid vented during the priming process will then agitate the hose and break up any solids, grease, or other substances likely to cause clogging.

CAUTION

A bypass line that is returned to a wet well must be secured against being drawn into the pump suction inlet.

It is also recommended that pipe unions be installed at each 90° elbow in a bypass line to ease disassembly and maintenance.

In **high discharge head applications** (more than 30 feet), an excessive amount of liquid may be bypassed and forced back to the wet well under the full working pressure of the pump; this will reduce overall pumping efficiency. **Therefore, it is recommended that a Gorman-Rupp Automatic Air Release Valve be installed in the bypass line.**

Gorman-Rupp Automatic Air Release Valves are reliable, and require minimum maintenance. See **AUTOMATIC AIR RELEASE VALVE** in this section for installation and theory of operation of the Automatic Air Release Valve. Consult your Gorman-Rupp distributor, or contact the Gorman-Rupp Company for selection of an Automatic Air Release Valve to fit your application.

If the installation involves a flooded suction such as a below-ground lift station. A pipe union and manual shut-off valve may be installed in the bleed line to allow service of the valve without shutting down the station, and to eliminate the possibility of flooding. If a manual shut-off valve is installed **anywhere** in the air release piping, it **must** be a full-opening **ball type** valve to prevent plugging by solids.

DANGER!

If a manual shut-off valve is installed in a bypass line, it must not be left closed during operation. A closed manual shut-off valve may cause a pump which has lost prime to continue to operate without reaching prime, causing dangerous overheating and possible explosive rupture of the pump casing. Personnel could be severely injured.

Allow an over-heated pump to cool before servicing. Do not remove plates, covers, gauges, or fittings from an overheated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use cau-

tion when removing the plug to prevent injury to personnel from hot liquid.

AUTOMATIC AIR RELEASE VALVE

When properly installed, a Gorman-Rupp Automatic Air Release Valve will permit air to escape through the bypass line and then close automatically when the pump is fully primed and pumping at full capacity.

WARNING

Some leakage (1 to 5 gallons [3.8 to 19 liters] per minute) will occur when the valve is fully closed. Be sure the bypass line is directed back to the wet well or tank to prevent hazardous spills.

Consult the manual accompanying the Air Release Valve for additional information on valve installation and performance.

Air Release Valve Installation

The Automatic Air Release Valve must be independently mounted in a horizontal position between the pump discharge port and the inlet side of the discharge check valve (see Figure 3). The inlet opening in the Air Release Valve is equipped with standard 1-inch NPT pipe threads.

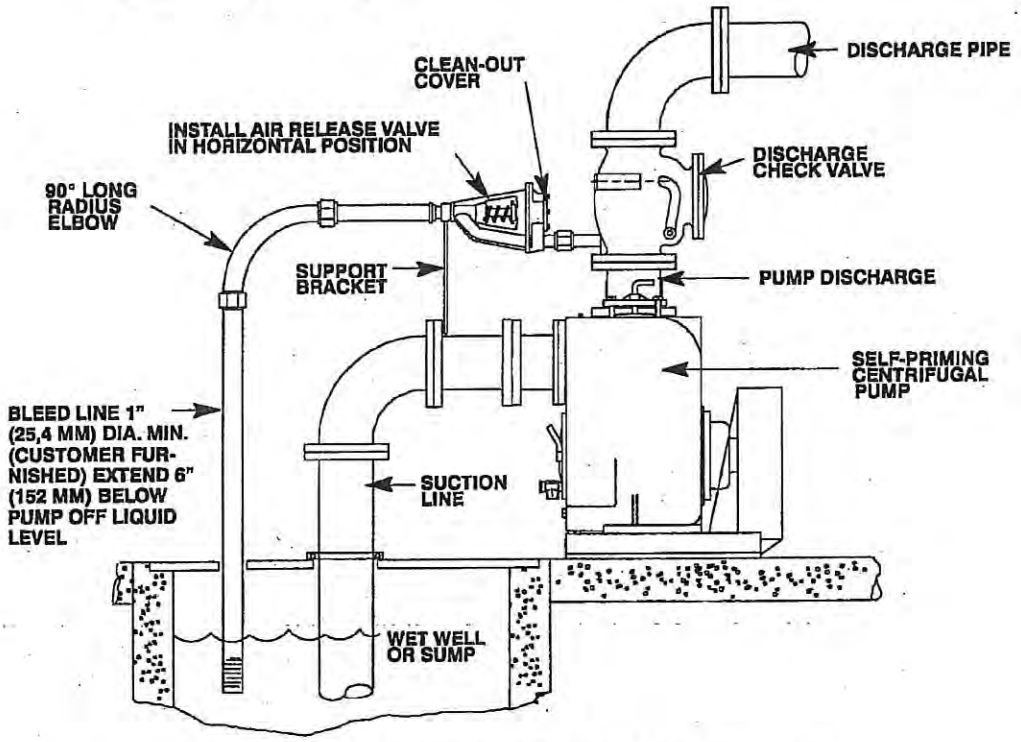


Figure 3. Typical Automatic Air Release Valve Installation

Connect the valve outlet to a bleed line which slopes back to the wet well or sump. The bleed line must be the same size as the outlet opening or larger, depending on which Air Release Valve is being used. If **piping** is used for the bleed line, avoid the use of elbows whenever possible.

NOTE

*For multiple pump installations, it is recommended that each Air Release Valve be fitted with an independent bleeder line directed back to the wet well. If multiple Air Release Valves are installed in a system, **do not** direct bleeder lines to a common manifold pipe. Contact your Gorman-Rupp distributor or the Gorman-Rupp Company for information about installation of an Automatic Air Release Valve for your specific application.*

ALIGNMENT

The alignment of the pump and its power source is critical for trouble-free mechanical operation. In either a flexible coupling or V-belt driven system, the driver and pump must be mounted so that their shafts are aligned with and parallel to each other. It is imperative that alignment be checked after the pump and piping are installed, and before operation.

NOTE

Check **Rotation,** *Section C, before final alignment of the pump.*

When mounted at the Gorman-Rupp factory, driver and pump are aligned before shipment. Misalignment will occur in transit and handling. Pumps **must** be checked and realigned before operation. Before checking alignment, tighten the foundation bolts. The pump casing feet and/or pedestal feet, and the driver mounting bolts should also be tightly secured.

