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FACILITIES PLAN

FOR

WASTEWATER MANAGEMENT

TOWN OF NARRAGANSETT, RHODE ISLAND

November 23, 2007

Chief, Office of Water Resources

DEM File #06-C

MARCH 2006
REVISED AUGUST 2006
REVISED MARCH 2007
REVISED SEPTEMBER 2007

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
272 West Exchange St., Suite 201, Providence, RI 02903
Phone: 401-454-7000 • Fax: 401-454-7415

STATE OF RHODE ISLAND **TOWN OF NARRAGANSETT**

COUNTY OF WASHINGTON **TOWN CLERK'S OFFICE**

I hereby **CERTIFY** that this is a **TRUE COPY of a VOTE of the TOWN COUNCIL OF THE TOWN OF NARRAGANSETT at a meeting held on DECEMBER 3, 2007** at which a quorum was present and acting throughout. It is unanimously

VOTED: To ADOPT the Facilities Plan for Wastewater Management dated September 2007 for the Town of Narragansett. (Garrett-Wilkens 5/0)

WITNESS my hand and seal this 4th day of December, A. D., 2007.

ATTEST:

Carol Robbins

CAROL ROBBINS, CMC
Town Clerk

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

November 23, 2007

RECEIVED
DEC - 5 2007
JAMES J. GEREMIA
AND ASSOCIATES, INC.

CERTIFIED MAIL

Jeffry Ceasrine, P.E., Town Manager
Narragansett Town Hall
25 Fifth Avenue
Narragansett, RI 02882

RE: Approval of Wastewater Facilities Plan and Finding of No Significant Impact (DEM file # 06-C)
Narragansett, Rhode Island

Dear Mr. Ceasrine:

This letter is in regard to the Town of Narragansett's request to approve the above-referenced Wastewater Facilities Plan (FP) and the FP's associated environmental review findings.

Narragansett submitted the FP approval request based on "Facilities Plan for Wastewater Management Town of Narragansett, Rhode Island" prepared by James J. Geremia & Associates, Inc., dated March 2006 (Revised August 2006, March 2007 and September 2007). The proposed projects involve the design and construction of wastewater collection system expansion to unsewered areas, existing wastewater collection system improvements, an Infiltration/Inflow study in the South End, and upgrades at the Scarborough Wastewater Treatment Facility. These projects are intended to mitigate adverse water quality impacts to the Pettaquamscutt River, Point Judith Pond, Narrow River, Narragansett Bay and the Atlantic Ocean.

Based on our review, RIDEM hereby approves this document as the Town-wide FP.

The FPA 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 **RIDEM is hereby issuing a Finding of No Significant Impact (FONSI)** for the proposed projects identified in the FP. 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 RIDEM that contain funds allotted to the state under provisions of the Clean Water Act.

30% post-consumer fiber

A copy of the approved FP will be forwarded to your office under separate cover. 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

pc: Jay Manning, OWR/SRF
Jim Geremia, JG & A

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

FINDING OF NO SIGNIFICANT IMPACT

The Office of Water Resources has reviewed "Facilities Plan for Wastewater Management" prepared by James J. Geremia & Associates, Inc., dated March 2006 (revised August 2006, March 2007 and September 2007) for the Town of Narragansett, in conjunction with a request for approval of this Facilities Plan (FP) 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 State Revolving Fund (SRF) Program", DEM has determined that the projects identified in the above FP will not cause significant detrimental effects, the quality of the environment will be improved by the proposed project, 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 FP.

The approval of the projects identified above and contained in the study area of this FP 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 wastewater collection system improvements to replace structurally deficient pipelines that allow I/I into the system and to increase capacity for future growth. These projects are intended to mitigate adverse water quality impacts to the Pettaquamscutt River, Point Judith Pond, Narrow River, Narragansett Bay and the Atlantic Ocean.

Project Name: Town of Narragansett FP

Project Location: Town-wide

Project Description: Design and construction of wastewater collection system expansion to unsewered areas, existing wastewater collection system improvements, an Infiltration/Inflow study in the South End, and upgrades at the Scarborough Wastewater Treatment Facility.

Anticipated Environmental Impacts:

Long Term: No detrimental impacts; beneficial impacts include enhancing the water quality of the Pettaquamscutt River, Point Judith Pond, Narrow River, Narragansett Bay and the Atlantic Ocean.

Short Term: Construction-related impacts only.

Required Mitigation Measures:

Sedimentation and erosion control, as necessary, during construction; traffic control measures; any other measures required by federal or state permitting and/or approval authorities.

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

DATE: November 23, 2007

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1.0 EXECUTIVE SUMMARY

1.1 PLAN OVERVIEW

This Facilities Plan, prepared by James J. Geremia & Associates, Inc. for the Town of Narragansett, is a comprehensive study of both present and future needs for upgrading and expanding of the North End Sewer System (which contributes to the South Kingstown Regional Wastewater Treatment Facility), the South End Sewer System and Scarborough Wastewater Treatment Facility. The study demonstrates the most cost-effective and environmentally sound solution for achieving the Rhode Island Department of Environmental Management's (RIDEM) water quality objectives.

This study has been conducted and formatted to meet the requirements of the State Revolving Loan Program to ensure funding support for the various projects noted herein.

1.2 SERVICE AREA

1.2.1 NORTH END SEWER SYSTEM

Wastewater generated by the northern end of Town is serviced by the South Kingstown Regional Wastewater Treatment Facility. In January 1969, the Rhode Island General Assembly passed an enabling act which established a wastewater district, permitting South Kingstown to operate and maintain a publicly owned sewage treatment works. The agreement indicates that the cost disbursement for capital expenses were to be proportioned based on percentages of total design flow. Operating costs for the Town of Narragansett, including maintenance, repairs, supplies and administration would be based upon the actual metered flow from the Ouida Street Pump Station.

Subsequent to the initial agreement with the Town of South Kingstown, a letter of agreement (dated 22 August 1974) agreed to guarantee at least 19% (0.785 MGD) of the treatment plant capacity, and stipulates that South Kingstown would not deny additional capacity if that capacity exists in the facility. This 1974 agreement did not have any provision for the purchase of unused capacity and the reassessment of the other partners.

During the 1984 fiscal year, the Town of Narragansett discharged an average of 905,000 gallons per day to the treatment facility, that represented 21.9% of the total plant capacity. It was acknowledged by South Kingstown that sufficient excess space existed to accommodate Narragansett's excess flow over the short term. However, South Kingstown indicated that plans had to be formulated and adopted in order to address the future plant expansion agreement and to protect the existing plant capacity ownership rights of South Kingstown and the University. To that end, the Towns (in January 1985) entered into an agreement that laid out when and how the plant expansion would occur.

In 1989, Narragansett voters approved a bond referendum for $9.8 Million implemented an aggressive plan to sewer the north end. This referendum was brought about as a result of the chronic problems the residents were experiencing with failed ISDS systems, high groundwater, and the impact these failed systems had on the Narrow River.

This increase in sewer connections resulted in the Town exceeding its reserve capacity of 784,700 gpd. To alleviate the need to upgrade South Kingstown RWWTF, the Town entered into an agreement (in April 1995) with the University of Rhode Island to lease their unused capacity in the treatment facility. This lease agreement allowed Narragansett to increase its capacity at the RWWTF by 400,000 gallons per day. The agreement allowed this use for a five year period at a cost of $425,000 (paid over that period).

In 1997, as a result of process improvements at the Regional Facility, the Rhode Island Department of Environmental Management (RIDEM) granted an increase in the capacity to South Kingstown's permit from 4.13 MGD to 5.0 MGD. This provided an additional flow of 0.87 MGD which could be distributed to each of the participants. Since the University of Rhode Island did not need any additional capacity, South Kingstown and Narragansett were able to increase their capacity equally.

The increase in wastewater allocated to Narragansett (increased by 435,000 gallons per day) was still not sufficient to meet the needs of the community. Therefore, in July 2001, when the lease between the University of Rhode Island and Narragansett came up for renewal, Narragansett signed a new agreement that again leased 400,000 gpd through June 30, 2006 for a total cost of $560,000. The following Table 1-1 shows the current flow distribution, including the 1995 and 2001 leased amounts from the University.

TABLE 1-1
CURRENT FLOW DISTRIBUTION

Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	1995/2001 URI-Narragansett Leases (MGD)	Current Available Capacity (MGD)	Current Available Percentage (%)
South Kingstown	1.6933	41.00	0.4350	0.000	2.1283	42.57
Narragansett	0.7847	19.00	0.4350	0.400	1.6197	32.39
URI	1.6520	40.00	0.0000	(0.400)	1.2520	25.04
Totals	**4.13**	**100.00**	**0.8700**	**0.00**	**5.0000**	**100.00**

Leasing 400,000 gallons from the University is a stop gap measure to avoid having Narragansett responsible for funding a physical plant expansion or purchasing unused capacity. Narragansett is the only regional partner at this time that has to expand sewer services to meet the needs of the community.

Narragansett's flow totals have fluctuated below and above the allotted capacity of 1.6197 over the past ten (10) years. This was a direct factor in the Town's lease of flow space from URI, as well as the adoption of a restrictive Sewer Policy governing extensions and connections in the area tributary to the Regional WWTF. While both the Town of South Kingstown and URI are projecting future flow increases, it is not expected that either of those regional partners will need additional flow space within the study period used to develop this plan. As such, the following general strategies and options exist for Narragansett with respect to future flow capacity at the Regional WWTF:

1. No Action – Under this scenario, the following is presented:

   a) Narragansett will need to continue the strict enforcement/application of its Sewer Policy, which restricts new connections in the tributary area to properties with existing sewer frontage.

   b) Narragansett will continue to grow (market-driven), especially given the proliferation of Innovative/Alternative (I/A) Individual Sewage Disposal Systems (ISDS) designs being approved by the State.

c) The Congdon Street and Ouida Street Pump Stations will still need upgrades (see Section 1.4 of this Executive Summary).

d) Narragansett will need to continue its lease of flow space from URI.

e) A physical expansion of the Regional WWTF will not be needed for the foreseeable (10-15 years) future.

f) Narragansett will not have a great deal of flexibility when dealing with affordable housing or other development initiatives.

2. Physical WWTF Expansion – Under this scenario, the following is presented:

a) Based on the information presented herein (Table 4-11; with the WWTF at 59.9% of capacity), Narragansett would be building overall physical capacity that will not be needed for the foreseeable future.

b) Narragansett is the only regional partner that will need additional capacity; hence, Narragansett will pay for all of it.

c) The Congdon Street and Ouida Street Pump Stations will still need upgrades.

d) The additional capacity will not be available for 4-5 years, based on design, permitting, and construction projections.

e) It should be noted that there will be certain Regional WWTF capital upgrades that may or may not be directly related to capacity that will be needed in the upcoming years. These are addressed in greater detail within this *Facilities Plan* (Tables 1-3 and 1-4).

3. Flow Allocation Agreement – Under this scenario, the flow allocation agreement with the regional partners would be re-negotiated, with the objective being for Narragansett to lease and/or purchase a share of the other partners' unused capacity. The following would apply:

   a) The capacity would be available immediately, allowing Narragansett flexibility in dealing with affordable housing and other developmental initiatives.

   b) Narragansett would need to restructure its Sewer Policy to prioritize how this additional capacity would be allocated.

   c) The Congdon Street and Ouida Street Pump Stations will still need upgrades.

4. I/I Removal – This is actually a component of all of the above scenarios, subject to an on-going review of the cost-effectiveness of each solution (i.e. performing I/I work that has a reasonable cost-per-gallon ratio). There is the potential here for outside participation, to wit:

   a) The Town of Narragansett could develop a "capacity-credit" program, wherein an applicant that meets certain defined criteria (i.e. affordable housing, creative commercial initiatives, etc.) could pay to remove I/I in exchange for sewage capacity being made available. This could be tied to the empirical peak flow factor that has been developed for the Pier area within this *Facilities Plan* report, namely 2.5 times the Average Daily Flow. In other words, if an applicant that meets whatever criteria is established needs relief from the Town's Sewer Policy, he/she would have to provide for 2.5 times their projected flow in I/I removal. The independent I/I studies that have been conducted by the Town provides the ability to calculate defensible numerical I/I removal cost-per-gallon figures. Additional information on this would be presented to the Town Council in a separate report." Based upon a build-out for the North End and the projected needs of the Regional Partners through the year 2025, the South Kingstown Regional Wastewater Treatment Facility will need to be upgraded to meet an average daily flow of 6.199 MGD. Table 1-2 presents Narragansett's projected needs, not including the 400,000 leased from URI.

TABLE 1-2 PROJECTED NEEDS						
Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	Current [1] Available Capacity (MGD)	2025 Capacity (MGD)	2025 Percentage (%)
South Kingstown	1.6933	41.00	0.4350	2.1283	3.189	48.02
Narragansett	0.7847	19.00	0.4350	1.2197	1.800	27.10
URI	1.6520	40.00	0.0000	1.6520	1.652	24.88
Totals	**4.13**	**100.00**	**0.8700**	**5.0000**	**6.641**	**100.00**

[1] Narragansett's projected needs do not include the 400,000 gallons leased from URI.

The preliminary design of the South Kingstown Regional Wastewater Treatment Facility, as presented in the South Kingstown Regional Wastewater Facilities Plan dated 2006, divides the improvements into two categories. The first component corresponds to the hydraulic upgrades necessary to meet the population demands for 2025; the second component corresponds to the necessary upgrades associated with process improvements.

The unit processes that relate to hydraulic expansion are:

- Two (2) Primary Settling Tanks
- Two (2) Primary Sludge Pumps
- One (1) Waste Activated Sludge Pump
- One (1) Return Activated Sludge Pump
- Sludge Thickener
- Aeration System

The unit processes that relate to system upgrades are:

- Odor Control - Headworks/Influent Screen
- Odor Control - Primary Settling Tank
- Odor Control - Septage Receiving
- Odor Control - Sludge Holding Tanks
- Aeration Blower Replacement
- Septage Receiving Station
- Sludge Building Enclosure

Table 1-3 presents the regional cost breakdown relating to the hydraulic expansion. Those components that are directly related to a hydraulic upgrade are distributed to South Kingstown and Narragansett based on their projected need. For example, the increase over the current capacity is 1.641 MGD, of which 1.061 MGD (or 64.66%) relates to South Kingstown's needs, while 0.58 MGD (or 35.34%) relates to Narragansett's future needs.

TABLE 1-3
PROJECT COST SUMMARY FOR HYDRAULIC EXPANSION
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN (64.66%)	NARRAGANSETT (35.34%)	U.R.I.
Primary Settling				
• (2) Settling Tanks	$ 1,750,000	$ 1,131,550	$ 618,450	$
• Sludge Pumps	95,000	61,427	33,573	
Aeration System - Basin	1,750,000	1,131,550	618,450	
Diffusers	450,000	290,970	159,030	
Secondary Settling Tank				
• WAS Pumps	60,000	38,796	21,204	
• RAS Pumps	65,000	42,029	22,971	
Sludge Thickener	150,000	96,990	53,010	
Sub-Total	$ 4,320,000	$ 2,793,312	$ 1,526,688	$ 0
Auxiliaries [1] (12%)	518,400	335,198	183,202	0
Sub-Total	$ 4,838,400	$ 3,128,510	$ 1,709,890	$ 0
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	725,760	469,276	256,484	0
TOTAL	**$ 5,564,160**	**$ 3,597,786**	**$ 1,966,374**	**$ 0**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

Table 1-4 presents the regional cost breakdown for the process components that are considered upgrades to the original facility, the capital cost distribution is based upon the projected percentage of 2025 need as presented in Table 9-1. The only exception would be the aeration blower replacement and septage equipment. Since these components are the replacement of existing equipment and not considered an upgrade, the cost distribution will be based on the actual flow from each participant (as presented in Table 4-11: South Kingstown - 38.67%; Narragansett - 44.67%; URI - 16.66%).

TABLE 1-4
PROJECT COST SUMMARY FOR PROCESS UPGRADES
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN (48.02%)	NARRAGANSETT (27.1%)	U.R.I. (24.88%)
Headworks Odor Control / Influent Screen	$ 400,000	$ 192,080	$ 108,400	$ 99,520
Solids Handling Facilities (including Odor Control)	3,500,000	1,680,700	948,500	870,800
Aeration Blower Replacement	1,000,000	(38.67%) 386,700	(44.67%) 446,700	(16.66%) 166,600
Primary Odor Control	1,250,000	600,250	338,750	311,000
Septage	750,000	(38.67%) 290,025	(44.67%) 335,025	(16.66%) 124,950
Sub-Total	$ 6,900,000	$ 3,149,755	$ 2,177,375	$ 1,572,870
Auxiliaries [1] (12%)	828,000	377,971	261,285	188,744
Sub-Total	$ 7,728,000	$ 3,527,726	$ 2,438,660	$ 1,761,614
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	1,159,200	529,159	365,799	264,242
TOTAL	**$ 8,887,200**	**$ 4,056,885**	**$ 2,804,459**	**$ 2,025,856**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

1.3 SOUTH END SEWER SYSTEM

The Scarborough treatment system for the southern section of Town was evaluated with respect to its ability to meet established effluent limitations and water quality objectives at both present and future flow rates and waste load. As in the north end, the Facilities Plan has projected the need through 2025. For the purposes of this report, 2025 is considered to be the build-out year for the South End. The corresponding sewered population in the South End is projected to be 9,416 individuals, and the corresponding number of housing units sewered is 3,891.

An analysis of the treatment facility indicates that under presently observed influent loads, the existing Scarborough Wastewater Treatment Facility is operated with a maximum achievable efficiency. In fact, with the implementation of the Industrial Pretreatment Program and the compliance from the industries, the peak daily BOD_5 and Total Suspended Solids loadings no longer exceed the plant's design parameters. The treatment system is performing well under the design parameters. Based on that determination, it has been concluded that only minor upgrades would be required to further optimize plant performance through process control and will permit the facility to meet its projected loadings through 2025.

The planning period for the evaluation is based on a 20-year period of projected growth and effluent quality. Based upon the current usage projection over the 20-year planning period, the wastewater projections finds that the plant will not exceed its designed hydraulic or organic capacity. The recent re-issuance of the facility's new permit (August 2005) has confirmed that nutrient removal will not be required during the five-year permit. Therefore, for the future planning period, the Town will focus on the replacement of existing equipment within their annual capital budget.

Integrated in this planning period is RIDEM's requirement to begin the planning process for upgrading a treatment facility when the facility reaches 80% of its design capacity. In the case of the Scarborough facility, this will occur when the flows reach 1.12 MGD. Since there is no immediate need to upgrade and expand the facility, the capital plan will focus on replacing the equipment as it reaches its useful life and upgrade other areas within the process. As part of the replacement process, each new component will be increased in its hydraulic capacity from the original design flows (1.4 MGD) by 25% (or 1.75 mgd) to ensure that those components are upgraded and will not be controlled by the 80% factor through the planning year 2025.

1.3.1 SCARBOROUGH TREATMENT PLANT UPGRADES

Based on the detailed review of the existing facilities, performance records, maintenance records, previous engineering studies, and pertinent regulatory requirements, process modifications will be required. The current system is adequate to meet the current and projected flows with a hydraulic capacity of 4.0 mgd. Due to the age of the system, the equipment should be replaced as part of the next ten year capital improvement project. The design should be based on a peak hydraulic capacity to 5.25 mgd (based upon 125% of the current maximum capacity of 4.2 MGD).

Influent Pump Station: The influent pump station is of a dry pit design and contains two (2) variable and one (1) constant speed, 25 horsepower pumps which lift the wastewater into the oxidation ditches. At the present, the facility performs satisfactorily, however, it has reached its useful life and needs to undergo a major overhaul. The upgrade will be designed to handle a range from 0.3 MGD (minimum) to 5.25 MGD (maximum) with two pumps, while the third pump will serve as a standby.

Headworks - Odor Control: In an effort to reduce the odor associated with the raw influent, it is recommended that the headworks be enclosed and the off-gases from the enclosed headworks and influent pump station be processed through a two-stage odor control system dedicated to the headworks.

Primary Clarifier: The addition of two (2) primary clarifiers and related primary sludge pumps is to be included within the long range Capital Improvement Plan. The idea behind this concept is that depending on the ratio of a soluble to suspended BOD_5 concentrations of the raw sewage, the sufficiently sized primary clarifiers can reduce up to 75% of solids and up to 35% of organic loads delivered for treatment to the activated sludge system, thereby eliminating the necessity of expanding the aeration capacity to meet the future treatment requirements. The primary clarifiers will be designed for an average daily flow of 1.75 mgd and a peak loading of 5.25 mgd. The avoidance of odors is critical in the consideration of any process upgrades. Therefore, the primary clarifier weir will be sealed with a launder cover designed from fiberglass reinforced plastic. The cover will be gastight designed to entrap 94 to 98% of the odor generated at the weirs. The entrapped gas under the weir covers will be withdrawn off through a two stage odor abatement system.

Secondary Clarification: The upgrade and expansion of the secondary clarification facilities will be required as part of the Capital Improvement Plan. One additional 40-foot diameter, 11-foot side water depth clarifier will work in conjunction with the two existing clarifiers. The third clarifier will allow the plant to maintain its effluent quality at peak hydraulic loadings and still take one unit out of service for maintenance.

Disinfection: Based upon the 25% increase in capacity, the two chlorine tanks will achieve the 37 minute detention time at average daily flow, however, at peak flows provides for only 12 minutes of detention time. Based upon RIDEM criteria of 15 minutes peak flow, the existing chlorine tanks are to be expanded to meet the 25% criteria. The construction of the chorine contact tank should occur before or in conjunction with the addition

of the secondary clarifier to allow for placement of the secondary clarifier in the location of the existing chlorine contact tank.

Table 1-5 presents a breakdown of the capital cost.

TABLE 1-5
TOTAL CAPITAL COST SUMMARY - SCARBOROUGH FACILITY

UNIT PROCESS	TOTAL CAPITAL COST [2]
Headworks Screening Grit Removal Odor Control	$ 640,000
Influent Pump Station	780,000
Primary Settling (2) Settling Tanks Sludge Pumps Scum Pumping System Odor Control	3,420,000
(1) Final Settling Tank WAS Pumps RAS Pumps	1,302,000
Chlorination	1,020,000
Sub-Total	$ 7,162,000
Auxiliaries [1]	860,000
Sub-Total	$ 8,022,000
Engineering Allowance (Design, Construction Administration, Resident Eng.)	215,000
TOTAL	**$ 8,237,000**

1 Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

2 Includes 20% contingencies.

1.3.2 WASTEWATER COLLECTION SYSTEM

In the future adequacy determination of the interceptor systems and pump stations, it was determined that the Congdon Street Pump Station (north end), Stanton Avenue Pump Station and Ouida Street Pump Station (north end) were inadequate to convey wastewater flows under future conditions. The future sewered area in the South End (such as Harbour Island, Great Island and Baltimore Avenue area) will require pump stations to convey the sewage flows generated by Harbour Island and Great Island to connect to the South End Sewer System.

Congdon Street Pump Station: The existing inadequate Congdon Street pumps will be replaced with new pumps and the force main will be replaced. The new 6-inch ductile iron force main will replace the existing 4-inch ductile iron force main in the same trench. The renovated pump station will have a capacity of 436,000 GPD (305 GPM). The two pumps will be the vertical centrifugal type rated at 375 GPM each with 5 horsepower motors. The estimated cost of the project is $650,000.

Stanton Avenue Pump Station: The proposed Stanton Avenue Pump Station sewage pumps will be replaced. The capacity of the station will be 624,000 GPD (440 GPM). The station will consist of two sewage pumps, each rated at 440 GPM with constant speed motors. During the installation of the new pumps, the contractor will be required to by-pass pump. The total estimated cost of the pump station is $625,000 (including engineering fees).

Ouida Street Pump Station: The Ouida Street Pump Station will be renovated to accommodate the future flows. The pump station service area is in the North End Sewer System, including the Middlebridge area of South Kingstown. The existing pumps, motors, flow, meter, and variable speed drives will be replaced with new units having the capacity to convey the future flows. The station will consist of three variable speed pumps, each having a capacity of 2,279,000 GPD (1,585 GPM), with 150 horsepower motors. Currently, the station is being equipped with a Data Acquisition System which will transmit flows and alarms via radio system to the Scarborough Wastewater Treatment Facility and to the police station. Also, the inoperable mechanical bar screen will be replaced. The total cost of the improvements is $975,000.

Harbour Island Wastewater Collection System: The Harbour Island Wastewater Collection System will consist of conventional gravity sewers and grinder pumps and pressure sewers serving 320 residential dwelling units. Approximately 50 grinder pumps will be required for dwellings located within low lying areas. The average flow generated by Harbour Island is 102,400 GPD, with an associated peak flow of 268,800 GPD. The Harbour Island Pump Station will transport the sewage flows via a force main to the Briggs Farm sewer system. The pump station will consist of two self-priming centrifugal sewage pumps, each rated at 268,800 GPD (190 GPM). The total estimated cost for the Harbour Island Wastewater Collection System is $7,585,600 ($30,512 per home) as summarized in Table 1-6.

TABLE 1-6
ESTIMATE OF PROJECT COST FOR THE
HARBOUR ISLAND WASTEWATER COLLECTION SYSTEM

8" PVC Pipe	$	1,428,000
Sewer Wyes		32,000
6" PVC Pipe		400,000
6" Force Main, including directional drilling		590,000
Precast Concrete Manholes		225,000
Force Main Cleanout		5,000
Rock Excavation		87,500
Gravel Refill		180,000
Test Pits		20,000
Dewatering		200,000
Erosion Control		100,000
Traffic Control		150,000
Temporary Pavement		280,000
Pavement Restoration		976,000
Grinder Pumps		375,000
Pump Station		500,000
Sub-Total	$	5,548,500
Construction Contingencies (25%)		1,387,100
Sub-Total	$	6,935,600
Engineering Design Services		100,000
Construction Administration and Resident Inspection		550,000
TOTAL	**$**	**7,585,600**

Great Island Wastewater Collection System: The Great Island Wastewater Collection System will consist of conventional gravity sewers in combination with grinder pumps and pressure sewers to provide a cost effective system for 375 residential dwellings. This sewer system will convey flows to the proposed Great Island Pump Station to be located prior to the Point Judith Pond Bridge crossing. The capacity of the pump station will be 313,000 GPD (220 GPM). Table 1-7 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Great Island Wastewater Collection System is $8,750,000 ($29,909 per home).

TABLE 1-7
ESTIMATE OF PROJECT COST FOR THE
GREAT ISLAND WASTEWATER COLLECTION SYSTEM

Force Main	$	225,000
8" PVC Pipe		1,708,000
Sewer Wyes		37,500
6" PVC Pipe		470,000
Precast Concrete Manholes		250,000
Force Main Cleanout		10,000
Rock Excavation		95,000
Test Pits		40,000
Gravel Refill		220,000
Erosion Control		150,000
Dewatering		300,000
Traffic Control		150,000
1½" Temporary Pavement		323,500
Pavement Restoration		1,164,000
Pump Station		500,000
Grinder Pumps		750,000
Sub-Total	$	6,393,000
Construction Contingencies (25%)		1,598,300
Sub-Total	$	7,991,300
Engineering Design Services		120,000
Construction Administration and Resident Inspection		639,000
TOTAL	**$**	**8,750,300**

Baltimore Avenue Area Wastewater Collection System: The Baltimore Avenue Area Wastewater Collection System will consist of conventional gravity sewers serving 49 residential dwellings. The sewer system will consist of approximately 5,000 linear feet of gravity sewers. Table 1-8 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Baltimore Avenue Area Wastewater Collection System is $1,409,300 ($35,000 per home).

TABLE 1-8
ESTIMATE OF PROJECT COST FOR THE
BALTIMORE AVENUE AREA WASTEWATER COLLECTION SYSTEM

8" PVC Pipe	$	350,000
Sewer Syes		4,900
6" PVC Pipe		65,000
Precast Concrete Manholes		50,000
Rock Excavation		35,000
Gravel Refill		30,000
Test Pits		10,000
Dewatering		50,000
Erosion Control		20,000
Traffic Control		25,000
Temporary Pavement		60,000
Permanent Pavement Restoration		253,200
State Roadway Restoration		54,300
Sub-Total	$	1,007,400
Construction Contingencies (25%)		251,900
Sub-Total	$	1,259,300
Engineering Design Services		50,000
Construction Administration and Resident Inspection		100,000
TOTAL	**$**	**1,409,300**

Knowles Campground Wastewater Collection System: The Knowles Campground Wastewater Collection System will consist of gravity sewers serving 110 residential units. The sewer system will consist of approximately 3,400 linear feet of gravity sewers. Knowles Campground began installing the sewer system in February 2006 and will be responsible for the construction as well as the long term maintenance of the system.

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2.0 PURPOSE OF STUDY

2.1 INTRODUCTION

The purpose of this study effort is to determine the future needs for upgrading and expanding the North End Sewer System that contributes to the South Kingstown Regional Wastewater Treatment Facility and the South End Sewer System that contributes to the Scarborough Treatment Facility.

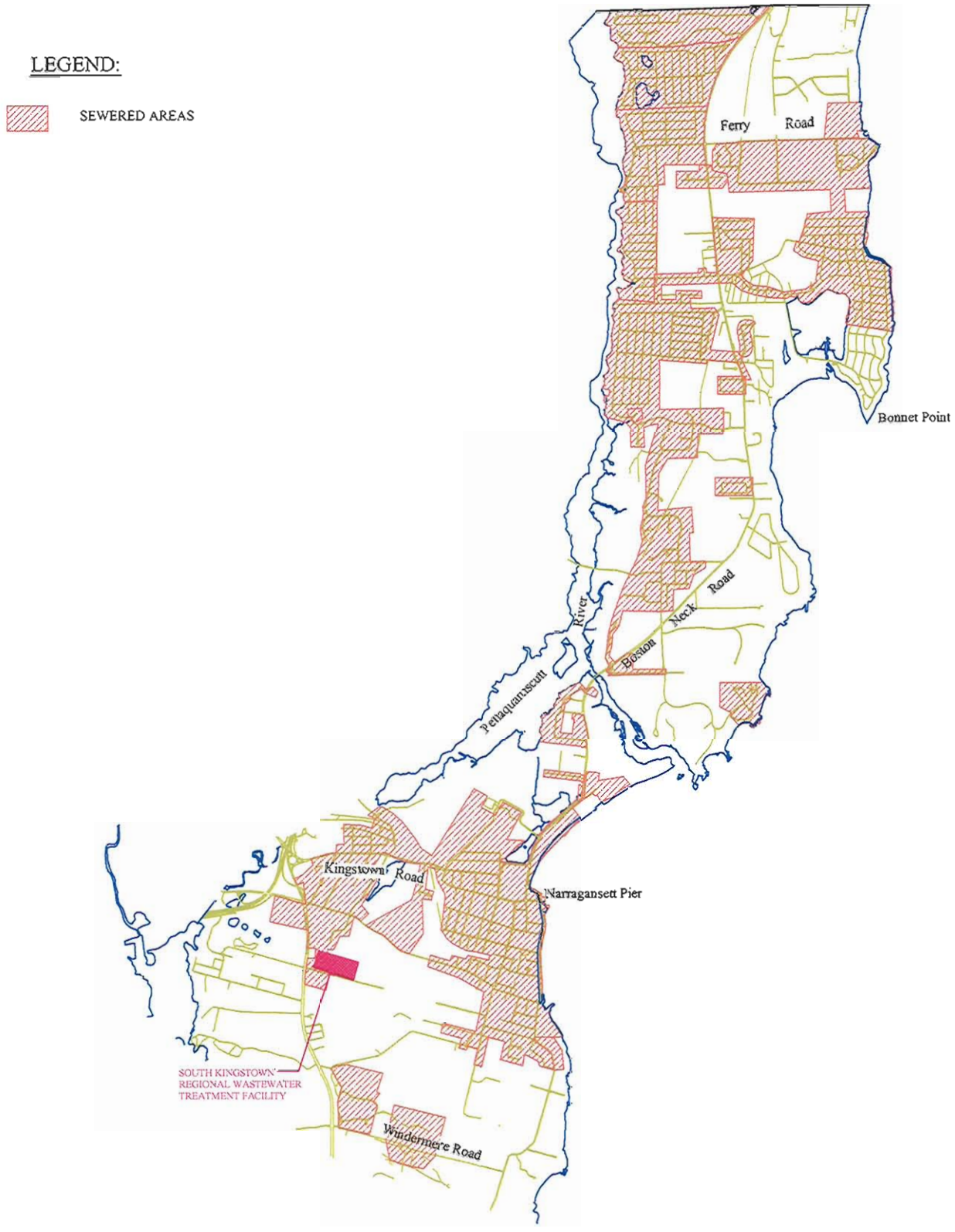
The study demonstrates the most cost-effective and environmentally sound solution for achieving the water quality objectives of the Town of Narragansett. This study is formatted and presented in such a manner to allow funding under the State Revolving Loan Program, for what may be required.

The study focuses on the North End Sewer System, the South End Sewer System, and the related treatment facilities. The North End Sewer System impact on the South Kingstown Regional Wastewater Treatment Facility will be discussed in the South Kingstown Facilities Plan. The Scarborough Treatment Facility is evaluated with respect to its ability to meet established effluent limitations and water quality objectives for the present and future flow rates and waste loads. The facilities' needs were evaluated based on the proposed permit conditions that were implemented in July of 2005. To that end, preliminary plans and cost estimates were prepared for the proposed upgrades to the treatment facility.

2.2 NORTH END SEWER SYSTEM

The wastewater generated by the northern end of Town is serviced by the South Kingstown Regional Wastewater Treatment Facility (Figure 2-1). In January 1969, the Rhode Island General Assembly passed an enabling act which established a wastewater district, permitting South Kingstown to operate and maintain a publicly owned sewage treatment works subsequent to the enabling legislation.

The Town of Narragansett, along with the University of Rhode Island, entered into an agreement with South Kingstown for the treatment and disposal of wastewater in November 1972 under Chapters 116 and 171 of the Public Laws of 1969 as amended. This agreement has since been amended to reflect cost sharing



Town of Narragansett
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Figure 2-1
NORTH END SEWER SYSTEM

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Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

provisions for improvements that were implemented at the South Kingstown Regional Wastewater Treatment Facility. Appendix A presents the amendments to the original agreement.

The cost disbursement for capital expenses were proportioned based on percentages of total flow that is designed into the facility.

The percentages were as follows:

South Kingstown	41%	1.693 MGD
University of Rhode Island	40%	1.652 MGD
Narragansett	19%	0.785 MGD
	Total	**4.130 MGD**

The capital cost includes the cost for design, construction, equipment, engineering and cost of acquiring real and personal property.

The operating costs for the Town of Narragansett, that includes maintenance, repairs, supplies and administration, is based on the actual metered flow from the Ouida Street Pump Station.

Subsequent to the initial agreement with the Town of South Kingstown, a letter of agreement (dated 22 August 1974) agreed to guarantee at least 19% (0.785 MGD) of the treatment plant capacity, and stipulates that South Kingstown would not deny additional capacity if that capacity exists in the facility. This 1974 agreement did not have any provision for the purchase of capital cost and the reassessment of the other partners.

During the 1983-84 fiscal year, the Town of Narragansett discharged an average of 905,000 gallons per day to the treatment facility, that represented 21.9% of the total plant capacity. It was acknowledged by South Kingstown that sufficient excess space existed to accommodate Narragansett's excess flow over the short term. However, South Kingstown indicated that plans had to be formulated and adopted in order to address the future plant expansion agreement and to protect the existing plant capacity ownership rights of South Kingstown and the University. To that end, the Towns (in January 1985) entered into an agreement that laid out when and how the plant expansion would occur.

This agreement stated:

1. When the regional treatment plant reaches 80% of design flow or 3.3 MGD average flow, an independent engineering study of the three regional partners' wastewater flow volumes, both present and future, be made to determine the site and scope of any planned expansion.

2. After determination of needed flow space and agreement by each regional partner, a cost-sharing agreement was formally adopted whereby cost-sharing by regional partners would be based on the following:

   Regional Partner Share =

$$\frac{\text{(Needed Flow Space - Previously Purchased Space)}}{\text{Total New Flow Space}}$$

Table 2-1 has been developed to illustrate how the cost sharing would work.

TABLE 2-1
REDISTRIBUTION OF FUTURE COST

Partner	Initial Contracted Flows (MGD)	Actual Use (MGD)	Future Design Flows Required (MGD)	Increased Capacity (MGD)	% of Capital Cost (%)
South Kingstown	1.693	X	Y	Z^1	$Z / \sum Z$
Narragansett	0.785	X	Y	Z^1	$Z / \sum Z$
URI	1.653	X	Y	Z^1	$Z / \sum Z$
Total	4.13			$\sum Z$	

Note: [1] Z = Y-X for each participation
[2] If Y-Z is negative, the value is 0

In 1989, Narragansett voters approved a bond referendum for $9.8 Million implemented an aggressive plan to sewer the north end. This referendum was brought about as a result of the chronic problems the residents were experiencing with failed ISDS systems, high groundwater, and the impact these failed systems had on the Narrow River.

This increase in sewer connections resulted in the Town exceeding its reserve capacity of 784,700 gpd. To alleviate the need to upgrade South Kingstown RWWTF, the Town entered into an agreement (in April 1995) with the University of Rhode Island to lease their unused capacity in the treatment facility. This lease agreement allowed Narragansett to increase its capacity at the RWWTF by 400,000 gallons per day. The agreement allowed this use for a five year period at a cost of $425,000 (paid over that period).

As a result of process improvements at the treatment facility, in 1997 the Rhode Island Department of Environmental Management (RIDEM) granted an increase in the capacity to South Kingstown's permit from 4.13 MGD to 5.0 MGD. This provided an additional flow of 0.87 MGD which could be distributed to each of the participants. Since the University of Rhode Island did not need any additional capacity, South Kingstown and Narragansett were able to increase their capacity equally, revising the flow distribution accordingly.

South Kingstown	42.57%	2.1283 MGD
University of Rhode Island	33.04%	1.6520 MGD
Narragansett	24.39%	1.2197 MGD
	Total	**5.0000 MGD**

The increase in wastewater allocated to Narragansett (increased by 435,000 gallons per day) was still not sufficient to meet the needs of the community. Therefore, in July 2001, when the lease between the University of Rhode Island and Narragansett came up for renewal, Narragansett signed a new agreement that again leased 400,000 gpd through June 30, 2006 for a total cost of $560,000. The following table shows the current flow distribution, including the 2001 leased amount from the University.

TABLE 2-2
CURRENT FLOW DISTRIBUTION

Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	2001 URI-Narragansett Lease (MGD)	Current Available Capacity (MGD)	Current Available Percentage (%)
South Kingstown	1.6933	41.00	0.4350	0.000	2.1283	42.57
Narragansett	0.7847	19.00	0.4350	0.400	1.6197	32.39
URI	1.6520	40.00	0.0000	(0.400)	1.2520	25.04
Totals	**4.13**	**100.00**	**0.8700**	**0.00**	**5.0000**	**100.00**

Leasing 400,000 gallons from the University is a stop gap measure to avoid having Narragansett funding the entire plant expansion. Narragansett is the only regional partner at this time that has to expand sewer services to meet the needs of the community.

Narragansett's flow totals have fluctuated below and above the allotted capacity of 1.6197 MGD. This fluctuation can be attributed to a number of factors such as inflow/infiltration and seasonal demographics. During the period 2002 - 2003, the Town's actual flow was 103.1% of its available capacity. However, it is important to understand that this reflects the 400,000 of leased capacity from the University that is only on loan and may be withdrawn at the end of June 2006 (pursuant to the terms of the lease agreement). In reality, Narragansett is using 137% of its purchased capacity.

It is apparent from the existing wastewater flows and the current policy changes, Narragansett must take the appropriate action to secure adequate wastewater capacity for the North End.