WARNING!

When checking alignment, disconnect the power source to ensure that the pump will remain inoperative.

CAUTION

Adjusting the alignment in one direction may alter the alignment in another direction. check each procedure after altering alignment.

Coupled Drives

When using couplings, the axis of the power source must be aligned to the axis of the pump shaft in both the horizontal and vertical planes. Most couplings require a specific gap or clearance between the driving and the driven shafts. Refer to the coupling manufacturer's service literature.

Align spider insert type couplings by using calipers to measure the dimensions on the circumference of the outer ends of the coupling hub every 90°. The coupling is in alignment when the hub ends are the same distance apart at all points (see Figure 4A).

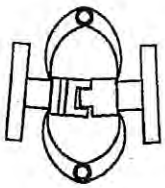


Figure 4A. Aligning Spider-Type Couplings

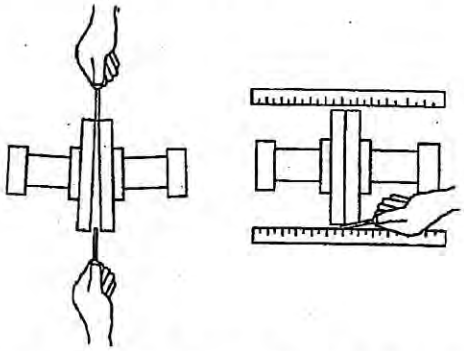


Figure 4B. Aligning Non-Spider Type Couplings

Align non-spider type couplings by using a feeler gauge or taper gauge between the coupling halves every 90°. The coupling is in alignment when the hubs are the same distance apart at all points (see Figure 4B).

Check parallel adjustment by laying a straightedge across both coupling rims at the top, bottom, and side. When the straightedge rests evenly on both halves of the coupling, the coupling is in horizontal parallel alignment. If the coupling is misaligned, use a feeler gauge between the coupling and the straightedge to measure the amount of misalignment.

V-Belt Drives

When using V-belt drives, the power source and the pump must be parallel. Use a straightedge along the sides of the pulleys to ensure that the pulleys are properly aligned (see Figure 4C). In drive systems using two or more belts, make certain that the belts are a matched set; unmatched sets will cause accelerated belt wear.

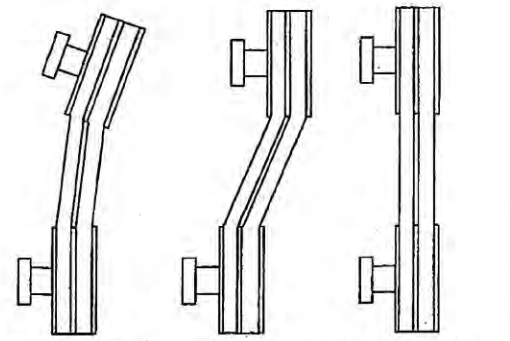


Figure 4C. Alignment of V-Belt Driven Pumps

Tighten the belts in accordance with the belt manufacturer's instructions. If the belts are too loose, they will slip; if the belts are too tight, there will be excessive power loss and possible bearing failure. Select pulleys that will match the proper speed ratio; overspeeding the pump may damage both pump and power source.

DANGER!

Do not operate the pump without the guard in place over the rotating parts. exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

DRIVE BELT TENSIONING

General Rules of Tensioning

For new drive belts, check the tension after 5, 20 and 50 hours of operation and re-tension as required (see the following procedure for measuring belt tension). Thereafter, check and re-tension if required monthly or at 500 hour intervals, whichever comes first.

Ideal drive belt tension is the **lowest** tension at which the belt will not slip under peak load conditions. Do not over-tension drive belts. Over-tensioning will shorten both drive belt and bearing life. Under-tensioning will cause belt slippage. Always keep belts free from dirt, grease, oil and other foreign material which may cause slippage.

OPERATION – SECTION C

Review all SAFETY Information in Section A.

Follow the instructions on all tags, labels and decals attached to the pump.

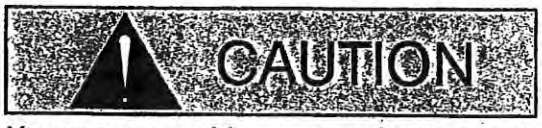
This pump is designed to handle liquids containing large entrained solids and slurries. Do not attempt to pump volatile, corrosive, or flammable liquids which may damage the pump or endanger personnel as a result of pump failure.

Pump speed and operating conditions must be within the performance range shown on page E-1.

PRIMING

Install the pump and piping as described in **INSTALLATION.** Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see **LUBRICATION** in **MAINTENANCE AND REPAIR**).

This pump is self-priming, but the pump should never be operated unless there is liquid in the pump casing.



Never operate this pump unless there is liquid in the pump casing. The pump will not prime when dry. extended operation of a dry pump will destroy the seal assembly.

Add liquid to the pump casing when:

1. The pump is being put into service for the first time.
2. The pump has not been used for a considerable length of time.
3. The liquid in the pump casing has evaporated.

Once the pump casing has been filled, the pump will prime and reprime as necessary.

After filling the pump casing, reinstall and tighten the fill plug. Do not attempt to operate the pump unless all connecting piping is securely installed. Otherwise, liquid in the pump forced out under pressure could cause injury to personnel.

To fill the pump, remove the pump casing fill cover or fill plug in the top of the casing, and add clean liquid until the casing is filled. Replace the fill cover or fill plug before operating the pump.

STARTING

Consult the operations manual furnished with the power source.

Rotation

The correct direction of pump rotation is counterclockwise when facing the impeller. The pump could be damaged and performance adversely affected by incorrect rotation. If pump performance is not within the specified limits (see the curve on page E-1), check the direction of power source rotation before further troubleshooting.

If an electric motor is used to drive the pump, remove V-belts, couplings, or otherwise disconnect the pump from the motor before checking motor rotation. Operate the motor independently while observing the direction of the motor shaft, or cooling fan.

If rotation is incorrect on a three-phase motor, have a qualified electrician interchange any two of the three phase wires to change direction. If rotation is incorrect on a single-phase motor, consult the literature supplied with the motor for specific instructions.