2.3 SOUTH END SEWER SYSTEM

The southern end of the Town is serviced by the Scarborough Wastewater Treatment Facility (Figure 2-2) which is owned and operated by the Town of Narragansett. This facility services the residential and commercial units in the southern portion of Town as well as the fishing industry at the Port of Galilee.

2.4 SCOPE OF STUDY

This study is concentrated in three major areas as follows: First, the interceptor sewers were analyzed and evaluated for the purpose of determining their capacity. The adequacy of the interceptor system for conveying wastewater flows from planned system expansions and population increases throughout a twenty (20) year planning period was also evaluated. In those areas where it was determined that the capacity of the existing system is inadequate, a program was developed for renovation of the trunk line system. The interceptor renovation program is based on a forty (40) year planning period.

LEGEND:

SEWERED AREAS

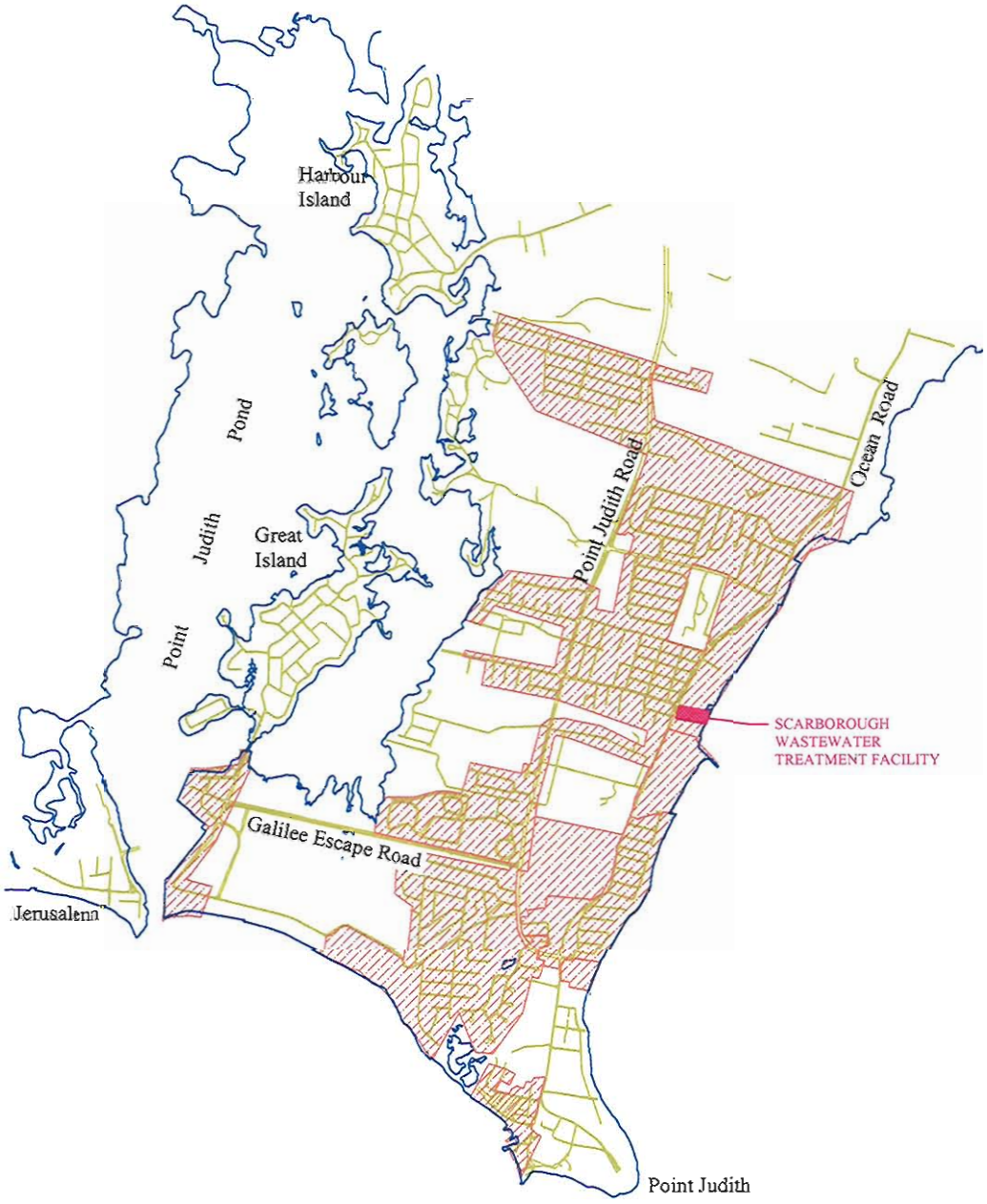

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Figure 2-2
SOUTH END SEWER SYSTEM

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Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

Second, the treatment system for the southern section of Town was evaluated with respect to its ability to meet established effluent limitations and water quality objectives at both present and future flow rates and waste loads. If it is necessary to increase the capacity of the Scarborough Treatment Facility, alternative proposals will be developed and evaluated. The alternative that is the most environmentally sound and cost-effective proposal selected. Preliminary plans and cost estimates will be prepared for proposed system upgrades.

The third area of concern evaluated is the expansion of sewer lines into areas of concern to improve water quality. Two islands located along Point Judith Pond and areas near Scarborough State Beach are targeted for improvement based on sampling in the adjacent waters that has revealed contamination from the Individual Sewer Disposal Systems that serve these neighborhoods.

2.5 FACILITY PLAN STUDY AREA

The geographical location of the Town of Narragansett is shown in Figure 2-3. The Town is situated in the southern portion of the State, approximately 30 miles south of Providence. Narragansett is bounded by the Town of North Kingstown on the north, the Atlantic Ocean on the east and south, and the Town of South Kingstown on the west as defined by Narrow River and Point Judith Pond.

Town of Narragansett
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Figure 2-3
STUDY AREA GEOGRAPHICAL LOCATION

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3.0 EFFLUENT LIMITATIONS

3.1 WATER QUALITY STANDARDS

All wastewater discharges to the nation's surface waters must meet the minimum effluent quality standards established in the Federal water quality regulations. The Scarborough Wastewater Treatment Facility, owned and administered by the Town of Narragansett, serves the southern portion of Narragansett, including the commercial fishing port of Galilee, and discharges the effluent into the Rhode Island Sound through an outfall pipe extending approximately one-half mile into the ocean. The effluent must comply with standards set forth in State and Federal water quality legislation. These standards establish minimum effluent discharge requirements which must be satisfied at all times.

The appropriate water quality classifications for salt waters are summarized in Table 3-1. Table 3-2 shows the maximum heavy metal concentrations for potable and fishable waters. The receiving waters for the Scarborough Wastewater Treatment Facility are classified as SB (refer to Table 3-1).

The wastewater from the Pier area and the northern portion of Town is processed at the Regional Wastewater Treatment Facilities located in Narragansett but operated by the Town of South Kingstown. Concurrent to this Facilities Plan, the Town of South Kingstown is proceeding with the preparation of a separate Facilities Plan which will address water quality standards and effluent limitation issues associated with discharges from the Regional Wastewater Treatment Plant.

3.2 RIPDES PERMIT

The Federal Environmental Protection Agency has delegated to the State of Rhode Island the responsibility for establishing and enforcing effluent discharge limitations which would ensure the respective water quality standards of the receiving waters.

The administration of this water quality management program is in the hands of the Department of Environmental Management, which controls the wastewater treatment plant discharges by issuing Rhode Island Pollutant Discharge Elimination System (RIPDES) permits to all discharges affecting the quality of the fresh and salt receiving waters in the State.

TABLE 3-1
SUMMARY OF RHODE ISLAND
WATER QUALITY CRITERIA FOR SEA WATER

ITEM		CLASS SA Suitable for all sea water uses, including shellfish harvesting for direct human consumption (approved shellfish areas), bathing and other water contact sports	CLASS SB Suitable for bathing, other recreational purposes, industrial cooling and shellfish harvesting for human consumption after depuration (restricted shellfish area); excellent fish and wildlife habitat; good aesthetic value	CLASS SC Suitable fish, shellfish and wildlife habitat; suitable for recreational basting and industrial cooling; good aesthetic value
1	Dissolved Oxygen	Not less than 6.0 mg/l at any time	Not less than 5.0 mg/l at any time	Not less than 5.0 mg/l during at least 16 hours of any 24 hour period, nor less than 4 mg/l at any time
2	Sludge Deposits - solid refuse - floating solids (oils-grease)scum)	Non allowable	None allowable	Non except that amount that may result from the discharge from a waste treatment facility providing appropriate treatment
3	Color and turbidity	None in such concentrations that will impair usages specifically assigned to this class	None in such concentrations that will impair usages specifically assigned to this class	None in such concentrations that will impair usages specifically assigned to this class
4	Coliform bacteria per 100 ml	Not to exceed a median MPN of 70 and not more than 10% of the samples shall ordinarily exceed an MPN of 230 for a 5-tube decimal dilution or 130 for a 3-tube decimal dilution	Not to exceed a median value of 70 and not more than 2300 in more than 10% of the samples	None in such concentrations that will impair usages specifically assigned to this class
5	Fecal Coliform bacteria/100 ml	Median value of 15 per 100 ml; not more than 10% of samples exceeding 50 per 100 ml	Median value of 50 per 100 ml and not more than 500 per 100 ml in 10% of samples	

TABLE 3-1
SUMMARY OF RHODE ISLAND
WATER QUALITY CRITERIA FOR SEA WATER

ITEM		CLASS SA Suitable for all sea water uses, including shellfish harvesting for direct human consumption (approved shellfish areas), bathing and other water contact sports	CLASS SB Suitable for bathing, other recreational purposes, industrial cooling and shellfish harvesting for human consumption after depuration (restricted shellfish area); excellent fish and wildlife habitat; good aesthetic value	CLASS SC Suitable fish, shellfish and wildlife habitat; suitable for recreational basting and industrial cooling; good aesthetic value
6	Taste and Odor	None allowable	None in such concentrations that would impair any usages specifically assigned to this Class and none that would cause taste and odor in edible fish or shellfish	None in such concentrations that would impair any usages specifically assigned to this Class and none that would cause taste and odor in edible fish or shellfish
7	pH	6.8 - 8.5	6.8 - 8.5	6.8 - 8.5
8	Allowable temperature increase	Not to exceed the recommended limit on most sensitive use and in no case exceed 83°F, or in any case raise normal temperature more than 1.5°F 15 June through September and not more than 4°F from October through 15 June at the boundary of mixing zones as is found to be reasonable by the Director		
9	Chemical Constituents*	None in concentrations or combinations which would be harmful to human, animal or aquatic life or which would make waters unsafe or unsuitable for fish or shellfish or their propagation, impair the palatability of same, or impair the waters for any other uses	None in concentrations or combinations which would be harmful to human, animal or aquatic life or which would make waters unsafe or unsuitable for fish or shellfish or their propagation, impair the palatability of same, or impair the waters for any other usage assigned to this Class	None in concentrations or combinations which would be harmful to human, animal or aquatic life or which would make waters unsafe or unsuitable for fish or shellfish or their propagation, impair the palatability of same, or impair the waters for any other usage assigned to this Class
10	Radioactivity	The level of radioactive materials in all waters shall not be in concentrations or combinations which would be harmful to human, animal or aquatic life, or result in concentration in organisms producing undesirable conditions		

* The latest edition of EPA Quality Criteria for Water, the latest edition of Water Quality Criteria State of California, and other scientifically acceptable criteria will be used as guidelines in assessing impacts of chemical constituents in the issuance of permits and implementing other water quality improvement programs.

TABLE 3-2 WATER QUALITY CRITERIA HEAVY METAL CONCENTRATIONS*				
METAL	DRINKING WATER	FISH HABITAT [2] Fresh	Marine	SHELLFISH [3]
Cadmium	0.010	0.0012	0.005	0.5
Chromium	0.05	0.1	N/A	1.0
Copper	1.0	0.026	0.01	10.0
Lead	0.05	0.03	0.01	4.0
Mercury	0.002	0.00005	0.00010	(5)
Nickel	N/A	0.026	0.01	(5)
Silver	0.05	(4)	(4)	(5)
Zinc	5.0	0.039	0.02	65.0
Iron	N/A	1.0	0.3	(5)
Manganese	N/A	N/A	0.1	(5)

Notes:

* Concentrations for drinking water and fish habitat are given in milligrams per liter (mg/l), equivalent to parts per million (ppm). Concentrations for shellfish are given in milligrams per kilogram (mg/kg) of shellfish meat, also equivalent to parts per million.

[1] EPA drinking water standards.

[2] Criteria recommended in 208 Report No. 38, based on EPA Quality Criteria for Water.

[3] Shellfish alert levels, established by the Food and Drug Administration, are indicators of environmental quality; they are not indicators of a health hazard.

(4) To be determined on a case-by-case basis by bioassay technique.

(5) No alert level established for these metals.

The Scarborough Wastewater Treatment Facility has been issued a RIPDES Permit No. RI0100188, under which it is authorized to discharge a disinfected effluent into Rhode Island Sound. The copy of the permit is included in Appendix B. This permit (which will expire on March 1, 2011) is a standard "30-30" permit, allowing an average monthly effluent quality of 30 mg/l of both BOD and suspended solids and does not contain any limitations for effluent discharge of heavy metals or phosphorous, nitrate, nitrite and ammonia. It is possible, however, that after expiration of the current permit, the new permit will include additional limitations established based on waste dilution factor analysis.

Chlorine residual requirements are to be imposed with acute concentration limit and chronic concentration limit to be set at 0.26 mg/l and 0.18 mg/l respectively, as presented in the Wright Pierce Report. To meet fecal coliform and future chlorine residual requirements, dechlorination facilities would be required.

Given below (Table 3-3) is the summary of the effluent limitations contained in the current RIPDES Permit.

TABLE 3-3
PRESENT EFFLUENT LIMITATIONS

PARAMETER	LIMITATION
Flow	1.4 MGD (monthly average)
BOD	30 mg/l - 351 lbs/day (monthly average) 45 mg/l - (weekly average) 50 mg/l - 584 lbs/day (daily maximum)
TSS	30 mg/l - 351 lbs/day (monthly average) 45 mg/l - (weekly average) 50 mg/l - 584 lbs/day (daily maximum)
Settleable Solids	0.1 ml/l (monthly average) 0.3 ml/l (daily maximum)
Fecal Coliform	200 MPN (monthly average) 400 MPN (daily maximum)
Chlorine Residual	No limit has been established to date

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4.0 EXISTING CONDITIONS

4.1 CONDITIONS IN THE PROPOSED PLANNING AREA

4.1.1 PLANNING AREA DESCRIPTION

Boundaries and Political Jurisdictions

Planning area boundaries for the Town of Narragansett have been illustrated in Figure 2-1 and have been briefly discussed in Chapter 2. The Town of Narragansett is situated in Washington County, Rhode Island. In general, the area naturally drains to the east and west, into Pettaquamscutt Cove and Rhode Island Sound.

The Narragansett facility planning area is located in the southeastern segment of Washington County. Its land area of approximately 14 square miles is bounded on the north by North Kingstown and on the west by South Kingstown. Rhode Island Sound borders the Town to the south and to the east.

4.1.2 ORGANIZATIONAL CONTEXT

All functions pertaining to the planning, design, construction, financing and operation of wastewater treatment facilities are under the jurisdiction of the Town Engineer. Figure 4-1 presents the organizational structure of the Engineering Department of the Town of Narragansett.

The Town Engineer has direct responsibility for the planning, design and construction of new facilities. Preparation of this Facilities Plan has been closely coordinated with the office of the Town Engineer.

The daily operation and maintenance of the sewage collection gand treatment facilities is supervised by the Wastewater Superintendent, who reports directly to the Town Engineer.

Financing the local share of the cost of the new facilities is presently accomplished through several methods.

Town of Narragansett

Engineering Department

Town Engineer

Jeffry Ceasrine P.E.

Support Staff	Wastewater Division	Water Division
Project Engineer	Wastewater Supt.	Water Superintendent
Utilities Inspector	Maintenance Supervisor	Clerk
Engineer Technician	Process Controller/ Pretreatment Coordinator	Foreman
Clerk	Foreman	Plant Operators
	Plant Operators	
	Clerk	

Town of Narragansett
Rhode Island

Figure 4-1

ENGINEERING DEPARTMENT DIAGRAM

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
372 S. Exchange Street Suite 201 Providence,RI 02903-1028
Phone: 401-454-7220 Fax: 401-454-7410

Source: Town of Narragansett

Date: 2005

Scale: No Scale

Pursuant to the Code of Ordinances of the Town of Narragansett Chapter 20 "Utilities", Division 3 Rates and Charges, Section 20-241 et. seq. and Division 4 Sewer Fund, Section 20-256 et. seq., the Wastewater Division operates as an Enterprise Fund, wherein all costs are recovered by the sewer system users. In general, the following three (3) charges described herein can be levied by the Town.

The *Sewer Use Charge* is an annual charge levied that is applied to all sewer users within the Town, regardless of specific location (i.e., whether the property is tributary to the South Kingstown Regional Wastewater Treatment Facility or the Scarborough Wastewater Treatment Facility). Costs recovered under this program include annual operation, maintenance, capital replacement (including infiltration/inflow removal) and improvements, interest and depreciation expenses.

The current sewer use charge structure is based on measured water consumption for residential, commercial and industrial users. The user charge is structured that a minimum charge of $345 is assessed on the water consumption up to 10,000 CF. For those users in excess of 10,000 CF but less than 20,000 CF, they will be assessed an additional charge of the CF between 10,000 and 20,000 of $2.75/HCF. Users over 20,000 CF but under 30,000 will be assessed an additional charge of $3.25/HCF. Those users in excess of 30,000 CF will be assessed an additional charge of $2.75/HCF.

The specific rates under this program are evaluated and may be adjusted annually by ordinance in conjunction with the Town's annual budgetary process. By ordinance, the adjusted rate "shall be designed to ensure that each recipient of wastewater treatment service will pay his proportionate share of the cost of operation, maintenance and replacement of treatment works" (Section 78-281). Actual rate schedules are kept on file in the Town Clerk's office at the Narragansett Town Hall.

The *Sewer Assessment* has historically established ad hoc sewer assessment programs for recovering costs associated with new sewer conveyance system extensions (i.e., collector sewers, interceptors, and pump stations for previously unsewered neighborhoods). Under this program, the benefitting (abutting) property owners are charged an assessment on a per dwelling unit basis for all capital costs (design, construction and administration) related to the specific project. The assessment programs are structured so that the repayment schedule (principal and interest) encompasses a twenty (20) year period.

The overall financing authority for a program such as this would be through a bond referendum and subsequently a general obligation bond issues, wherein the Town essentially "guarantees" the ability of the Wastewater Fund to support this debt.

The Town has established a *Sewer Lot Development Fund* (SLDF) program for all properties that connect to publicly-owned sanitary sewers wherein an assessment does not apply (i.e., sewer systems that are installed by private developers and then either remain privately operated, such as within a condominium complex and/or maintenance). As such, this program is intended to distribute the sewer-related debt to those new users that become a part of the system, but have not paid an assessment.

The specific rates under this program include a flat fee (interest bearing, payable over four (4) years) for residential connections on a per unit basis, and square footage charges based on total building size for commercial and industrial users. These fees are also evaluated and may be adjusted annually along with the budgetary process. A schedule of current SLDF's is on file in the Town Clerk's office.

4.1.3 EXISTING DEMOGRAPHIC AND LAND USE DATA

Introduction

In this section of the Facilities Plan, a brief history of the Town of Narragansett is presented as a background to the demographic, economic, and land use discussion. Following this historical review, a population trend analysis of the facilities planning study area is provided. Land use patterns of the Town are discussed. Information regarding population composition, housing description and employment generating activities is presented in these sections.

It is important to note that the information presented in this section(Chapter 4.1) has been, in part, provided by the following sources:

> Town of Narragansett Staff, Town of Narragansett Comprehensive Plan, December 1998 approved by Town Council, February 1999 approved by State of Rhode Island.

Planimetrics, Town of Narragansett Comprehensive Plan Update, Draft December 2004.

Davis and Robinson, History You can See, 1985, League of RI Historicalites.

Steinberg and McGuigan, Rhode Island, An Historical Guide, 1976, Rhode Island Bicentennial Foundation.

RI Department of Economic Development, Town of Narragansett Monograph, 1976, State of Rhode Island.

Quinn, Alonzo, Rhode Island Geology for the Non-Geologist, 1973, RI Department of Natural Resources.

Travassos-Geremia & Associates, Inc., Facility Plan for Wastewater Management, November 1993.

The existing information and future projections derived in this Facilities Plan is consistent with the Town of Narragansett Comprehensive Plan Update prepared by Planimetrics, December 2004. This includes projections with regards to population, sewered population, wastewater flow, septage volumes, and residential, commercial and industrial growth, along with the built-out projections for future development.

Twentieth Century History

A narrow strip of land running along the eastern bank of the Pettaquamscutt River to the shore of the bay, Narragansett was separated from South Kingstown in 1888. It was at this time period that the Town quickly evolved as a prestigious summer resort. This was due in part to the construction of the Narragansett Pier Railroad line which connected the pier with the main line that ran through Kingston. The train connection provided easy access to the center of Town, allowing affluent industrialists throughout the northeast to visit this growing resort community. From the mid 1870's to the turn of the century, over fifteen hotels were erected, mostly in the pier area. Narragansett Pier (named for the long pier which once stood at the south end of the beach) quickly became the center of Town.

Narragansett's golden age of tourism ended abruptly in1900 when the huge Rockingham Hotel, the Great Casino, and other hotels caught fire and burned to the ground. The only vestige of this era still standing is the Narragansett Towers and arch which are located on Ocean Road. The great fire caused extensive damage,

and with the rise and popularity of Newport, the Town never recovered as a summer resort community. However, shortly thereafter (in 1901), Narragansett was incorporated as a Town.

The early 1900's were a period of little change. The population of the Town became steady (approximately 1,500 people). A large majority of the residents were involved with fishing and farming. Residents also labored in the nearby textile mills located in Peace Dale and Rocky Brook. The great hurricane of 1938 ravaged the shoreline of Narragansett and ensured that tourism would not immediately play a major role in the Town's recovery.

Beginning with the construction of the federal highway system in the late 1950's and early 1960's, the Town slowly but surely began its re-emergence as a summer resort and tourism community. The new roadways provided easy access to the Town's beachfront area at the Narragansett Pier, Scarborough and Sand Hill Cove. From 1950 to 1965, the Town's population more than doubled to over 5,000 people. During this period, many summer cottages were built.

Through the last four years, these "beach cottages" have been converted to year-round residences. Subdivisions (such as Briggs Farm and Eastwood Look) which were built as summer homes have now become year-round residences, and the remaining summer cottages have become winter residences for students attending the nearby University of Rhode Island.

Population Trend Analysis

Since 1950, Narragansett has experienced a rapid and sustained increase in population (Table 4-1). While the amount and rate of growth appear to have slowed somewhat in recent years, population has grown from 2,288 people in 1950 to 16,361 people in the year 2000 (according to the United States Bureau of the Census).

This rate of growth is much faster than that experienced in Washington County or the State of Rhode Island as a whole.

Population growth is expected to continue in Narragansett due to the community's strategic oceanfront location, local amenities, and overall community character. If the reported Census growth between 1990 and

2000 continues, it is estimated that Narragansett's 2005 population will be between 17,049 people (linear trend) and 17,112 people (rate trend).

Population estimates for the year 2010 have been estimated as follows:

Local cohort survival method	17,299 people
Statewide Planning Program projection	17,454 people
Linear growth trend (amount)	17,737 people
Exponential growth trend (rate)	17,863 people

According to August 2004 projections by the Rhode Island Statewide Planning Program, this growth trend is projected to continue and Narragansett could have more than 20,000 residents (a 24% increase) by the year 2030.

TABLE 4-1
POPULATION TRENDS - NARRAGANSETT, RI
1890 TO 2030

Year	Population
1890	1,408
1900	1,523
1010	1,250
1920	993
1930	1,258
1940	1,560
1950	2,288
1960	3,444
1970	7,138
1980	12,088
1990	14,985
2000	16,361
2010	*17,454*
2020	*19,028*
2030	*20,256*

Population Projections from RI-SPP

Land Use

The Land Use Element describes (in narrative and graphic form) the desirable pattern and location of development, both public and private. The Land Use Map is relied upon as the vehicle which drives changes, namely the transformation of policy into land use law (zoning and subdivision amendment). The link between general plans and zoning is quite apparent. That is, the plan identifies a pattern of desired land use development, and zoning ordinances specify the range and condition of use that can occur on parcels of land.

Based on the Handbook of the Town of Narragansett Comprehensive Plan (approved February 1999):

> "The land use element must consider the allocation of land for residence, business, industry, municipal facilities, public and private recreation, major institutional facilities, mixed uses, open space and natural and fragile areas. Optimum intensities and standards of development must be established for each use classification and location, based upon current development; natural land characteristics; and projected municipal, regional and state services and facilities."

One of the most basic components of land use plan or element is a summary of existing land uses by classification and acreage. This presents a simple picture of the Town at a particular point in time. Insight also can be gained by comparing current data with similar historical information which allows for a more in-depth analysis of change. This comparison can help focus attention on such important policy issues as loss of open space or recent commercial and industrial trends.

Existing land use information has been taken from the 2005 Comprehensive Plan Update prepared by Planimetrics and is presented in Table 4-2.

For planning purposes, the following classifications of land use have been made. They are meant to be overall guidelines for future land use on a Town-wide basis only and are not intended to supersede the zoning ordinance map or other site-specific land use ordinances. These areas are shown on the Land Use Plan Map (Figure 4-2). Reference to specific land parcels have been avoided on this map. Except for certain major land parcels with fixed, permanent boundaries (such as public parks), the Land Use Plan Map is not intended to follow specific lot lines. Within the classification shown on the map, environmental and site planning considerations are not to be disregarded and may affect individual project density or land use.

TABLE 4-2 EXISTING LAND USE ACRES				
2004 Narragansett Land Use		**Acres**	**Percent of Developed**	**Percent of Total**
Residential		**2,975**	**44%**	**34%**
Single Family	2,503			
Multi-Family	353			
Trailer Park	119			
Business		**291**	**4%**	**3%**
Commercial	262			
Industrial	29			
Open Space		**2,476**	**36%**	**29%**
Dedicated Open Space	1,880			
Managed Open Space	596			
Civic Uses		**323**	**5%**	**5%**
Institutional Uses	253			
Community Facility	70			
Other Uses		**747**	**11%**	**9%**
Transportation/Utility	654			
Water	93			
Developed / Committed		6,812	100%	79%
Vacant / Remaining Potential		2,856		21%
Total Area		8,669		100%

Source: 2005 Comprehensive Plan Update (Planimetrics)

The purposes of the Land Use Plan Map are as follows:

1. To present a visual representation of the policies and goals of the Town for the future use and intensity of development of all land and waterbodies;

2. To illustrate the relationship of the Land Use Plan with that of adjacent communities and with the State Guide Plan; and,

3. To demonstrate the consistency of the Land Use Plan with the Town zoning ordinance and map, and with other zoning requirements, subdivision regulations and other land use controls.

The recent approval of the Narragansett Affordable Housing Plan may significantly affect the land use figures presented in Table 4-2. This plan proposes new regulations that will allow unmerger of residential lots

Legend

landuse

- "R-C" Residential Cluster
- High Density Residential
- Medium Density Residential
- LowDensity Residential
- Multi-Family Residential
- Commercial
- Industrial
- Transportation; 999
- Water and Sewage Treatment
- Junkyard / Disposal Area
- Ferry Terminal
- Urban Open Space
- Institutional
- Agricultural
- Forest
- Brushland
- Wetland
- Recreational

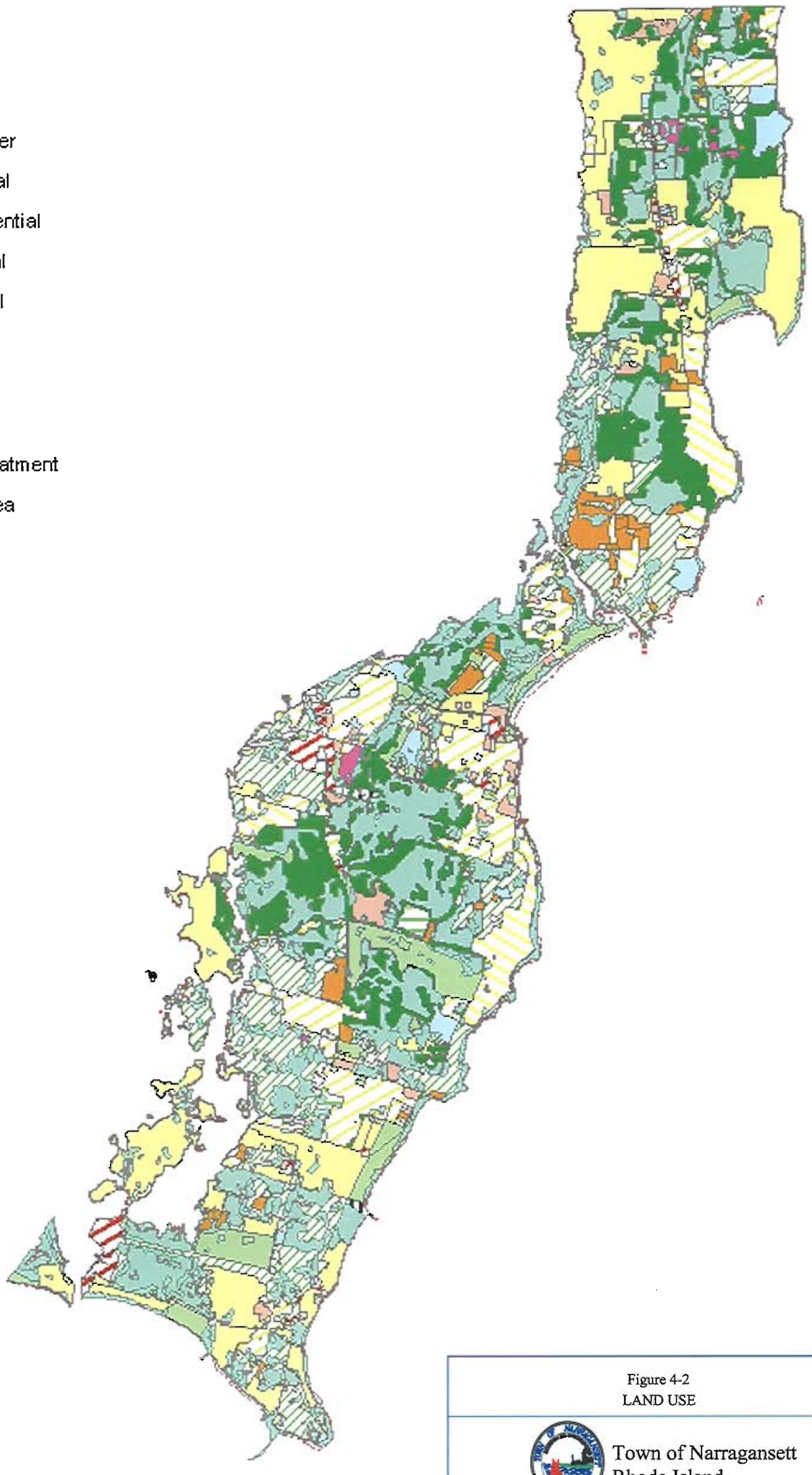

Figure 4-2
LAND USE

Town of Narragansett
Rhode Island

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
272 W. Exchange Street Suite 201 Providence,RI 02903-1025
Phone: 401-454-7000 Fax: 401-454-7415

Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

previously considered merged by zoning or by use for the purpose fo building a permanently affordable house. This plan also anticipates additional dwelling units not previously estimated through creation of accessory units and special development on the Boon Street area. All together, this strategy could add nearly200 dwelling units in Town.

An unknown factor of density waivers related to comprehensive Permit applications for affordable housing must also be considered. Under state law Sec 45-53, private developers may receive density waivers for construction of affordable housing. The amount of waiver is considered on a case by case basis.

Climate

The proximity to Narragansett Bay and the Atlantic Ocean plays an important part in determining the climate for Narragansett. In winter, the temperatures are modified considerably and many major snowstorms are changed to rain. In summer, many days that would be uncomfortably warm are cooled by sea breezes. At other times, sea fog may move onshore with southerly winds. Most cases of dense fog are produced this way, but the number of such days is few, averaging only two days a month.

Extreme temperatures are infrequent in Narragansett because of the marine influence. Temperatures exceeding 90 degrees occur nine days a year (between late April and September). Temperatures dropping below zero occur two to three days a year (between December and February), but winters are relatively cool; freezing temperatures occur 120 days a year. The average date for the first freeze in Fall is late October and the average last freeze in Spring is mid-April.

The Narragansett planning area lies in a belt of the prevailing westerlies. The movement of air masses in the region is derived principally from the west and originates principally as a result of:

1. Cold, damp air moving onshore from the Atlantic Ocean;
2. Cold air moving south from the Arctic; and
3. Moist, warm air derived from the Gulf of Mexico funneled north-northeastward along the Appalachian trough.

The bulk of normal precipitation comes from northeasterly winds which bring either rain or snow from the coast. According to a 40 year climatological summary for the Theodore F. Green Airport weather station in Warwick, RI, the Narragansett planning area has a mean annual precipitation of 41.19 inches, including a mean annual snowfall of 39.2 inches. The mean annual temperature for the station was 50.5 degrees F. The mean temperature for July was 72.7 degrees F., while for January it was 29.1 degrees F. The mean wind speed is 10.7 m.p.h. and originates from the southwest. Spring winds are predominantly from the north and northwest, while summer winds are derived largely from southeast to southwest. Fall winds are more variable but occur mostly from the north to northwest, while winter winds are from the north to west-northwest. Within the planning area, the growing season averages 160 to 180 days.

Topography

The topography of Narragansett is attributed to the forces of glacial erosion and deposition. The topographic structure of the Town is dominated by a central ridge running north-south. The ridge may be defined by Boston Neck Road (Route 1A) in the northern section of Town and Point Judith Road (Route 108) in the southern half. Significant topographic features Wesquage Pond, the Narrows, Point Judith, Black Point, and the beaches at Sand Hill Dove, Scarborough and Bonnet Shores. The highest point in Town is located north of South Ferry Road and is approximately 120 feet above mean sea level.

Drainage

The central ridge which runs through Town sheds rainwater to the east and west over highly mottled slopes high in silt content, generating a large number of undefined stream courses and wetlands swamps on both east and west slopes. This phenomena is particularly evident at Fort Nathaniel Greene, under and to the north of Eastwood Look and south of Briggs Farm. These wetlands have been increased in their intensity due to little or no subsurface drainage in older subdivisions. Major drainage waterways include the Pettaquamscutt River, the Narrows and Crooked Brook.

Geology and Soils

The Rhode Island shoreline is the result of previous glacial action and the forces of erosion and deposition. These two forces create a constantly changing coastline, filled with such dynamic features as marshes, bays, estuaries, barrier beaches, spits, sand dunes, and salt ponds. The combination of wind and wave action causes these features to move and to change continually. In addition, the impacts of human activity can exert powerful, and sometimes undesirable, changes on the natural features.

Normally, a beach face is made of sand, deposited by the waves. However, when a beach intersects a deposit of glacial gravels, the result can be a cobbly beach front formed as the waves wash away the sand. Narragansett has a number of these beaches, including Narragansett Pier and Scarborough.

The varying soils of Narragansett are shown in Figure 4-3. Much of the area is veneered with a thin glacial till and some critical features of the bedrock geology are therefore not exposed. The east part of an end moraine enters the area in the vicinity of Wakefield. South of Wakefield and Narragansett Pier, a low, rather level plain is underlain by a considerable thickness of glacial outwash. Outcrops are numerous along most of the ridges in the northern part and are particularly abundant along the coastline.

Surface drainage is not well developed, and swamps and marshes are extensive. Streams are small and, in most places, bordered by swamps.

Ground moraine covers the major portion of the Town from the pier area north, and is a discontinuous mantle of till that lies on the glacially eroded bedrock. Local names for the till are "Blue Marl" and "Hardpan". It consists mostly of subangular and subrounded stones, sand and silt, and is generally compact and difficult to dig. Percolation rates are very low.

A ridge of relatively thick glacial deposits, believed to be an end moraine, covers most of the southern portion of the Town.

Most till exposures more than a few feet thick include some sand, gravel or silt as layers and lenses up to three feet in thickness. The layers of till that show little sorting generally are moderately to very compact and difficult to excavate.

LEGEND:

- EXCESSIVELY DRAINED
- SOMEWHAT EXCESSIVELY DRAINED
- EXCESSIVELY DRAINED - WELL DRAINED
- WELL DRAINED
- WELL DRAINED - MODERATELY WELL DRAINED
- MODERATELY WELL DRAINED
- POORLY DRAINED
- POORLY DRAINED - VERY POORLY DRAINED
- VERY POORLY DRAINED
- URBAN LAND

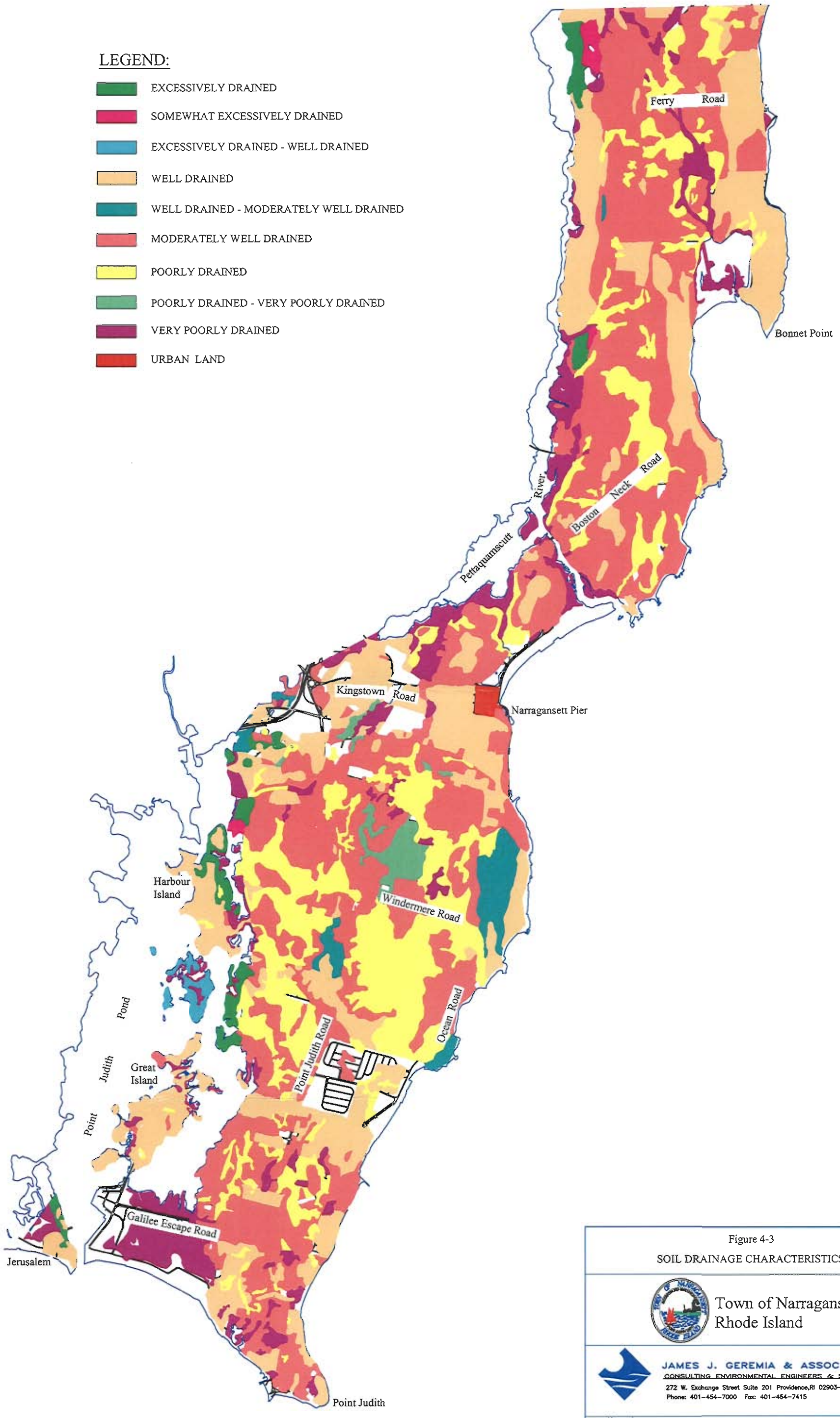

Figure 4-3

SOIL DRAINAGE CHARACTERISTICS

Town of Narragansett
Rhode Island

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Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

Economic Development

Narragansett's geographic location makes some types of economic development unlikely or impractical. Narragansett is surrounded by ocean on two sides and is located in a low density region away from the major elements of the transportation system. As a result, it is unlikely to be a major location for business activity unless there is a locational advantage locally or the business activity is to meet local needs.