OPERATION

Lines With a Bypass

If a Gorman-Rupp Automatic Air Release Valve has been installed, the valve will automatically open to allow the pump to prime, and automatically close after priming is complete (see **INSTALLATION** for Air Release Valve operation).

If the bypass line is open, air from the suction line will be discharged through the bypass line back to the wet well during the priming cycle. Liquid will then continue to circulate through the bypass line while the pump is in operation.

Lines Without a Bypass

Open all valves in the discharge line and start the power source. Priming is indicated by a positive reading on the discharge pressure gauge or by a quieter operation. The pump may not prime immediately because the suction line must first fill with liquid. If the pump fails to prime within five minutes, stop it and check the suction line for leaks.

After the pump has been primed, partially close the discharge line throttling valve in order to fill the line slowly and guard against excessive shock pressure which could damage pipe ends, gaskets, sprinkler heads, and any other fixtures connected to the line. When the discharge line is completely filled, adjust the throttling valve to the required flow rate.

WARNING!

Do not operate the pump against a closed discharge throttling valve for long periods of time. If operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 160° F (71° C). Do not apply it at a higher operating temperature.

Overheating can occur if operated with the valves in the suction or discharge lines closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the pump casing with cool liquid.

DANGER!

Allow an over-heated pump to cool before servicing. Do not remove plates, covers, gauges, or fittings from an overheated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.

As a safeguard against rupture or explosion due to heat, this pump is equipped with a pressure relief valve which will open if vapor pressure within the pump casing reaches a critical point. If overheating does occur, stop the pump immediately and allow it to cool before servicing it. **Approach any overheated pump cautiously.** It is recommended that

the pressure relief valve assembly be replaced at each overhaul, or any time the pump casing overheats and activates the valve. **Never** replace this valve with a substitute which has not been specified or provided by the Gorman-Rupp Company.

Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop. If a vacuum suction gauge has been installed, monitor and record the readings regularly to detect strainer blockage.

Never introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or damage to the equipment. If backflushing is absolutely necessary, liquid pressure **must** be limited to 50% of the maximum permissible operating pressure shown on the pump performance curve.

Pump Vacuum Check

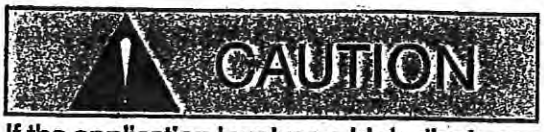
With the pump inoperative, install a vacuum gauge in the system, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches (508,0 mm) or more of mercury. If it does not, check for air leaks in the seal, gasket, or discharge valve.

Open the suction line, and read the vacuum gauge with the pump primed and at operation speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

STOPPING

Never halt the flow of liquid suddenly. If the liquid being pumped is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly.

On engine driven pumps, reduce the throttle speed slowly and allow the engine to idle briefly before stopping.



If the application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

After stopping the pump, lock out or disconnect the power source to ensure that the pump will remain inoperative.

Do not operate the pump against a closed discharge throttling valve for long periods of time. If operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

Cold Weather Preservation

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approximately one minute; this will remove any remaining liquid that could freeze the pump rotating parts. If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump from completely draining, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

BEARING TEMPERATURE CHECK

Bearings normally run at higher than ambient temperatures because of heat generated by friction.

Temperatures up to 160°F (71° C) are considered normal for bearings, and they can operate safely to at least 180°F (82° C).

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the housing. Record this temperature for future reference.

A sudden increase in bearing temperature is a warning that the bearings are at the point of failing to operate properly. Make certain that the bearing lubricant is of the proper viscosity and at the correct level (see **LUBRICATION** in **MAINTENANCE AND REPAIR**). Bearing overheating can also be caused by shaft misalignment and/or excessive vibration.

When pumps are first started, the bearings may seem to run at temperatures above normal. Continued operation should bring the temperatures down to normal levels.

TROUBLESHOOTING – SECTION D

Review all SAFETY Information in Section A.

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Lock out or disconnect the power source to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Not enough liquid in casing.	Add liquid to casing. See **PRIMING**.
	Suction check valve contaminated or damaged.	Clean or replace check valve.
	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Suction lift or discharge head too high.	Check piping installation and install bypass line if needed. See **INSTALLATION**.
	Strainer clogged.	Check strainer and clean if necessary.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Strainer clogged.	Check strainer and clean if necessary.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct submergence as needed.
	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.
	Impeller clogged.	Free impeller of debris.
	Pump speed too slow.	Check driver output; check belts or couplings for slippage.
	Discharge head too high.	Install bypass line.
	Suction lift too high.	Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high.	Check driver output; check that sheaves or couplings are correctly sized.
	Discharge head too low.	Adjust discharge valve.
	Liquid solution too thick.	Dilute if possible.
	Bearing(s) frozen.	Disassemble pump and check bearing(s).
PUMP CLOGS FREQUENTLY	Liquid solution too thick.	Dilute if possible.
	Discharge flow too slow.	Open discharge valve fully to increase flow rate, and run power source at maximum governed speed.
	Suction check valve or foot valve clogged or binding.	Clean valve.
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.
	Pumping entrained air.	Locate and eliminate source of air bubble.
	Pump or drive not securely mounted.	Secure mounting hardware.
	Impeller clogged or damaged.	Clean out debris; replace damaged parts.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature regularly to monitor any increase.
	Low or incorrect lubricant.	Check for proper type and level of lubricant.
	Suction and discharge lines not properly supported.	Check piping installation for proper support.
	Drive misaligned.	Align drive properly.

PREVENTIVE MAINTENANCE

Since pump applications are seldom identical, and pump wear is directly affected by such things as the abrasive qualities, pressure and temperature of the liquid being pumped, this section is intended only to provide general recommendations and practices for preventive maintenance. Regardless of the application however, following a routine preventive maintenance schedule will help assure trouble-free performance and long life from your Gorman-Rupp pump. For specific questions concerning your application, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Record keeping is an essential component of a good preventive maintenance program. Changes in suction and discharge gauge readings (if so equipped) between regularly scheduled inspections can indicate problems that can be corrected before system damage or catastrophic failure occurs. The appearance of wearing parts should also be documented at each inspection for comparison as well. Also, if records indicate that a certain part (such as the seal) fails at approximately the same duty cycle, the part can be checked and replaced before failure occurs, reducing unscheduled down time.