The economic development which has occurred in the Town can be directly related to local needs and locational advantages which exist:

- a summer-time resort community (including seasonal rentals) related to the local beaches and boating amenities,
- a tourism focus based on local events and amenities and the types of facilities available,
- a winter-time housing market supported by students at the University of Rhode Island,
- local retail and service businesses that serve the needs of year-round and seasonal residents,
- proximity to the University of Rhode Island's Kingston and Bay Campuses,
- establishment of the South Ferry Road marine research centers,
- relatively easy access to urban centers via U.S. Route 1 and other connectors, and
- its protected harbors at Galilee as a center for commercial and sports fishing industries.

According to the Rhode Island Research and Economic Database (RIRED), there were 9,574 Narragansett residents employed and about 3,446 jobs (excluding self-employed) located in Narragansett in 2004.

Narragansett is predominantly a residential suburb (and a net exporter of workers) since there were at least 6,128 Narragansett residents who work in other communities. Local unemployment (about 3 percent) is among the lowest in the state, indicating that there is an adequate supply of jobs for residents available in the region.

In addition, there is considerable seasonal variation in employment in Narragansett. Data from the Rhode Island Department of Labor and Training (2000) showed an increase of 1,045 jobs in Narragansett between the first quarter (January to March) and the third quarter (July to September) with about 600 more jobs in retain sales and about 375 more jobs in services.

Industrial Development

Industrial development in Narragansett is concentrated in three separate commercial zones:

- Galilee, center of the fishing industry for Rhode Island;
- A small industrial zone bordering Route 108 and South Pier Road; and
- A larger industrial area adjacent to the URI Bay Campus, which combines a state-owned research oriented park and a private service industry area.

Four of the seven largest employers in Town operate within these industrially zoned areas: Town Dock and Slavin (in Galilee), URI Bay Campus, and the Federal Research Facilities (EPA, National Marine Fisheries Lab). Much of the growth in the industrial sector has been associated with relocation of local service businesses into the private north end industrial park and the development of research and technical industries associated with the EPA lab, the URI lab and the URI Bay Campus. All industrial areas are serviced by water and sewer. However, expansion is limited due to lack of space or presence of wetlands.

Residential Uses

Narragansett is predominantly a residential community. As noted above, it serves as a bedroom community, exporting labor to employment centers generally outside of Town. Contrary to common belief, however, the employment centers are diversified and are not all in the City of Providence. Much of Narragansett's residential area services a brisk market for summer vacation rentals and winter rentals to students at URI.

The dominance of residential development is a continuing trend. Over the past ten years, the ratio of residential evaluation to combined industrial/commercial and non-taxable property has climbed from 71 percent to 81

percent of the real estate evaluations. Business property has declined in share from 21.8 percent in 1983 to 12.4 percent of total real estate evaluations in 2001.

In light of the above, the following primary goals stated in the Comprehensive Plan for economic development are adopted:

- Promote employment opportunities in marine research and technology, recreational boating, and commerce which are related to Narragansett's unique seaside character.
- Accommodate forms of tourism beneficial to the community assuring that tourism respects the Town's environmental, scenic and historic qualities which are Narragansett's chief attraction.
- Broaden the source of Town revenues in order to assure a sound financial future and to assist the achievement of Town goals expressed in the Comprehensive Plan.

4.1.4 WATER QUALITY AND SUPPLY

The Town of Narragansett depends upon summer recreational activities to sustain its economic viability. Two of Rhode Island's major state operated salt water beaches are located in Narragansett. Two other significant Town beach facilities also contribute to the economic stability of Narragansett. In addition, Point Judith Pond and the Pettaquamscutt River (which form the western border of the Town) are both significant recreational bodies of water.

It is obvious, therefore, that the water quality of the surface waters near the beach areas must be preserved and maintained. The existing Scarborough Treatment Plant has an outfall near one of the state beaches, extending out approximately 2,200 feet from the shore. Therefore, and in accordance with state law, a minimum of secondary level treatment is necessary to preserve the water quality, particularly when design flows are reached.

A new permit has been issued (in October 2005). The new permit is presented in Exhibit B.

No industrial point sources exist in the Town of Narragansett. The industrial fish processing activity in the Galilee area of Town discharges their wastewater into the existing sewer system.

The Scarborough Wastewater Treatment Facility (WWTF) receives maximum waste loads and flows during the summer recreational period. The average daily flow for the past four years has been 540,000 gallons per day. About 36,000 gallons of the total flow is pumped from the Galilee area, the only source of any industrial processing waste. Eighteen (18) acres of the site are classified as SC (suitable for fishing, shellfish and wildlife habitat), while an area of approximately 144 acres surrounding the outfall (located just south of Scarborough Beach and one half mile off shore) is classified as SB (suitable for bathing and other recreational purposes).

The outfall from the South Kingstown Regional Wastewater Treatment Facility is located in the pier area of Town and extends approximately 1,500 feet from the shore.

The South Kingstown facility receives wastewater flows from Narragansett's North End and Pier Area Sewer Systems, the University of Rhode Island, and various sections of the Town of South Kingstown. The design flow of the plant is 5.0 million gallons per day. An area of approximately 18 acres surrounding the outfall site is classified as Class SC. An additional 207 acres are classified as SB.

The Salt Pond Regional Special Area Management Plan (CRMC, April 1999) indicates that the water quality of Point Judith and the Pettaquamscutt River has been deteriorating. In both cases there is evidence which indicates that inadequate individual on-site disposal systems, in rapidly development areas, are causing the pollution problem.

None of the Pettaquamscutt River currently meets its SA classification. Under certain conditions, parts of the Pettaquamscutt River may even exceed the SB standards. Shellfishing is prohibited in the entire river. Parts of the upper Point Judith Pond also do not meet the SA classification and, therefore, are closed to shellfishing.

Thus, the significant environmental and water management goals for Narragansett are preservation or enhancement of surface waters for aesthetics, recreation and fish and wildlife purposes. Specific goals to achieve acceptable water quality for the Town are, therefore:

- Maintain SA classification water quality at Sand Hill Cove, Scarborough, Narragansett Pier and Bonnet Shores Beaches.
- Improve water quality in Point Judith Pond to achieve SA classification in the southern portion of the upper pond.
- Improve water quality in the Pettaquamscutt River to achieve SA classification.

According to the RIDEM, groundwater within the Town is classified as GA (that is, groundwater which may be suitable for public or private drinking water without treatment). Also located within the Town are four GA non-attainment sites less than ten acres in area. These sites are located within the direct vicinity of U.S. Route 1. However, all of the Town's water supply needs are imported from other communities. Thus, there is no sole source aquifer to consider and the question of water re-use by groundwater recharge is not applicable in this case.

4.1.5 EXISTING NOISE AND AIR QUALITY

No noise complaints from the Scarborough Treatment Facility have been received. Even though the treatment plant is close to nearby residences, the presence of Ocean Road creates a higher ambient noise level than normally present in a suburban community. Noise is generated from several sources associated with the treatment, such as mechanical aerators, pumps and motors.

The Division of Air and Hazardous Materials and the Division of Occupational Health and Radiation Control of the State of Rhode Island has established a network of air monitoring stations. They are part of the Metropolitan Providence Interstate Air Quality Control Region (MPIAQCR), which is designated an Air Quality Control Region by the U.S. Environmental Protection Agency (EPA). Narragansett lies within the AQCR and it does not have an air monitoring station itself. Thus, deductions concerning air quality in Narragansett must be made from data obtained from stations in the surrounding area. National Ambient Air Quality Standards have been established for Carbon Monoxide, Total Suspended Particulates, Ozone, Oxides of Nitrogen (NO_X) and Oxides of Sulfur (SO_X).

In order to determine which station(s) would produce an accurate assessment of Narragansett's air quality, an Annual Wind Rose was prepared using data obtained from the National Oceanic and Atmospheric Administration (NOAA) for the Green State Airport in Warwick. Due to the fact that some air pollutants are dependent on seasonal activities, the wind patterns were also reviewed with relation to the seasons of the year. Based upon these observations, the stations that would provide the most reliable information for the Town of Narragansett concerning air quality are Cranston and Providence for the winter months (November - March) and West Greenwich and Newport for the summer months (April - October).

The data compiled from these stations indicate that, with the exception of its ozone levels, Narragansett is experiencing no difficulty with its air quality. Concerning oxidants, according to the publication entitled Air Quality Data Summary (1990) for Rhode Island, "A decreased number of exceedances observed in certain years is attributed to the generally cooler weather conditions which prevailed in those years". The burning of fossil fuels places the needed oxidant precursors into the atmosphere. This is not a unique problem to Narragansett, but exists in the entire Northeastern United States and will remain a problem until an alternative for fossil fuels becomes common.

Very low concentrations of sulfur dioxide (another by-product emitted as a result of fossil fuels combustion) have been found to occur in Rhode Island. This is probably due in part to the fact that the state has imposed a 1 percent maximum sulfur content limit on fuel oil for the past twenty years.

Total Suspended Particulates (TSP) and Carbon Monoxide (CO) are being controlled by the State's strictly enforced Federal Motor Vehicle Emission Control Program (FMVECP).

4.1.6 VEGETATION AND WILDLIFE

Much of the forest land in Rhode Island was cleared at one time for grazing, farming or timber. The post agricultural fields are marked by stands of gray birch, red cedar, white pine, sumac, juniper and dogwood, to name a few species. Each forest type represents a distinct habitat which provides homes for a diversity of plants and animals. Additionally, the transition zones from one forest type to another, or from forest to a field, provide rich areas of plant and animal life.

Stands of white pine (Pinus Strobus) are also found, yet, because the trees are not shade tolerant and seedlings do not germinate well in organic soils, white pines are not found in mature forests (as are the oaks). White pines may live to be 400 years old, but were a heavily exploited tree, being cut and sold for ship masts. Another vegetative cover is the pine barrens, found in the sandy outwash soils. The pine barren habitat - - dry, sandy soils, supports several rare and endangered species. Hemlocks (Tsuga Canadensis) and Beech(Fagus Grandilfolia) often are found on the northerly cooler slopes, as they are more shade tolerant trees and not resistant to fire.

Climatic, physiographic, edaphic (soil and biotic factors) plus the influence of man has directly or indirectly affected the present day vegetative communities of Narragansett and surrounding towns. For example, the soil in this area is of the melanized type, which has the characteristic of producing forests containing many tree species. However, the influence of man cannot be overemphasized when discussing the vegetative changes which have occurred in the Narragansett area.

Cultivation, logging and/or fire has influenced the vegetation by removing climax species and initiating a succession or by maintaining seral conditions. Clearing of forests and substitution with artificial communities of cultured species brought about an explosion of native and foreign pests and diseases (e.g., Chestnut blight). Poor agricultural practices in the past also accelerated erosion by exposing additional soils, making these areas less suitable to the original species.

The wildlife expected to be found in this area include, but are not limited to, several specifies of the Ranidae family of frogs, snapping turtle, painted turtle, Northern banded water snake, mallard duck, red tailed hawk, belted kingfisher, hairy woodpecker, chickadee, several species of warblers, red-winged blackbird, swamp sparrow, song sparrow, water shrew, raccoon, muskrat, deer and red fox.

4.1.7 CULTURAL RESOURCES

Although the Town of Narragansett is relatively young (incorporated in 1901), its history is reflected in the assortment of its historic buildings and its diverse land features (Figure 4-4).

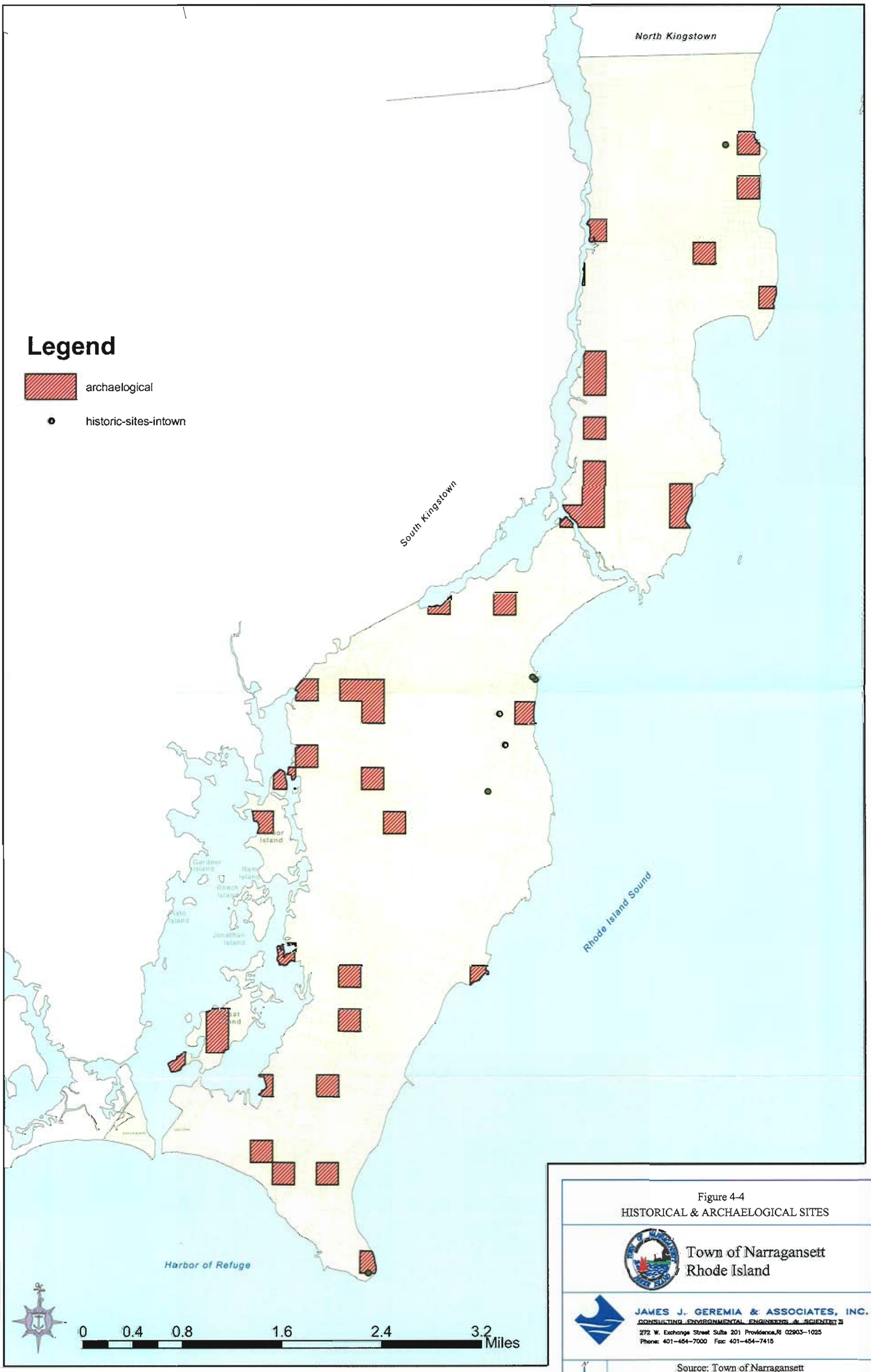

Figure 4-4
HISTORICAL & ARCHAELOGICAL SITES

Town of Narragansett
Rhode Island

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Phone: 401-454-7000 Fax: 401-454-7415

Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

The early history of Narragansett is shared with the adjoining Town of South Kingstown. It was in this area that the Narragansett and Niantic Indians lived prosperously. In 1670, the earliest white settlement in this area began in the Pettaquamscutt region. Until the beginning this century, Narragansett was part of the Town of South Kingstown. For hundreds of years, the community was a farming area. In fact, during the late 17th Century, the Tower Hill area became a prosperous settlement, a wealth community of farmers and traders. Unfortunately, the settlement could not economically sustain itself and quickly disappeared, leaving no physical remnants of its past.

Beginning in the 1850's, as stage coaches and railroad services made the region more accessible, the eastern shore quickly bloomed as a summer resort. The Narragansett Pier area, named for a long pier which once stood at the south end of the beach, became the center of the resort. The first luxury hotel (The Narragansett) opened in 1856. Soon afterwards, then-Governor William Sprague built "Canonchet", a 60-room summer mansion. Due to Canonchet and the area's newly established resort hotel, the wealthy and aristocratic flocked to the pier. This era ended at the turn of the century, due to the great fire of 1900.

Today, the Town of Narragansett has a rich and prestigious cultural history of its own. Its resources are diverse, from the scenic beaches along its eastern and southern shores to its irreplaceable landmarks.

The Narragansett Towers, located on Ocean Road (Route 1A) just south of the Town beach, is a parallel pair of stone arches anchored on either side by curved towers, and is all that remain of the Casino, testament to the gold Victorian resorts era. The famous New York architectural firm of McKim, Mead and White designed the Casino in 1883. Three story blocks of granite with semicircular ends topped by conical roofs, the Towers are connected by one long gallery room above the arches. The main casino building - - a long wooden structure - - burned in the great fire of 1900. The remaining Towers are a powerful image today of a glorious bygone era. The Towers are the Town's most important civic structure and are one of the State's major landmarks, having withstood the fire and also several hurricanes. Today, they are the property of the Town of Narragansett.

The Coast Guard House, which abuts the Towers, was also designed by McKim, Mead and White, and was built in 1888. Although it has been altered numerous times, it remains noteworthy for its close relationship in style to the Towers.

Another well known landmark is the Point Judith Lighthouse, an octagonal brick building erected in 1816. The lighthouse has been an important coastal beacon for centuries. A tower beacon and Coast Guard Station have been maintained at the Point since the American Revolution. Originally, a wooden lighthouse built in 1806, the structure was destroyed during the Great Gale of 1815. The last German U-Boat to be sunk in World War II lies two miles south of the light.

The Town also celebrates its heritage with monuments dedicated to the American Indians who once roamed throughout South County. At the corner of Kingstown Road and Strathmore Street is the Narragansett Indian Monument. Carved from a single Douglas fir by Peter Toth, this 23-foot tall sculpture is one of a series throughout the country honoring the local American Indians.

On the green at Exchange Place (near the Towers) is the Canonchet Memorial. The 6,000 pound limestone statue was sculptured in 1977 by Robert Carsten and memorializes the Narragansett Indian Chief Canonchet.

The Town of Narragansett, not unlike its neighboring Town of South Kingstown, also is home to significant educational facilities and landmarks. The University of Rhode Island, Narragansett Bay Campus, situated on South Ferry Road, houses one of the finest marine educational facilities in the country. The Campus includes the Graduate School of Oceanography, Department of Ocean Engineering, the Pell Marine Science Library, and the Division of Marine Resources. Also located here are the United States Environmental Protection Agency Research Laboratory and the Rhode Island Nuclear Science Center.

On Canonchet Farm (located on Strathmore Street) is the South County Museum. The museum houses articles of early Rhode Island life and industry. On display are tools, farming implements, utensils, vehicles, appliances and mechanical devices. Canonchet Farm itself is a 174-acre, 19th century working farm. The farm also contains a historic cemetery, with gravestones dating back to the year 1700.

With regards to recreational facilities, Narragansett is home to some of the most beautiful beaches in the state. These include beaches at Bonnet Shores, Narragansett Pier, Scarborough, Sand Hill Cove and Galilee. There is one private golf course in Narragansett (the Point Judith Country Club) which is an 18-hole course. Also, there is one yacht club (the Point Judith Yacht Club) which is located on Salt Pond.

The Fisherman's Memorial State Park on Point Judith Road (Route 108) is a 92-acre state park. The park contains attractions such as naturalist and recreation programs, saltwater fishing and shellfishing, an observation/lookout area, tennis and basketball courts, a playground, and approximately 200 campsites.

4.1.8 WETLANDS AND FLOODPLAINS

Narragansett, because of its glacial geology and coastal location, has many acres and classes of wetland (Figure 4-5). The term wetland usually brings to mind a swamp, a bog, or a marsh. In fact, wetlands include a number of different land types: aquatic beds, beaches, floodplains, wet meadows, swamps, bogs, and marshes are examples. The common characteristic of a wetland is that the area be at least periodically saturated or covered with water. Wetlands can be defined by soil characteristics (hydric soils), vegetation, or hydrology (Army Corps of Engineers, 1989).

In Rhode Island, freshwater wetlands are defined by the Freshwater Wetlands Act, R.I.G.L. Title 2, Chapter 1, Sect. 2-1-18 et seq. Wetlands are protected and regulated by federal, state and local laws because they provide many valuable functions, such as:

- Pollution abatement is provided by wetlands. Pollutants can be trapped and held in wetlands through a variety of chemical, physical and biological processes.

- Wetlands serve as a mechanism of flood control because they are able to store water after heavy rain. Water then slowly is released during a later period, thus mitigating flooding downstream. As we lose more wetlands, the remaining wetlands serve a much greater role in floodwater storage and flood prevention.

- Habitats for plant and animal life is an important function of wetlands. Many animals live there permanently, but many also use wetlands as places to feed, to breed, or to rest during migration. Wetlands are the sites of many rare and endangered plants and animals. Salt marshes have a higher net primary productivity (in grams/carbon/year) than a tropical rainforest or any freshwater wetlands (Tiner, 1985). Because coastal wetlands are areas of high productivity, they function as an important food source for a variety of wildlife and a nursery to many commercial fish species.

- Many scenic landscapes are provided by wetlands - whether it is a meandering river through the fall foliage, the morning mist over a marsh, or a sunset over a lake or beach, wetlands form an important part of our stock of scenic places.

LEGEND:

INLAND WETLANDS

COASTAL WETLANDS

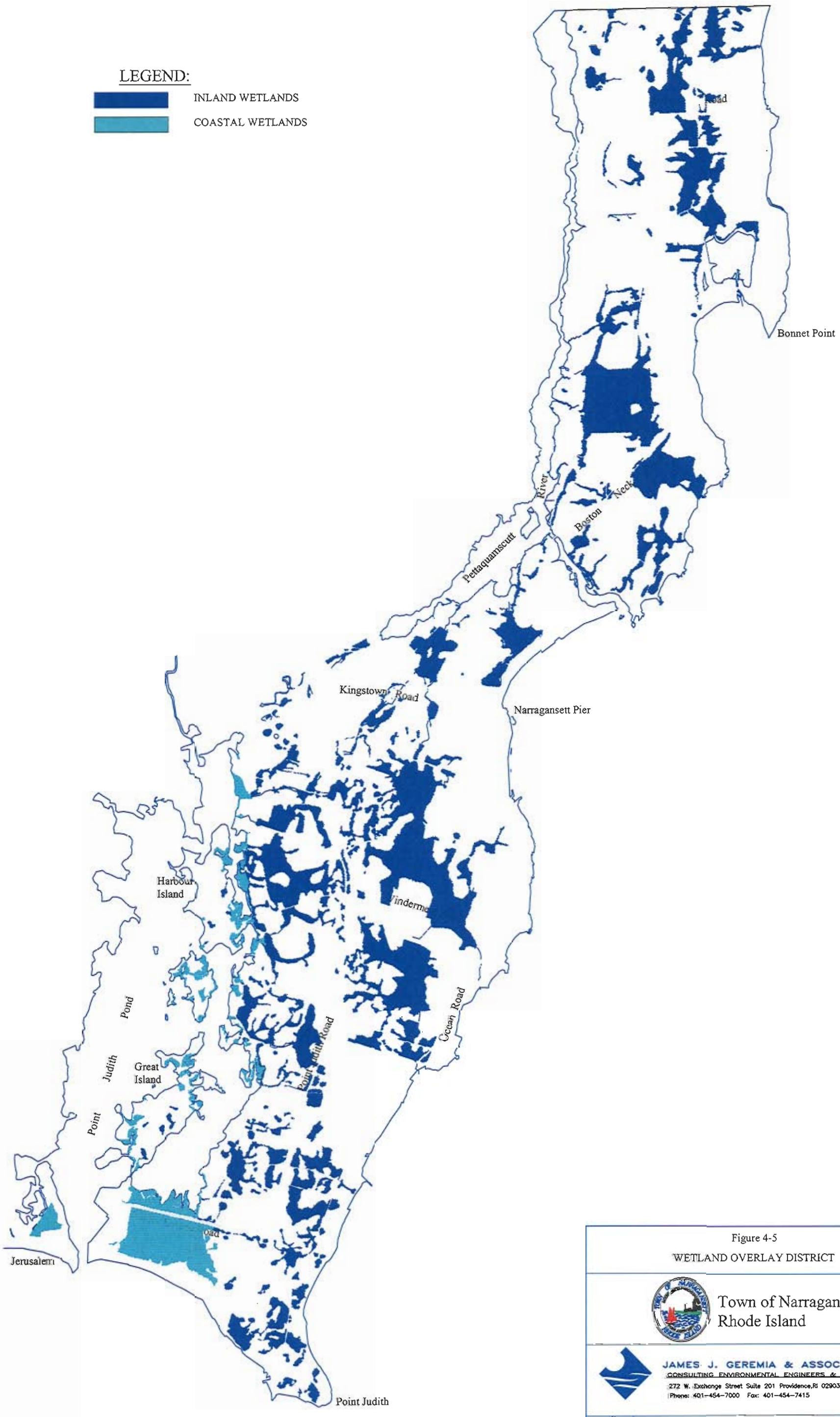

Figure 4-5

WETLAND OVERLAY DISTRICT

Town of Narragansett
Rhode Island

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Phone: 401-454-7000 Fax: 401-454-7415

Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

Freshwater wetlands include wooded swamps, marshes, bogs, aquatic beds, wet meadows, and floodplains. Descriptions of wetland types can be found in Cowardin, et al, 1979. Bogs, fens and open water areas are described in Golet and Divas, 1982.

- Forested wetlands are commonly referred to as swamps. In Rhode Island, most of our forested wetlands are dominated by red maples, ash, willow, birch and dogwood trees. Common shrubs include blueberry, winterberry, spicebush, alder and buttonbush. Forested wetlands often have trees growing from mossy mounds surrounded by low, wet areas.

- Scrub shrub wetlands are areas which are dominated by shrubs or young trees. In addition to be above species, common shrubs in southern New England wetlands include swamp rose, steeplebush and viburnums.

- Wet meadows are areas in which grasses, sedges and rushes are the primary vegetation. If these areas are not moved, burned or grazed, they will soon fill with shrubs and trees.

- Marshes are areas which are seasonally flooded with water and support a nonpersistent vegetation. Cattails, bulrushes and phragmites are found in freshwater marshes. These areas are especially important to waterfowl and other wildlife.

- Open water areas support many microscopic plants and may support some rooted and floating vegetation (water lilies, pondweed, water shield, and duckweed are some examples). In the shallow areas along ponds, stands of juncuses, pickerel weed, arrow arum, arrowheads, and wild rice many be found.

- Bogs are areas of high acidity, low temperatures, restricted drainage, and low nutrient availability. The common plants are sphagnum mosses, bog laurel, leatherleaf, pitcher plants, sundew, sweet gale, and bog cotton. A bog often has a thick deposit of peat (sphagnum moss) which quakes when walked on. Fens are areas with similar physical and chemical characteristics, but in which the sphagnum does not quake and the dominant plants often are carexes.

Narragansett has a total of 2,093 acres of wetlands, which comprise approximately 23 percent of the Town (RIGIS, 1990). In addition, another 24 percent of the Town (2,174 acres) is classified as forest and brushlands. Water, that is rivers and lakes, comprise 147 acres, or nearly 2 percent of the Town.

Coastal wetlands include salt marshes, estuarine scrub wetlands, beaches (unconsolidated shores, rocky shores), and estuarine and tidal waters (salt ponds and estuarine rivers). A description of the wetland classes is found in Cowardin, et al, 1979.

- Barrier beaches are narrow strips of beach running parallel to the mainland and are deposited by wave and wind action. These beaches usually serve as a buffer between the ocean and salt ponds, salt marshes, or some type of coastal wetland. As the sands shift with the dynamic forces of erosion and deposition, the beach faces continual change. Barrier beaches are unvegetated and may be sandy or contain cobbles and other sediments. Barrier beaches serve as important nesting and feeding spots for shore birds, including the least tern and the endangered piping plover.

- In a salt marsh, sediment being deposited and trapped is balanced by erosion (which prevents filling of the marsh). A salt marsh is an area which regularly is covered with salt water and has the following dominant vegetation: red grass, cord grasses, cattails, sea lavender, black grass, saltwort, and marsh alder. Salt marshes and their contiguous wetlands have large numbers of shellfish and act as a nursery and spawning ground for several species of commercial and recreational fish and shellfish.

- Salt ponds are areas which are shallow and receive inputs of both salt and fresh water. The salinity of a pond depends on the amount of salt water entering (either from breachways or ocean washing over the dunes) and the amount of fresh water entering from the upland (groundwater, streams or surface run-off). It is this dynamic combination of brackish, shallow water, barrier beaches, and salt marshes that creates such a unique environment.

- Estuaries are the most productive of the aquatic habitats. It is the area where fresh and salt water mis (estuarine). Plankton communities, sea grasses and many species of fin and shellfish are found.

The Town of Narragansett has over one mile of developed barrier beaches, as designated by the Rhode Island Coastal Resources Management Program. Construction is prohibited on an undeveloped barrier beach, except where the primary purpose of the project is protection, maintenance, restoration or improvement of the feature as a conservation area or natural storm buffer.

FLOODPLAINS

The floodplain of a river is the valley floor adjacent to the incised channel which may be inundated during high water. Floodplains are built up primarily from deposition of fine sediments on the floodplain when flooded.

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by the Federal Emergency Management Administration as the base flood for floodplain

management purposes (Figure 4-6). The 0.2 percent annual chance (500-year) flood is utilized to indicate additional areas of flood risk in the community.

The floodplain of coastal tidal areas subject to significant wave attack is referred to as coastal high hazard zones where a 3-foot breaking wave is the criterion for identifying the limit of the zone.

The federal regulations include:

- Executive Order 11514 requiring public hearings so that the public can review plans to construct in wetlands;
- Executive Order 11988 requiring the consideration of practical alternatives while seeking to preserve the material and beneficial uses of floodplains (this order requires the evaluation of floodplain effects using the 100-year flood as the base flood prior to the application of federal grants);
- Executive Order 1190 requiring the avoidance of adverse impacts to wetlands whenever possible, the provision of measures to minimize harm to wetlands, the evaluation of flood hazards, the maintenance of natural systems, and early public review of any plans or proposals for new construction in wetlands, in accordance with Section 2(b) of Executive Order 11514; and
- Executive Order 11296 seeking to prevent the uneconomic use and development of floodplains and requiring evaluation of flood hazards and flood-proofing of proposed facilities.

The Rhode Island Wetland Act defines the term "Floodplain" as 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 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.

In addition to the federal regulations, the Rhode Island Inland Wetland Act requires a permit for activities that remove material from, deposit material in, construct, obstruct, alter or pollute an inland wetland. Wetland soil types include poorly drained soils, very poorly drained, allevial and floodplain.

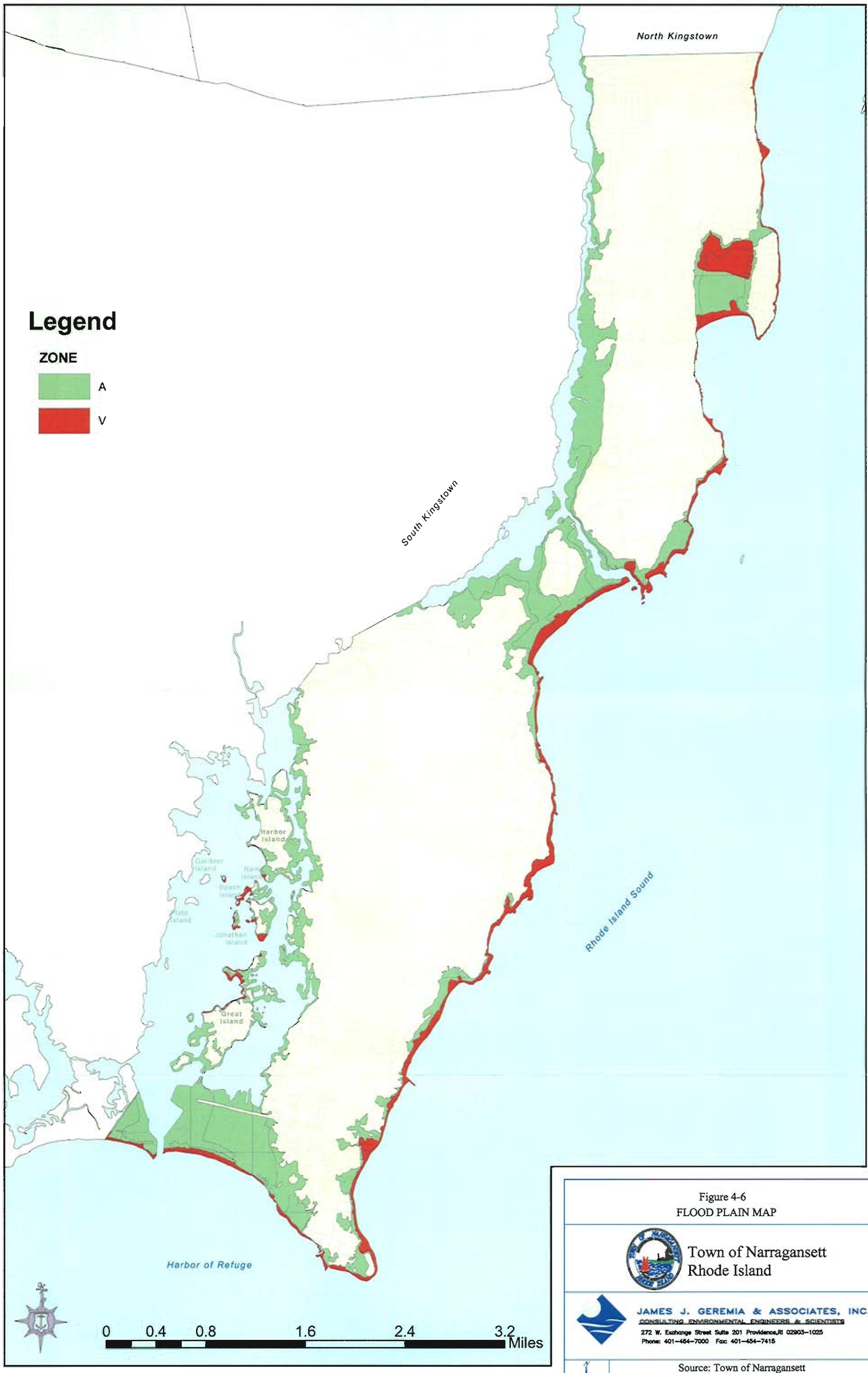

Figure 4-6
FLOOD PLAIN MAP

Town of Narragansett
Rhode Island

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Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

Certain criteria are used to evaluate the impact of the proposed project when applying for the permit. These criteria are: the value of the wetlands as a water supply, its recharge and discharge value, its importance in flood control, the productivity of the natural habitat, its recreational and open space value and the wetland size. The permit may be granted if the public benefit outweighs any possible degradation of the wetland and that all alternatives, both technical and locational, have been considered.

The State of Rhode Island Building Code Standards Committee has adopted "Rhode Island State Building Code Rules and Regulations for Construction in Flood Hazard Areas." The code requires a permit to construct in flood hazard areas. The following provisions are required: all new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure; all new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage; all new construction and substantial improvements shall be constructed by methods and practices that minimize flood damage; and al new and replacement water supply systems, sanitary sewerage systems, and on-site waste disposal systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters.

The Town of Narragansett has adopted the following National Flood Insurance Program Maps to assist in floodplain management:

Flood Insurance Rate Maps (FIRM) #445402-0001-0009

The flood insurance rate map is designed for flood insurance and floodplain management applications.

4.2 EXISTING SEWAGE COLLECTION SYSTEM

4.2.1 EXISTING ON-SITE DISPOSAL CONDITIONS

The majority of the 9,159 dwellings in Town (approximately two-thirds) are serviced by a municipal sewer system. The remaining residents are serviced by Individual Sewage Disposal Systems (ISDS). Because the Town is a coastal community, many of the unsewered area neighborhoods are located in environmentally-

sensitive areas abutting ponds and estuaries. Typically, these areas have poor or inappropriate soils for significant residential development. Over time, this development, along with the associated ISDS systems, detrimentally impacts these local estuaries.

To address this issue, Narragansett prepared an ISDS Wastewater Management Plan in 2003. This ISDS Plan provided a more detailed and comprehensive plan that accounts for soil conditions, proximity to estuaries, zoning, level of use and recently improved ISDS technology.

The Plan included the following elements:

- Develop a proposed ISDS maintenance ordinance
- Develop an understanding of environmentally sensitive areas
- Investigate new ISDS technologies
- Develop a public education program
- Develop a homeowner assistance program
- Develop zoning and planning board procedures

The Plan illustrated that there are relatively large and populated tracts of land which are on ISDS systems. This includes such areas as Great Island, Harbour Island and the southern portion of Bonnet Shores.

Another fundamental function of the ISDS report was to identify both the locations and concentrations of Individual Sewage Disposal Systems within Town. By determining the locations of active septic systems/cesspools within certain areas, we can draw conclusions as to which coastal areas may be potentially threatened. Figure 4-7 depicts the concentration of ISDS systems in each plat within the Town of Narragansett. A listing of each plat and the number of ISDS's within that plat is presented in Table 4-3.

LEGEND:

(#) NUMBER OF SEPTIC SYSTEMS

PROVIDED BY THE TOWN OF NARRAGANSETT
JULY 2005 DATA

Figure 4-7

ISDS SYSTEMS BY PLAT

Town of Narragansett
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Date: 2005

Scale: 1"= 3500'±

TABLE 4-3 ISDS LOCATIONS BY PLAT					
Plat	**Number**	**Plat**	**Number**	**Plat**	**Number**
N-B	78	A	39	T	40
N-C	0	B	1	V	48
N-D	10	B-2	7	R-4	1
N-A	9	O	9	Y-4	8
N-E	22	H	18	S	0
N-R	64	W	70	S-1	2
N-S	218	P	12	U	47
N-H	151	Q	4	K	1
N-G	4	E	7	R-1	67
N-I	28	F	23	R	0
N-Q	25	Y	61	L	1
N-J	51	Y-2	33	N	2
N-L	5	Z	5	M	94
N-N	9	G	36	J	28
N-O	5	Z-1	8	R-2	283
N-M	13	Y-1	309	R-3	89
N-K	0	Y-3	0	I-G	13
C	1	X	0	I-J	142
D	0	N-F	0	N-P	0
TOTAL			**2,201**		

Source: Town of Narragansett

A review of Figure 4-7 and the associated table clearly reveals that there are certain areas containing few ISDS systems. Indeed, many plats within the Town possess insignificant amounts of systems. There are, however, other areas which are heavily concentrated with systems. Table 4-4 lists the neighborhoods which are the most heavily populated with ISDS systems.

As can be seen from the table, these eleven areas represent 1,932 of the 2,201 ISDS in Town, or 88% of the total number of ISDS in the Town, a significant quantity. This is not totally unexpected, however, because the Town is partially sewered, hence, there are some neighborhoods with few or no septic systems.

There are generally considered to be two ways in which an ISDS system can fail. In the first circumstance, the leaching field does not operate, meaning that water cannot pass through the system. The system eventually surcharges, or backs up into the house. In the second instance, the system drains too freely, causing untreated sewage to percolate to the groundwater.

TABLE 4-4 NARRAGANSETT LOCATIONS CONTAINING HIGH NUMBER OF ISDS					
Location	**Plats**	**No. of ISDS**	**Location**	**Plats**	**No. of ISDS**
Bonnet Shores	N-H, N-R N-S	433	Point Judith	M	94
Great Island	R-2, R-3	372	Black Point	T, V	88
Harbour Island	Y-1	309	West Passage	N-B	78
Brigg's Farm*	Y-3	171	Sunset Blvd.	R-1	67
Jerusalem	I-J	142	Durkin Dr.	U	47
Wandsworth St.	W, Y	131			
TOTAL			**1,932**		

Source: Town of Narragansett

* *Sewer installed in 2005*

In each case of failure, there may be several factors which contribute to the system not operating properly. For example, soils that drain poorly cannot pass large volumes of water. Conversely, soils which drain excessively may result in poor wastewater treatment and short-circuit to the surface or groundwater table. Population density is another factor. Areas which have a high concentration of residences over a small land area may experience oversaturation of ISDS effluent in the soil, particularly in wetland or coastal areas. High groundwater will also restrict a soil's ability to disperse and treat wastewater.

The following describes the numerous factors which contribute to an ISDS failure.

4.2.2 SOIL CONDITIONS

One of the most important factors in evaluating the impacts of ISDS on water and groundwater quality is the condition and make-up of soil in specific areas. The ability of a soil to absorb, and therefore effectively treat ISDS effluent, is an imperative concern when dealing with the influence of ISDS leachate upon coastal rivers, estuaries and groundwater. Unfortunately, ISDS systems installed prior to 1995 do not entirely take this fact into consideration. In the past, domestic wastewater was originally discharged into cesspools, and later on, septic systems. Cesspools, however, are considered to be substandard according to current RIDEM regulations. In a typical failure, wastewaters are no longer absorbed below ground level, clogging occurs, and

wastewater pools on the ground surface. Organics and silt accumulated from years of flow clog soil pores, and the leaching field can no longer filter wastewater.

Conversely, soils which are well draining can cause wastewater to leach rapidly through the system, enter the groundwater table relatively untreated, and ultimately be transported directly to local waterways. ISDS's built in these areas often do not exhibit classical failure symptoms.

In either case, whether it be through surface water or via groundwater, soil conditions are a predominant consideration in untreated ISDS discharges and ISDS failures.

There are currently two commonly used soil condition classifications. For the purpose of this report, we will use the Soil Survey of Rhode Island, July 1981, United States Department of Agriculture Natural Resources Conservation Service. In this classification, soil types throughout the State are scientifically identified and characterized by specific geological groups. A graphical depiction of the Soil Survey drainage characteristics for the Town of Narragansett is presented in Figure 4-3 (Section 4.1.3).

A review of the Soil Map shows that the soils in these locations exemplify the types of soils usually present in ISDS failures. In some cases, the soils are classified as slow to very slow draining due to high groundwater or poor permeability. Such soils promote clogging of the soil pores and leaching field. According to Figure 4-3, Bonnet Shores, Black Point, Point Judith, Sunset Boulevard, Maplehurst Drive and Durkin Drive are described as having slow draining soils.

Both Great Island and Harbour Island are classified as having rapidly draining soils. Well draining soils result in rapid leaching of ISDS effluent and ultimately introduce relatively untreated wastewater into the soil and groundwater. Therefore, it can be concluded that Great Island and Harbour Island possess high concentrations of ISDS systems in isolated areas completely surrounded by Point Judith Pond, and are situated on rapidly draining soils.

4.2.3 SPECIAL AREA MANAGEMENT PLANS

The suitability of soil to treat ISDS effluent along with the concentration of domestic dwellings (housing density) and the age of existing ISDS have all been well established concerns in both the Narrow River and Salt Pond Area Special Area Management plans. These Plans were originally published by the Rhode Island Coastal Resource Management Council in 1986 and 1984 respectively, but have been revised with new environmental studies and reissued in April 1999.

Because these SAMPs utilize environmental data collected specifically with regards to the Narrow River and Point Judith Pond, they are the most comprehensive studies of water quality within these two waterbodies.

Concerning the Narrow River, CRMC states the detrimental impact of ISDS very clearly and succinctly.

"1. The Narrow River has a serious and persistent bacterial contamination problem. This has resulted from a relatively simple and predictable interaction between the natural features of the watershed and past and present land uses. There are still many areas of high and medium density residential communities (0.25 to 1 acre) which abut the Narrow River. These residential communities dispose of their waste by utilizing individual sewage disposal systems (ISDS). Not only are ISDS not recommended for such high densities, but neglect, high water tables, and old age have led to numerous failures resulting in soils clogged with organic matter. When this happens, the untreated sewage waste is unable to filter or percolate through the soils and pools near the surface. During rain events, pooling on the surface facilitates rapid transport downslope to the river. Once in the river, the waste accumulates due to poor flushing and eventually exceeds acceptable levels, thus degrading water quality and creating a potential health hazard.

Although sewers have replaced many ISDS, vigilance with regard to proper ISDS installation and maintenance needs to be continued. Alternative technologies need to be required in areas abutting the Narrow River and wastewater management districts need to be established by the towns.

2. While fecal coliform bacteria are an immediate and well known problem, the same circumstances and conditions that promote bacterial degradation of the estuary also apply to excess nutrient inputs to the Narrow River. Water quality problems associated with nutrients, particularly nitrogen, are further exacerbated by groundwater flows recharged to the river, which move the nitrogen from residential septic systems directly into the estuary. Nutrient impacts have been noted as early as 1972 and, in consideration of the potential for future development, even when factoring in the extension of sewer services, nitrogen loading to the estuary can increase significantly. As the ecosystem is poorly flushed and therefore prone to long retention time for anthropogenic inputs, the control of nitrogen should be a priority management issue.

3. A decline in water quality invokes serious questions as to the perceived present and future use of estuary by surrounding communities. Development is continuing in close proximity to the river as ever-increasing

numbers of homeowners desire the Narrow River's premier attractions - aesthetic quality and recreational uses. Concurrent with development is the potential for more pollutants to reach undesirable levels. The unique combination of natural features, which give the Narrow River its high aesthetic quality and unique resource value, imposes significant constraints on the continued uses of the watershed."

To its credit, the Town of Narragansett has addressed these concerns by aggressively pursuing the construction of public sewers in the North End area in the 1990's. While this should lessen ISDS wastewater's impact in the watershed, CRMC's SAMP states that sewer construction will not completely eliminate this problem:

"1. Public sewer lines are a key factor in determining the destiny of future development. The installation of sewer lines encourages building and bypasses natural constraints that would otherwise inhibit development (River Landscapes 1976, Olsen and Lee 1984). However, where ISDS appear to be failing at a high rate, or where development will take place regardless of site constraints, the installation of sewer lines may be beneficial to the sanitary conditions of the neighborhood and to the water quality of nearby receiving waters. In the Town of Narragansett, many areas have been sewered over the last ten years, with additional lines planned. The Middlebridge Road area in South Kingstown is also sewered. North Kingstown is the only town not presently utilizing public sewer lines within the watershed. ASA et al. (1995) suggest that even were sewering to occur throughout the entirety of the developable watershed, a 17% increase in nitrogen entering the river would occur due to increased use of fertilizers on new residential lawns. Sewering therefore is not the complete answer to pollution control and cannot supersede competent planned growth management."

The Salt Pond Area SAMP, which includes Point Judith Pond, yields the same conclusions:

"1. Failing and sub-standard individual sewage disposal systems (ISDS) and resultant contaminated runoff are the principal sources of bacterial contamination to the salt ponds. Sources of fecal coliform contamination to groundwater and surface waters include discharges or improperly treated sewage to storm sewers, fecal material from pets and livestock carried by stormwater runoff, and leaking sewers.

2. Most of the existing residential and commercial development in the watersheds of Point Judith, Potter, Trustom, Cards, Green Hill, Ninigret, Quonochontaug and Winnapaug Ponds are unsewered and therefore rely upon ISDS for the disposal of sewage. Municipal sewers extend to only a small portion of Winnapaug Pond, part of the eastern shore of Point Judith Pond in Narragansett (but not to Great Island or Harbor Island) and much of the town of Wakefield along the Saugatucket River that flows into the northern end of Point Judith Pond.

3. Many of the ISDS in the Salt Pond Region were installed prior to the adoption of state construction standards promulgated in 1969. Other systems pre-date the implementation of more rigorous standards of the early 1980s. Before the adoption of state regulations and standards, commercial and domestic wastewater was discharged through a variety of methods ranging from improvised systems to dry wells and cesspools.

These older systems are frequently sited on undersized lots without adequately sized leach fields, are in direct contact with the groundwater table, or are used at levels which exceed the original design capacity. As a result, these systems do not adequately treat sewage nor meet current state standards. In some of these cases, new innovative and alternative technologies may be necessary for the adequate treatment of wastewater.

4. Many of the houses around the salt ponds which were originally constructed as summer cottages have since been converted to year-round residences, yet the ISDS have not been replaced to meet existing building codes. Of those residences used seasonally, many have ISDS which are overloaded and must be frequently pumped out due to continuous and heavy use during the summer months."

To address this problem, both the Narrow River and Salt Pond Special Area Management Plans establish CRMC's Land Use Classifications for Watershed Protection. Section 920.1 of each SAMP includes these regulations. The ramifications of these classifications and regulations are extensive. The land use classifications are depicted in Figure 4-8.

The Coastal Resources Management Council prohibits the installation of municipal or private sewers in lands designated as Critical Concern and Self-sustaining (identified in Figure 4-8 as yellow and green respectively), as identified in Section 920.1 of the CRMC Narrow River (North End) and Salt Pond Region Special Area Management Plans (South End) unless all of the following conditions are met:

(i) the property meets the RIDEM regulatory siting requirements for the installation of a conventional ISDS,

(ii) the proposal is agreeable to both the Town and the CRMC,

(iii) a deed restriction is attached to the property ensuring no further subdivision, and

(iv) the properties to be sewered are within 500 feet of an existing sewer line or are within a subdivision which abuts the sewer easement.

Any municipal or private sewer line extension within CRMC designated Critical Concern or Self-sustaining lands must meet the four above conditions and obtain approval from the CRMC. Moreover, the construction of new or extension of existing sewer lines and facilities anywhere within the Narrow River SAMP boundary requires the review and approval of the CRMC in accordance with Section 325 of the RI Coastal Resources Management Plan.

The Salt Pond Region Special Area Management Plan (Salt Pond SAMP) identifies areas in Narragansett, specifically along Point Judith Pond, which have been developed beyond the carrying capacity of the soil (these areas have been highlighted in red on Figure 4-8). The SAMP identifies Great Island, Harbour Island, Jerusalem, Wandsworth Street, Sunset Boulevard and Durkin Drive as areas which are currently developed beyond the soil's carrying capacity (identified in red). The Plan defines these areas as being developed at one residential unit per ⅛ to ½ acre, and states that:

"Such intense development is the major source of contamination to groundwater and the salt ponds. High nutrient loadings and contaminated runoff waters are resulting in a high incidence of polluted wells and increasing evidence of eutrophic conditions and bacterial contamination in adjoining salt water ponds. Most of the individual sewage disposal systems in these areas predate state enforced siting and design standards and are approaching their expected life span."

Similarly, the Narrow River Special Area Management Plan (Narrow River SAMP) identifies areas in the Town's North End - generally west of Boston Neck Road - as also being developed beyond the soil's carrying capacity. In these areas, CRMC has recommended the sewers be extended to avoid further contamination to the groundwater and the Salt Pond or Narrow River areas.

Jerusalem has been classified by CRMC as being developed beyond the soil's carrying capacity. It is a small land area with a dense housing concentration located on Point Judith Pond. Its residents are serviced by ISDS and there are 142 such systems. The area may be characterized as having high groundwater and/or poor or excessively drained soils. In addition, the State Coastal Resources Management Council has classified this area Developed Barrier Beach. As a result of this classification, CRMC policy prohibits the construction or expansion of any utilities to include water, gas or sewer lines (see Coastal Resources Management Program, Section 210.2).

4.2.4 MAJOR SERVICE AREAS AND INTERCEPTORS

The Facilities Planning Study Area encompasses the Town of Narragansett. The Town's sewer collection system is comprised of the North End Sewer System and the South End Sewer System. Windemere Road is the line of demarcation for the North and South Sewer Systems. The wastewater flows emanating from the North End Sewer System are treated by the South Kingstown Regional Wastewater Treatment Facility. The South End Sewer System wastewater flows are treated by the Scarborough Wastewater Treatment Facility.

LEGEND:

- AREAS OF CRITICAL CONCERRN
- DEVELOPED BEYOND CARRYING CAPACITY
- SELF SUSTAINING LANDS

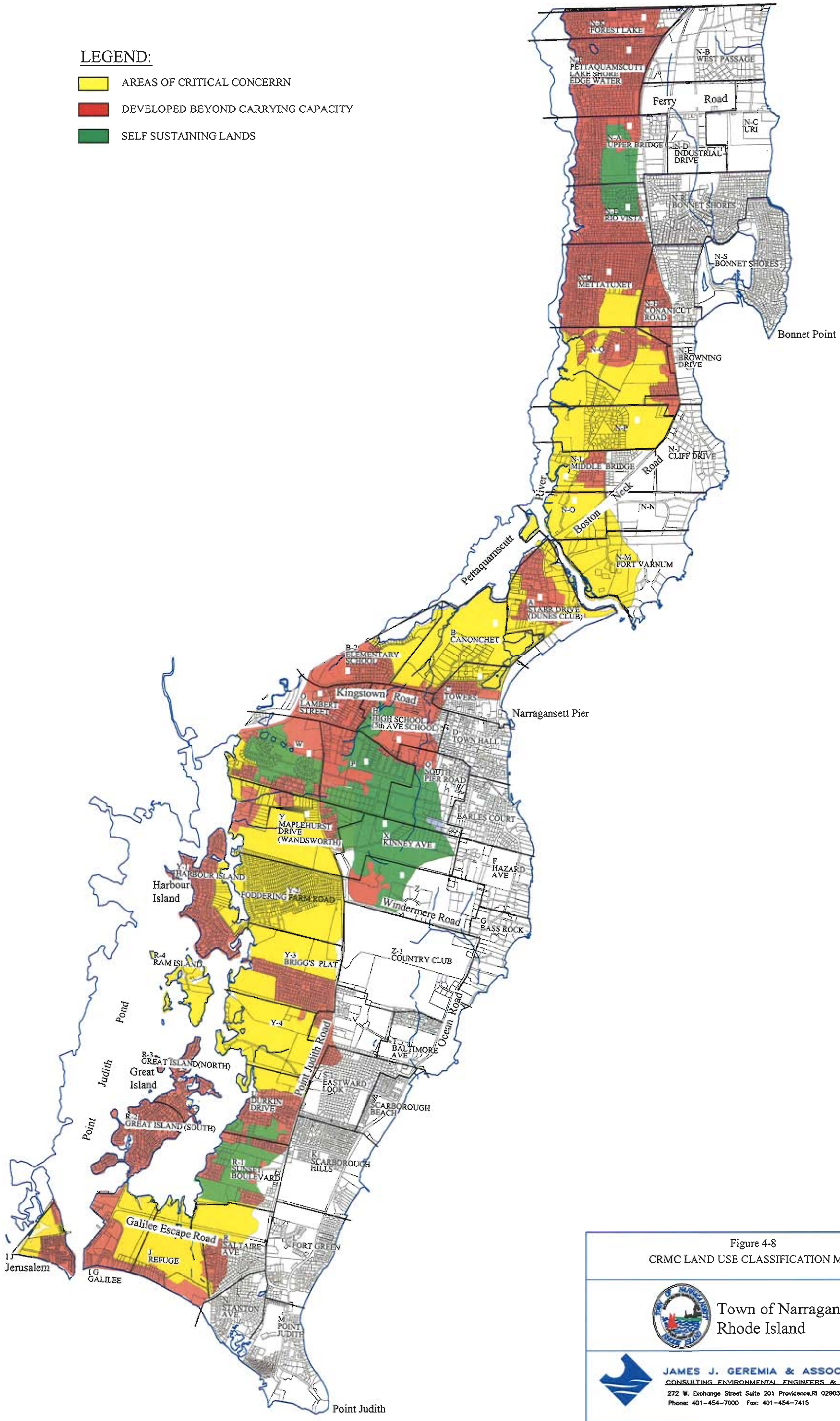

Figure 4-8
CRMC LAND USE CLASSIFICATION MAP

Town of Narragansett
Rhode Island

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Source: CRMC Narrow River and Salt Pond S.A.M.P.

Date: 2007

Scale: 1"= 3500'±

Figure 4-9 shows the existing sewered areas. The North End Sewer System consists of 60 miles of lateral and intercepting sewers. The South End Sewer System consists of 32 miles of lateral and intercepting sewers. For the purpose of this report, an interceptor was defined as the main sewer within the service area which collects sewage from branch sewers and transports it to a treatment facility or to another interceptor.

NORTH END SEWER COLLECTION SYSTEM

Bonnet Shores Interceptor

The Bonnet Shores Interceptor begins in the vicinity of the Narragansett Bay Campus of the University of Rhode Island and terminates on Ottowa Trail. It serves an area of approximately 250 acres including the Narragansett Bay Campus. The service area is comprised of the Industrial Park, Bonnet Shores, Narragansett Bay Campus and a residential area in the vicinity of Muratore and Clara Lane. The Bonnet Shores Interceptor is approximately 4,800 feet long and consists of 2,800 feet of 12-inch diameter asbestos cement pipe and 2,000 feet of 18-inch diameter asbestos cement pipe installed in 1979. The interceptor commences at the Narragansett Bay Campus and follows a cross-country route in a southerly direction onto Webster Avenue. From this point, the interceptor continues along Webster Avenue to Lake Road and then onto Lake Road in a westerly direction to Bonnet Point Road. On Bonnet Point Road, the sewer continues for a short distance to its point of termination at the Bonnet Shores Pump Station located at the intersection of Allagash Trail and Bonnet Point Road.

A review of the Town of Narragansett zoning map illustrates that the area is composed of residential and industrial properties and public land. The South Ferry Road Industrial Park and the University of Rhode Island Narragansett Bay Campus are located in the Bonnet Shores Interceptor service area.

North Interceptor

The North Interceptor serves an area of approximately 470 acres and is located in the west section of Town. The interceptor is approximately 14,200 feet long. The North Interceptor consists of 1,800 feet of 15-inch diameter asbestos cement pipe, 3,800 feet of 24-inch diameter asbestos cement pipe and 8,600 feet of 30-inch

LEGEND:

SEWERED AREAS

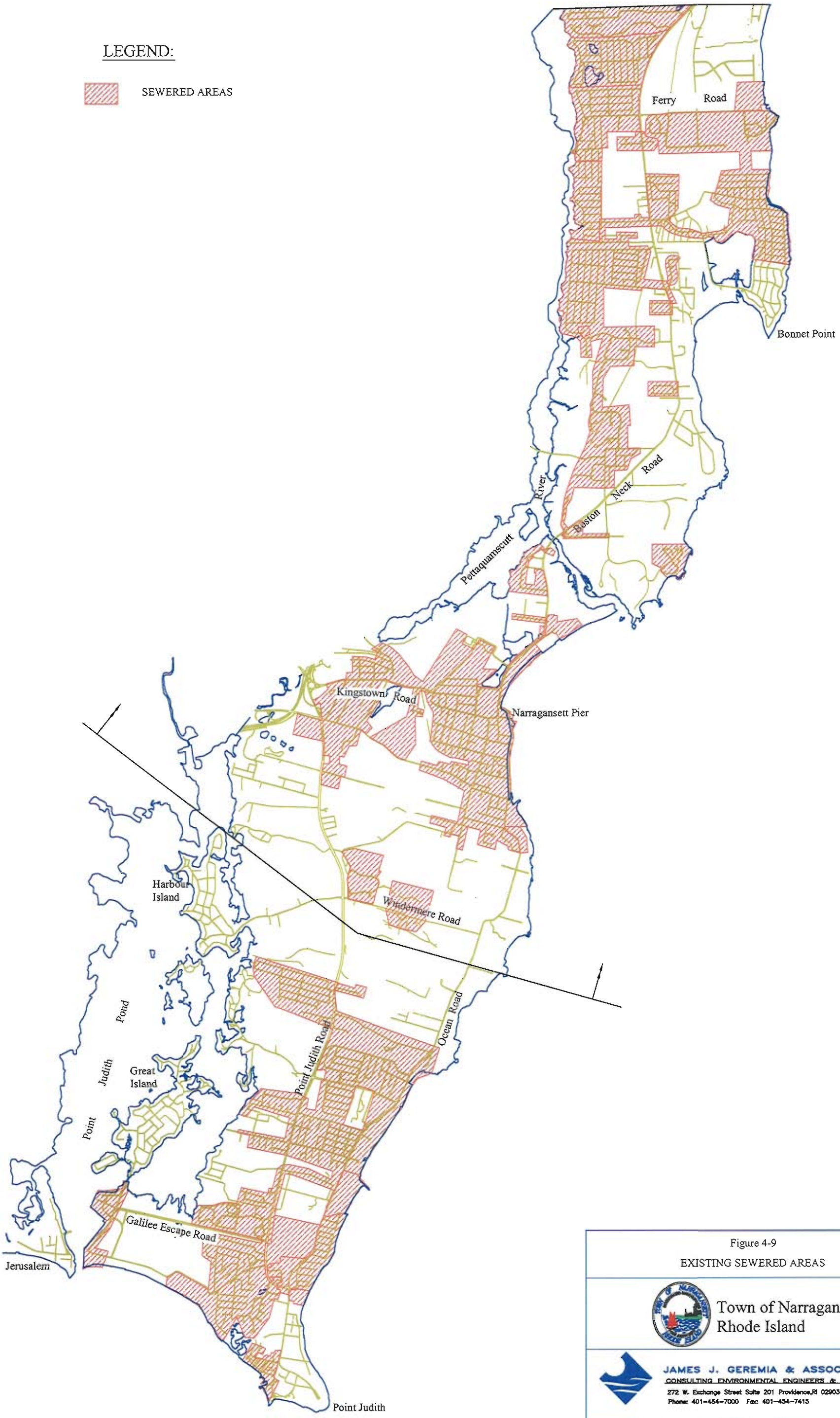

Figure 4-9

EXISTING SEWERED AREAS

Town of Narragansett
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diameter reinforced concrete pipe. The interceptor starts at the intersection of Boston Neck Road and Wampum Road and proceeds in a westerly direction along Wampum Road to Saybrook Avenue. On Saybrook Avenue, the sewer proceeds in a southerly direction to Conanicus Road onto a right-of-way, and then to Old Pine Road and Tupelo Road. On Tupelo Road, the interceptor proceeds in a southerly direction to a right-of-way and then to West Bay Drive, at which point the sewer proceeds in a westerly direction onto Denison Drive.

At the end of Denison Drive, the interceptor enters a right-of-way along the wetlands edge of the Pettaquamscutt River. The sewer follows the wetland's edge in a southerly direction to its point of termination at the Sprague Pump Station. The upstream contributor to the North Interceptor is the Bonnet Shores Pump Station, and the incremental contributor is the Mettatuxet Pump Station and 140 acres of residential zoned land. The land use in the sewered portions of the service area is residential, commercial and industrial.

SOUTH END SEWER COLLECTION SYSTEM

Point Judith Road Interceptor

The Point Judith Road Interceptor begins at the southeast section of the Town and terminates at the entrance manhole to the Scarborough Wastewater Treatment Facility. It serves an area of approximately 190 acres. The Interceptor is approximately 6,000 feet long and consists of 14-inch diameter pipe that was sliplined in the late 1990's. The Point Judith Interceptor begins on Galilee Escape Road and the sewer line proceeds northerly for 2,700 feet, at which point the interceptor enters a right-of-way through the U.S. Military Reservation in an easterly direction to Ocean Road. It then proceeds north along Ocean Road to the sanitary manhole located at the entrance to the Scarborough Wastewater Treatment Facility. The main contributors to the interceptor are the Galilee and Stanton Avenue Pump Stations. The interceptor was constructed in the early 1970's and is composed of asbestos cement. In the mid-1990's, the interceptor was lined with "Institu Form".

Point Judith Interceptor

The Point Judith Interceptor serves the Briggs Farm and incremental flows along Clarke Road and Ocean Road. In the future, the service area will include Alexander Drive, Ocean View Plat and Harbour Island. The

interceptor was installed in 2004 and is approximately 6,900 feet long consisting of 3,300 feet of 12-inch polyvinyl chloride pipe and 3,600 feet of 10-inch polyvinyl chloride pipe. The interceptor commences on Point Judith Road at Palm Beach Road and traverses southerly to Clarke Road. On Clarke Road, the interceptor proceeds to Ocean Road. The Point Judith Interceptor follows Ocean Road southerly to its point of termination at the Burnside Avenue Pump Station.

NORTH END SEWER SYSTEM PUMP STATIONS

The North End Sewer System consists of thirteen (13) sewage pump stations serving residential, industrial, commercial, institutional and public establishments. There are eight (8) above-ground lift stations and five (5) below-ground lift stations.

Industrial Park Pump Station

The Industrial Park Pump Station is located in the northern part of the Town in the vicinity of the intersection of Old Boston Neck Road and Industrial Drive. The service area which contributes to the station consists of approximately 80 acres. The flows contributing to the pump station are industrial because the land use is 100% industrial. The pump station is a below-ground lift station. The force main is a 6-inch cast iron pipe traversing along Industrial Drive in an easterly direction, then proceeding cross-country for approximately 200 feet to its point of termination at the existing sanitary manhole.

The pump chamber has two (2) vertical sewage pumps, sump pump, dehumidifier, air bubbler control system, pump running meters, heating and ventilation. The separate wetwell is ventilated. The alarm system consists of a local annunciator and an additional annunciator at the police station which receives a common alarm that is transmitted through the telephone system. The plant is in the process of replacing telephone lines with a radio system for alarms and data acquisition. The alarm signal is activated for high water in wetwell, loss of air, and high water in the pump chamber. In the situation of long term power outages, a septage hauler is contracted to transfer the sewage into the downstream collection system.

Winterberry Road Pump Station

The Winterberry Road Pump Station is located in the northwest of the North Sewer District at the intersection of Winterberry Road and Woodsia Road. The pump station serves the Forest Lake Area and part of the Pettaquamscutt Area of Town. The Winterberry Road Pump Station is a below-ground lift station consisting of a separate pump chamber and wetwell. The pump station was constructed in the 1990's. the 6-inch force main from the pump station traverses along Winterberry Road in an easterly direction to its point of termination at a gravity sewer manhole located at the intersection of Winterberry Road and Pepperbush Trail.

In the pump chamber there are two Gorman Rupp sewage pumps, sump pump, emergency generator, flow meter, heating and ventilation equipment, pump controls and a telemetry system. The wetwell has two compartments, air bubbler system that monitors the level and controls the on and off of the sewage pumps, channel grinder unit and a ventilation system. This station is equipped with a generator to maintain full operation with the loss of power.

Baneberry Trail Pump Station

The Baneberry Trail Pump Station is located at the intersection of Woodsia Road and Baneberry Trail in the northeast section of Town. The pump station is a submersible pump station consisting of two grinder sewage pumps. The pump station was installed in the 1990's and serves Baneberry Trail and parts of Woodsia Road and Columbia Road. The 2-inch force main traverses through a right-of-way in a southerly direction to a gravity sewer manhole located at the intersection of Edgewater Road and Lakeside Drive.

The pump station is enclosed is a wooden framed building. The pumping station is equipped with a generator receptacle so that during a power outage a portable generator can be used to power the pump station.

Wilson Drive Pump Station

The Wilson Drive Pump Station is located in the northwest section of Town at the intersection of Wilson Drive and Pettaquamscutt Avenue. The pump station was constructed in the 1990's and is a below-ground lift

station. The 10-inch force main traverses along Pettaquamscutt Avenue in an easterly direction to a right-of-way. In the right-of-way, the force main traverses southerly to Ninigret Road and Saybrook Avenue. On Saybrook Avenue, the force main traverses in a southerly direction to its point of termination at a sewer gravity manhole (North Interceptor) located at the intersection of Saybrook Avenue and Wampum Road. The Wilson Drive Pump Station serves the following areas of the Town: Forest Lake, Pettaquamscutt, Lake Shore, Edge Water, Upper Bridge and Rio Vista.

In the pump chamber there are two Cornell sewage pumps and the remaining equipment is the same as the Winterberry Pump Station. The wetwell also has the same equipment as the Winterberry Pump Station.

Circuit Drive Pump Station

The Circuit Drive Pump Station is located on Circuit Drive approximately 500 feet west of Wampum Drive in the northwest section of Town. The pump station serves Circuit Drive, Iroquois Road, Mountview Road, Nepaug Road, Sachem Road, and Montauk Road west of Saybrook Avenue. The Circuit Drive Pump Station is the submersible type and is identical to the Baneberry Trail Pump Station. The 3-inch force main traverses along Circuit Drive in an easterly direction and connects to the North Interceptor at the intersection of Circuit Drive and Saybrook Avenue. With the loss of power, the station is equipped with a 3-inch by-pass connection to allow a portable pump to be used to maintain a continuous wastewater flow.

Wolfe Road Pump Station

The Wolfe Road Pump Station serves a residential area consisting of 85 acres within Bonnet Shores. The pump station is located on Wolfe Road north of Canopus Avenue. The Wolfe Road Pump Station is a below-grade lift station constructed in the early 1980's. The 6-inch force main from the station traverses cross-country in an easterly direction to Lake Road where it terminates at the existing sanitary manhole.

The pump station consists of a pump chamber and wetwell. In the pump chamber there are two vertical sewage pumps, sump pump, pump running maters, heating and ventilation and an air bubbler control system. The wetwell is ventilated. The station is equipped with an alarm system which is activated for high or low water level in wetwell, low air, power failure and pump chamber flooding. A common alarm is transmitted through

a radio system to the annunciator located at the police station. A portable emergency generator may be installed during a power failure, as a manual transfer switch is presently installed. A gravity sewer manhole which is part of the Bonnet Shores Sewage Collection System is located approximately 500 feet from the wetwell, facilitating the use of a portable pump to bypass the pump station during power failures. With the loss of power, the station is equipped with a quick connection that will allow a portable pump to be used to maintain a continuous wastewater flow.

Bonnet Shores Pump Station

The Bonnet Shores Pump Station is an above-ground lift station receiving sewage flows from a service area of approximately 250 acres, located in the vicinity of the intersection of Bonnet Point Road and Allagash Trail. The service area consists of the tributary areas to the Industrial Park and Wolfe Road Pump Stations, as well as the University of Rhode Island Narragansett Bay Campus and 85 acres of residential area incremental to the pump station. The 12-inch force main from the pump station traverses along Lake Road to an existing sanitary manhole located at the intersection of Wampum Road, Boston Neck Road and Bonnet Shores Road. This sanitary manhole is the beginning of the North Interceptor.

The Bonnet Shores Pump Station consists of a wetwell and drywell. Located in the drywell is the emergency generator, hoisting equipment, two centrifugal non-clogging vertical close coupled mounted sewage pumps with running meters, flow measuring system (consisting of a venturi tube, flow transmitter and the receiver with a totalizer), hydraulic comminutor, alarm annunciator panel, backflow preventer for a potable water supply, heating and ventilating. At the time of our review, the flow metering system did not work and had not operated for several years. The wetwell consists of an air bubbler system for the control of the sewage pumps as well as for the high level and low level alarms, bar rack as a standby for the comminutor and mercury float switches as standby to the bubbler system.

Mettatuxet Pump Station

The Mettatuxet Pump Station is located on South River Drive. The pump station is an above-ground lift station serving the Mettatuxet section of Town. The general character of the service area is residential consisting of

approximately 80 acres of land zoned R-10. The 8-inch force main traverses along Wood Bridge Road for approximately 1,000 feet and commences at the existing sanitary manhole at the intersection of Tupelo Trail and Wood Bridge Road (which is part of the North Interceptor).

The Mettatuxet Pump Station consists of wetwell and drywell chambers. In the drywell chamber, two centrifugal vertical sewage pumps are located along with heating and ventilation, control panels, dehumidifier and a sump pump. In the wetwell, the Town has recently installed a comminutor located at the influent pipe to shred debris to prevent damage to the downstream system. The air bubbler system measures the liquid level in the wetwell on a continuous basis. Specific liquid levels in the wetwell turn the sewage pumps on and off, as well as activate the alarms for the low water levels in the wetwell. Emergency power is provided by an exterior emergency generator. The alarm system consists of a local annunciator panel at the pump station and an additional annunciator is located at the police station which activates a common alarm. The local annunciator consists of the following alarms: low air in the bubbler system, pump failure, generator failure, high wetwell level, low wetwell level, high water in drywell, low fuel and low battery. This station does not have a flow meter. Therefore, the pump running meters are utilized by the Town to determine the sewage flows.

Sprague Pump Station

The Sprague Pump Station is an above-ground lift station located in the vicinity of the intersection of Boston Neck Road and Old Boston Neck Road. The pump station serves the areas contributed by the Bonnet Shores and Mettatuxet Pump Stations and incremental sewage flows between Mettatuxet and the Sprague Pump Station. This service area encompasses approximately 70 percent (70%) of the North Sewer District. The upstream contributary area consists of 250 acres of residential property contributed by Wolfe Road and Bonnet Shores Pump Stations, and 80 acres of industrial property contributed by the Industrial Park Pump Station. The incremental service area consists of 140 acres of residential zoned land. The total service area consists of 470 acres.

The North Interceptor is the main truck line contributor. The pump station was put into service in the early 1980's. The force main from the Sprague Pump Station is located along Boston Neck Road and terminates approximately 400 feet east of Ouida Street Pump Station.

The Sprague Pump Station consists of a wetwell and drywell. In the drywell, the emergency generator is located along with the three centrifugal vertical sewage pumps, magnetic flow meter, flow recorder and totalizer, sump pump, heating and ventilation equipment, monorail, potable water, two in-line grinders, circular spiral staircase and EG control panel. The EG control panel consists of an electrogage and logic control panel. The electrogage monitors the liquid level in the wetwell on a continuous basis, which in turn controls the on and off of the sewage pumps. The changing liquid level in the wetwell varies bubbler pressure which in turn causes the mercury column to rise and fill in direct proportion to the liquid level. The logic control panel is equipped with selector switches, pump run lights, level alarm light and running meters. In the wetwell is located the comminutor and back rack which serve to reduce the size of solids entering the sewage pumps.

The alarm system consists of a local annunciator and an additional annunciator at the police station which receives a common alarm via radio. An alarm is activated in any one of the following cases: loss of control air, low wetwell level, high wetwell level, drywell flood, comminutor failure, generator failure, low battery voltage and no fuel.

The flow meter at this station does not function.

Lakewood Drive Pump Station

The Lakewood Drive Pump Station is located in the southwest section of the North Sewer District. The pump station serves the Glen Oaks Condominiums, a fishing industry on Walt's Way, 20 acres of industrial land and 10 acres of residentially zoned land. The Lakewood Drive Pump Station is a below-ground lift station constructed in the early 1970's. The force main from the pump station connects to the gravity sewer located on Inez Street.

In the dry chamber there are two centrifugal sewage pumps, sump pump, heating and ventilation equipment, pump controls with pump running meters and the alarm annunciator panel. An alarm is activated for high water level in the wetwell and high water level in the dry chamber. At the police station, an annunciator panel is located which receives a common alarm. The wetwell has an air bubbler system which monitors the level and controls the on and off of the sewage pumps. During a power failure, a portable pump is used to bypass the

sewage flow, discharging the flow to a gravity sewer manhole which is part of the Lakewood Sewage Collection System.

Mumford Road Pump Station

The Mumford Road Pump Station is located adjacent to the dugouts located in Sprague Field. The pump station was constructed in 1995 and consists of a separate pump chamber and divided wetwell. The pump station serves the Lakewood Drive Pump Station service area, 90 acres of residential development and the Narragansett High School complex. The 8-inch force main traverses a cross-country route in an easterly direction to Kingstown Road. In the close proximity of the intersection of Prospect Avenue and Kingstown Road, the force main ties into the gravity system.

The pump chamber consists of two suction lift sewage pumps, emergency generator, flow meter, telemetry system and heating and ventilation. The wetwell is below grade and has two compartments. The wetwell has a ventilation system, sluice gate and an aluminum grating walkway.

Congdon Street Pump Station

The Congdon Street Pump Station is a below-ground lift station receiving sewage flows from a service area of approximately 55 acres. The pump station is located at the intersection of Congdon Street and Ocean Road. The general character of the service area is residential with some waterfront businesses. The 4-inch force main connects to a sanitary manhole located on Rodman Street.

The Congdon Street Pump Station consists of the same equipment as all the other below-grade lift stations throughout the Town of Narragansett. During power failures, a portable generator is utilized, as the station is equipped with a manual transfer switch. The portable generator has the capacity to run one pump.

Ouida Street Pump Station

The Ouida Street Pump Station is located in the vicinity of Beach Pond. The station was constructed in the early 1980's. The Ouida Street Pump Station is the main pump station for the North Sewer District. This pump station conveys all of the wastewater flows generated by the North End Sewer System via a 16-inch force main to the South Kingstown Regional Wastewater Treatment Facility. The Ouida Street Pump Station consists of three areas: pump chamber, generator chamber and wetwelll chamber.

The pump chamber consists of two variable speed sewage pumps, one constant speed sewage pump, venturi flow meter, flow recorder and totalizer, sump pump, heating and ventilation, sink and sanitary facilities. The pumps are located in the lower level with extended shafts to the upper level motors.

The generator chamber houses the emergency generator. The emergency power supply automatically delivers the required electricity to keep the pump station operational in the event of a power failure.

The wetwell consists of a channel grinder, bar rack, and the chemical addition of bioxide for odor control. The station also has a chlorine-based scrubber for odor control. The wetwell is divided into two chambers: influent chamber and pump chamber. The influent chamber is utilized for grit settling. The influent then overflow into the pump chamber where the suction piping of the sewage pumps is located. An air bubbler system measures the liquid level in the pump chamber. The pressure in the bubbler tubes varies directly with the chamber. The pressure in the bubbler tubes varies directly with the depth that the bubbler tube is submerged. Pressure switches in the control panel are set to turn the sewage pumps on and off at bubbler tube pressures that correspond to specific liquid levels in the wetwell. The pump station is equipped with a flow matcher system which corresponds to the incoming flow, that is, the speed of the pump(s) is increased or decreased based upon the flow.

The alarm system consists of a local annunciator and an additional annunciator is located at the police station. A common alarm signal is transmitted from the local annunciator to the police station annunciator through a radio system. The alarm signal is activated for high water level in the wetwell and high water level in the dry pump chamber. The local annunciator has the following alarm signals which may be activated if they were connected to the transmission alarm system: power failure, low pressure bubbler system, air blower high discharge temperature, comminutor, pump failure, generator failure and vandal alarm.

SOUTH END SEWER SYSTEM PUMP STATIONS

The South End Sewer System consists of five (5) sewage pump stations. The pump stations serve an area consisting of approximately 290 acres of residential zoned property, waterfront business establishment, fisherman's cooperative and beaches.