For new applications, a first inspection of wearing parts at 250 hours will give insight into the wear rate for your particular application. Subsequent inspections should be performed at the intervals shown on the chart below. Critical applications should be inspected more frequently.

Preventive Maintenance Schedule

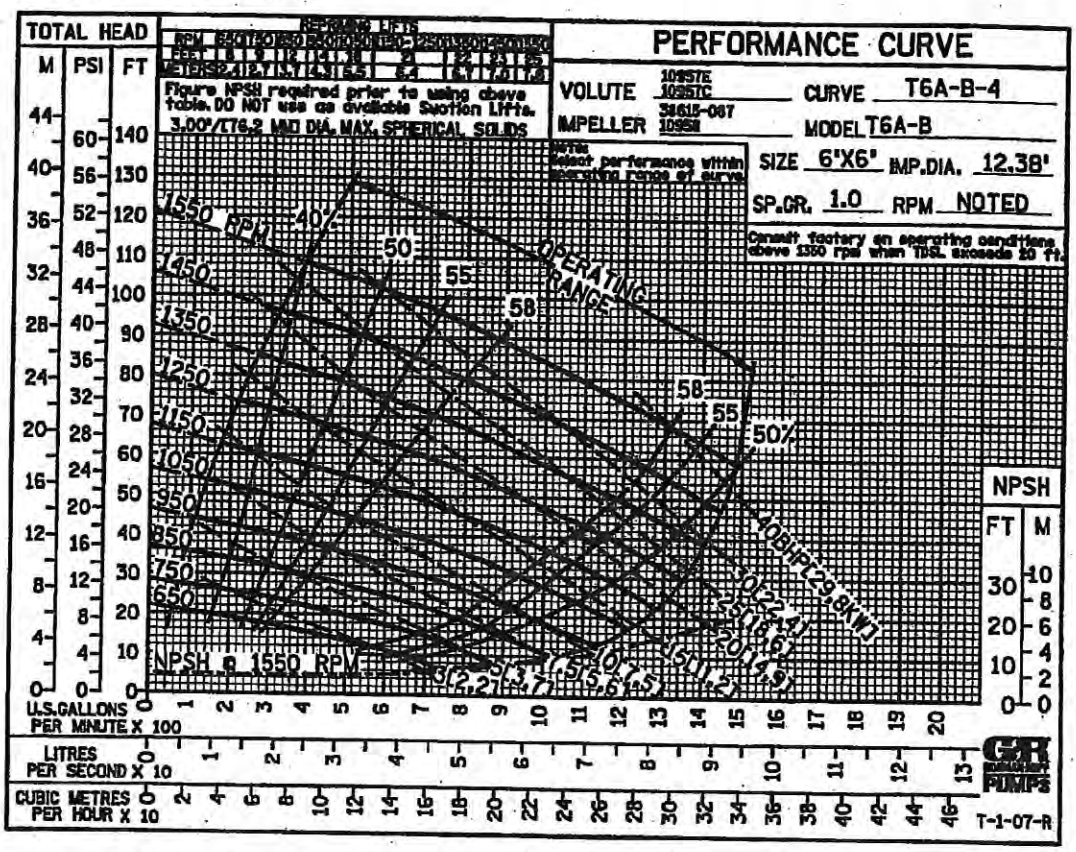
Item	Service Interval*				
	Daily	Weekly	Monthly	Semi-Annually	Annually
General Condition (Temperature, Unusual Noises or Vibrations, Cracks, Leaks, Loose Hardware, Etc.)	I				
Pump Performance (Gauges, Speed, Flow)	I				
Bearing Lubrication		I			R
Seal Lubrication (And Packing Adjustment, If So Equipped)		I			R
V-Belts (If So Equipped)			I		
Air Release Valve Plunger Rod (If So Equipped)			I	C	
Front Impeller Clearance (Wear Plate)				I	
Rear Impeller Clearance (Seal Plate)				I	
Check Valve					I
Pressure Relief Valve (If So Equipped)					C
Pump and Driver Alignment					I
Shaft Deflection					I
Bearings					I
Bearing Housing					I
Piping					I
Driver Lubrication – See Mfgr's Literature					

Legend:
I = Inspect, Clean, Adjust, Repair or Replace as Necessary
C = Clean
R = Replace

* Service interval based on an intermittent duty cycle equal to approximately 4000 hours annually. Adjust schedule as required for lower or higher duty cycles or extreme operating conditions.

PUMP MAINTENANCE AND REPAIR – SECTION E

MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.



* **STANDARD PERFORMANCE FOR PUMP MODEL T6A60-B, Including /F and /FM**

*Based on 70° F (21° C) clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be difference due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify performance or part numbers.

CAUTION

Pump speed and operating condition points must be within the continuous performance range shown on the curve.