Stanton Avenue Pump Station

The Stanton Avenue Pump Station is a below-ground lift station constructed in the early 1970's and receives sewage flows from a service area of about 150 acres known as Village at Point Judith. The pump station is located in the northern part of the Village at the terminus of Stanton Avenue. The general character of the service area is residential, consisting of land zoned R-10 (10,000 square foot lots). The 8-inch force main exits the pump station onto Stanton Avenue and then traverses along Elm Avenue onto Chestnut Avenue for approximately 1,300 feet, to the intersection of Cove Wood Avenue. There, the force main traverses along Cove Wood Avenue in an easterly direction onto Point Judith Road, to the intersection of Galilee Escape Road, terminating at the existing sanitary manhole.

The Stanton Avenue Pump Station consists of a pump chamber, wetwell and control building. In the pump chamber there are two belt driven sewage pumps, sump pump, heating and intermittent ventilation. The wetwell is intermittently ventilated. The air bubbler system continuously monitors the liquid level in the wetwell in order to turn the sewage pumps on and off and to activate the high and low water level in the wetwell. The control building was installed in1998 adjacent to the pump station. The control building consists of a pump control panel, heating and ventilation, and a telemetry system. The quantity of sewage pumped is based on the pump running meters. If a power outage occurs, the station is equipped with the ability to utilize a portable pump to maintain flow through the station.

Galilee Pump Station

The Galilee Pump Station is located in the vicinity of the intersection of Great Island Road and Galilee Escape Road. The pump station serves businesses along the waterfront on Great Island Road from Sand Hill Cove Wood Road, to approximately 600 feet north of Galilee Escape Road. These businesses consist of restaurants,

a hotel and a number of fish/seafood processing operations. Improvements to the pump station were made during 1991, at which point the station underwent a complete rehabilitation. The effluent line from the pump station is composed of an 8-inch and 6-inch force main. The force mains traverse along Galilee Escape Road to Point Judith Road, at which point they terminate into an existing sanitary manhole.

The pump station consists of two (2) 75 HP sewage pumps, flow meter, flow recorder and totalizer, sump pumps, dehumidifer, heating and ventilation, and EG controls. The station has an emergency power supply consisting of a diesel driven generator. The generator is automatically activated by failure of any phase of the power supply. The EG controls are composed of an electrogage and a logic control system. The liquid level in the wetwell is continuously monitored by the electrogage liquid level indicator/controller. As the liquid level in the wetwell changes, the bubbler pressure varies, which in turn causes the mercury column to rise and fall in direct proportion to that liquid level. When the mercury makes or breaks a series of electrical contacts in the indicating column, the pumps are turned on and off. The logic control system is equipped with selector switches, pump run lights, elapsed time meters and status indicators for alarm conditions. A common alarm is transmitted through the radio system to the annunciator located at the police station. The wetwell is ventilated and is equipped with a bar rack and a standby float system to be used in the vent that the primary system fails. The original design of this station included connecting the 283 residential homes located on Great Island. Because of this, the pumps were oversized and equipped with VFD controls. Due to the reduced flows the station deals with and the wetwell volume, the pumps operate at a constant speed. The floats in the wetwell operate the pumps' on and off cycle. Consideration should be given to replacing the 75 HP pumps with smaller ones to handle the present flow and the existing controls.

Burnside Avenue Pump Station

The Burnside Avenue Pump Station is located at the intersection of Ocean Road and Burnside Avenue in the Scarborough Hills section of Narragansett. The pump station is an above-ground lift station with a separate wetwell and pump chamber. The service area is approximately 170 acres, consisting of 137 acres of residential, 13 acres of waterfront businesses and 20 acres of public use land (Scarborough Beach). During 1989, the Burnside Avenue Pump Station was rehabilitated. The 8-inch force main from the station traverses along Ocean Road in a southerly direction onto Angell Road and terminates at the existing sanitary manhole located at the intersection of Longview Drive and Angell Road.

The pump chamber consists of two variable speed sewage pumps, sump pump, dehumidifier, heating and ventilation, flow meter, flow recorder and totalizer, and EG controls. The wetwell is a separate chamber which is ventilated and a comminutor. An emergency generator is utilized during power failure. The local annunciator provides an alarm signal for high and low water level in wetwell, low air pressure, power failure and high water in pump chamber. A common alarm signal is transmitted through the radio system to the annunciator panel located at the police station.

Point Judith Pump Station

The Point Judith Pump Station is located at the intersection of Point Judith Road and Old Ocean Road and was installed in 1998. The pump station is an above-ground lift station with a separate wetwell and pump chamber. The service area consists of residential dwellings and five restaurants. The 8-inch force main for the station traverses along Ocean Road in a northerly direction terminating at the existing sanitary manhole located approximately 600 feet south of the Scarborough Wastewater Treatment Facility.

The pump chamber consists of two suction lift sewage pumps, heating and ventilation, flow meter, emergency generator and a SCADA system. The wetwell is a separate chamber consisting of two compartments.

Briggs Farm Pump Station

The Briggs Farm Pump Station was installed in 2005 and is located at the intersection of Palm Beach Road and Delray Avenue. The existing service area consists of residential dwellings within the Briggs Farm area. The future service area will include the Harbour Island area. The 8-inch force main traverses along Palm Beach Road in an easterly direction to Point Judith Road. On Point Judith Road, the force main traverses in a southerly direction for approximately 250-feet, terminating at the Point Judith Interceptor sanitary manhole.

The pump station consists of an above-ground pump chamber and a separate divided wetwell. The pump chamber consists of two suction lift sewage pumps, emergency diesel powered generator, flow meter, heating and ventilation, and a SCADA system.

Conclusions

Generally, the interceptors and pump stations are in fair to good condition. The interceptors and pump stations have been constructed at various phases, ranging from 1960 to 2005. Based on the Town's sewer accounts, 73% of the developed lots are presently sewered. In the North End Sewer System, 76% of the developed lots are sewered, and in the South End Sewer System, 63% of the developed lots are presently sewered.

Based on Town records, it was found that approximately 4,986 dwelling units are sewered and 962 equivalent dwelling units are not sewered in the North End Sewer System, and that 2,214 equivalent dwelling units are sewered and 1,249 equivalent dwelling units are not sewered in the South End Sewer System (not including Briggs Farm which is under construction). The total number of dwelling units sewered in the Town of Narragansett is 7,200 and the total unsewered dwelling units which are connected to individual on-site disposal systems is 2,211.

4.2.5 INTERCEPTOR ADEQUACY ANALYSIS

General Description

The interceptors that were analyzed are listed in the previous section and depicted in Figure 4-10. The Bonnet Shores Interceptor and North Interceptor are tributary to the South Kingstown Regional Wastewater Treatment Facility. The total connected population is approximately 12,066 (based on an occupancy rate of 2.42 persons per unit as determined by the U.S. Census Bureau).

The Point Judith Road Interceptor and Point Judith Interceptor are tributary to the Scarborough Wastewater Treatment Facility. The connected population is approximately 5,358 (based on an occupancy rate of 2.42 persons per unit as determined by the U.S. Census Bureau).

The 2000 Census was conducted during the off season when 22% of the dwellings were not occupied. In accordance with the 2000 Census, the occupancy rate was 1.79 persons per dwelling (16,361 persons ÷ 9,159 housing units). The Census Bureau also calculated an owner-occupied occupancy rate of 2.42 persons per

unit, which is based on the occupied housing units but did not agree to a new population. The total sewered units are based on Town records which are accurate. Therefore, flows will be based on the gallons per day per connected unit in lieu of population.

Figure 4-10 also shows sub-areas of each interceptor. Hydraulically, it is not necessary for the upper portions of the interceptors to carry the entire flow from the interceptor service area. For this reason, sub-areas were established on the basis of a reasonable estimate of incremental capacity requirements. In the following analyses, the sub-areas are examined, and conclusions are formulated on the adequacy of the interceptor segment capacities within these sub-areas. In analyzing the sub-areas, several factors were considered. On the following pages, these factors are explained and evaluated in order to provide an overall view of the adequacy of the interceptor segments.

Wastewater Flow

In analyzing the adequacy of each sewer, it was necessary to determine sewage flow based on the Town's flow records for each contributing pump station, and on the current population. In the areas where the pump stations were not the sole contributors, zoning and plat maps were utilized to determine the number of dwelling units. The per dwelling flow rate used for the North End Sewer System was 215 gallons per day per unit. The per dwelling flow rate used for the South End Sewer System was 260 gallons per day per unit. The per unit flow rate was determined from sewer usage rates obtained from the Town of Narragansett.

Peaking Factors for Wastewater Flow

It is sound engineering practice in the design or evaluation of sewers, to include an allowance for peak rates of flow. Peak rates of flow are obtained by increasing the average daily flow by a percentage. The larger the population serviced, the lower the peaking factor. The reason for the variation in peaking factors is that peak discharges from small areas tend to reach a common point in the sewer at the same time. Conversely, in a large area, nearby peak discharges pass a specific point sooner than peak discharges from a more remote area. This is due to storage and travel time in the sewer. Peaking factors used in this analysis were obtained

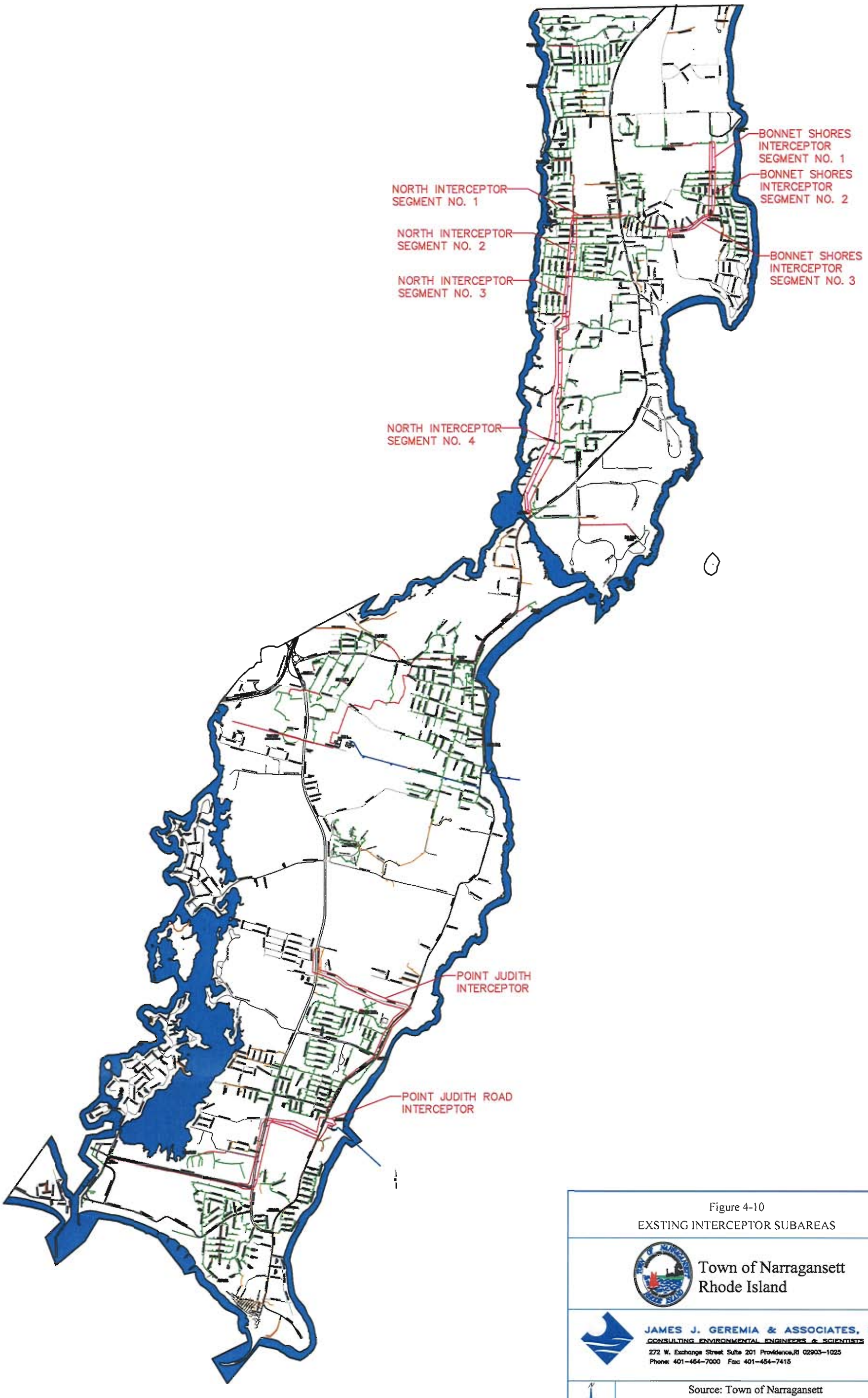

Figure 4-10

EXSTING INTERCEPTOR SUBAREAS

Town of Narragansett
Rhode Island

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Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

from "Design and Construction of Sanitary and Storm Sewers", Water Pollution Control Federation (WPCF) Manual of Practice Number 9. The average daily domestic flow for a given sub-area was multiplied by the appropriate peaking factor to obtain peak daily flow.

Interceptor Capacities

To determine the adequacy of each sewer segment, it was necessary to compare existing capacities with the present wastewater flows. The capacity of the pipe sections was computed using Manning's equation for circular pipes flowing full and was used in the form.

$$Q = (1.49A/n)\, R^{2/3}\, S^{1/2}$$

Where:
- Q = discharge (cfs)
- A = cross section area (ft^2)
- n = Manning roughness coefficient (dimensionless)
- R = hydraulic radius (ft), pipe diameter/4 for pipes flowing full
- S = slope of the pipe (ft/ft), assumed parallel to the hydraulic grade line

The roughness coefficient used in this analysis for the majority of the interceptors was 0.013, and is a standard design value. In certain older interceptor sections, a Manning's "n" factor of 0.015 was utilized because of the age and structural condition of the pipe. All pipe diameters and slopes were obtained from the Town of Narragansett's Engineering Department "as-built" drawings. The capacity of each pump station was determined from the Scarborough Wastewater Treatment Facility's records.

NORTH END SEWER SYSTEM PUMP STATIONS

Industrial Park Pump Station

The Industrial Park Pump Station contains two constant speed sewage pumps each rated at 200 GPM. In accordance with TR-16 published standards of the New England Interstate Water Pollution Control Commission, the capacity of the station is 200 GPM (the capacity of the station with one pump in service while the other pump is on standby). The station pumps flow from the South Ferry Industrial Park. Based on the Town records, the average daily flow is 20,200 GPD (14 GPM) and the associated peak flow is 74,900 GPD

(52 GPM). Based on the capacity of the pumps and the actual flow, it is apparent that the present system is adequate.

Winterberry Road Pump Station

The Winterberry Road Pump Station contains two constant speed Gorman Rupp pumps, rated at 180 GPM. The pump station receives flow from Forest Lake area and section of Pettaquamscutt area of Town. The average flow processed is 51,800 GPD (36 GPM) with an associated peak flow of 155,500 GPD (108 GPM). Based on the capacity of the pumps and the actual flow, it is evident that the present system is adequate.

Baneberry Trail Pump Station

The Baneberry Trail Pump Station contains two constant speed submersible ABS Piranha pumps rated at 92 GPM. The pump station receives flow from Columbia Road, Baneberry Trail and a section of Woodside Road. The average flow processed is 4,300 GPD (3 GPM) with an associated peak flow of 17,300 GPD (12 GPM). Based on the capacity of the pumps and the actual flow, it is evident that the present system is adequate.

Wilson Drive Pump Station

The Wilson Drive Pump Station contains two constant speed Cornell pumps rated at 1100 GPM. The pump station receives flow from Forest Lake, Pettaquamscutt, Lake Shore, Edge Water, Upper Bridge and Rio Vista section of Town. The average flow processed is 175,700 GPD (122 GPM) with an associated peak flow of 527,100 GPD (366 GPM). Based on the capacity of the pumps and the actual flow, it is evident that the present system is adequate.

Circuit Drive Pump Station

The Circuit Drive Pump Station contains two submersible ABS Piranha pumps rated at 46 GPM. The pump station receives flow from Circuit Drive, Iroquois Road, Mountview Road and Nepaug Road. The average flow processed is 10,700 GPD (7 GPM) with an associated peak flow of 42,800 GPD (28 GPM). Based on the capacity of the pumps and the actual flow, it is evident that the present system is adequate.

Wolfe Road Pump Station

The Wolfe Road Pump Station contains two constant speed Allis Chalmers pumps rated at 300 GPM. The pump station receives flow from Bonnet Shores section of Town. The average flow processed is 50,400 GPD (35 GPM) with an associated peak flow of 151,200 GPD (105 GPM). Based on the capacity of the pumps and the actual flow, it is evident that the present system is adequate.

Bonnet Shores Pump Station

The present capacity of the Bonnet Shores Pump Station is 2,102,400 GPD (1,460 GPM). The pump station has two 1,460 GPM centrifugal Krogh pumps. The present average flow entering the pump station is 266,400 GPD (185 GPM) and the peak rate of flow is 799,200 GPD (555 GPM). The pump station is adequate for the present conditions.

Mettatuxet Pump Station

The Mettatuxet Pump Station contains two vertical Clow sewage pumps rated at 200 GPM. The pump station receives an average flow of 40,300 GPD (28 GPM) and a peak flow of 121,000 GPD (84 GPM). Based on the existing flows, the present system is adequate.

Sprague Pump Station

The Sprague Pump Station's capacity is 4,204,800 GPD (2,920 GPM). The pump station is outfitted with three 1,460 GPM Krogh pumps. The present average flow of the station is 727,200 GPD (505 GPM) and the peak flow is 1,584,000 GPD (1,100 GPM). Therefore, the pumping system is adequate for the present conditions. The major upstream contributors to the Sprague Pump Station are the Bonnet Shores and Mettatuxet Pump Stations. Also, the Middlebridge Area of South Kingstown sewer flows are handled by the Sprague Pump Station.

Lakewood Drive Pump Station

The Lakewood Drive Pump Station contains two Worthington pumps each rated at 200 GPM. The average flow to the pump station is 57,600 GPD (40 GPM) with an associated peak flow of 172,800 GPD (120 GPM). The pump station is adequate for the existing flows.

Mumford Road Pump Station

The capacity of the Mumford Road Pump Station is 660 GPM. The pump station consists of two self-priming horizontal centrifugal pumps (suction lift) manufactured by Gorman Rupp rated at 660 GPM each. The average flow processed is 148,300 GPD (103 GPM). The theoretical peak flow, based on the average flow, is 444,960 GPD (309 GPM). Based on the theoretical peak flow of 309 GPM, the pump station is adequate.

Congdon Street Pump Station

The capacity of the Congdon Street Pump Station is 225 GPM. The pump station consists of two new vertical centrifugal pumps each rated at 225 GPM. The average flow at the pump station is 145,400 GPD (101 GPM) and the theoretical peak flow is 436,300 GPD (303 GPM). The pump station is inadequate based on the theoretical peak flow. During rainfalls, the "high level" alarm is activated as the flows entering cannot be handled by the existing pumps. The existing force main discharges into a sewer manhole with an 8-inch gravity sewer. The 8-inch diameter pipe opening of the gravity sewer is a flow restriction, as it has been observed on several occasions where the manhole has been surcharged and overflows.

Ouida Street Pump Station

The Ouida Street Pump Station processes flows from the entire North Sewer District to the South Kingstown Regional Wastewater Treatment Facility. The station consists of two 1,740 GPM variable speed sewage pumps and one 1,260 GPM constant speed pump used as a standby pump. The capacity of the pump station is 4,320,000 GPD (3,000 GPM) (constant speed pump plus one variable speed pump). The average daily flow is 1.37 MGD (951 GPM), and the peak daily flow is 3.51 MGD (2,436 GPM). Based upon the wastewater demands, this station is adequate. However, during significant rain events, this station's wetwell backs up

causing the incoming raw sewerage to overflow the collection system. These overflows have resulted in beach closures. During these events, it has been observed that all three pumps operate and are not able to keep up with the incoming flows. This can be caused by one of two issues:

- The force main is undersized for these extreme flow conditions and cannot match the pumpout, or
- Due to age and mechanical condition of the pumps, the pumps are not performing at their design rate.

The failure of the effluent flow meter makes this evaluation difficult to conclusively state which condition exists. To eliminate the force main as the cause of the problem, a desktop analysis was performed on the force main based on the following assumptions: total dynamic head of 216 feet and motor size of 150 HP. Based upon this analysis the force main can handle in excess of 4,000 gpm (5.1 MGD). This leads us to conclude that the pumps (not the force main) are inadequate to match the incoming wastewater flow.

Salt Pond/Seaport Village Pump Station

The original pump station was designed to meet all of the Town standards that were current at that time, and was also sized for the original 79 Seaport Village units as well for future flows from the neighborhood to the south.

In July of 1993, the Town received formal request from the developers to consider allowing gravity flow from this subdivision to the Town of South Kingstown, connecting to their existing pump station near Stone Cove Marina. After lengthy negotiations between the Town of South Kingstown, the Town of Narragansett, and the developers, this alternate plan was agreed upon. In October 1993, the Narragansett Town Council approved an Intermunicipal Agreement with South Kingstown to allow for this plan. The South Kingstown Town Council similarly authorized this work in March 1994. As a condition of this approval from South Kingstown, there were a number of significant upgrades required at the developer's expense to two (2) existing South Kingstown pump stations.

During 1994, the gravity sewers were installed for the first twenty-six (26) lots (referred to as Phase I), and work progressed on the gravity interceptor to South Kingstown. Before this interceptor work could be

completed, however, significant Native American artifacts were discovered, halting the project. It should be noted that the improvements that were required at the South Kingstown Pump Stations were never done.

Due to the uncertainty of the Phase 2 construction timing, the developers then asked the Town of Narragansett Planning Board to consider allowing the installation of a small pump station, sized to service the Phase I lots only. The station design did not comply with the specific Town technical standards at that time in terms of types of controls, alarm/telemetry system, building enclosure (the control panels are outside), and standardized pumps and motors. In December 1994, the developers requested and received Planning Board approval to install a "temporary" pump station, noting that the "owners of the proposed 26 homes will be responsible for its upkeep..." The developers agreement between Down Salt Pond Partners and the Town was subsequently amended on December 19, 1994 by a vote of the Town Council, and an"Amendment to By-Laws of Salt Pond/Seaport Homeowners Associates" recorded that notes the responsibility of said Association to maintain the pump station and force main.

The station was constructed, and the developers originally secured a five (5) year maintenance contract (January 1995 - December 31, 1999) with a private contractor. As designed, it can meet the needs for the Phase I units, if properly maintained. In addition to securing the maintenance contract, the developers provided $3,500 towards future utility bills (electric, gas) at the station. This funding lasted until approximately August 1998. The Town has paid for all of the operation and maintenance costs since then.

SOUTH END SEWER SYSTEM PUMP STATIONS

Point Judith Pump Station

The Point Judith Pump Station has a Gorman Rupp pumping system consisting of two self-priming horizontal centrifugal pumps (suction lift). The sewage pumps are rated at 325 GPM. The average daily flow processed is equal to 73,400 GPD (51 GPM) and the peak flow is 205,920 GPD (153 GPM). The pump station is adequate.

Briggs Farm Pump Station

The Briggs Farm Pump Station consists of two 400 GPM self-priming horizontal centrifugal pumps (suction lift) manufactured by Gorman Rupp. The pump station was put into service during the Summer of 2005. The pump station is designed to handle flows from Briggs Farm and Harbour Island. Therefore, the pump station is adequate.

Stanton Avenue Pump Station

The Stanton Avenue Pump Station serves the Village at Point Judith and Sand Hill Cove sections of the Town. The station has two constant speed belt driven Gorman Rupp pumps rated at 250 GPM. The average flow processed by the pump station is 283,700 GPD (197 GPM) and the peak flow is 623,520 GPD (433 GPM). Therefore, the pump station is adequate for peak flows.

Galilee Pump Station

The Galilee Pump Station consists of two Cornell sewage pumps driven by 75 HP motors. The sewage pumps are rated at 1,100 GPM. The average daily flow processed is equal to 180,000 GPD (125 GPM) and the peak flow is 540,000 GPD (375 GPM). The pump station is adequate for the existing sewage flows. However, due to the oversized pumps, consideration should be given to replace them with smaller units.

Burnside Avenue Pump Station

The Burnside Avenue Pump Station processes an average daily flow of 248,000 GPD (172 GPM) and the peak flow is 743,000 GPD (515 GPM). The pump station has two Cornell sewage pumps each driven by a two speed motor. On low speed 900 GPM is pumped, and at high speed 1,200 GPM is pumped. The pump station is adequate for existing sewage flows.

Interceptor Adequacy

Table 4-5 and Table 4-6 compare the estimated peak flows to the present capacities for each interceptor segment. Each interceptor segment consists of various sizes and slopes, resulting in a variation in capacities within each segment. The capacities shown in Table 4-5 and Table 4-6 represent the lowest capacity of an interceptor segment. Estimated peak flows will be compared to the "weakest link" (section) within the segment.

It can be concluded from the tabulations in Table 4-5 and Table 4-6 that the existing interceptors are adequate for the existing peak sewage flows, and that the Congdon Street Pump Station is inadequate for existing peak flows.

Conclusions

At the present time, the Congdon Street Pump Station is not adequate for the theoretical peak sewage flows. It is recommended that flows be monitored with flow meters in the sanitary manholes located prior to the wetwells so that actual peak sewage flows can be determined. With the new data, an analysis will be made to each pump station's adequacy.

4.2.6 INFILTRATION/INFLOW

4.2.6.1 General

Infiltration is groundwater entering a collection system primarily through defective sewer pipes, pipe joints, other connections and manhole walls. Inflow is the water discharge into a collection system from such sources as roof leaders, sump pumps, foundation drains, manhole covers and cross connections, among others.

Infiltration is a physical factor. It is the result of groundwater levels and improperly installed materials and methods of construction, pipe joints, manholes and chamber structures and connections. Some of the major causes of infiltration are: improperly constructed sewer pipe joints, unstable pipe bedding, improper methods of backfilling, defective plugs used on stubs and sewer connections, inadequate testing and inspection of sewer construction (as well as service connections), improper construction of manholes (such as pipe connections and horizontal joints), pipe deterioration due to age, and pipe damage at points where service connections cross from shallow trenches to deep structure tunnels.

TABLE 4-5
ADEQUACY ANALYSIS - NORTH END SEWER SYSTEM

Interceptor	Minimum Capacity (MGD)	Peak Discharge (MGD)	Comments
Bonnet Shores			
Segment 1	2.430	0.151	Adequate
Segment 2	2.430	0.271	Adequate
Segment 3	3.720	0.799	Adequate
North Interceptor			
Segment 1	4.580	0.799	Adequate
Segment 2	7.000	1.356	Adequate
Segment 3	7.000	1.473	Adequate
Segment 4	7.500	1.584	Adequate
Industrial Park P.S.	0.288	0.075	Adequate
Wolfe Road P.S.	0.432	0.151	Adequate
Bonnet Shores P.S.	2.102	0.799	Adequate
Mettatuxet P.S.	0.288	0.121	Adequate
Sprague P.S.	4.205	1.584	Adequate
Lakewood Drive P.S.	0.288	0.173	Adequate
Mumford Road P.S.	0.950	0.445	Adequate
Congdon Street P.S.	0.324	0.436	**Inadequate**
Ouida Street P.S.	4.320	3.510	Adequate
Circuit Drive P.S.	0.060	0.043	Adequate
Baneberry Trail P.S.	0.132	0.017	Adequate
Wilson Drive P.S.	1.584	0.527	Adequate
Winterberry Road P.S.	0.259	0.156	Adequate

TABLE 4-6
ADEQUACY ANALYSIS - SOUTH END SEWER SYSTEM

Interceptor	Minimum Capacity (MGD)	Peak Discharge (MGD)	Comments
Point Judith Interceptor	1.30	0.002*	Adequate
Point Judith Road	2.67	1.52	Adequate
Stanton Avenue P.S.	0.360	0.624	Adequate
Galilee P.S.	1.584	0.540	Adequate
Burnside Avenue P.S.	1.728	0.743	Adequate
Point Judith P.S.	0.468	0.206	Adequate
Briggs Farm P.S.	0.576	0.002*	Adequate

* System has only recently began receiving tie-in requests (Summer 2005)

Inflow is the result of connections of sources of water into the sewage collection system. These connections are made as a method to dispose of unwanted sources of stormwater or other drainage water into a sewer conduit. Inflow can be a result of draining low areas through manhole covers, cross connections of drainage systems, discharges from roof leaders, foundation drains and basement drains or sump pumps. Flow from such sewers is a result of operational conditions and can be corrected by rigorous regulations and inspections.

An Infiltration/Inflow Analysis is an engineering analysis for the purpose of demonstrating the possible existence, or non-existence, of excessive infiltration/inflow in each sewage collection sub-system discharging to the treatment works. This analysis identifies the presence of extraneous flows and characterizes flows as being either infiltration, inflow or both. A "desk top" investigation was performed to examine the extent of infiltration/inflow (I/I) that enters the Narragansett collection system. The total town-wide I/I entering the collection system during the wet season was determined to be 2.433 MGD.

Infiltration

The rate of infiltration was calculated utilizing the actual flow figures during the wet season (months of March and April). The infiltration rates for the system were determined by subcontracting the average dry weather flows from the average daily flows during high water conditions (excluding flows during rainfalls). The dry weather flows were determined from examining the wastewater flow during the month of November (when there is very little rainfall and groundwater was at its lowest).

The Town has undertaken a Sewer System Evaluation Survey and a Rehabilitation Program within the Pier Area (North End Sewer System) and within the Sand Hill Cove Area (South End Sewer System). Table 4-7 presents the development of the average infiltration rate of 0.40 MGD for the North End Sewer System and 0.087 MGD for the South End Sewer System.

4.6.2 Summary of Infiltration/Inflow Study

The Town contracted with National Water Main Cleaning Company in April 2004 to provide services relating to a comprehensive I/I investigation and analysis. The services included developing a work plan to investigate the collection system, data collection, analysis and recommendations for rehabilitation.

TABLE 4-7 DETERMINATION OF INFILTRATION		
	NORTH END SEWER SYSTEM [1] (MGD)	**SOUTH END SEWER SYSTEM [2] (MGD)**
Average Flow (March - April)	1.57	0.808
Dry Weather Flow	(1.09)	(0.615)
Initial Infiltration	.48	0.193
Reduction in Infiltration	.08 [3]	0.106 [3]
Final Infiltration	0.40	0.087
Connected Population	12,066	5,358
Per Capita (GPCD)	128	144
Infiltration Per Equivalent Dwelling Unit (GPD)	80	39
TOTAL INFILTRATION = 0.40 + 0.087 = 0.487 MGD		

[1] Infiltration and residential flow during periods of high groundwater of 128 GPCD was determined by subtracting the existing non-domestic flow of 0.020 MGD from the average flow of 1.55 MGD (1.57 - 0.020) and dividing it by the sewered population of 12,066.

[2] Infiltration and residential flow during periods of high groundwater of 144 GPCD was determined by subtracting the existing non-domestic flow of 0.036 MGD from the average flow of 0.702 MGD (0.808 - 0.036) and dividing it by the sewered population of 5,358.

[3] Reduction in Infiltration is based on the rehabilitation that was undertaken by the Town of Narragansett which was performed by National Water Main Cleaning Company (see Appendix C).

The two main areas identified by the Town has having an excessive inflow/infiltration problem are the Pier Area and the Sand Hill Cove Area.

The collection system of the Pier Area that was examined consists of 40,050 linear feet of gravity sewer mains (predominantly eight-inch) and 174 sewer manholes. Increased volume of sewer flow has been observed during and immediately after significant storm events and during the wet season. The collection system of the second neighborhood, Sand Hill Cove Area, consists of 23,250 linear feet of gravity sewer mains (predominantly eight-inch) and 119 sewer manholes. Peak I/I has been observed shortly after storm events and when groundwater levels are high.

As a result of this study, it was determined that both areas had problems. The following presents the findings of the National Water Main Cleaning Co. Study.

Sand Hill Cove Area

Defect	# Found	# / MH Section	GPD Identified
Leaking SCs	49 SCs	34 Sections	23,920
Short Line Repair	17 Repairs	14 Sections	43,920
Seal SCs	19 SCs	13 Sections	29,880
Test & Seal Joints	1,806 feet	8 Sections	32,400
		Total	130,120

Pier Area

Defect	# Found	# / MH Section	GPD Identified
Leaking SCs	115 SCs	59 Sections	262,800
Short Line Repair	67 Repairs	36 Sections	2,160
Seal SCs	19 SCs	16 Sections	14,760
Test & Seal Joints	13,688 feet	51Sections	64,224
		Total	343,944

Inflow

The wet weather flows during the latter part of March and the month of April were used to determine the average wet weather flow based on three (3) rain events ranging from intensities of 1.8 inches to 2.4 inches. The rainfall intensities were based on the Town's recorded data.

The flows in these months were utilized because the Rhode Island Department of Environmental Management, as discussed previously, has determined this period to be during the wet season. The wet season is defined as the period of time when the groundwater is at its highest. The dry weather flow and infiltration determined previously was subtracted from the total flow. The result is the wet weather inflow to the collection system.

Table 4-8 presents the results of the inflow analysis.

TABLE 4-8
DETERMINATION OF INFLOW

	NORTH END SEWER SYSTEM[1] (MGD)	SOUTH END SEWER SYSTEM (MGD)
Wet Weather Flow	2.251	1.856
Dry Weather and Infiltration	1.568	0.808
Inflow	0.683	1.048
Connected Population	12,066	5,358
Per Capita (GPCD)	187	346
Inflow Per Equivalent Dwelling Unit (GPD)	137 [2]	473 [3]
TOTAL INFLOW = 0.683 + 1.048 = 1.731		

[1] The per capita flow was determined by dividing the connected population by the wet weather flow.
[2] The inflow per equivalent dwelling unit of 137 GPD was determined by dividing the inflow of 0.683 MGD by 4,987 dwelling units.
[3] The inflow per equivalent dwelling unit of 473 GPD was determined by dividing the inflow of 1.048 MGD by 2,214 dwelling units.

The domestic wastewater plus non-excessive infiltration of 128 gallons per capita per day (GPCD) for the North End Sewer System is slightly under the recommendation of 130 GPCD and 131 gallons per capita per day for the South End Sewer System is slightly over the 130 GPCD in accordance with the EPA Handbook, Sewer System Infrastructure Analysis and Rehabilitation. The total daily flow during a storm is 187 GPDC for the North End Sewer System which does not exceed 275 GPCD based on the EPA Handbook. The total daily flows during a storm is 346 GPCD for the South End Sewer System which exceeds the 275 GPCD based on the EPA Handbook. Therefore, it is recommended that the Town undertake an Infiltration/Inflow analysis for the remainder of the South End Sewer System.

The combined systems' Infiltration/Inflow is 2.433 MGD as summarized in Table 4-9.

TABLE 4-9 SUMMARY OF INFILTRATION/INFLOW		
	NORTH END SEWER SYSTEM (MGD)	SOUTH END SEWER SYSTEM (MGD)
Infiltration Inflow Infiltration/Inflow	0.400 0.683 1.083	0.087 1.048 1.135
TOTAL INFILTRATION/INFLOW = 1.083 + 1.135 = 2.433 MGD		

4.3 EXISTING WASTEWATER TREATMENT SYSTEM

4.3.1 EXISTING WASTEWATER FLOWS AND CHARACTERISTICS

Sources of existing wastewater flows in the Town of Narragansett includes single and multiple family residential units, motels and other small commercial establishments, public buildings, fishing industry, infiltration into the sewer system from groundwater and inflow from stormwater run-off.

The Scarborough Wastewater Treatment Facility (WWTF) serves the South End Sewer System of the Town, including flows from the beach facilities and fish processing facilities at the Port of Galilee, which is considered the only type of industry present in this tributary area. The information attributed to the existing wastewater flows from the North End Sewer System of the Town tributary to the South Kingstown Regional WWTF, and from the South End Sewer System of the Town tributary to the Scarborough WWTF, were based on data provided by the Town.

The Scarborough WWTF historical flows and characteristics (on a monthly basis) for the years 2001 through 2004, utilized from the data provided by the Town, are presented in Table 4-10.

Table 4-11 presents the South Kingstown WWTF wastewater flows and characteristics (on a monthly basis) for the years 2001 through 2004. More detailed information on wastewater flows and loads for that facility can be found in the concurrently developed South Kingstown Facility Plan.