SECTION DRAWING

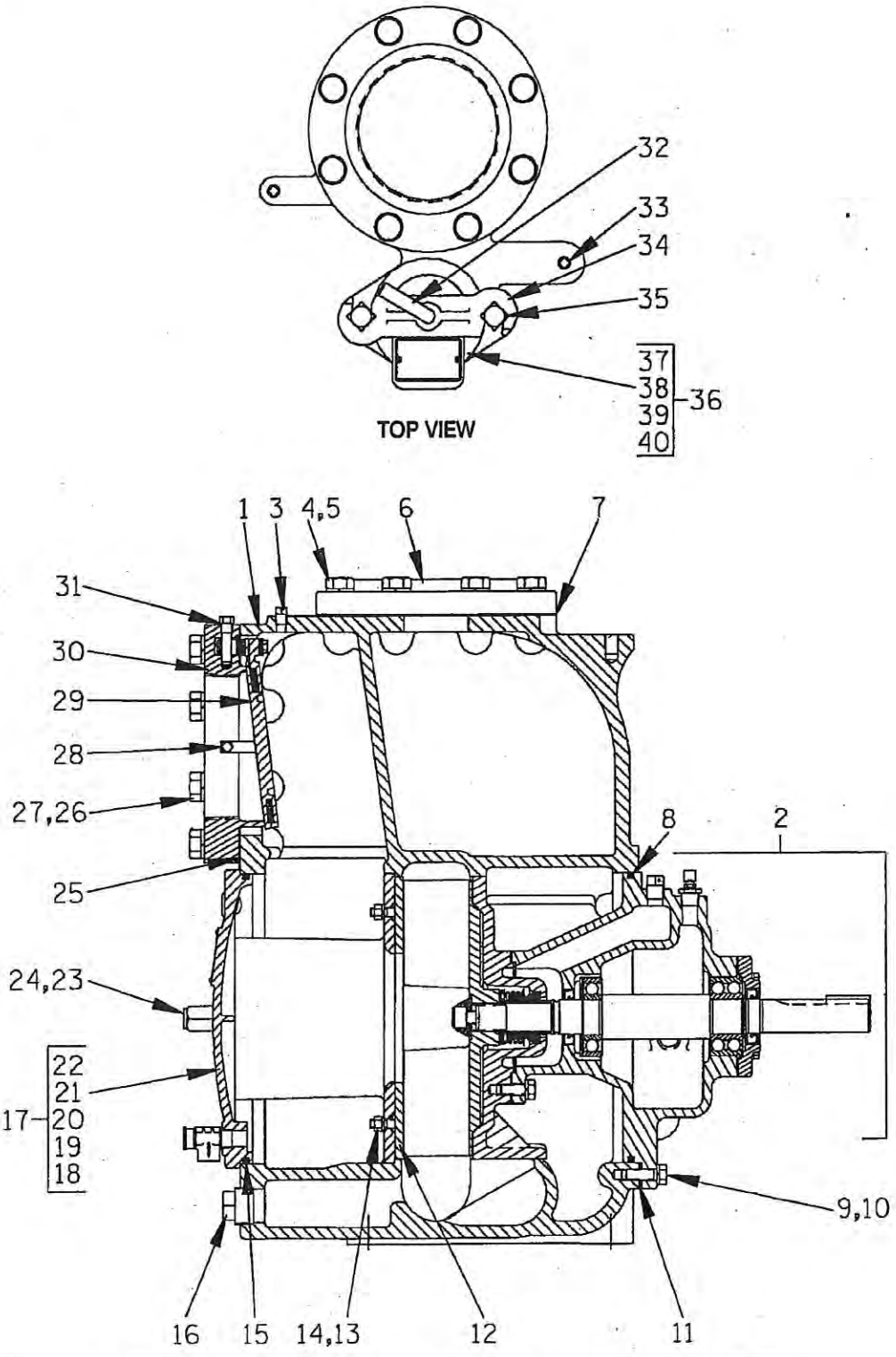


Figure 1. Pump Model T6A60–B, Including /F and /FM

PARTS LIST
Pump Model T6A60–B, Including /F and /FM
(From S/N 791258 Up)

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify part numbers.

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1	PUMP CASING	10957C	10010	1
2 *	REPAIR ROTATING ASSY	44163–050	---	1
3	PIPE PLUG	P04	15079	1
4	HEX HD CAPSCREW	B1208	15991	8
5	LOCKWASHER	J12	15991	8
6	DISCHARGE FLANGE	1758	10010	1
7 *	DISCH FLANGE GSKT	1679G	19370	1
8 *	ROTATING ASSY O-RING	S1676	---	1
9	HEX HD CAPSCREW	B0806	15991	4
10	LOCKWASHER	J08	15991	4
11 *	ROT ASSY SHIM SET	13131	17040	4
12 *	WEAR PLATE ASSY	46451–723	24150	1
13	LOCKWASHER	J06	15991	4
14	HEX NUT	D06	15991	4
15 *	BACK COVER O-RING	S1676	---	1
16	CASING DRAIN PLUG	P20	10009	1
17	BACK CVR PLATE ASSY	42111–905	---	1
18	–DRIVE SCREW	BM#04–03	17000	4
19	–WARNING PLATE	2613EV	13990	1
20	–PRESS RELIEF VALVE	26662–005	---	1
21	–BACK COVER PLATE	NOT AVAILABLE		1
22	–WARNING DECAL	38816–302	---	1
23	STUD	C1211	15991	2
24	BACK COVER NUT	31871–073	15000	2
25 *	SUCTION FLANGE GSKT	1402G	19370	1
26	HEX HD CAPSCREW	B1211	15991	8
27	LOCKWASHER	J12	15991	8
28	PIPE PLUG	P04	15079	1
29 *	SUCT CHK VALVE ASSY	46411–064	---	1
30	SUCTION FLANGE	11402	10010	1
31	CHECK VALVE PIN	11645	17010	1
32	CLAMP BAR SCREW	31912–009	15000	1
33	PIPE PLUG	P04	15079	1
34	CLAMP BAR	38111–004	11010	1
35	MACHINE BOLT	A1014	15991	2
36	FILL COVER ASSY	42111–344	---	1
37	–DRIVE SCREW	BM#04–03	17000	2
38	–FILL COVER PLATE	NOT AVAILABLE		1
39	–WARNING PLATE	38816–097	13990	1
40 *	–COVER GASKET	50G	19210	1
NOT SHOWN:				
	DRIVE SCREW	BM#04–03	17000	4
	LUBE DECAL	11421	---	1
	ROTATION DECAL	2613M	---	1
	WARNING DECAL	2613FE	---	1
	NAME PLATE	38818–040	13990	1
	SUCTION STICKER	6588AG	---	1
	PRIMING STICKER	6588AH	---	1
	DISCHARGE STICKER	6588BJ	---	1
OPTIONAL:				
	DISASSEMBLY TOOL	48711–020	---	1
	/F FLANGE KIT	48213–041	---	1
	–SUCTION	11402A	10010	1
	–DISCHARGE	11402B	10010	1
	/FM METRIC FLNG KIT	48213–078	---	1
	–SUCTION	38642–502	10000	1
	–DISCHARGE	38642–503	10000	1
	WEAR PLATES:			
	–SPA ALLOY	46451–729	24160	1
	–TUNGSTEN CARBIDE	46451–726	2415D	1
	CASING HEATERS:			
	–120V	47811–004	---	1
	–240V	47811–005	---	1
	CHECK VALVE ASSYS:			
	–NEO SOLID TYPE	46411–019	---	1
✓	–VITON SOLID	46411–078	---	1
✓	–VITON BLOW–OUT	46411–088	---	1
	PRESS RELIEF VALVES:			
	–SEWAGE TYPE	46431–628	---	1
	–STAINLESS STEEL	26662–101	---	1
	HI TEMP SHUT–DOWN KITS:			
	–145°F	48313–188	---	1
	–130°F	48313–256	---	1
	–120°F	48313–257	---	1
	HI TEMP SHUT–DOWN THERMOSTAT KIT 145°F	48313–172	---	1
	AIR RELEASE VALVES:			
	–10# COMP SPRING	GRP33–07A	---	1
	–25# COMP SPRING	GRP33–07	---	1
	–80# COMP SPRING	GRP33–07B	---	1
	A/R VLVE MOUNTING KIT	46331–515	---	1

* INDICATES PARTS RECOMMENDED FOR STOCK
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★ AFLAS® IS A PRODUCT OF THE 3M CORP.

SECTION DRAWING

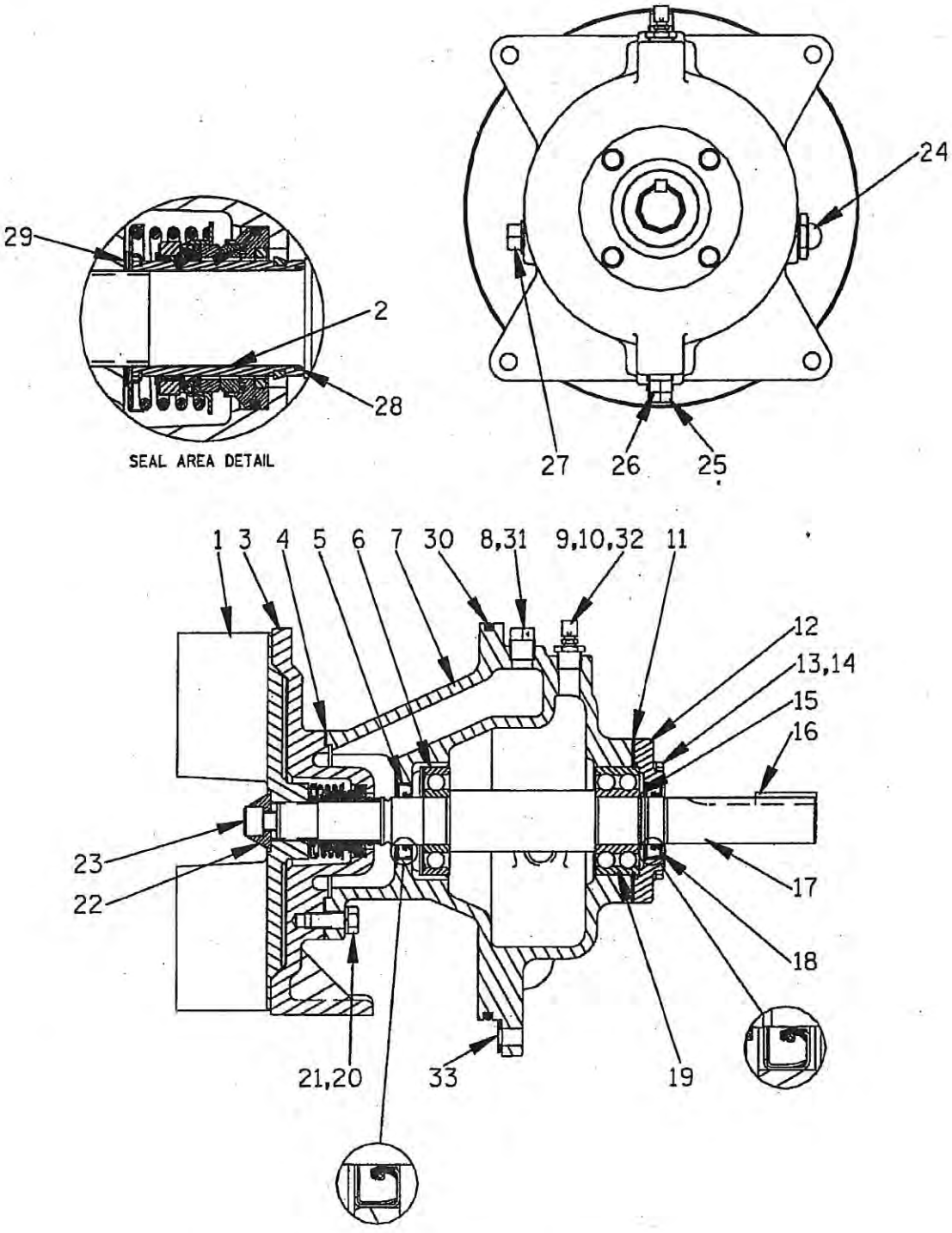

Figure 2. 44163–050 Repair Rotating Assembly

PARTS LIST
44163–050 Repair Rotating Assembly

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1 *	IMPELLER	10958	11010	1
2 *	SEAL ASSEMBLY	46513–151	---	1
3	SEAL PLATE	11837E	10010	1
4 *	SEAL PLATE GASKET	10959G	20000	1
5 *	INBOARD OIL SEAL	S1352	---	1
6 *	INBOARD BALL BEARING	23276–009	---	1
7	BEARING HOUSING	10959B	10010	1
8	VENTED PLUG	4823A	15079	1
9	AIR VENT	S1530	---	1
10	RED PIPE BUSHING	AP0802	15079	1
11 **	BEARING CAP GASKET	38683–248	18000	1
12	BEARING CAP	38322–215	10010	1
13	HEX HD CAPSCREW	B0805	15991	4
14	LOCKWASHER	J06	15991	4
15	RETAINING RING	S244	---	1
16 *	SHAFT KEY	N0612	15990	1
17 *	IMPELLER SHAFT	10529	16040	1
18 *	BEARING CAP OIL SEAL	S1352	---	1
19 *	OUTBD BALL BEARING	S1040	---	1
20	HEX HD CAPSCREW	B0805 1/2	15991	4
21	LOCKWASHER	J08	15991	4
22	IMPELLER WASHER	10278	15030	1
23	SOCKET HD CAPSCREW	DM1004S	15991	1
24	SIGHT GAUGE	S1471	---	1
25	SEAL CVTY DRAIN PLUG	P08	15079	1
26	BEARING DRAIN PLUG	P08	15079	1
27	PIPE PLUG	P12	15079	1
28 *	SEAL SLEEVE O-RING	25154–022	---	REF
29 *	IMPELLER ADJ SHIM SET	37J	17090	REF
30 *	ROTATING ASSY O-RING	S1676	---	1
31	SHIPPING PLUG	11495B	15079	1
32	SHIPPING PLUG	11495B	15079	1
33 *	ASSY ADJ SHIM SET	13131	17040	4
NOT SHOWN				
	ROTATION DECAL	2613M	---	1
	INSTRUCTION TAG	6588U	---	1
OPTIONAL:				
STAINLESS STEEL PARTS:				
	SEAL PLATE	38272–242	10010	1
	IMP SHAFT (LESS SLEEVE)	10529B	1706H	1
	SPACER WASHER (FOR SST SHAFT)	38329–040	17130	1
	ASTL SEAL SLEEVE	11876B	16000	1
	IMPELLERS:			
	–ADI	10958	1102H	1
	–TUNGS CARB COATED	10958A	1101D	1
	IMP CLEAN–OUT KIT	48783–003	---	1
	SEAL PLATE			
	–TUNG CARB COATED	11837F	1001D	1
	–ADI	11837E	1102H	1
† ★	AFLAS SEAL(W/SST SLEEVE OR SOLID SST SHAFT)	46512–194	---	1
†	PERMALON COATED MECH SEAL ASSY	46512–150	---	1
†	STD MECHANICAL SEAL ASSEMBLY	46512–047	---	1
†	MECH SEAL SHAFT SLEEVE	11876A	16000	1
† ✓	METAL BELLOWS MECH SEAL ASSY (VITON OR EQUAL	46512–147	---	1
† ✓	METAL BELLOWS MECH SEAL ASSY (KALREZ)	46512–142	---	1
✓	ROTATING ASSY O-RING –VITON	25154–454	---	1

* INDICATES PARTS RECOMMENDED FOR STOCK

** FOR PUMPS WITH SERIAL NUMBERS BELOW 864836, ORDER 10530G/18000 BEARING CAP GASKET. IF BOTH BEARING CAP AND GASKET MUST BE REPLACED, ORDER PARTS LISTED ABOVE.

† OPTIONAL MECHANICAL SEAL(S) MUST BE USED WITH MECHANICAL SEAL SHAFT SLEEVE OR SOLID SST SHAFT.

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PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

Review all SAFETY information in Section A.

Follow the instructions on all tags, label and decals attached to the pump.

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the sectional views (see Figures 1 and 2) and the accompanying parts lists.

This manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that **only** safe, established maintenance procedures are used, and that any procedures not addressed in this manual are performed **only** after establishing that neither personal safety nor pump integrity are compromised by such practices.