TABLE 4-10
HISTORICAL FLOW COMPONENTS CONCENTRATION
SCARBOROUGH WASTEWATER TREATMENT FACILITY

	Minimum Flow (MGD)	Average Daily Flow (MGD)	Peak Flow (MGD)	Influent BOD (mg/l Avg.)	Effluent BOD (mg/l Avg.)	Influent TSS (mg/l Avg.)	Effluent TSS (mg/l Avg.)
Fiscal Year 2002							
July	0.45	0.784	2.60	216	6	244	9
August *	0.60	0.744	3.20	227	5	227	6
September	0.40	0.492	2.85	197	5	202	9
October	0.40	0.400	2.65	173	4	157	8
November	0.90	0.329	2.65	182	7	197	16
December	0.60	0.343	2.80	216	8	207	14
January	0.40	0.450	1.70	170	8	165	15
February	0.50	0.396	1.20	172	6	193	13
March	0.35	0.507	1.90	181	6	168	8
April	0.40	0.518	2.35	180	5	145	9
May	0.15	0.624	2.60	163	6	172	13
June	0.20	0.586	1.65	152	4	176	7
Average	*0.45*	*0.514*	*2.35*	*185.75*	*5.83*	*187.75*	*10.58*
Fiscal Year 2003							
July	0.20	0.584	3.00	227	5	249	10
August	0.40	0.462	2.10	276	6	250	8
September	0.50	0.313	1.70	178	4	223	13
October	0.50	0.308	2.05	183	4	197	5
November	0.25	0.455	2.05	114	7	125	11
December	0.25	0.571	2.05	127	7	110	9
January	0.15	0.395	2.00	164	6	120	9
February **	0.15	0.410	3.25	182	6	126	14
March	0.30	0.564	3.05	108	7	93	10
April	0.35	0.692	3.20	94	7	97	9
May ***	0.30	0.404	1.95	130	5	150	10
June	0.30	0.587	2.10	142	5	177	6
Average	*0.30*	*0.479*	*2.38*	*160.42*	*5.75*	*159.75*	*9.50*
Fiscal Year 2004							
July	0.30	0.505	2.15	229	5	310	5
August	0.20	0.551	2.30	269	5	219	6
September	0.15	0.382	1.40	91	3	140	7
October	0.10	0.340	2.40	130	4	142	7
November	0.10	0.390	1.90	145	6	121	8
December	0.30	0.480	2.80	126	4	130	9
January	0.20	0.322	2.250	164	5	132	10
February	0.10	0.684	2.900	156	5	131	9
March	0.10	0.557	2.350	115	4	110	6
April	0.30	0.610	3.000	77	3	87	5
May	0.10	0.600	1.900	162	4	155	7
June	0.10	0.482	1.500	141	4	233	9
Average	*0.17*	*0.492*	*2.24*	*150.42*	*4.33*	*159.17*	*7.33*
Fiscal Year 2005							
July	0.10	0.569	1.450	193	5	244	8
August	0.10	0.737	2.750	156	4	206	6
September	0.10	0.589	2.950	131	4	216	5
October	0.10	0.682	1.750	121	4	126	8
November	0.10	0.640	1.950	120	7	145	12
December	0.15	0.839	2.800	99	5	93	7
January	0.10	0.800	3.650	119	4	102	8
February	0.10	0.769	2.200	136	5	111	10
March	0.15	0.805	3.800	112	3	124	8
April	0.10	0.796	3.450	160	3	167	6
May	0.30	0.702	2.300	140	5	124	7
June	0.10	0.560	1.800	166	8	174	9
Average	*0.13*	*0.707*	*2.571*	*137.75*	*4.75*	*152.67*	*7.83*
Average of Average	**0.26**	**0.548**	**2.38**	**158.58**	**5.17**	**164.83**	**8.81**

PEAK FLOW IS THE MAXIMUM FLOW RECORDED FOR ANY GIVEN DAY

NOTES:

* Meter calibrated August 2001

** New flow meter installed February 2004

*** New effluent meter (May 26, 2004)

TABLE 4-11
TOWN OF SOUTH KINGSTOWN REGIONAL WASTEWATER TREATMENT FACILITY
FLOWS BY REGIONAL PARTICIPANT (IN MG/MONTH)

	NARRAGANSETT	U.R.I.	SO. KINGSTOWN	TOTAL FLOWS
Fiscal Year 2002				
July (2001)	36.68	8.81	26.43	71.92
August	41.43	7.38	27.22	76.03
September	31.29	13.34	23.22	67.85
October	31.43	15.04	24.39	70.86
November	30.87	13.38	22.24	66.49
December	29.91	10.23	23.81	63.95
January (2002)	34.68	8.54	26.52	69.74
February	31.23	10.89	25.41	67.53
March	39.59	11.17	29.96	80.72
April	38.90	13.43	33.02	85.35
May	48.15	15.72	32.18	96.05
June	37.15	8.31	30.87	76.33
[1] S.K. Middlebridge Area and URI Bay Campus Adjustments	-10.17	1.34	8.83	0.00
Total Flow	**421.14**	**137.58**	**334.10**	**892.82**
Average Daily Flow	**1.15**	**0.38**	**0.92**	**2.45**
Actual Flow (%)	**47.17%**	**15.41%**	**37.42%**	**100.00%**
Fiscal Year 2003				
July (2002)	32.17	6.42	27.79	66.38
August	31.88	4.20	26.04	62.12
September	27.64	9.85	26.79	64.28
October	38.05	10.20	30.39	78.64
November	35.36	12.92	31.55	79.83
December	53.30	14.63	33.32	101.25
January (2003)	48.24	15.29	32.58	96.11
February	47.74	13.43	26.45	87.62
March	46.88	17.89	33.28	98.05
April	52.94	19.09	38.48	110.51
May	38.13	13.36	35.66	87.15
June	50.23	12.68	34.09	97.00
S.K. Middlebridge Area and URI Bay Campus Adjustments	-12.84	1.38	11.46	0.00
Total Flow	**489.72**	**151.34**	**387.88**	**1,028.94**
Average Daily Flow	**1.34**	**0.41**	**1.06**	**2.82**
Actual Flow (%)	**47.59%**	**14.71%**	**37.70%**	**100.00%**

TABLE 4-11
TOWN OF SOUTH KINGSTOWN REGIONAL WASTEWATER TREATMENT FACILITY
FLOWS BY REGIONAL PARTICIPANT (IN MG/MONTH)

	NARRAGANSETT	U.R.I.	SO. KINGSTOWN	TOTAL FLOWS
Fiscal Year 2004				
July (2003)	38.38	13.94	31.45	83.77
August	39.88	10.05	34.74	84.67
September	35.24	17.72	26.48	79.44
October	36.38	13.81	29.99	80.18
November	32.11	11.67	32.62	76.40
December	42.53	15.50	31.56	89.59
January (2004)	31.67	16.00	27.57	75.24
February [2]	30.23	18.62	28.24	77.09
March	34.35	17.70	26.79	78.84
April	58.30	23.68	36.62	118.60
May	33.54	13.00	31.06	77.60
June	31.20	8.67	29.69	69.56
S.K. Middlebridge Area and URI Bay Campus Adjustments	-10.94	1.06	9.88	0.00
Total Flow	**432.87**	**181.42**	**376.69**	**990.98**
Average Daily Flow	**1.18**	**0.50**	**1.03**	**2.71**
Actual Flow (%)	**43.68%**	**18.31%**	**38.01%**	**100.00%**
Fiscal Year 2005				
July (2004)	33.60	8.39	36.09	78.08
August	32.23	5.08	33.80	71.11
September	32.21	15.30	33.53	81.04
October	41.63	18.09	30.10	89.82
November	37.67	17.08	28.56	83.31
December	55.55	18.11	35.93	109.59
January (2005)	47.84	17.23	35.35	100.42
February	43.63	18.34	30.88	92.85
March	48.00	18.48	39.82	106.30
April	50.20	20.63	39.46	110.29
May	42.64	16.84	35.34	94.82
June	34.69	8.53	31.77	74.99
S.K. Middlebridge Area and URI Bay Campus Adjustments	-11.93	0.94	10.99	0.00
Total Flow	**487.96**	**183.04**	**421.62**	**1,092.62**
Average Daily Flow	**1.34**	**0.50**	**1.16**	**3.000**
Actual Flow (%)	**44.67%**	**16.66%**	**38.67%**	**100.00%**

[1] The "S.K. Middlebridge Area and URI Bay Campus Adjustments" represent flow from the South Kingstown Middlebridge area that is conveyed through the Narragansett collection system and URI flows have been adjusted to represent the URI Bay Campus flow contribution that is conveyed through the Narragansett collection system.

[2] Fiscal Year 2004 was a leap year (366 days)

The average flow and concentration for the North End and South End has remained relatively steady through that four year period.

Industrial Flows

The Scarborough WWTF receives industrial flows from the Port of Galilee. In the early 1900's, prior to the implementation of strict limits on the industries' discharges, the three (3) major fish processors would represent 20% of the plant's flow and 80% of the organic loading.

At this time, two of the three fish processors remain in business. The enforcement of the industrial limits have led these industries to construct on-site pretreatment systems. The two fish processors took different approaches to meeting the local limits. In 2001, Town Dock installed a pretreatment system that reduced the effluent BOD. Slavin, however, decided to obtain a discharge permit from EPA to dump their fish waste approximately fifteen miles off-shore. For that reason, there are no flows reported for Slavin between January 2001 to July 2003. However, in August 2003, Slavin began operating a pretreatment system to reduce their effluent BOD before discharging into the municipal system. Table 4-12 provides a summary of those conditions. Based upon these values, the Port of Galilee discharges approximately 21 lbs/d of BOD and 10 lbs/d of TSS.

4.3.2 EXISTING WASTEWATER TREATMENT SYSTEM - SCARBOROUGH WWTF

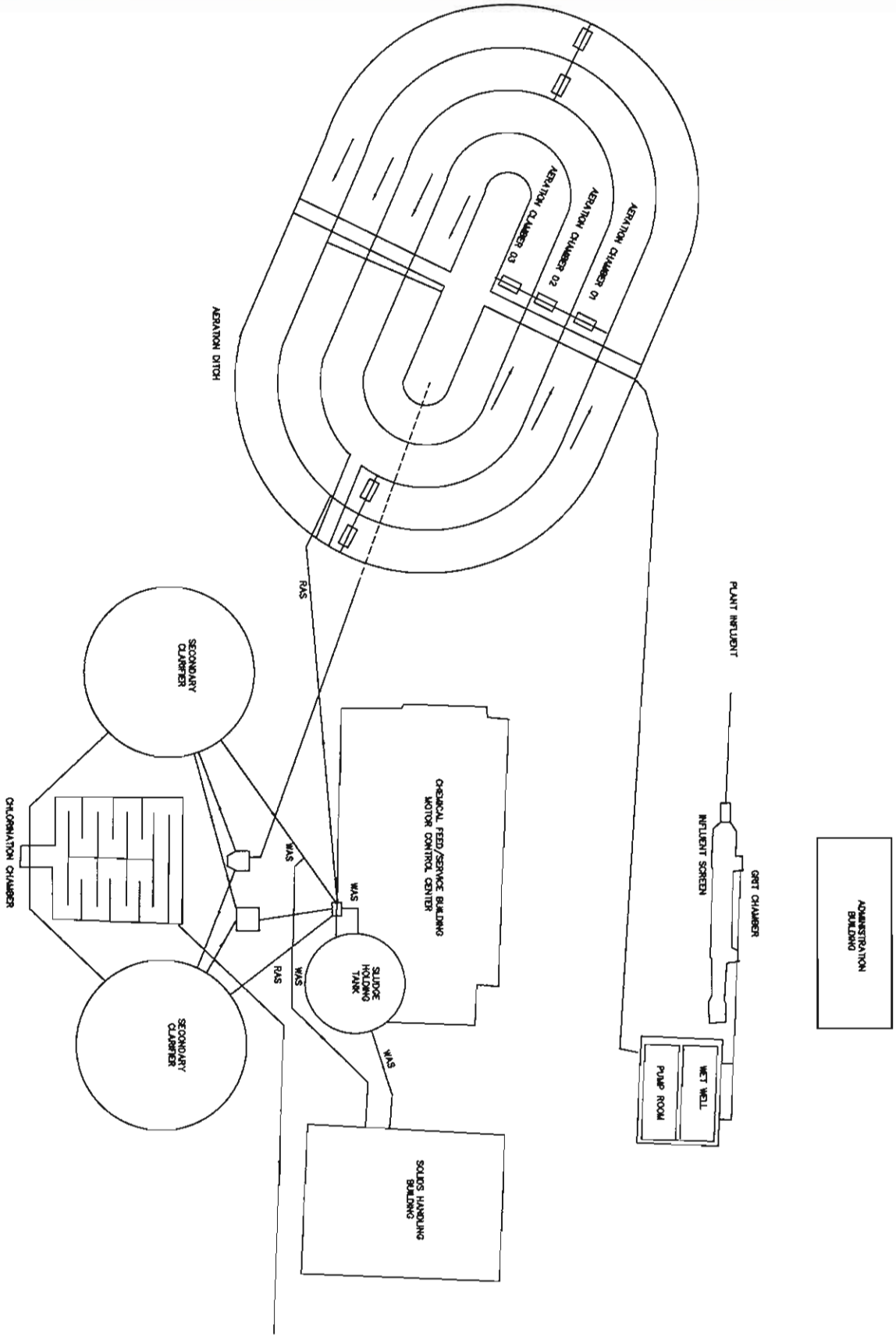
4.3.2.1 GENERAL

The type of treatment utilized at the Scarborough WWTF is an oxidation ditch, activated sludge process (see Figure 4-11). In general, wastewater entering the plant is pretreated for debris and grit removal before reaching the influent pump station. From the influent pump station, the wastewater then enters the oxidation ditch system where the wastewater and mixed liquor are blended together. The combined wastestreams are pumped around the oval pathway by brushes (aerators). As the combined mixed liquor passes the aerators, the dissolved oxygen is introduced into the wastestream, therefore, substantially reducing the Biochemical Oxygen Demand (BOD_5) of the sewage. The mixed liquor then flows to the clarifiers where the biological solids are separated by sedimentation, leaving a clarified supernatant which is subsequently disinfected and discharged. The solids

TABLE 4-12
INDUSTRIAL FLOWS AND LOADING
JANUARY 2001 THROUGH DECEMBER 2004

PERIOD	TOWN DOCK MONTHLY FLOW (GALLONS)	BOD (LBS/DAY)	TSS (LBS/DAY)	SLAVIN MONTHLY FLOW (GALLONS)	BOD (LBS/DAY)	TSS (LBS/DAY)
2001						
January	269,000	24.90	8.80			
February	278,000	29.30	11.90			
March	251,000	31.10	9.60			
April	263,000	30.30	9.10			
May	395,000	34.00	10.00			
June	270,000	41.50	10.00			
July	402,000	39.00	8.70			
August	402,000	86.70	26.00			
September	372,000	171.00	29.00			
October	344,000	27.80	9.10			
November	275,000	36.70	6.90			
December	273,000	22.00	4.70			
Total Flow	3,794,000	574.30	143.80			
Monthly Avg.	316,167	47.86	11.98			
Daily Avg.	10,395	1.57	0.39			
2002						
January	252,000	36.70	10.00			
February	243,000	17.60	7.60			
March	253,000	29.80	7.10			
April	252,000	46.00	10.30			
May	268,000	12.70	4.00			
June	269,000	39.00	7.30			
July	248,000	24.00	9.00			
August	347,000	40.00	5.00			
September	194,000	14.00	5.00			
October	263,000	5.20	1.50			
November	253,000	12.00	3.00			
December	322,000	9.00	5.00			
Total Flow	3,164,000	286.00	74.80			
Monthly Avg.	263,667	23.83	6.23			
Daily Avg.	8,668	0.78	0.20			
2003						
January	284,000	22.00	5.00			
February	284,000	5.50	6.00			
March	299,000	27.60	18.60			
April	261,000	40.40	10.50			
May	266,000	11.50	7.50			
June	207,000	11.20	5.20			
July	305,000	30.20	7.20			
August	272,000	24.50	4.90	894,000	6.90	1.30
September	263,000	40.80	8.04	501,000	1.10	0.30
October	239,000	1.10	2.20	1,010,000	17.00	5.70
November	284,988	11.00	6.00	949,212	3.70	0.50
December	222,904	28.40	7.60	1,312,740	3.00	3.60
Total Flow	3,187,892	254.20	88.74	4,666,952	31.70	11.40
Monthly Avg.	265,658	21.18	7.40	933,390	6.34	2.28
Daily Avg.	8,734	0.70	0.24	30,503	0.21	0.07
2004						
January	171,292	10.20	7.70	1,135,464	31.30	48.80
February	206,448	7.35	7.17	949,900	4.80	1.50
March	172,788	19.00	5.00	1,226,720	4.80	2.90
April	133,892	12.70	3.30	1,181,840	2.70	0.70
May	192,984	8.70	3.70	1,211,760	1.70	0.70
June	112,200	2.30	1.20	979,880	1.00	0.50
July	153,340	8.20	1.63	957,440	0.78	0.78
August	148,852	4.60	2.20	598,400	0.74	0.45
September	100,232	5.60	1.80	336,600	0.42	0.25
October	140,624	1.58	3.08	359,040	0.36	0.21
November	182,512	1.23	4.45	703,120	0.78	1.04
December	276,012	37.60	4.10	740,520	17.50	5.60
Total Flow	1,991,176	119.06	45.33	10,380,684	66.88	63.43
Monthly Avg.	165,931	9.92	3.78	865,057	5.57	5.29
Daily Avg.	5,440	0.33	0.12	28,363	0.18	0.17
PERMIT LIMITS		110.00	24.00		347.00	86.00

PERMIT VIOLATION



Town of Narragansett
Rhode Island

Figure 4-11
SCARBOROUGH TREAMENT FACILITY

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Source: Town of Narragansett
Date: 2005
Scale: No Scale

which settle out in the clarifiers are returned to the oxidation ditches to maintain a specific mixed liquor suspended solids concentration. The outer ring of the oxidation ditch is designated and performs as an aerobic digester. Excess solids (waste activated sludge) are wasted to the aerobic digester then pumped to the sludge holding tank.

The excess solids (waste activated sludge) is pumped directly from the sludge storage tank to the gravity belt thickener. The thickener concentrates the sludge to a maximum 6 percent. From the gravity belt thickener, the sludge is discharged to the thickened sludge holding tank. The thickened sludge is then hauled off-site by a private company for incineration under a recently-negotiated long term contract.

The Scarborough facility is designed for 85% (minimum) removal of raw BOD_5 and Total Suspended Solids (TSS) at an influent loading of 2,335 pounds (200 mg/l) of BOD_5 and TSS at a daily average flow of 1.4 MGD. Peak hydraulic capacity of the plant is designed for 4.2 MGD with the three inner channels in operation. The plant design is intended to satisfy the discharge permit which requires a monthly average of the daily average effluent BOD_5 and TSS not to exceed a concentration of 30 mg/l each.

Table 4-13 lists major design parameters of the existing unit processes.

4.3.2.2 UNIT PROCESSES ASSESSMENT

Headworks

The raw sewage first enters the headworks facility through an influent chamber where the mechanical screen is located. The mechanical screen (installed in 1995) replaced the stationary bar rack. At this point, material, such as rags, metals, sticks, etc. that may obstruct the pipeline and channels, are eliminated.

Equipment includes one (1) mechanical filter screen of a self-cleaning type installed in a wide channel configuration, upstream of the grit removal chambers. The filter screen removes materials larger than ¼" diameter. In addition to the fine materials, all other materials are automatically transported by the screen for deposit into a screening receptacle and an ultimate disposal at a landfill. The screen has a maximum hydraulic capacity of 2,063 gpm (3.0 MGD). Flows in excess of 3.0 mgd would be diverted through the stationary bar rack.

TABLE 4-13 EXISTING DESIGN PARAMETERS	
INFLUENT DATA	Design Value
Influent Average Flow (MGD)	1.4 ADF
Influent Peak Flow (MGD)	4.2 APF
Influent BOD (lbs/day)	2,335
Influent TSS (lbs/day)	2,335
Influent BOD (mg/l)	200
Influent TSS (mg/l)	200
Effluent BOD (mg/l)	30
Effluent TSS (mg/l)	30
PRELIMINARY TREATMENT DATA	
Bar Rack	1
Number of Units	24" W x 36" D
Size of Channel	1.89
Depth of Flow @ 4.2 mgd (feet)	6.7
Max. Flow with 3 ft. depth (MGD)	
Influent Screen	1
Number of Units	3.0
Capacity (MGD)	
Grit Chamber	1
Number of Units	4.0
Total Hydraulic Capacity (MGD)	
Pump Station	3
Number of Pumps	
Max. Capacity (GPM)	1,450
Each Pump	2,900 (4.2 mgd)
Total Firm	4,050 (5.8 mgd)
Total Peak	
AERATION BASIN DATA	
Basin Volume (CF)	
First Channel	29,990
Second Channel	20,383
Third Channel	14,585
Total Basin Volume (CF)	64,958
Total Basin Volume (GALS)	485,886

TABLE 4-13 EXISTING DESIGN PARAMETERS	
OPERATING DATA - AERATION BASIN	
Return Sludge Rate (%)	50
Hydraulic Residence Time (HRS)	15.7
Volumetric Loading (LBS BOD/1000 CF)	16.6
MLSS (mg/l)	4,814
Total MLSS (LBS)	19,508
Volatile SS (%)	81.2
MLVSS (mg/l)	3,909
Total MLVSS (LBS)	15,840
F/MLVSS	0.07
Waste Sludge (GPD)	8,302
RAS Concentration (%)-Estimate	1.0
Waste Sludge (LBS/DAY)	692
SRT (DAYS)	28.2
Sludge Yield (LBS TSS/LB BOD REM)	0.68
Horsepower Required (HP)	38
AEROBIC DIGESTION CHANNEL DATA	
Volume (CF)	38,191
Volume (GALS)	285,669
OPERATING DATA AEROBIC DIGESTION CHANNEL	
Volumetric Loading (LBS VSS/100 CF)	14.7
HRT (DAYS)	34.4
Digested Sludge Removal	
Avg. GPD	2,362
Avg. LBS/DAY	395
Concentration(%)	2.0
TSS Reduction (%)	42.9
Solids Under Aeration (LBS)	47,650
SRT (DAYS)	121
FINAL CLARIFIER DATA	
Number of Units	2
Diameter (FT)	40.0
Side Water Depth	11.0
Surface Area (SF)	
Each	1,257
Total	2,513
Weir Length (FT)	
Each	126
Total	251

TABLE 4-13
EXISTING DESIGN PARAMETERS

OPERATING DATA **FINAL CLARIFICATION**	Average	Peak
Hydraulic Residence Time (HRS)	4.7	6.1
Surface Overload Rate (GPD/SF)	550	1,652
Solids Loading Rate (@ 50% Recycle-LBS/DAY/SF)	17.9	19.1
Weir Loading Rate (GPD/FT)	5,513	16,434

Chlorination	
Type	Sodium Hypochloride
Number of Feed Pumps	2
Capacity (each)	20 gallons per hour
Storage Capacity	3,000 gallons
Contact Tanks Capacity	44,880 gallons
Detention Time (Average)	47
Detention Time (Peak)	15
Dechlorination	
Type	Sodium Bisulfite
Number of Feed Pumps	2
Capacity (each	20 gallons per hour
Storage Capacity	3,000 gallons
SLUDGE HANDLING FACILITY	
Sludge Pumps	
Progressive Cavity Type	3
Number	1) GBT Feed Pump
Description	2) Thickened Sludge Transfer Pump 3) Swing Pump for 1) and 2)
Type	Progressive Cavity
Capacity (gpm)	75 to 350
Drive	Variable Frequency
SLUDGE HANDLING FACILITY (Cont'd)	
Sludge Pumps	2
Positive Displacement Type	1) Pumping sludge into existing sludge storage tank
Number	2) Transferring sludge from the existing storage tank
Description	to a transport vehicle
Type	Double Disc
Drive	V-belt
Capacity (gpm)	150 - 200

TABLE 4-13
EXISTING DESIGN PARAMETERS

Gravity Belt Thickener		
Number	1	
Size, meters	2	
Mode of Operation	1	2
GBT Feed		
Sludge Type	ADS	WAS
Feed Solids (%)	1.5	0.5
Solids Loading (lb/hr/in)	1,126	500
GBT Discharge		
Solids (lb/hr/in)	1,103	490
Solids (%)	6	5
Waste Solids to GBT (gals/wk)	51,199	204,796
GBT Operating Time		
Hours/week	2.84	8.53
Days/week	1	2
Thickened Sludge Volume		
Gallons/week	12,544	20,070
Gallons/day (5 days basis)	2,509	4,014
Available Storage (gals.)	20,000	20,000
Available Capacity (days)	11.2	7.0
Polymer System		
Type	Dry or liquid batch make-up	
Feed Points	GBT Influent Line	
Average Polymer Solution Required Per Sludge Type (gal/day):		
Digested WAS from Storage	647	
WAS from Storage	647	
WAS from RAS Line	431	
a) Polymer Solution Tanks		
Number	2	
Capacity per unit (gals.)	290	
Polymer System (Cont'd)		
b) Polymer Tank Mixers		
Number	2	
c) Polymer Feed Pumps		
Number	2	
Type	Progressive Cavity	
Capacity (gpm)	0.5 - 5	
Drive	DC Drive w/SCR Controller	

TABLE 4-13
EXISTING DESIGN PARAMETERS

Plant Water System	
Plant Water Pumps	
Number	Present: 3
Type	Centrifugal
Capacity	2 @ 80 gpm
Hydropneumatic Tank	
Type	Diaphragm
Capacity (gals.)	88
Pressure Range (psi)	40 - 60
Permanganate System	
Permanganate Feed Pumps	
Number	4
Type Capacity (gpm)	0 - 20
Mixing Tank	
Number	1
Capacity (gals.)	35
Permanganate Solution Mixer	
Number	1
Thickened Sludge Storage Well Aeration System	
Blower	
Number	1
Type	Positive Displacement
Capacity (scfm)	80
Pressure (psi)	7
Diffuser System	
Type	S.S. Coarse Bubble

The grit collection system is situated downstream of the filter screen. The grit system is designed to remove sand, gravel, cinders or other heavy solid materials that have subsiding velocities substantially greater than those of the organic putrescible solids in wastewater. The grit collection system provides protection for the mechanical equipment from abrasion and accompanying abnormal wear; to reduce formation of heavy deposits in pipelines, channels and conduits.

Influent Pump Station

Following the preliminary treatment, the flow is directed into either Wetwell No. 1 or No. 2 of the influent pump station. The pump station is of a dry pit design and contains two (2) variable and one (1) constant speed 25 horsepower pumps which lift the wastewater into the oxidation ditches. At the present, the facility performs satisfactorily, however, due to its age (mechanically), the system must be upgraded.

Aeration System

The aeration system facility involves an oxidation ditch which is composed of four (4) concentric channels. The outer-most channel is used as an aerobic digestion channel. The three inner channels are utilized as the aeration tanks.

In the aeration channels, the wastewater is mixed with the biological solids and undergoes further treatment. From the aeration channels, the wastewater is directed to the two secondary clarifiers, where the biological solids are separated from the liquid. Three separate return sludge pumps lift the settled biological solids back to the aeration tanks or to the aerobic digester.

In a biological system, excess solids must be removed to maintain a system balance. Presently, excess solids are wasted to the aerobic digester where further treatment is provided. Again, "brush" mechanical aerators are provided for mixing and oxygen transfer. The aerobic digester solids are pumped to a holding tank, thickened by a gravity belt thickener, and hauled off-site by a private contractor where the thickened liquid sludge is incinerated.

The secondary influent can be directed to either the first or second aerator channel and the return sludge can be added to the aerobic digester or first channel. These piping arrangements allow the plant staff to operate the system in the "plug flow" or "contact stabilization" modifications of the activated sludge process. Traditionally, a "plug flow" mode of operation is used by the plant staff.

The rate of oxygen transfer and the degree of mixing provided by a "brush" system are controlled by available horsepower, the number of and length of rotors, depth of submergence and rotor speed. The depth of submergence and the speed of the brush aerators can be adjusted to vary the amount of air supply to the system.

Each rotor is 42-inches in diameter. Two (2) 32-foot long, 30 horsepower units mix and aerate the outer aeration channel and aerobic digester. Two (2) 25-foot long, 25 horsepower units mix and aerate the interior two aeration channels. The total horsepower applied to the aeration channel is 80 horsepower. Given standard transfer efficiencies for "brush" aerators, approximately 38 horsepower is required to treat the current average daily BOD_5 load.

Secondary Clarification

The secondary clarifiers are of the high-rate sludge return design, utilizing updraft tubes. The updraft tubes are attached to, and spaced along, a V-plow scraper and continuously collect the sludge as it settles to the bottom. The discharge elevation of the updraft tubes are maintained below the water surface so that the hydraulic pressure continually forces the settled sludge into the updraft tubes and into the sightwell, where the sludge is directed into a draw-off pipe to the return sludge pumps. The effluent from the clarifiers passes over peripheral V-notch weirs and into the effluent channel.

Operating experience with the secondary clarifiers has indicated that the system can perform satisfactorily and without solids carry-over with instantaneous peak flows up to 2.0 MGD. This translates to overflow rates of approximately 350 gallons per day per square foot. Final clarifiers should be able to operate satisfactorily at hydraulic loading rates of up to 800 gallons per day per square foot based on average daily flow condition, and 1,800 gallons per day per square foot at peak flow condition.

Three (3) return sludge pumps are located in the Control Building to recycle the biological solids from the clarifiers back to the aeration tanks. The pumps are also used to pump scum and waste sludge to the aerobic digester. Each pump has a rated capacity of approximately 365 GPM. Generally, a return sludge rate is set between 30 to 50 percent of the influent flow rate is used. Given the current plant loadings, these rates are consistent with other plants of this nature.

The return sludge pumps are operated manually by adjusting the motor-drive setting for each pump. The scum generated in the secondary clarifier is sent to the holding tanks for processing with the sludge.

Disinfection System

The disinfection system (chlorination and dechlorination) was upgraded in 1995 to meet RIDEM's new Total Residual Chlorine (TRC) limit of 325 µg/l. The upgrade involved the use of 15% solution of sodium hypochloride for fecal reduction and 35% solution of sodium bisulfite to reduce the residual chlorine to 325 µg/l.

The sodium hypochloride solution is injected into the entrance of the chlorine contact chamber. At this location, the sodium hypochloride solution mixes with the effluent from the two secondary settling tanks. The process control is accomplished by the use of High Resolution Redox (HRR). Oxidation Reduction Potential (ORP) is based on millivolt readings or potential created across a bipolar electrode. These millivolt readings are a unit of electromotive force (EMF) generated by adding chlorine to water. Higher voltage readings correspond to higher concentrations of chlorine in solution. The system responds directly to the balance between oxidizers (chlorine) and the reducers (contaminants). The ORP sensing electrode is immersed in the water to measure the electrical potential of the oxidizers present. This potential is then displayed in millivolts. The ORP system monitors and controls the chlorine feed based on the immediate changes in chemical demand rather than on the residual obtained.

Due to the sensitive nature of the receiving waters, fecal coliform levels are to be taken at the end of the chlorine contact chamber prior to the effluent Parshall flume. The process delivers enough sodium hypochloride to sufficiently destroy or inactivate the indicator bacterial that signal the likely presence of pathogens. The main objective of the chlorination process is to destroy pathogenic organisms. However, coliform bacteria, which are often used as indicators, are not pathogenic. The indicator bacteria inactivation concept works because coliform

and other indicator bacterial are much easier to detect than pathogens and more difficult to destroy than most pathogenic organisms, except possibly viruses. The coliform count must be sufficiently reduced through disinfection to corresponding organisms (400 col/100 ml.).

Total Residual Chlorine (TRC) in excess of 325 µg/l have been found to be toxic to fish and other aquatic life in the receiving waters. Sodium bisulfite is used to counteract the effect of residual chlorine. A 34% solution of sodium bisulfite is injected upstream of the effluent Parshall flume. The Parshall flume is used to mix the sodium bisulfite into the effluent. As a result of the rapid mixing time, the effluent can be measured for TRC just downstream of the Parshall flume prior to leaving the chlorine contact tank.

The sodium hypochloride and sodium bisulfite are stored in 3,000 gallon double-wall polyethylene tanks. The chlorine contact chambers share a common inlet that is designed with a jet mixing system to improve disinfection. The total tank volume is 44,800 gallons. Under the current flow conditions, the detention time for the average daily flow of 0.702 MGD is 92 minutes, and 21 minutes for the peak daily flow rate of 3.0 MGD.

The existing chemical storage capacity to feed sodium hypochloride and sodium bisulfite at maximum recommended dosage rates is sufficient to meet the existing and design conditions. The overall efficiency of the disinfection process is within the regulatory standard requirements.

Existing Outfall

The existing outfall from the Scarborough WWTF consists of a subaqueous segment of approximately 2,200 feet of 22-inch polyethylene pipe extending from the shore to a multiport diffuser in the Atlantic Ocean. The outfall diffuser is located at the end of the polyethylene pipe and consists of three (3) 1-foot diameter ports at the floor of the ocean spaced at 10-foot intervals. The ports all discharge parallel to the bottom in an easterly direction. The mean low water depth of the ports is about 20-feet.

Sludge Handling System

Excess solids are wasted to the aerobic digester. The operation of an aerobic digester is similar to the activated sludge process. As the supply of food is depleted in the digester, the microorganisms begin to consume

themselves to obtain energy. As tissue is consumed, carbon dioxide, water and ammonia are produced. As the process continues, the ammonia is reduced further to nitrates.

Usually, solids reductions in the neighborhood of 20 to 40 percent can be obtained through aerobic digestion. Warm temperatures, high dissolved oxygen levels and long detention times are required to achieve higher solids reductions. The solids content in a properly operated digester will range from 1 to 2 percent.

From the digester, waste solids are pumped to Sludge Storage Tank No. 1 where air is added to allow the sludge in the storage tank to remain in suspension.

The gravity belt thickener feed pumps withdraws the sludge from Storage Tank No. 1 and delivers it for processing at the thickener. The thickened sludge is discharged into the thickened sludge Storage Tank No. 2 and the filtrate flows back to the influent pump station.

The thickened sludge Storage Tank No. 2 is also provided with an air mixing system. A thickened sludge pump is provided to pump the thickened sludge out of the storage tank to the sludge transporting vehicle where it is then hauled by a private contractor for incineration. This system (installed in 1991) will meet the needs of the Treatment Facility for the foreseeable future.

4.3.2.3 OVERALL EVALUATION

Treatment Plant Performance

The overall performance of the Scarborough Treatment Plant has improved significantly since the 1990 Facilities Plan was completed. The Scarborough Plant has consistently produced an effluent quality below the permit limits for BOD_5 and Total Suspended Solids. The improved operation can be attributed to the implementation and enforcement of the following items.

- The implementation and enforcement of the Town's Industrial Pretreatment Program - In the mid 1990's, the industrial contribution from the fishing industry was responsible for approximately 80% of the organic loading (BOD_5 and TSS) while representing only 20% of the hydraulic loading to the facility. This resulted in high concentrated fish waste being processed at the facility which caused significant operational problems

for the facility. At this time, each of the fish processors are utilizing a pretreatment system that reduces the organic loadings to below the domestic concentration before it is discharged to the facility.

- An aggressive inflow/infiltration program resulted in an overall reduction of influent to the plant. The one significant project undertaken was the Fort Green area. Even with the addition of approximately 24,700 gallons per day from the Point Judith Area, the current average daily flow for the last three years has been 640,000 GPD, representing a 14% reduction from the 1990 Facilities Plan flows of 745,000 GPD.

- Plant improvements, such as new influent mechanical headwork screens, installation of variable frequency drives for the brush aerators, installation of a sludge thickening facility, and modifications to the Chlorination and Dechlorination Facility.

- A pro-active role by the treatment plant staff in the operations of the Treatment Facility.

- The addition of a sludge storage and thickening facility and the reduction in I/I has resulted in the elimination of the problems with the secondary clarifiers that would overflow solids affecting the performance of the clarifier - This is the primary reason plant performance improved (currently, waste between 0.040 - 0.060). Before the solids handling building was constructed, wasting was severely limited.

Table 4-14 summarizes performance parameters for the existing treatment facilities based on the Fiscal Year 2005 operating records at average month flow, minimum month BOD_5 load and maximum month BOD_5 load conditions.

Sampling and Testing Procedures

The RIPDES permit for the Scarborough WWTF requires that influent and final effluent characteristics at the plant are tested based on 24 hour composite samples. This requirement is satisfied through the use of two (2) automatic influent and effluent samplers. A third sampler is of the portable type and is utilized for sampling associated with periodic bioassay and pretreatment tests.

Laboratory

The laboratory equipment and supplies are of sufficient floor space and capacity to match the testing requirements of the current Scarborough RIPDES permit.

TABLE 4-14
EXISTING ACTIVATED SLUDGE SYSTEM

	2005	
INFLUENT DATA		
Influent Flows (MGD)		
Average Daily	0.71	
Peak Hourly	2.57	
Influent BOD (lbs/day)	761	
Influent TSS (lbs/day)	836	
Influent BOD (mg/l)	138	
Influent TSS (mg/l)	153	
	Permit	Actual
Effluent BOD (mg/l)	30	5
Effluent BOD (lbs/day)	176	30
Effluent TSS (mg/l)	30	8
Effluent TSS (lbs/day)	176	47
PRELIMINARY TREATMENT		
Bar Rack	1	
No. of Units		
Depth of Flow	0.29	
Average Daily (ft)	0.88	
Peak Hourly (ft)		
Fine Screen		
No. of Units	1	
Capacity (MGD)	3	
Flow (MGD)		
Average Daily	0.71	
Peak Hourly	2.57	
Existing Grit Chamber		
No. of Units	1	
Capacity (MGD)	4.0	
Flow (MGD)		
Average Daily	0.71	
Peak Hourly	2.57	

TABLE 4-14
EXISTING ACTIVATED SLUDGE SYSTEM

	2005
PRELIMINARY TREATMENT (Continued)	
Pump Station [1]	
No. of Pumps	3
Total Capacity (MGD)	5.8
Flow (MGD)	
Average Daily	0.71
Peak Hourly	2.57
AERATION TANKS	
Basin Volume	
First Channel	29,990
Second Channel	20,383
Third Channel	14,585
Digester Channel	38,191
Total Tank Volume (cf)	103,149
Total Tank Volume (gals)	771,555
AERATION BASIN OPERATING DATA	
Volumetric Loading *	
(lbs BOD/1000 CF)	7.46
HRT (hrs) **	26.4
MLSS (mg/l)	4,000
Total MLSS (lbs)	25,739
Volatile SS (%)	80
MLVSS (mg/l)	3,200
Total MLVSS (lbs)	20,591
SRT (days) ***	20.0

[1] Maximum firm capacity of the existing pump station (2 pumps in operation) is 4.0 MGD. All 3 pumps operating simultaneously can handle peak flows of up to 5.8 MGD.

* Maximum 17 lbs BOD/1000 CF permissible for extended aeration system (MOP-8).

** Minimum 20 hours required for extended aeration system (MOP-8)

*** Recommended range for extended aeration system is 20 to 30 days.

TABLE 4-14
EXISTING ACTIVATED SLUDGE SYSTEM

DESIGN CONDITION	FY 2005 AVG BOD LOAD	FY 2005 MIN BOD LOAD	FY 2005 MAX BOD LOAD
Existing Activated Sludge System - Mechanical Surface Aerators (Rotors)			
ACTUAL OXYGEN REQUIRED (AOR)			
Influent BOD Load (lbs/day) [1]	761	150	1,922
Lbs Oxygen/Lb BOD Applied	1.5	1.5	1.5
AOR (lbs/day)	1,153	576	2,884
STANDARD OXYGEN REQUIRED (SOR)			
Liquid Temperature (DEGS C)	20	15	20
Basin DI Cl (mg/l)	2.0	1.0	1.0
Std Oxygen SatCs (mg/l)	9.17	9.17	9.17
Site Oxygen SatCsw (mg/l)	9.17	10.15	9.17
ALPHA	0.80	0.90	0.80
BETA	0.90	0.90	0.90
THETA	1.024	1.024	1.024
AOR/SOR	0.55	0.71	0.63
SOR (lbs/day)	2,096	406	4,580
HORSEPOWER REQUIREMENTS			
Oxygen Transfer (lbs/oxy per hp per hour)	3.4	3.4	3.4
Drive Efficiency (%)	95	95	95
Horsepower Required	27	10	47
Horsepower Available	80	80	80

[1] Min. BOD Load equals 50 percent of average BOD load. Max BOD load equals 200 percent of average BOD load.

TABLE 4-14
EXISTING ACTIVATED SLUDGE SYSTEM

	2005
FINAL CLARIFIERS	
OPERATING DATA	
Influent Flow (MGD)	
Average Daily	0.71
Peak Hourly (@ 3 Times Avg.)	2.57
FINAL CLARIFIER DATA EXISTING	
No. of Units	2
Diameter (ft)	40
Side Water Depth (ft)	11.0
Volume (gals)	
Each	103,396
Total	206,792
Surface Area (sf)	
Each	1,256
Total	2,512
Weir Length (lf)	
Each	126
Total	251
OPERATING DATA	
FINAL CLARIFICATION	
No. of Clarifiers	2
Surface Overflow Rate (gpd/sf)	
@ Average Daily Flow [1]	283
@ Peak Hourly Flow [2]	1,023
Weir Loading Rate [3] (gpd/lf)	
@ Average Daily Flow	2,828
@ Peak Hourly Flow	10,239

1 Maximum permissible Surface Overflow Rate at average daily flow condition is 800 gpd/sf.
2 Maximum permissible Surface Overflow Rate at peak flow condition is 1,800 gpd/sf.
3 Maximum permissible Weir Loading Rate is 30,000 gpd/lf

TABLE 4-14
EXISTING ACTIVATED SLUDGE SYSTEM

	2005
CHLORINATION	
OPERATING DATA	
Flow (MGD)	
Average Daily (ADF)	0.71
Peak Hourly (@ 3 Times ADF)	2.57
CONTACT CHAMBER DATA	
Total Volume (gals)	44,880
Total Volume (cf)	6,000
OPERATING DATA	
Detention Time (min.)	
@ ADF	91
@ PHF	25
SODIUM HYPOCHLORIDE	
Gallons per day	32
mg/l	167
SODIUM BISULFITE	
Gallons per day	10
mg/l	5

TABLE 4-14
EXISTING ACTIVATED SLUDGE SYSTEM

	2005
SLUDGE GENERATION	
Waste Activated Sludge	
Sludge Yield (lbs TSS/lf BOD REM)	1.30
% Solids	1.0
Gallons per Day (winter)	40,000
Gallons per Day (summer)	60,000
GRAVITY BELT THICKENER	
Effective Width (m)	2.0
Sludge Feed Rate (gpm)	300
Period of Operation (hrs/wk)	5.9
Efficiency (%)	95
Thickened Sludge Solids (%)	5.0
Thickened Sludge (gals/wk)	20,317
Thickened Sludge (gals/day)	4,063
Loads per Week (@ 2,300 gals)	8.8
Loads per Day 2 (@ 2,300 gals)	1.8
SLUDGE STORAGE	
Existing Tank Volume (gals)	
Waste Activated Sludge	69,000
Thickened Sludge	18,000
Storage Capacity (days)	
Waste Activated Sludge	4.3
Thickened Sludge	4.2

Operating Staff

In accordance with an approved O&M Manual, the plant should be staffed with six (6) employees (i.e., Superintendent, Foreman, two (2) Operators and two (2) Laborers). The present personnel organization includes eight (8) employees as follows:

- Superintendent (1)
- Process Control/Pretreatment Coordinator (1)
- Working Foreman (1)
- Maintenance Supervisor (1)
- Operators (4)

The present staffing is sufficient to handle daily operations, process control and maintenance of the Wastewater Treatment Facilities. However, additional employees will be required to establish a preventive maintenance program for the collection system. At this time, the Town does not have the ability to conduct any significant routine maintenance on their collection system.