Many service functions may be performed by draining the pump and removing the back cover assembly. If major repair is required, the piping and/or power source must be disconnected. The following instructions assume complete disassembly is required.

Before attempting to service the pump, disconnect or lock out the power source and take precautions to ensure that it will remain inoperative. Close all valves in the suction and discharge lines.

For power source disassembly and repair, consult the literature supplied with the power source, or contact your local power source representative.

Before attempting to open or service the pump:

1. **Familiarize yourself with this manual.**
2. **Disconnect or lock out the power source to ensure that the pump will remain inoperative.**
3. **Allow the pump to completely cool if overheated.**
4. **Check the temperature before opening any covers, plates, or plugs.**
5. **Close the suction and discharge valves.**
6. **Vent the pump slowly and cautiously.**
7. **Drain the pump.**

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment.

Back Cover And Wear Plate Removal

(Figure 1)

The wear plate (12) is easily accessible and may be serviced by removing the back cover assembly (17). Before attempting to service the pump, remove the pump casing drain plug (16) and drain the pump. Clean and reinstall the drain plug.

Remove the back cover nuts (24) and pull the back cover and assembled wear plate from the pump casing (1). Inspect the wear plate, and replace it if badly scored or worn. To remove the wear plate, disengage the hardware (13 and 14).

Inspect the back cover O-ring (15) and replace it if damaged or worn.

Suction Check Valve Removal

(Figure 1)

If the check valve assembly (29) is to be serviced, remove the check valve pin (31), reach through the back cover opening and pull the complete assembly from the suction flange (30).

NOTE

Further disassembly of the check valve is not required since it must be replaced as a complete unit.

Individual parts are not sold separately.

Rotating Assembly Removal

(Figure 2)

The rotating assembly may be serviced without disconnecting the suction or discharge piping; however, the power source must be removed to provide clearance.

The impeller (1) should be loosened while the rotating assembly is still secured to the pump casing. Before loosening the impeller, remove the seal cavity drain plug (25) and drain the seal lubricant. This will prevent the oil in the seal cavity from escaping when the impeller is loosened. Clean and reinstall the seal cavity drain plug.

Immobilize the impeller by wedging a block wood between the vanes and the pump casing, and remove the impeller capscrew and washer (22 and 23).

Install a lathe dog on the drive end of the shaft (17) with the "V" notch positioned over the shaft keyway.

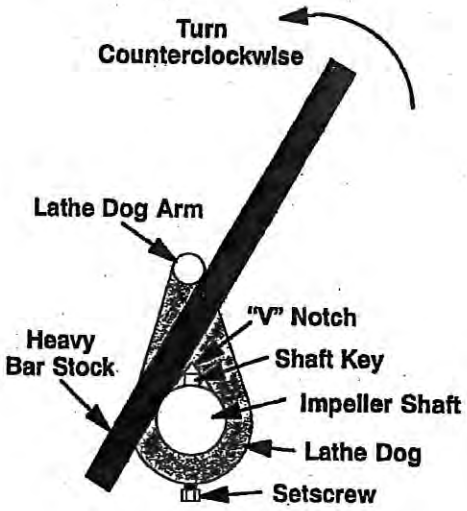


Figure 3. Loosening Impeller

With the impeller rotation still blocked, see Figure 3 and use a long piece of heavy bar stock to pry against the arm of the lathe dog in a counterclockwise direction (when facing the drive end of the shaft). **Use caution** not to damage the shaft or keyway. When the impeller breaks loose, remove the lathe dog and wood block.