Currently, the crew of operators operate and maintain the Scarborough WWTF along with eighteen (18) pump stations and associated collection system. The operators are also assigned on a rotating schedule to perform routine laboratory analysis on weekends and standby for same.

Maintenance Program

The corrective maintenance tasks represent a majority of maintenance currently conducted at the plant. The preventive maintenance program includes greasing and lubrication, and a periodic replacement of crucial components of drive mechanisms, gear boxes, etc. The plant personnel understand the need for improvements in the overall maintenance program where the majority of efforts should be shifted from corrective to preventive maintenance. The implementation of the computerized preventive maintenance system has allowed the management to keep track of equipment maintenance history, carry out the preventive maintenance tasks in an efficiently scheduled manner and assure that all the tasks recommended by manufacturers are being completed on time so that the costly corrective maintenance can be reduced as much as possible.

4.3.3 INDUSTRIAL IMPACT

The Town has made significant progress in the area of Industrial pretreatment and enforcement. Prior to 2000, the industrial wastewater from the Port of Galilee represented approximately 20% of the flow to the plant and over 80% of the organic loading. With the implementation of pretreatment by the two remaining fish cooperatives, the wastewater volume has been reduced from 200,000 gpd to 36,000 gpd, and the organic loads was reduced to below domestic levels (49 mg/l for BOD_5 and 32 mg/l for TSS).

The continued enforcement of the industrial pretreatment standards will ensure the operation and performance of the treatment facility is not impacted from the potentially heavy organic and solids concentrations and their daily variations.

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5.0 FUTURE CONDITIONS

5.1 FUTURE SEWERED POPULATION AND SERVICE AREA

The projection of population is based on a host of differing objective and subjective factors. This task is made especially difficult in a community like Narragansett, where fluctuations due to the influx of summer residents and winter rentals to college students tend to skew normal analyses. Table 5-1 presents the 2000 census figures for the Town of Narragansett.

TABLE 5-1
TOWN OF NARRAGANSETT AND WASHINGTON COUNTY POPULATION
U.S. CENSUS 2000

	1980	1990	2000
Narragansett	12,088	14,985	16,361
Washington County	93,317	107,573	123,456
State	947,154	1,003,464	1,048,319

Source: R.I. Statewide Planning Program, Rhode Island Population Totals by County, City & Town and U.S. Census 2000

A comparison of the 2000 Census data to the previous population studies (Mount Vernon and 1992 Wastewater Management Facilities Plan) finds that the population has decreased when in fact this is not the trend. The Town continues to raise concerns with the latest population figures generated by the U.S. Census Bureau. The 2000 Census had been conducted during the off-season, when 22% of the housing units were not occupied. If the 2000 Census was to be used, the number of persons per housing unit would translate to 1.79 persons (16,361 persons ÷ 9,159 housing units). The same report, prepared by the Census Bureau, calculated an occupancy rate for the Town at 2.42 persons per dwelling unit. Based upon the 2.42 persons occupancy rate and the 9,159 housing units, the projected population should be 22,165.

For the purpose of forecasting the future wastewater needs, this report will use the occupancy rate of 2.42 persons per dwelling unit combined with the number of new and existing homes that will connect to sewers in the future. The Town has an informal policy that sewers will be provided for the entire Town, as capacity allows. Therefore, the future needs will be incrementally added to the new construction figures, provided by the Town, and a stage tie-in for existing ISDS systems. This will be established for the north and south end of Town.

The Town's data base provides a wastewater generation per residential housing unit for the north end and south end. The north end sewer system generates 215 gallons per housing unit per day, while the south end sewer system generates 260 gallons per housing unit per day. This data, along with the future number of housing units, provide insight to the future wastewater production.

The future service area in the North End Sewer System is based on the Town providing sewers for the entire north end with the exception of Plat N-B West Passage. For the south end, the Town is planning to provide sewers for the entire south end with the exception of Plat I-J Jerusalem. Figure 5-1 illustrates the future service areas for the entire Town. In addition to these two areas, the Coastal Resources Management Council prohibits the installation of municipal or private sewers in lands designated as Critical Concern and Self-sustaining, as identified in Section 920.1 of the CRMC Narrow River (North End Sewers) and Salt Pond Region (South End) Special Area Management Plans unless all of the following conditions are met:

(i) the property meets the RIDEM regulatory siting requirements for the installation of a conventional ISDS,

(ii) the proposal is agreeable to both the Town and the CRMC,

(iii) a deed restriction is attached to the property ensuring no further subdivision, and

(iv) the properties to be sewered are within 500 feet of an existing sewer line or are within a subdivision which abuts the sewer easement.

Any municipal or private sewer line extension within CRMC designated Critical Concern or Self-sustaining lands must meet the four above conditions and obtain approval from the CRMC. Moreover, the construction of new or extension of existing sewer lines and facilities anywhere within the Narrow River SAMP boundary requires the review and approval of the CRMC in accordance with Section 325 of the RI Coastal Resources Management Plan.

Figure 5-2 overlays the future sewered areas and those areas of either Critical Concern or Self-sustaining land. In the North End, the areas identified as Critical Concern and Self-sustaining are located west of Route 1A. They are portions of Plats N-3, N-A, N-G, N-Q, N-L, A, K, P, Z and all of Plats O, N-O, N-M, B and X. In the South End, the areas identified as Critical Concern and Self-sustaining are located west of Point Judith Road. They are portions of plats.

LEGEND:

EXISTING SEWERED AREAS

FUTURE SEWERED AREAS

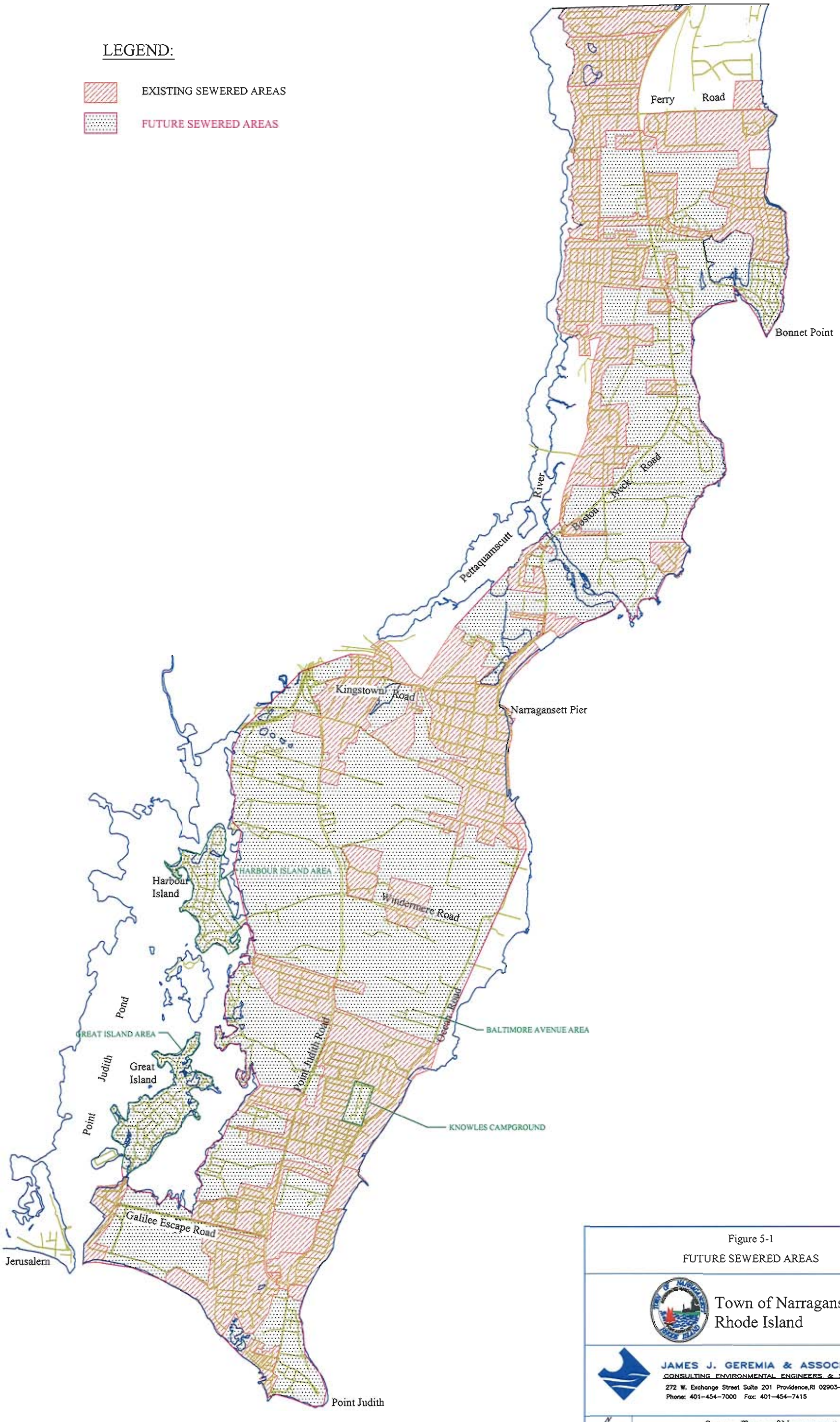

Figure 5-1

FUTURE SEWERED AREAS

Town of Narragansett
Rhode Island

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
272 W. Exchange Street Suite 201 Providence,RI 02903–1025
Phone: 401–454–7000 Fax: 401–454–7415

Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

LEGEND:

- FUTURE SEWERS
- (#) NUMBER OF EXISTING DWELLINGS
- [#] NUMBER OF VACANT LOTS
- AREAS OF CRITICAL CONCERRN
- DEVELOPED BEYOND CARRYING CAPACITY
- SELF SUSTAINING LANDS

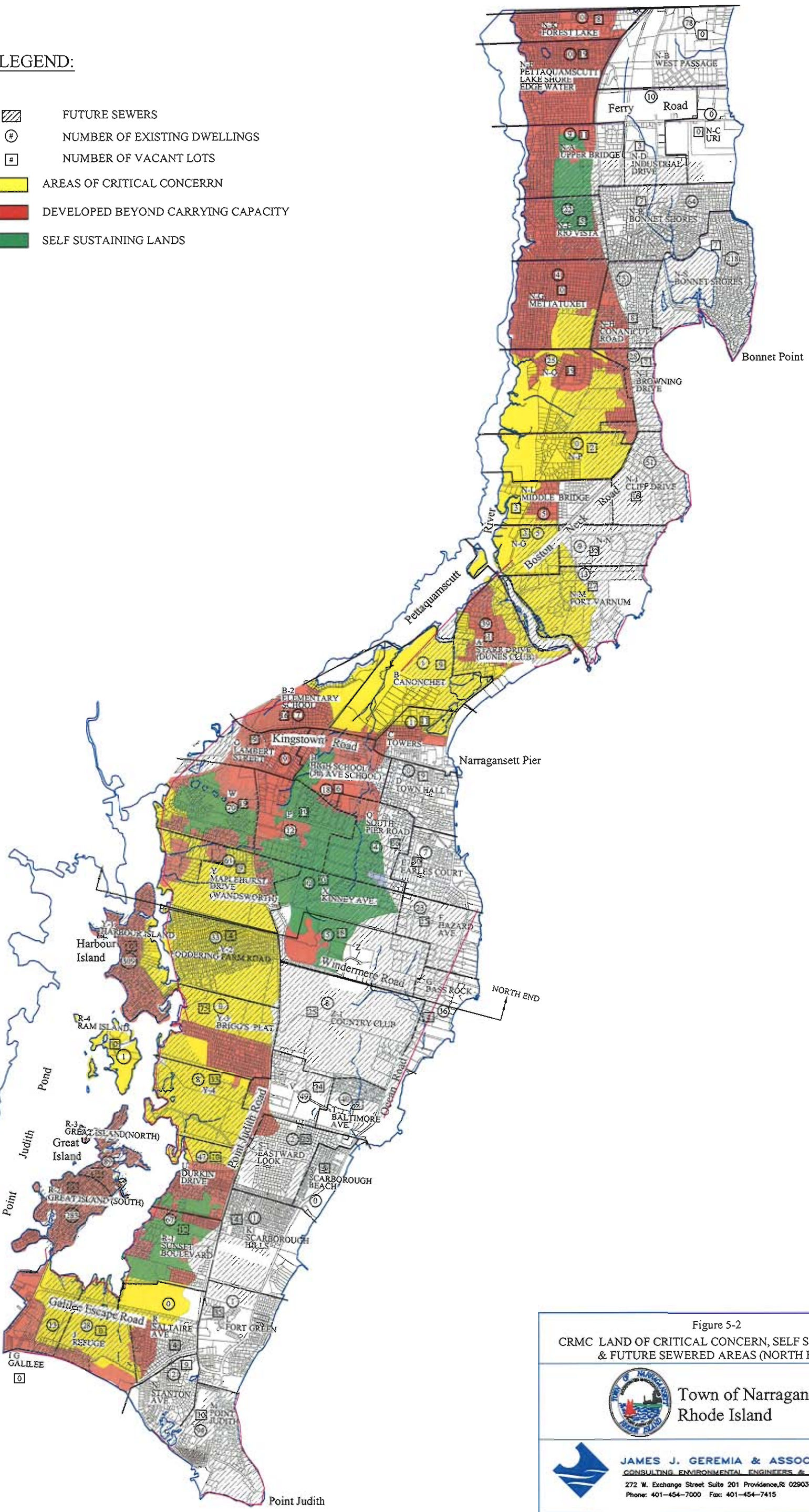

Figure 5-2
CRMC LAND OF CRITICAL CONCERN, SELF SUSTAINING & FUTURE SEWERED AREAS (NORTH END)

Town of Narragansett
Rhode Island

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
272 W. Exchange Street Suite 201 Providence,RI 02903-1025
Phone: 401-454-7000 Fax: 401-454-7415

Source: CRMC Narrow River and Salt Pond S.A.M.P.

Date: 2007

Scale: 1"= 3500'±

Since these areas still have the potential be serviced by sewers (if they meet CRMC conditions), the future flow projections will assume they will be connected to either the South Kingstown Regional Wastewater Treatment Facility of the Scarborough Wastewater Treatment Facility. For the purposes of this study, it is assumed that 100% of a future service area will be sewered at build-out. Table 5-2 indicates corresponding sewered populations will reach 24,543 in 2025.

TABLE 5-2
EXISTING AND FUTURE SEWERED POPULATION

NARRAGANSETT	2005	2010	2015	2020	2025
North End Sewer System Population	12,066	12,797	13,552	14,341	15,127
North End Housing Units	4,976	5,288	5,600	5,926	6,251
South End Sewer System Population	5,358	6,604	8,635	9,024	9,416
South End Housing Units	2,214	2,729	3,568	3,729	3,891
Total Population	**17,424**	**19,401**	**22,187**	**23,365**	**24,543**
Total Housing Units	**7,190**	**8,017**	**9,168**	**9,655**	**10,142**

Note: Population is based on 2.42 persons per housing unit.

5.2 FUTURE LAND USE

The 2005 Comprehensive Plan states that the buildout projections were prepared to assess the potential for future residential growth in Narragansett. This type of analysis evaluates the entire land area of the Town for its development potential under current zoning regulations. The estimates are based on land ownership and regulated zoning densities.

Estimates were developed by:

- Identifying land that is potentially developable in the future;
- Evaluating the environmental (or other) constraints that may limit development of that land (wetlands, watercourses, water bodies, slopes in excess of 25%, 100-year floodplain, or soils with a seasonally high water table within 18" of the surface that are not currently sewered, nor scheduled to be sewered within the next ten years); and
- Determining the amount of development allowed under the existing zoning regulations.

The land use survey found that 1,856 acres of land in Narragansett (21% of the community) are potentially developable in the future because they are vacant, not presently developed to their full potential, or might be converted to another use in the future.

The Town's consultant for Planning (Planimetric) has estimated the potential buildout projection to be an additional 600 to 1,800 units in the future. This range reflects, at the low end, the amount of "buidable" land area in conforming lots in the different zoning districts and, at the high end, the potential resulting from development of pre-existing lots. Since the buildout potential of any pre-existing lot is so dependent on site specific characteristics (physical, regulatory, and economic), it is difficult to be more specific. Clearly the variation in buildout potential is highest in areas with a large number of pre-existing lots.

5.3 FUTURE INFILTRATION AND INFLOW

The existing infiltration/inflow values are incorporated for the North End and South End Sewer Collection Systems. For those areas currently not sewered in the South End, a per housing unit rate of 60 GPD was used (2.42 persons per housing unit x 25 gallons per person per day). Table 5-3 illustrates the amount of I/I that will be generated.

TABLE 5-3
SUMMARY OF INFILTRATION/INFLOW COMPONENTS

	NORTH END SEWER SYSTEM	SOUTH END SEWER SYSTEM	TOTAL
Present (2004)			
Infiltration	0.400	0.087	0.487
Inflow	0.683	1.048	1.731
Future (2025)			
Infiltration/Inflow	0.077	0.100	0.170
TOTAL	**1.160**	**1.235**	**2.388**

5.4 FUTURE FLOWS AND WASTELOADS

5.4.1 FUTURE FLOWS

In order to compute the future wastewater flows, the following assumptions have been made based on a realistic, but conservative, approach:

- The 2000 Census was conducted during the off-season when 22% of the dwellings were not occupied. In accordance with the 2000 Census, the occupancy rate was 1.79 persons per dwelling (16,361 persons ÷ 9,159 housing units). The Census Bureau also calculated an owner-occupied occupancy rate of 2.42 persons per unit, which is based on the occupied housing units but did not agree to a new population. The total sewered dwelling units are based on Town records which are accurate. Therefore, flows will be based on the gallons per day per dwelling unit in lieu of population.

- Present residential per dwelling wastewater flow selected for the computation is equal to 215 gpd per dwelling unit for the North End Sewer System and 260 gpd per dwelling unit for the South End Sewer System, based on the sewer flows obtained from the Narragansett Engineering Department.
- Based upon the existing plumbing code which promotes water conservation measures, it would continue to result in a stabilization of water consumption.

- Future residential per housing unit wastewater flow will be based on 300 gpd for the North End Sewer System and the South End Sewer System.

- Future infiltration will be increased by 60 gpd (25 gpdp x 2.42 persons per housing unit) for the future dwellings in the North End and South End Sewer Systems.

- Future inflow will remain at the current level.

- Peak flow factor for future residential, industrial and commercial flows is based on flow records from the Narragansett Sewer Department and TR-16.

- Future industrial flow is based on Town Council Resolution No. 85-33 (adopted 26 June 1985) which established a future reserve capacity of 150,000 gallons per day for the Port of Galilee in the South End (an annual increase of 10,000 gallons per day for 15 years). In the North End, the existing Industrial Park is at build-out, therefore, there are no further flows in the North End.

- Assumed 25 percent of the existing ISDS systems will connect during each 5-year period, therefore by the year 2025 all of the ISDS systems will be connected.

- Assumed 25 percent of the total number of dwellings at the build-out scenario per Planimetric will connect during each 5-year period resulting in all of the dwellings to be connected by the year 2025.

The future sewered population and housing units are comprised of two elements: the first being those existing housing units that are on ISDS, the second reflects the potential available land for new residential units.

Tables 5-4 and 5-5 provide a breakdown of the future sewered connections. The number of future connections are comprised of the number of dwelling units that exist and are on ISDS systems combined with the number of vacant parcels that could be built on with the Town's current zoning.

Utilizing previously presented housing unit projections by Planimetric, flows, infiltration/inflow rates and industrial/commercial flows, Tables 5-6 and 5-7 were calculated. Table 5-6 displays the anticipated future wastewater flows from the North End Sewer System and Table 5-7 displays the anticipated future wastewater flows through 2025 for the South End Sewer System.

5.4.2 FORECAST OF FUTURE WASTELOADS

The future waste load contributions for the years 2010, 2015, 2020 and 2025 were based upon the assumptions that per capital wasteloads of suspended solids and BOD_5 are essentially equal to the nationwide average per capita loadings of these constituents. These averages as reported in various sources are 0.17 pounds of BOD_5 per person per day, or 0.41 pounds per housing unit per day (0.17 lbs/day x 2.4 persons/housing unit) and 0.2 pounds of Suspended Solids per capita per day, or 0.48 pounds per housing unit per day (0.20 lbs./day x 2.4 persons/housing unit).

The loadings attributed to the industrial users, based upon the current data, are well below domestic concentrations. This condition is a result of the on-site treatment that exists at each of the industrial locations.

For the purpose of forecasting the future loading, the actual permitted loadings will be used to establish the industrial component of the Town's loading. Table 5-8 provides a composite of the average future wasteloads and concentrations for the Scarborough WWTF.

Table 5-9 provides a breakdown of the future organic loading attributed to the North End Sewers. The North End Sewers are not monitored separately at the South Kingstown facility, therefore, for the purpose of future loadings,

TABLE 5-4
FUTURE DWELLING UNITS (SOUTH END)

	2010 INCREMENTAL			2015 INCREMENTAL				2020 INCREMENTAL				2025 INCREMENTAL			
Plat	ISDS	FUTURE LOTS	Total ISDS + Develop-able	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2010 + 2015	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2015 + 2020	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2020 + 2025
G	9	1	10	9	1	10	20	9	1	10	30	9	1	10	40
I-G	3		3	3		3	6	3		3	9	4		4	13
I-J Jerus															
J	7		7	7		7	14	7		7	21	7		7	28
K	1	1	2		1	1	3		1	1	4		1	1	5
L	1	8	9		8	8	17		8	8	25		11	11	36
M	24	2	26	24	2	26	52	24	2	26	78	22	4	26	104
N	2	2	4		2	2	6		2	2	8		3	3	11
R		1	1		1	1	2		1	1	3		1	1	4
R-1	17	3	20	17	3	20	40	17	3	20	60	16	3	19	79
R-2 G1				283	1	284	284		1	1	285		1	1	286
R-3 G1				89		89	89				89				89
R-4															
S		1	1		1	1	2		1	1	3		2	2	5
*S-1	112	6	118		6	6	124		6	6	130		7	7	137
T Balt	40	1	41		1	1	42		7	7	49				49
U	13	2	15	13	2	15	30	13	2	15	45	11	4	15	60
V	12	8	20	12	8	20	40	12	8	20	60	13	10	23	83
Harbor Y1				309		309	309				309				309
Y2	8	1	9	8	1	9	18	8	1	9	27	9	1	10	37
Briggs Y3	171	34	205		17	17	222		17	17	239		7	7	246
Y4	2	8	10	2	8	10	20	2	8	10	30	2	9	11	41
Total	422	79	501	776	63	839	1,340	95	69	164	1,504	93	65	158	1,662

* Includes Knowles Campground (110 units)

TABLE 5-5
FUTURE DWELLING UNITS (NORTH END)

	2010 INCREMENTAL			2015 INCREMENTAL				2020 INCREMENTAL				2025 INCREMENTAL			
Plat	ISDS	FUTURE LOTS	Total ISDS + Develop-able	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2010 + 2015	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2015 + 2020	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2020 + 2025
A	10	1	11	10		10	21	10		10	31	9		9	40
B	1	2	3		2	2	5		2	2	7		3	3	10
B-2	2	4	6	2	4	6	12	2	4	6	18	1	4	5	23
C	1	3	4		3	3	7		3	3	10		2	2	12
D		2	2		2	2	4		2	2	6		3	3	9
E	2	7	9	2	7	9	18	2	7	9	27	1	9	10	37
F	6	3	9	6	3	9	18	6	3	9	27	5	6	11	38
H	5	1	6	5	1	6	12	5	1	6	18	3	3	6	24
N-A	3	3	6	3	3	6	12	3	3	6	18	1	2	3	21
N-B															
N-C															
N-D	3	1	4	3	1	4	8	3	1	4	12	1		1	13
N-E	5	1	6	5	1	6	12	5	1	6	18	7	2	9	27
N-F		5	5		5	5	10		5	5	15		4	4	19
N-G	1		1	1		1	2	1		1	3	1		1	4
N-H	38	2	40	38	2	40	80	38	2	40	120	38	2	40	160
N-I	7	2	9	7	2	9	18	7	2	9	27	7	1	8	35
N-J	13	4	17	13	4	17	34	13	4	17	51	12	4	16	67
N-K		2	2		2	2	4		2	2	6		2	2	8
N-L	1	1	2	1	1	2	4	1	1	2	6	2		2	8
N-M	3	7	10	3	7	10	20	3	7	10	30	4	6	10	40
N-N	2	9	11	2	9	11	22	2	9	11	33	3	8	11	44
N-O	1	1	2	1	1	2	4	1	1	2	6	2		2	8
N-P									1	1	1		1	1	2
N-Q	7	5	12	7	5	12	24	7	5	12	36	5	4	9	45
N-R	16	2	18	16	2	18	36	16	2	18	54	16	1	17	71
N-S	55	2	57	55	2	57	114	55	2	57	171	53	1	54	225
O	2	2	4	2	2	4	8	2	2	4	12	4	3	7	19
P	3	2	5	3	2	5	10	3	2	5	15	3	4	7	22
Q	1	9	10	1	9	10	20	1	9	10	30	1	9	10	40
W	18	4	22	18	4	22	44	18	4	22	66	16	7	23	89
Y	15	2	17	15	3	18	35	15	2	17	52	16	2	18	70
X															
Z	1	2	3	1	2	3	6	1	2	3	9	2	2	4	13
Z-1	2		2	2		2	4	2	12	14	18	3	13	16	34
Total	224	91	315	222	91	313	628	222	103	325	953	216	108	324	1,277

TABLE 5-6
ANTICIPATED FUTURE FLOWS BY CONTRIBUTOR TO THE SOUTH KINGSTOWN REGIONAL WWTF
(NORTH END SEWER SYSTEM)

	FY 2005		2010		2015		2020		2025	
	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly
	(MGD)		(MGD)		(MGD)		(MGD)		(MGD)	
North End Sewer System										
Residential/Commercial	0.920	2.300	1.015	2.536	1.108	2.771	1.206	3.015	1.303	3.258
Industrial	0.020	0.050	0.020	0.050	0.020	0.050	0.020	0.050	0.020	0.050
Infiltration	0.400	0.400	0.419	0.419	0.438	0.438	0.457	0.457	0.477	0.476
Inflow	0.000	0.683	0.000	0.683	0.000	0.683	0.000	0.683	0.000	0.683
TOTALS	**1.340**	**3.433**	**1.454**	**3.688**	**1.566**	**3.942**	**1.683**	**4.205**	**1.800**	**4.467**

TABLE 5-7
ANTICIPATED FUTURE FLOWS BY CONTRIBUTOR TO THE SCARBOROUGH WASTEWATER TREATMENT FACILITY
(SOUTH END SEWER SYSTEM)

	FY 2005		2010		2015		2020		2025	
	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly
	(MGD)		(MGD)		(MGD)		(MGD)		(MGD)	
South End Sewer System										
Residential/Commercial	0.587	1.345	0.737	1.843	0.989	2.472	1.038	2.595	1.085	2.713
Industrial	0.036	0.090	0.086	0.215	0.136	0.340	0.186	0.465	0.186	0.465
Infiltration	0.087	0.087	0.117	0.117	0.167	0.167	0.177	0.177	0.187	0.187
Inflow	0.000	1.048	0.000	1.048	0.000	1.048	0.000	1.048	0.000	1.048
TOTALS	**0.710**	**2.570**	**0.940**	**3.223**	**1.292**	**4.027**	**1.401**	**4.285**	**1.458**	**4.413**

TABLE 5-8
AVERAGE FUTURE WASTELOADS AND CONCENTRATIONS
SOUTH END SEWER SYSTEM (SCARBOROUGH WWTF)

		2005	2010	2015	2020	2025
Residential/C (lbs./day)	BOD_5	752	957	1,301	1,368	1,433
	TSS	780	1,021	1,424	1,503	1,573
Industrial [1, 2] (lbs./day)	BOD_5	17	627	627	627	627
	TSS	9	147	177	147	147
TOTAL (lbs./day)	BOD_5	769	1,584	1,928	1,995	2,060
	TSS	789	1,178	1,581	1,660	1,736
TOTAL ADF (MGD)		0.71	0.94	1.292	1.401	1.458
Average Concentration (mg/l)	BOD_5	138	202	170	171	169
	TSS	153	150	147	142	143

[1] Base line concentration for BOD and TSS are actual IPT permit limits.
[2] Industrial loading based upon permit limits.

TABLE 5-9
AVERAGE FUTURE WASTELOADS AND CONCENTRATIONS
NORTH END SEWER SYSTEM (SOUTH KINGSTOWN REGIONAL WWTF)

		2005	2010	2015	2020	2025
TOTAL (lbs./day)	BOD_5	2,544	2,673	2,801	2,934	3,067
	TSS	2,544	2,695	2,845	3,001	3,157

it was assumed that a standard loading of 250 mg/l for BOD and TSS were used for the initial concentration. The future loadings were based on 0.41 pounds per housing unit per day for BOD and 0.48 pounds per housing unit per day for TSS.

5.4.3 FUTURE SEPTAGE VOLUME AND LOADS

The future quantities of septage were computed based on the projected future non-sewered populations and the rate of per capita septage generation. For calculating future septage quantities, a conservative value of 150 gallons per capita, per year, was used. The future quantities derived in this section of the report were computed using residential units and population projections.

The loading associated with the future septage increases were calculated based on the average characteristics of domestic septage recommended for design purposes in EPA publications. These characteristics are listed in Table 5-10.

TABLE 5-10
PHYSICAL AND CHEMICAL CHARACTERISTICS OF SEPTAGE

PARAMETER	SUGGESTED[1] DESIGN VALUE	PARAMETER	SUGGESTED DESIGN VALUE
TS	40,000 mg/l	Iron	205 mg/l
TVS	25,000 mg/l	Zinc	49 mg/l
TSS	15,000 mg/l	Aluminum	48 mg/l
VSS	10,000 mg/l	Lead	8.4 mg/l
BOD5	7,000 mg/l	Copper	6.4 mg/l
COD	15,000 mg/l	Manganese	5.02 mg/l
TKN	700 mg/l	Chromium	1.07 mg/l
NH3-N	150 mg/l	Nickel	0.90 mg/l
TOTAL P	250 mg/l	Cadmium	0.71 mg/l
ALKALINITY	1,000 mg/l	Mercury	0.28 mg/l
GREASE	8,000 mg/l	Arsenic	0.16 mg/l
pH	6.0	Selenium	0.076 mg/l

1 Handbook for Septage Treatment and Disposal, EPA, October 1984.
2 Process Design Manual, Sludge Treatment and Disposal EPA, September 1979.

The summary of the non-sewered population projections and future septage volumes is presented in Table 5-11. The septage waste generated throughout the Town will be processed by the South Kingstown Regional Wastewater Treatment Facility.

5.5 FUTURE ADEQUACY OF THE INTERCEPTOR SYSTEM AND PUMP STATIONS

Current capacities of the interceptor segments are presented in Chapter 4.2.2. This information is used in this section for comparison with forecasted wastewater flows in the year 2025. Tables 5-12 and 5-13 present the lowest capacities in each interceptor segment and the forecasted wastewater flows. From this comparison, it is evident that the interceptors are adequate.

Table 5-12 summarizes the capacity of each station and the forecasted wastewater flows.

ADEQUACY OF PUMP STATIONS

North End Sewer System

There are fourteen pump stations in the North End Sewer System:

Industrial Park Pump Station
Wolfe Road Pump Station
Bonnet Shores Pump Station
Mettatuxet Pump Station
Sprague Pump Station
Lakewood Drive Pump Station
Mumford Road Pump Station
Congdon Street Pump Station
Ouida Street Pump Station
Circuit Drive Pump Station
Baneberry Trail Pump Station
Wilson Drive Pump Station
Winterberry Pump Station
Salt Pond/Seaport Village Pump Station (privately owned/publicly managed)

Industrial Park Pump Station

The Industrial Park Pump Station receives flows from South Ferry Road Industrial Park, which is totally developed. The future peak daily flow to the Industrial Park Pump Station is 0.060 GPD (42 GPM). The capacity of the station is 288,000 GPD (200 GPM) and appears to be adequate for the year 2025.

TABLE 5-11
PROJECTED FUTURE SEPTAGE QUANTITIES

TOWN	2004 Non-Sewered Septage			2010 Non-Sewered Septage			2015 Non-Sewered Septage			2020 Non-Sewered Septage			2025 Non-Sewered Septage		
	Popul.[1]	Total Mgal/yr	Total Pumped Mgal/yr[2]	Popul.	Total Mgal/yr	Total Pumped Mgal/yr[2]	Popul.	Total Mgal/yr	Total Pumped Mgal/yr[2]	Popul.	Total Mgal/yr	Total Pumped Mgal/yr[2]	Popul.	Total Mgal/yr	Total Pumped Mgal/yr[2]
Narragansett	5,956	3.113	0.778	4,462	2.305	0.576	2,047	1.058	0.265	1,285	0.664	0.166	532	0.275	0.069

[1] Based upon the current Ordinance, one quarter of the Town is required to pump their septic systems annually.
[2] Gallons are based on 25% of the septic systems at a capacity of 1,250 gallons.

TABLE 5-12
FUTURE ADEQUACY ANALYSIS - NORTH END SEWER SYSTEM

Interceptor	Minimum Capacity (MGD)	Peak Discharge (MGD)	Comments
Bonnet Shores			
Segment 1	2.43	0.092	Adequate
Segment 2	2.43	0.259	Adequate
Segment 3	3.72	1.237	Adequate
North Interceptor			
Segment 1	4.58	1.237	Adequate
Segment 2	7.00	1.810	Adequate
Segment 3	7.00	1.958	Adequate
Segment 4	7.50	2.229	Adequate
Industrial Park P.S.	0.288	0.060	Adequate
Wolfe Road P.S.	0.432	0.261	Adequate
Bonnet Shores P.S.	2.102	1.237	Adequate
Mettatuxet P.S.	0.288	0.124	Adequate
Sprague P.S.	4.205	2.229	Adequate
Lakewood Drive P.S.	0.288	0.203	Adequate
Mumford Road P.S.	0.950	0.492	Adequate
Congdon Street P.S.	0.324	0.510	**Inadequate**
Ouida Street P.S.	4.310	4.558	**Inadequate**
Circuit Drive P.S.	0.06	0.040	Adequate
Baneberry Trail P.S.	0.06	0.040	Adequate
Wilson Drive P.S.	1.584	0.573	Adequate
Winterberry Road P.S.	0.259	0.166	Adequate

TABLE 5-13
FUTURE ADEQUACY ANALYSIS - SOUTH END SEWER SYSTEM

Interceptor	Minimum Capacity (MGD)	Peak Discharge (MGD)	Comments
Point Judith Interceptor	1.30	0.655	Adequate
Point Judith Road	2.67	2.560	Adequate
Stanton Avenue P.S.	0.360	0.987	**Inadequate**
Galilee P.S.	1.584	1.377	Adequate
Burnside Avenue P.S.	1.728	1.535	Adequate
Point Judith P.S.	0.468	0.387	Adequate
Briggs Farm P.S.	0.576	0.516	Adequate

Wolfe Road Pump Station

The projected future peak flow at this station is estimated at 260,600 GPD (181 GPM). The station is equipped with two pumps, each rated at 432,000 GPD (300 GPM), and, therefore, the station is adequate for future flows.

Bonnet Shores Pump Station

The Bonnet Shores Pump Station will be receiving flows from the Industrial Park, URI Bay Campus and Bonnet Shores. The capacity of the station is 2,102,000 GPD (1,460 GPM) and the future peak daily flow will be 1,237,000 GPD (859 GPM). The pump station is adequate for the future flows.

Mettatuxet Pump Station

The future peak daily flow to the Mettatuxet Pump Station will be 123,800 GPD (86 GPM). The capacity of the station, determined in Chapter 4, is 288,000 GPD (200 GPM) and appears to be adequate. The station will be receiving flows from the Mettatuxet section of Town, consisting of residential properties.

Sprague Pump Station

In 1992, the Sprague Pump Station began to receive flows from the Middlebridge area within the Town of South Kingstown.

The future peak daily flow to the station will be approximately 2,229,300 GPD (1,548 GPM). The capacity of the Sprague Pump Station is 4,205,000 GPD (2,920 GPM). Therefore, the station is adequate for future flows in the year 2025. In the future, flow pacing should be considered to alleviate the flow problems at Ouida Street.

Lakewood Drive Pump Station

The Lakewood Drive Pump Station is rated at 288,000 GPD (200 GPM). The future peak flow will be 202,600 GPD (141 GPM). The pump station is adequate for future flows.

Mumford Road Pump Station

The Mumford Road Pump Station receives sewage flows from the Lakewood Drive Pump Station and adjacent areas, consisting of mostly residential flows. The future daily flow to the station is 491,900 GPD (342 GPM). The capacity of the station, determined in Chapter 4, is 950,000 GPD (660 GPM) and is adequate for future flows.

Congdon Street Pump Station

The present and future sewage flows consist mainly of 8-inch gravity residential flows. The capacity of the Congdon Street Pump Station is 324,000 GPD (225 GPM). The future required capacity for the station is 510,000 GPD (354 GPM) and is 155% greater than the existing capacity. Therefore, the Congdon Street Pump Station is inadequate for future flows. It is recommended that the existing pumps be replaced with a new pumps to meet the future demands of the station, and a new force main.

Ouida Street Pump Station

The Ouida Street Pump Station receives all the sewage flows generated by the North End Sewer System (including the Pier Area) and the Middlebridge area of South Kingstown. The major components of the future estimated flow to the Ouida Street Pump Station are presented in Table 5-14.

TABLE 5-14
FUTURE FLOW TO THE OUIDA STREET PUMP STATION

SOURCE	AVERAGE FLOW (MGD)	PEAK FLOW (MGD)
Residential/Commercial	1.303	3.258
Industrial	0.020	0.050
Infiltration	0.476	0.476
Inflow	0.000	0.683
Middlebridge [1]	0.031	0.090
TOTAL	**1.830**	**4.557**

[1] Middlebridge: Wastewater flow processed by Narragansett and allocated to South Kingstown.

The future required capacity for the Ouida Street Pump Station is 4,557 MGD (3,165 GPM), which is greater than the existing capacity of 4,320,000 GPD (3,000 GPM). The pumps and controls are inadequate. There are several other aspects of the existing installation which must be considered. In addition to inadequate pumping capacity, the alarms which are transmitted are the high wet level and high water pump room; the remaining 10 alarm signals are not transmitted to the Police Station, and the flow matcher should be changed to variable frequency drives. It is recommended that the pumps and related appurtenances (check and plug valves) be replaced, and the flow meter. SCADA controls should be set up to communicate with the Regional Plant.

Circuit Drive Pump Station

The Circuit Drive Pump Station receives residential flows. The capacity of the pump station is 60,000 GPD (42 GPM). The future required capacity for the station is 40,000 GPD (28 GPM). Therefore, the station is adequate for future flows.

Baneberry Trail Pump Station

The Baneberry Trail Pump Station serves Baneberry Trail, Woodsia Road and Columbia Road. The future daily flow is 40,000 GPD (28 GPM). The capacity of the station is 60,000 GPD (42 GPM). Therefore, the station is adequate for future flows.