NOTE

Do not remove the impeller until the rotating assembly has been removed from the pump casing.

(Figure 1)

Remove the hardware (9 and 10) securing the rotating assembly to the pump casing. Separate the rotating assembly by pulling straight away from the pump casing.

NOTE

An optional disassembly tool is available from the factory. If the tool is used, follow the instructions packed with it. A similar tool may be assembled using 1/2-inch pipe (schedule 80 steel or malleable iron) and a standard tee (see Figure 4). All threads are 1/2-inch NPT. ***Do not pre-assemble the tool.***

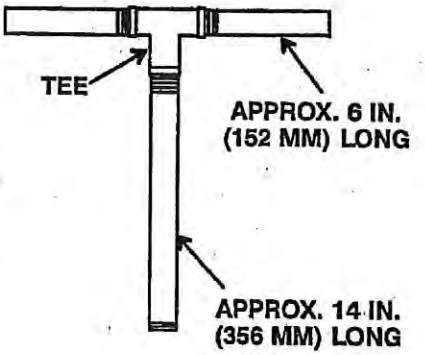


Figure 4. Rotating Assembly Tool

To install the tool, remove the air vent (9, Figure 2) from the bearing housing, and screw the longest length of pipe into the vent hole until fully engaged. Install the tee, and screw the handles into the tee. Use caution when lifting the rotating assembly to avoid injury to personnel or damage to the assembly.

Remove the bearing housing O-ring (8).

Impeller Removal

(Figure 2)

With the rotating assembly removed from the pump casing, unscrew the impeller from the shaft.

Use caution when unscrewing the impeller; tension on the shaft seal spring will be released as the impeller is removed. Inspect the impeller and replace if cracked or badly worn.

Remove the impeller adjusting shims (29); tie and tag the shims, or measure and record their thickness for ease of reassembly.

Seal Removal

(Figure 2)

Slide the integral shaft sleeve and rotating portion of the seal off the shaft as a unit.

Use a pair of stiff wires with hooked ends to remove the stationary element and seat.

An alternate method of removing the stationary seal components is to remove the hardware (20 and 21) and separate the seal plate (3) and gasket (4) from the bearing housing (7). Position the seal plate on a flat surface with the impeller side down. Use a wooden dowel or other suitable tool to press on the back side of the stationary seat until the seat, O-rings, and stationary element can be removed.

Remove the shaft sleeve O-ring (28).

If no further disassembly is required, refer to **Seal Installation**.

Shaft and Bearing Removal and Disassembly

(Figure 2)

When the pump is properly operated and maintained, the bearing housing should not require disassembly. Disassemble the shaft and bearings **only** when there is evidence of wear or damage.

Shaft and bearing disassembly in the field is not recommended. These operations should be performed only in a properly-equipped shop by qualified personnel.

Remove the bearing housing drain plug (26) and drain the lubricant. Clean and reinstall the drain plug.

Disengage the hardware (13 and14) and slide the bearing cap (12) and oil seal (18) off the shaft.Remove the bearing cap gasket (11), and press the oil seal from the bearing cap.

Place a block of wood against the impeller end of the shaft and tap the shaft and assembled bearings (6 and 19) from the bearing housing.

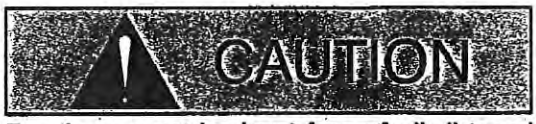
After removing the shaft and bearings, clean and inspect the bearings **in place** as follows.

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

Clean the bearing housing, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage and replace as necessary.

Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Clean the bearings thoroughly in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.



Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. **DO NOT** spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

Rotate the bearings by hand to check for roughness or binding and inspect the bearing balls. If ro-

tation is rough or the bearing balls are discolored, replace the bearings.

The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the bearing housing. Replace the bearings, shaft, or bearing housing if the proper bearing fit is not achieved.

If bearing replacement is required, remove the outboard bearing retaining ring (15), and use a bearing puller to remove the bearings from the shaft.

Press the inboard oil seal (5) from the bearing housing.

Shaft and Bearing Reassembly and Installation (Figure 2)

Clean the bearing housing, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage as necessary.

WARNING!

Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Inspect the shaft for distortion, nicks or scratches, or for thread damage on the impeller end. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

Position the inboard oil seal (5) in the bearing housing bore with the lip positioned as shown in Figure 2. Press the oil seal into the housing until the face is **just flush** with the machined surface on the housing.

CAUTION

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

NOTE

Position the inboard bearing (6) on the shaft with the shielded side toward the impeller end of the shaft. Position the outboard bearing (19) on the shaft with the integral retaining ring on the bearing O.D. toward the drive end of the shaft.

The bearings may be heated to ease installation. An induction heater, hot oil bath, electric oven, or hot plate may be used to heat the bearings. Bearings should **never** be heated with a direct flame or directly on a hot plate.

NOTE

*If a hot oil bath is used to heat the bearings, both the oil and the container must be **absolutely** clean. If the oil has been previously used, it must be **thoroughly** filtered.*

Heat the bearings to a uniform temperature **no higher than** 250°F (120°C), and slide the bearings onto the shaft, one at a time, until they are fully seated. This should be done quickly, in one continuous motion, to prevent the bearings from cooling and sticking on the shaft.

After the bearings have been installed and allowed to cool, check to ensure that they have not moved away from the shaft shoulders in shrinking. If movement has occurred, use a suitable sized sleeve and a press to reposition the bearings against the shaft shoulders.

If heating the bearings is not practical, use a suitable sized sleeve, and an arbor (or hydraulic) press to install the bearings on the shaft.

CAUTION

When installing the bearings onto the shaft, **never** press or hit against the outer race, balls, or ball cage. Press **only** on the inner race.

Secure the outboard bearing on the shaft with the bearing retaining ring (15).

Slide the shaft and assembled bearings into the bearing housing until the retaining ring on the outboard bearing seats against the bearing housing.