Wilson Drive Pump Station

The Wilson Drive Pump Station is rated at 1,584 MGD (1,100 GPM). The future peak flow will be .573 MGD (398 GPM). The pump station is adequate for future flows.

Winterberry Pump Station

The present and future sewage flows consist mainly of residential flows. The capacity of the Winterberry Road Pump Station is 259,000 GPD (180 GPM). The future flows will be 166,000 GPD (115 GPM). Therefore, the station is adequate for future flows.

Salt Pond/Seaport Village Pump Station

Despite the recorded by-laws to fully fund the operation and maintenance cost, the Association has refused to participate in those costs. That has left the Town with two options:

1. Let the station operate itself until it failed (or the electricity and gas for the standby generator) were shut off for non-payment, or

2. The Town would have to assume these responsibilities.

Acting in the interest of public health and safety, the Town has adopted the latter approach, although at a minimal level only. This station is now eleven (11) years old, and is at a point where certain preventative maintenance procedures should be undertaken.

In 2003, the Engineering Department identified capital improvements that would be necessary to bring this station into compliance with Town standards. These improvements will not increase the capacity of the station. Should these improvements be implemented in full, this station could be added to the Town's infrastructure inventory, and operated and maintained accordingly. This decision will have long-term budgetary impacts, in that the Town will essentially be committing to adding another pump station to the overall total. Funding was appropriated in the FY 2003-04 Wastewater Capital budget ($65,750) for these improvements; however, the implementation of same has been held pending further information from the developer relative to Phase II of this project.

South End Sewer System

There are five pump stations in the South End Sewer System:

Stanton Avenue Pump Station
Galilee Pump Station
Burnside Avenue Pump Station
Point Judith Pump Station
Briggs Farm Pump Station

Stanton Avenue Pump Station

The Stanton Avenue Pump Station serves a residential area, including Breakwater Village. The projected future peak flow at this station is 987,000 GPD (685 GPM). The station is equipped with two pumps, each rated at 360,000 GPD (250 GPM). The Stanton Avenue Pump Station is inadequate for present and future flows. It is recommended that the pumps be upgraded to meet the present and future demands.

Galilee Pump Station

The Galilee Pump Station receives flows from restaurants, hotels and a number of fish/seafood processing operations. In the future, the station will serve Great Island, consisting of one-family residences and seasonal and beach properties. The capacity of the station is 1,584,000 GPD (1,100 GPM), and the future sewage flow is 1,376,900 GPD (956 GPM). The station is adequate for future flows in the year 2025. Controls need to be upgraded since VFDs no longer work.

Burnside Avenue Pump Station

The future service areas that the Burnside Avenue Pump Station will service are Harbour Island and Baltimore Avenue area. The future peak daily flow is 1,535,100 GPD (1,066 GPM). The capacity of the pump station is 1,728,000 GPD (1,200 GPM). The Burnside Avenue Pump Station is adequate for future flows.

Point Judith Pump Station

The Point Judith Pump Station serves a residential area, including a few restaurants. The projected future peak flow at this station is 386,600 GPD (268 GPM). The station is equipped with two pumps, each rated at 468,000 GPD (325 GPM). The station is adequate for future flows.

Briggs Farm Pump Station

The Briggs Farm Pump Station serves the Briggs Farm area and, in the future, the station will process flows from Harbour Island. The future daily peak flow is 515,800 GPD (360 GPM). The capacity of the pump station is 576,000 GPD (400 GPM). Therefore, the station is adequate to handle future flows.

5.6 WASTEWATER MANAGEMENT DISTRICT

In December 2002, the Town revised and amended their Ordinance to establish a Wastewater Management District (WWMD) to ensure that Individual Sewage Disposal Systems (ISDS) are properly operated, regularly inspected, and routinely maintained to prevent malfunctioning systems and to serve, where appropriate, as an alternative to municipal sewer systems. While this program will provide the framework for the efficient inspection, repair and maintenance systems in the Town, it is still ultimately the homeowner's responsibility to ensure that their system is well-maintained and properly functioning.

The Ordinance (Appendix D) encompasses the entire Town of Narragansett. This Ordinance is applicable to every owner of premises that have an ISDS located within the WWMD. Through the WWMD Rules and Regulations, the Town has the ability to enforce the proper maintenance of all existing and future ISDS's within the Town.

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6.0 ALTERNATIVES AND PLAN SELECTION

6.1 GENERAL

The treatment process for the Scarborough WWTF has been presented in Chapter 4. Secondary biological treatment is achieved by a conventional oxidation ditch type activate sludge process, clarification and disinfection. Although treatment efficiencies will vary with every treatment plant, based upon the overall performance, the Scarborough facility proves that the system can achieve an effluent quality of BOD_5 and Total Suspended Solids of 30 mg/l of each.

The Rhode Island Water Quality Standards indicate that the Rhode Island Sound is a "Class SB" receiving water and shall not be negatively affected or downgraded by the Scarborough Wastewater Treatment Facility discharge.

An analysis of the treatment indicates that under presently observed influent loads, the existing Scarborough WastewaterTreatment Facility is operated with a maximum achievable efficiency. In fact, with the implementation of the Industrial Pretreatment Program and the compliance from the industries, the peak daily BOD_5 and Total Suspended Solids loadings no longer exceed the plant design parameters. The treatment system is performing well under the design parameters (see Table 4-14). Based on that determination, it has been concluded that only minor upgrades would be required to further optimize plant performance through process control and will permit the facility to meet its projected loadings through 2025.

Table 6-1 provides a comparison of the plant's existing operating conditions to the projected future hydraulic and organic loadings. It is important to recognize that for the future organic loadings (BOD_5 and total suspended solids), the permitted industrial loadings have been incorporated. This approach will provide more concerted projections for the future loadings since the industrial loads are well below the permitted levels.

As discussed earlier in this report, the planning period is based on a 20-year period of projected growth and effluent quality. In addition, the Rhode Island Department of Environmental Management (RIDEM) requires that the Facilities Plans be updated or re-affirmed every five (5) years. A review of the wastewater projections

TABLE 6-1
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE SCARBOROUGH WASTEWATER TREATMENT FACILITY

YEAR	Existing FY 2005	Future 2010	Future 2015	Future 2020	Future 2025
INFLUENT DATA					
Influent Flows (MGD)					
Average Daily	0.71	0.94	1.292	1.401	1.458
Peak Hourly	2.57	3.223	4.027	4.285	4.413
Influent BOD (lbs/day)	761	1,584	1,928	1,995	2,060
Influent TSS (lbs/day)	836	1,178	1,581	1,660	1,736
Influent BOD (mg/l)	138	202	179	171	169
Influent TSS (mg/l)	153	154	147	142	143
Effluent BOD (mg/l)	30	30	30	30	30
Effluent BOD (lbs/day)	176	228	38	333	346
Effluent TSS (mg/l)	30	30	30	30	30
Effluent TSS (lbs/day)	176	228	308	333	346
PRELIMINARY TREATMENT					
Bar Rack	1	1	1	1	1
No. of Units					
Depth of Flow	0.29	0.44	0.57	0.72	0.85
Average Daily (ft)	0.88	1.33	1.72	2.15	2.56
Peak Hourly (ft)					
Fine Screen					
No. of Units	1	1	1	1	1
Capacity (MGD)	3	3	3	3	3
Flow (MGD)					
Average Daily	0.71	0.94	1.292	1.401	1.458
Peak Hourly	2.57	3.223	4.027	4.285	4.413
Existing Grit Chamber					
No. of Units	1	1	1	1	1
Capacity (MGD)	4.0	4.0	4.0	4.0	4.0
Flow (MGD)					
Average Daily	0.71	0.94	1.292	1.401	1.458
Peak Hourly	2.57	3.223	4.027	4.285	4.413

TABLE 6-1
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE SCARBOROUGH WASTEWATER TREATMENT FACILITY

YEAR	Existing FY 2005	Future 2010	Future 2015	Future 2020	Future 2025
PRELIMINARY TREATMENT (Continued)					
Pump Station [1]					
No. of Pumps	3	3	3	3	3
Total Capacity (MGD)	5.8	5.8	5.8	5.8	5.8
Flow (MGD)					
Average Daily	0.71	0.94	1.292	1.401	1.458
Peak Hourly	2.57	3.223	4.027	4.285	4.413
AERATION TANKS					
Basin Volume					
First Channel	29,990	29,990	29,990	29,990	29,990
Second Channel	20,383	20,383	20,383	20,383	20,383
Third Channel	14,585	14,585	14,585	14,585	14,585
Digester Channel	38,191	38,191	38,191	38,191	38,191
Total Tank Volume (cf)	103,149	103,149	103,149	103,149	103,149
Total Tank Volume (gals)	771,555	771,555	771,555	771,555	771,555
AERATION BASIN OPERATING DATA					
Volumetric Loading *					
(lbs BOD/1000 CF)	7.46 [2]	15.4 [3]	18.7 [3]	19.4 [3]	20 [3]
HRT (hrs) **	26.4	20.3	15	14	13.3
MLSS (mg/l)	4,000	4,000	4,000	4,000	4,000
Total MLSS (lbs)	25,739	25,739	25,739	25,739	25,739
Volatile SS (%)	80	80	80	80	80
MLVSS (mg/l)	3,200	3,200	3,200	3,200	3,200
Total MLVSS (lbs)	20,591	20,591	20,591	20,591	20,591
SRT (days) ***	20.0	10.7	8.7	7.3	7.0

[1] Maximum firm capacity of the existing pump station (2 pumps in operation) is 4.0 MGD. All 3 pumps operating simultaneously can handle peak flows of up to 5.8 MGD.

[2] Loading is based upon actual loading from the industrial users.

[3] Loading is based upon permit limit on industrial users.

* Maximum 17 lbs BOD/1000 CF permissible for extended aeration system (MOP-8).

** Minimum 20 hours required for extended aeration system (MOP-8)

*** Recommended range for extended aeration system is 20 to 30 days.

TABLE 6-1
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE SCARBOROUGH WASTEWATER TREATMENT FACILITY

YEAR	Existing FY 2005			2010			2015			2020			2025		
DESIGN CONDITION	**AVG BOD LOAD**	**MIN BOD LOAD**	**MAX BOD LOAD**	**AVG BOD LOAD**	**MIN BOD LOAD**	**AVG BOD LOAD**	**MIN BOD LOAD**	**MAX BOD LOAD**	**MAX BOD LOAD**	**AVG BOD LOAD**	**MIN BOD LOAD**	**MAX BOD LOAD**	**AVG BOD LOAD**	**MIN BOD LOAD**	**MAX BOD LOAD**
Existing Activated Sludge System - Mechanical Surface Aerators (Rotors)															
ACTUAL OXYGEN REQUIRED (AOR)															
Influent BOD Load (lbs/day) [1]	761	385	1,536	1,584	792	3,168	1,928	964	3,856	1,995	998	3,990	2,060	1,030	4,120
Lbs Oxygen/Lb BOD Applied	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
AOR (lbs/day)	1,153	576	2,307	2,376	1,188	4,752	2,892	1,446	5,784	2,993	1,496	5,985	3,090	1,545	6,180
STANDARD OXYGEN REQUIRED (SOR)															
Liquid Temperature (DEGS C)	20	15	20	20	15	20	20	15	20	20	15	20	20	15	20
Basin DO Cl (mg/l)	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0
Std Oxygen SatCs (mg/l)	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17
Site Oxygen SatCsw (mg/l)	9.17	10.15	9.17	9.17	10.15	9.17	9.17	10.15	9.17	9.17	10.15	9.17	9.17	10.15	9.17
ALPHA	0.80	0.90	0.80	0.80	0.90	0.80	0.80	0.90	0.80	0.80	0.90	0.80	0.80	0.80	0.80
BETA	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
THETA	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024
AOR/SOR	0.55	0.71	0.63	0.55	0.71	0.63	0.55	0.71	0.63	0.55	0.71	0.63	0.55	0.71	0.63
SOR (lbs/day)	2,096	812	3,661	4,320	1,673	7,543	5,258	2,036	9,181	5,442	2,107	9,500	5,618	2,176	9,809
HORSEPOWER REQUIREMENTS															
Oxygen Transfer (lbs/oxy per hp per hour)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Drive Efficiency (%)	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Horsepower Required	27	10	47	55	21	97*	68	26	118	70	27	122	72	28	126
Horsepower Available	80	80	80	110	110	110	110	110	110	110	110	110	110	110	110

1 Min. BOD Load equals 50 percent of average BOD load. Max BOD load equals 200 percent of average BOD load.

* Supplemental aerators capacity shall be installed or existing aerators shall be retrofitted to match the requirements.

TABLE 6-1
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE SCARBOROUGH WASTEWATER TREATMENT FACILITY

YEAR	Existing FY 2005	Future 2010	Future 2015	Future 2020	Future 2025
OPERATING DATA					
Influent Flow (MGD)					
Average Daily	0.71	0.94	1.292	1.401	1.458
Peak Hourly (@ 3 Times Avg.)	2.57	3.223	4.027	4.285	4.413
FINAL CLARIFIER DATA EXISTING					
No. of Units	2	2	2	2	2
Diameter (ft)	40	40	40	40	40
Side Water Depth (ft)	11.0	11.0	11.0	11.0	11.0
Volume (gals)					
Each	103,396	103,396	103,396	103,396	103,396
Total	206,792	206,792	206,792	206,792	206,792
Surface Area (sf)					
Each	1,256	1,256	1,256	1,256	1,256
Total	2,512	2,512	2,512	2,512	2,512
Weir Length (lf)					
Each	126	126	126	126	126
Total	251	251	251	251	251
OPERATING DATA FINAL CLARIFICATION					
No. of Clarifiers	2	2	2	2	2
Surface Overflow Rate (gpd/sf)					
@ Average Daily Flow [1]	283	374	514	558	580
@ Peak Hourly Flow [2]	1,023	1,283	1,603	1,706	1,757
Weir Loading Rate [3]					
@ Average Daily Flow	2,829	3,745	5,147	5,582	5,809
@ Peak Hourly Flow	10,239	12,841	16,044	17,072	17,582

1 Maximum permissible Surface Overflow Rate at average daily flow condition is 800 gpd/sf.
2 Maximum permissible Surface Overflow Rate at peak flow condition is 1,800 gpd/sf.
3 Maximum permissible Weir Loading Rate is 30,000 gpd/ft.

TABLE 6-1
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE SCARBOROUGH WASTEWATER TREATMENT FACILITY

YEAR	Existing FY 2005	Future 2010	Future 2015	Future 2020	Future 2025
OPERATING DATA					
Flow (MGD)					
Average Daily (ADF)	0.71	0.94	1.292	1.401	1.458
Peak Hourly (@ 3 Times ADF)	2.57	3.223	4.027	4.285	4.413
CONTACT CHAMBER DATA					
Total Volume (gals)	44,880	44,880	44,880	44,880	44,880
Total Volume (cf)	6,000	6,000	6,000	6,000	6,000
OPERATING DATA					
Detention Time (min.)					
@ ADF [1]	91	60	50	46	44
@ PHF [1]	25	20	18	15	15
SODIUM HYPOCHLORIDE					
Gallons per day	32	41	55	60	62
SODIUM BISULFITE					
Gallons per day	10	13	18	19	20

[1] Minimum of 30 minutes detention time @ ADF and 15 minutes @ PHF.

TABLE 6-1
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE
SCARBOROUGH WASTEWATER TREATMENT FACILITY

YEAR	Existing FY 2005	Future 2010	Future 2015	Future 2020	Future 2025
SLUDGE GENERATION					
Primary and Waste Activated Sludge					
Sludge Yield (lbs TSS/lf BOD REM)	1.30	1.35	1.40	1.45	1.50
% Solids	1.0	1.0	1.0	1.0	1.0
Pounds per Day	1,274	1,902	2,583	3,350	4,033
Gallons per Day	15,276	22,811	30,974	40,166	48,366
GRAVITY BELT THICKENER					
Effective Width (m)	2.0	2.0	2.0	2.0	2.0
Sludge Feed Rate (gpm)	300	300	300	300	300
Period of Operation (hrs/wk)	5.9	9.5	12.4	15.5	18.2
Efficiency (%)	95	95	95	95	95
Thickened Sludge Solids (%)	5.0	5.0	5.0	5.0	5.0
Thickened Sludge (gals/wk)	20,317	32,660	42,324	53,088	62,194
Thickened Sludge (gals/day)	4,063	6,532	8,465	10,618	12,439
Loads per Week (@ 2,300 gals)	8.8	14.2	18.4	23.1	27.0
Loads per Day 2 (@ 2,300 gals)	1.8	2.8	3.7	4.6	4.6
SLUDGE STORAGE					
Existing Tank Volume (gals)					
Waste Activated Sludge	69,000	69,000	69,000	69,000	69,000
Thickened Sludge	20,000	20,000	20,000	20,000	20,000
Storage Capacity (days)					
Waste Activated Sludge	4.3	2.6	2.1	2.7	1.6
Thickened Sludge	4.2	2.6	2.1	2.7	1.5

finds that over the next twenty years, the plant will not exceed its hydraulic or organic capacity. The recent re-issuance of the facility's new permit (August 2005) has confirmed that nutrient removal will not be required during the five-year permit. However, for future planning purposes, the Town must consider that the facility will be at design capacity.

RIDEM's requirement states that once a facility reaches 80% of its design capacity it must begin the planning process to upgrade the facility. In the case of the Scarborough facility, this will occur when the flows reach 1.12 MGD. This is projected to occur over the next ten years. For the purposes of this report, the capital planning process will assume that the capacity will increase 25% after 2025. Therefore, the replacement of equipment will factor in the increase from the original design flows (1.4 MGD) by 25% to ensure that those components that are upgraded will not be controlled by the 80% factor through the planning year 2025.

A system approach in the process modification and a technique known as morphological analysis was used to generate various alternative treatment schemes. When a new treatment plant must be constructed, there are over 130 thousand variations of complete treatment systems. This evaluation process has been simplified by the existence of a 1.4 MGD secondary treatment plant. Our aim in evaluating this facility was to utilize the existing facilities as much as possible and to minimize the extent of on-site structural modifications.

Table 6-2 presents a comparison of the existing operating condition through the 25% increase in hydraulics and organic capacity.

6.2 TREATMENT PLANT UPGRADES

Based on the detailed review of the existing facilities, performance records, maintenance records, previous engineering studies, and pertinent regulatory requirements, the following process modifications and capital improvements have been presented to meet the 20-year future performance requirements.

TABLE 6-2
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE
SCARBOROUGH WASTEWATER TREATMENT FACILITY
(INCLUDING 25% INCREASE IN 2025 CAPACITY)

YEAR	Existing FY 2005	2010	2015	2020	2025	25% Increase in 2025 Capacity
INFLUENT DATA						
Influent Flows (MGD)						
Average Daily	0.71	0.94	1.292	1.401	1.458	1.750
Peak Hourly	2.57	3.223	4.027	4.285	4.413	5.250
Influent BOD (lbs/day)	761	1,584	1,928	1,995	2,060	2,575
Influent TSS (lbs/day)	836	1,178	1,581	1,660	1,736	2,170
Influent BOD (mg/l)	138	202	179	171	169	176
Influent TSS (mg/l)	153	154	147	142	143	148
Effluent BOD (mg/l)	30	30	30	30	30	30
Effluent BOD (lbs/day)	176	228	38	333	346	438
Effluent TSS (mg/l)	30	30	30	30	30	30
Effluent TSS (lbs/day)	176	228	308	333	346	438
PRELIMINARY TREATMENT						
Bar Rack	1	1	1	1	1	1
No. of Units						
Depth of Flow	0.29	0.44	0.57	0.72	0.85	1.01
Average Daily (ft)	0.88	1.33	1.72	2.15	2.56	3.20
Peak Hourly (ft)						
Fine Screen						
No. of Units	1	1	1	1	1	1
Capacity (MGD)	3	3	3	3	3	3
Flow (MGD)						
Average Daily	0.71	0.94	1.292	1.401	1.458	1.750
Peak Hourly	2.57	3.223	4.027	4.285	4.413	5.250
Existing Grit Chamber						
No. of Units	1	1	1	1	1	1
Capacity (MGD)	4.00	4.00	4.00	4.00	4.00	5.25
Flow (MGD)						
Average Daily	0.71	0.94	1.292	1.401	1.458	1.750
Peak Hourly	2.57	3.223	4.027	4.285	4.413	5.250

TABLE 6-2
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE
SCARBOROUGH WASTEWATER TREATMENT FACILITY
(INCLUDING 25% INCREASE IN 2025 CAPACITY)

YEAR	Existing FY 2005	2010	2015	2020	2025	25% Increase in 2025 Capacity
PRELIMINARY TREATMENT (Cont'd)						
Pump Station	3	3	3	3	3	3
No. of Pumps	5.8	5.8	5.8	5.8	5.8	5.25
Total Capacity (MGD)						
Flow (MGD)	0.71	0.94	1.292	1.401	1.458	1.750
Average Daily	2.57	3.223	4.027	4.285	4.413	5.250
Peak Hourly						
NEW PRIMARY CLARIFIERS						
No. of Units		1	2	2	2	2
Diameter (ft)		35	35	35	35	35
Side Water Depth (ft)		11	11	11	11	11
Surface Area (sf)						
Each		961	961	961	961	961
Total		961	1,922	1,922	1,922	1,922
Weir Length (ft)						
Each		110	110	110	110	110
Total		110	220	220	220	220
OPERATING DATA PRIMARY CLARIFICATION						
Surface Overflow Rate (gpd/sf)						
Avg.	738	949	640	694	720	910
Peak	2,191	2,847	1,912	2,080	2,160	2,731
Weir Loading Rate (gpd/ft)						
Avg.	6,382	8,291	5,591	6,059	6,291	7,955
Peak	19,145	24,873	16,722	18,177	18,873	23,864
TSS % Removal Efficiency	55	55	55	55	55	55
Primary Effluent TSS (lbs/day)	355	530	711	747	781	976
Primary Sludge (lbs/day)	433	647	868	911	953	1,191
Primary Sludge % Concentration	4	4	4	4	4	4
Primary Sludge (gpd)	1,306	1,940	2,604	2,734	2,859	3,573
BOD % Removal Efficiency	30	30	30	30	30	30
Primary Effluent BOD (lbs/day)	538	1,108	1,349	1,396	1,442	1,802

TABLE 6-2
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE
SCARBOROUGH WASTEWATER TREATMENT FACILITY
(INCLUDING 25% INCREASE IN 2025 CAPACITY)

YEAR	Existing FY 2005	2010	2015	2020	2025	25% Increase in 2025 Capacity
AERATION TANKS						
Basin Volume						
First Channel	29,990	29,990	29,990	29,990	29,990	29,990
Second Channel	20,383	20,383	20,383	20,383	20,383	20,383
Third Channel	14,585	14,585	14,585	14,585	14,585	14,585
Digester Channel	38,191	38,191	38,191	38,191	38,191	38,191
Total Tank Volume (cf)	103,149	103,149	103,149	103,149	103,149	103,149
Total Tank Volume (gals)	771,555	771,555	771,555	771,555	771,555	771,555
AERATION BASIN OPERATING DATA						
Influent BOD (lbs/day)	538	1,108	1,349	1,396	1,442	1,802
Recycle BOD (%)	0	5	5	5	5	5
Total Inf. BOD (lbs/day)	538	1,164	1,417	1,466	1,514	1,893
Influent TSS (lbs/day)	355	530	711	747	781	976
Recycle TSS (%)	0	10	10	10	10	10
Total Inf. TSS (lbs/day)	355	583	783	821	859	1,074
AERATION BASIN OPERATING DATA						
Volumetric Loading (lbs BOD/1000 CF)	5.2	10.8	13.1	13.6	14	17.5
HRT (hrs)	26.4	20.3	15	14	13.3	10.6
MLSS (mg/l)	4,000	4,000	4,000	4,000	4,000	4,000
Total MLSS (lbs)	25,739	25,739	25,739	25,739	25,739	25,739
Volatile SS (%)	80	80	80	80	80	80
MLVSS (mg/l)	3,200	3,200	3,200	3,200	3,200	3,200
Total MLVSS (lbs)	20,591	20,591	20,591	20,591	20,591	20,591
SRT (days)	20.0	10.7	8.7	7.3	7.0	6.8

TABLE 6-2
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE
SCARBOROUGH WASTEWATER TREATMENT FACILITY
(INCLUDING 25% INCREASE IN 2025 CAPACITY)

YEAR	Existing FY 2005			2010			2015			2020			2025			25% Increase in 2025 Capacity		
DESIGN CONDITION	AVG BOD LOAD	MIN BOD LOAD	MAX BOD LOAD	AVG BOD LOAD	MIN BOD LOAD	AVG BOD LOAD	MIN BOD LOAD	MAX BOD LOAD	MAX BOD LOAD	AVG BOD LOAD	MIN BOD LOAD	MAX BOD LOAD	AVG BOD LOAD	MIN BOD LOAD	MAX BOD LOAD	AVG BOD LOAD	MIN BOD LOAD	MAX BOD LOAD
Existing Activated Sludge System - Mechanical Surface Aerators (Rotors)																		
ACTUAL OXYGEN REQUIRED (AOR)																		
Influent BOD Load (lbs/day) [1]	538	269	1,076	1,108	554	2,217	1,349	674	2,699	1,397	698	2,793	1,442	721	2,884	1,802	901	3,605
Lbs Oxygen/Lb BOD Applied	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
AOR (lbs/day)	807	403	1,614	1,663	831	3,326	2,024	1,012	4,048	2,094	1,047	4,189	2,163	1,081	4,326	2,703	1,351	5,407
STANDARD OXYGEN REQUIRED (SOR)																		
Liquid Temperature (DEGS C)	20	15	20	20	15	20	20	15	20	20	15	20	20	15	20	20	15	20
Basin DO Cl (mg/l)	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0
Std Oxygen SatCs (mg/l)	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17
Site Oxygen SatCsw (mg/l)	9.17	10.15	9.17	9.17	10.15	9.17	9.17	10.15	9.17	9.17	10.15	9.17	9.17	10.15	9.17	9.17	10.15	9.17
ALPHA	0.80	0.90	0.80	0.80	0.90	0.80	0.80	0.90	0.80	0.80	0.90	0.80	0.80	0.80	0.80	0.80	0.80	0.80
BETA	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
THETA	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024
AOR/SOR	0.55	0.71	0.63	0.55	0.71	0.63	0.55	0.71	0.63	0.55	0.71	0.63	0.55	0.71	0.63	0.55	0.71	0.63
SOR (lbs/day)	1,468	569	2,563	3,024	1,171	5,280	3,681	1,426	6,427	3,809	1,475	6,650	3,933	1,523	6,867	4,916	1,904	8,583
HORSEPOWER REQUIREMENTS																		
Oxygen Transfer (lbs/oxy per hp per hour)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Drive Efficiency (%)	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Horsepower Required	27	10	47	55	21	97*	68	26	118	70	27	122	72	28	126	72	28	126
Horsepower Available	80	80	80	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110

[1] Min. BOD Load equals 50 percent of average BOD load. Max BOD load equals 200 percent of average BOD load.

* Supplemental aerators capacity shall be installed or existing aerators shall be retrofitted to match the requirements.

TABLE 6-2
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE
SCARBOROUGH WASTEWATER TREATMENT FACILITY
(INCLUDING 25% INCREASE IN 2025 CAPACITY)

YEAR	Existing FY 2005	2010	2015	2020	2025	25% Increase in 2025 Capacity
OPERATING DATA						
Influent Flow (MGD)						
Average Daily	0.71	0.94	1.292	1.401	1.458	1.750
Peak Hourly (@ 3 Times Avg.)	2.57	3.223	4.027	4.285	4.413	5.250
FINAL CLARIFIER DATA EXISTING						
No. of Units	2	2	2	2	2	3
Diameter (ft)	40	40	40	40	40	40
Side Water Depth (ft)	11.0	11.0	11.0	11.0	11.0	11.0
Volume (gals)						
Each	103,396	103,396	103,396	103,396	103,396	103,396
Total	206,792	206,792	206,792	206,792	206,792	310,188
Surface Area (sf)						
Each	1,256	1,256	1,256	1,256	1,256	1,256
Total	2,512	2,512	2,512	2,512	2,512	3,768
Weir Length (lf)						
Each	126	126	126	126	126	126
Total	251	251	251	251	251	377
OPERATING DATA FINAL CLARIFICATION						
No. of Clarifiers	2	2	2	2	2	3
Surface Overflow Rate (gpd/sf)						
@ Average Daily Flow [1]	283	374	514	558	580	467
@ Peak Hourly Flow [2]	1,023	1,283	1,603	1,706	1,757	1,393
Weir Loading Rate [3]						
@ Average Daily Flow	2,829	3,745	5,147	5,582	5,809	4,642
@ Peak Hourly Flow	10,239	12,841	16,044	17,072	17,582	13,925

1 Maximum permissible Surface Overflow Rate at average daily flow condition is 800 gpd/sf.
2 Maximum permissible Surface Overflow Rate at peak flow condition is 1,800 gpd/sf.
3 Maximum permissible Weir Loading Rate is 30,000 gpd/ft.

TABLE 6-2
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE
SCARBOROUGH WASTEWATER TREATMENT FACILITY
(INCLUDING 25% INCREASE IN 2025 CAPACITY)

YEAR	Existing FY 2005	2010	2015	2020	2025	25% Increase in 2025 Capacity
OPERATING DATA						
Flow (MGD)						
Average Daily (ADF)	0.71	0.94	1.292	1.401	1.458	1.75
Peak Hourly (@ 3 Times ADF)	2.57	3.223	4.027	4.285	4.413	5.25
CONTACT CHAMBER DATA						
No. of Tanks	2	2	2	2	2	4
Total Volume (gals)	44,880	44,880	44,880	44,880	44,880	89,760
Total Volume (cf)	6,000	6,000	6,000	6,000	6,000	12,000
OPERATING DATA						
Detention Time (min.)						
@ ADF	91	60	50	46	44	73
@ PHF	25	20	10	15	15	25
SODIUM HYPOCHLORIDE						
Gallons per day	32	41	55	60	62	78
SODIUM BISULFITE						
Gallons per day	10	13	18	19	20	25

TABLE 6-2
EXISTING AND FUTURE OPERATING CONDITIONS FOR THE SCARBOROUGH WASTEWATER TREATMENT FACILITY
(INCLUDING 25% INCREASE IN 2025 CAPACITY)

YEAR	Existing FY 2005	2010	2015	2020	2025	25% Increase in 2025 Capacity
SLUDGE GENERATION						
Primary and Waste Activated Sludge						
Sludge Yield (lbs TSS/lf BOD REM)						
% Solids	1.30	1.35	1.40	1.45	1.50	1.50
Pounds per Day	1.0	1.0	1.0	1.0	1.0	1.0
Gallons per Day	1,274	1,902	2.583	3,350	4,033	5,041
	15,276	22,811	30,974	40,166	48,366	60,477
GRAVITY BELT THICKENER						
Effective Width (m)	2.0	2.0	2.0	2.0	2.0	2.0
Sludge Feed Rate (gpm)	300	300	300	300	300	300
Period of Operation (hrs/wk)	5.9	9.5	12.4	15.5	18.2	23
Efficiency (%)	95	95	95	95	95	95
Thickened Sludge Solids (%)	5.0	5.0	5.0	5.0	5.0	5.0
Thickened Sludge (gals/wk)	20,317	32,660	42,324	53,088	62,194	78,620
Thickened Sludge (gals/day)	4,063	6,532	8,465	10,618	12,439	15,724
Loads per Week (@ 2,300 gals)	8.8	14.2	18.4	23.1	27.0	34
Loads per Day 2 (@ 2,300 gals)	1.8	2.8	3.7	4.6	4.6	3.4
SLUDGE STORAGE						
Existing Tank Volume (gals)						
Waste Activated Sludge	69,000	69,000	69,000	69,000	69,000	69,000
Thickened Sludge	20,000	20,000	20,000	20,000	20,000	20,000
Storage Capacity (days)						
Waste Activated Sludge	4.3	2.6	2.1	2.7	1.6	1.4
Thickened Sludge	4.2	2.6	2.1	2.7	1.5	1.3

Preliminary Treatment

As discussed, the plant has upgraded the influent screens to accommodate a peak flow of 3 mgd. Flows in excess of this would be processed through a manual bar screen. Due to the infrequency of this occurrence, the influent screening operation is adequate.

The grit removal operation has been in operation since the plant was commissioned in the 1970's. The current system is adequate to meet the current and projected flows with a hydraulic capacity of 4.0 mgd. Due to the age of the system, the equipment should be replaced as part of the next ten year capital improvement project. During the design phase, consideration will be given to expand its peak hydraulic capacity to 5.25 mgd to provide a 25% increase from the current conditions.

Influent Pump Station

Following the preliminary treatment, the flow is directed into either Wetwell No. 1 or No. 2 of the influent pump station. The pump station is of a dry pit design and contains two (2) variable and one (1) constant speed, 25 horsepower pumps which lift the wastewater into the oxidation ditches. At the present, the facility performs satisfactorily, however, it has reached its useful life and needs to undergo a major overhaul. The capacity of the pump station, as designed, is 4.0 mgd with two pumps in operation. The upgrade will be designed to handle a range from 0.3 MGD (minimum) to 5.95 MGD (maximum) with two pumps, while the third pump will serve as a standby. In addition to the hydraulic capacity increase, the pump design selection should include an increase in the total head of the pump to accommodate the possibility of the addition of future primary clarifiers.

Headworks - Odor Control

In an effort to reduce the odor associated with the raw influent, it is recommended that the headworks be enclosed and the off-gases from the enclosed headworks and influent pump station be processed through a two-stage odor control system dedicated to the headworks. This construction will occur during the headworks upgrade.

Primary Clarifier

The addition of two (2) primary clarifiers and related primary sludge pumps is to be included within the long range Capital Improvement Plan. The idea behind this concept is that depending on the ratio of a soluble to suspended BOD_5 concentrations of the raw sewage, the sufficiently sized primary clarifiers can reduce up to 75% of solids and up to 60% of organic loads delivered for treatment to the activated sludge system, thereby eliminating the necessity of expanding the aeration capacity to meet the future treatment requirements. For the Scarborough WWTF, a conservative value of 30% primary BOD_5 removal and 55% of primary suspended solids removal efficiency has been assumed in our future assessment of the oxidation process. Raw primary sludge is typically 4 to 8 times more concentrated than waste activated sludge. It is also more suitable for thickening on the gravity belt thickener when blended with the waste activated sludge.

The primary clarifiers will be located in the newly acquired portion of the treatment plant side adjacent to Ocean Road, on the south side of the present site. The primary clarifiers will be designed for an average daily flow of 1.75 mgd and a peak loading of 5.25 mgd. The clarifiers need to be of a 40-foot diameter and an 11-foot side water depth.

The avoidance of odors are critical in the consideration of any process upgrades. Therefore, the primary clarifier weir will be sealed with a launder cover designed from fiberglass reinforced plastic. The cover will be gastight designed to entrap 94 to 98% of the odor generated at the weirs.

The entrapped gas under the weir covers will be withdrawn off through a two stage odor abatement system. The system will be designed for removal of 99.5% of hydrogen sulfide and mercaptans at inlet concentrations of 10 ppm dissolved, and 100 ppm atmospheric. The odor abatement system will be designed for 30 air changes per hour. Special design consideration will be a two speed exhaust fan and air balancing, and a calibration damper.

Aeration

This arrangement would eliminate any expansion or modifications to the aeration facilities to cover the 25% increase in future treatment requirements. Under the most critical loading condition (i.e., average BOD load of 1,339 lbs/day and corresponding maximum BOD loading of 3,348 lbs/day at the year 2025), the activated sludge

process would require an input of 45 average and 91 maximum horsepower which can be satisfied by existing rotors having a total useful horsepower of 110.

Secondary Clarification

The upgrade and expansion of the secondary clarification facilities will be required as part of the Capital Improvement Plan. One additional 40-foot diameter, 11-foot side water depth clarifier will work in conjunction with the two existing clarifiers. The third clarifier will allow the plant to maintain its effluent quality at peak hydraulic loadings and still take one unit out of service for maintenance.

Disinfection

Based upon the 25% increase in capacity, the two chlorine tanks will achieve the 37 minute detention time at average daily flow, however, at peak flows provides for only 12 minutes of detention time. Based upon RIDEM criteria of 15 minutes peak flow, the existing chlorine tanks are to be expanded to meet the 25% criteria. The construction of the chorine contact tank should occur before or in conjunction with the addition of the secondary clarifier to allow for placement of the secondary clarifier in the location of the existing chlorine contact tank. At that time, the hydraulic condition requires a Preliminary Engineer's Study be conducted to evaluate a UV installation in lieu of expansion of the contact tanks due to the limited space in the southeast corner of the site.

6.3 TRANSPORTATION

6.3.1 WASTEWATER COLLECTION SYSTEM ALTERNATIVES

There are several different types of wastewater collection systems which could be used, such as a conventional gravity system and a grinder pump system.

Conventional Wastewater Collection System

The conventional wastewater collection system consists of gravity lateral sewers and pump stations with gravity house service connections. The advantages of this system are that a gravity system requires a minimal amount

of maintenance, low operation and maintenance costs, and are typically operational during loss of power. The disadvantage to this system is the construction cost associated with depth of excavation.

Grinder Pump Sewer Systems

Grinder pump sewer systems permit shallow excavations and small diameter pipelines to be provided with individual grinder pump units located at every property. This system is feasible and cost effective in areas with undulating roadways, shallow bedrock, and for dwellings at lower elevations than the roadways. The disadvantages of the grinder pump sewer system are the high operation and maintenance requirements, inability to function during loss of power, requirement of a properly conceived and implemented management arrangements, individual home electrical requirements, and provisions for portable standby power. Grinder pump sewer systems are used in combination with gravity sewers to ensure that the gravity sewers are cost effective.

Cost-Effective Analysis

The capital cost was developed for each alternate system, assuming a service area consisting of 65 dwelling units and 6,000 linear feet in length. Table 6-3 summarizes the capital cost of each alternate.

Recommendation

Based on the cost-effective analysis and the comparison of the advantages versus disadvantages, it is recommended that the wastewater collection systems consist of a combination of gravity sewers and grinder pump pressure sewers. The pressure sewers will be utilized in areas that have undulating terrain; thereby, a cost-effective system will be provided.

At the facilities planning phase, the location of the grinder pump pressure sewers are determined by the available topography provided by USGS maps. During the design phase, detailed topographic mapping and subsurface investigations will dictate the location of the grinder pump pressure sewers.

TABLE 6-3 SUMMARY OF CAPITAL COST FOR ALTERNATE WASTEWATER COLLECTION SYSTEMS		
	CONVENTIONAL GRAVITY SYSTEM	GRINDER PUMP SYSTEM
8-inch PVC Pipe	$ 420,000	$ 0
6-inch PVC Pipe	81,300	0
3-inch PVC Pipe	0	210,000
1½-inch PVC Pipe	0	52,000
Pump System	0	487,500
Sewer Wyes	6,500	0
Precast Concrete Manholes	50,000	0
Rock Excavation and Gravel Refill	66,000	30,000
Dewatering	60,000	30,000
Pavement Replacement	70,000	70,000
Traffic Control	25,000	25,000
Sub-Total	$ 778,800	$ 904,500
Construction Contingencies (25%)	194,700	226,100
TOTAL	**$ 973,500**	**$ 1,130,600**
Cost per Unit	$ 15,000	$ 17,400

The Town has adopted a set of guidelines titled "Standard Sanitary Sewer Requirements" which consists of a set of specifications and details governing gravity sewers, low pressure sewers, force mains, and pump stations that are based on state-of-the-art technology and RIDEM guidelines. These standards may be revised by the Town Engineer as required based on technology improvements or revised RIDEM guidelines.

For Town-sponsored sewer projects, the Town provides a grinder pump unit to each dwelling owner that is located within a low pressure sewer system or a dwelling that is located in a low lying area along a gravity system provided by the Town at no cost to the dwelling owner.

NO-BUILD ALTERNATIVE

The "no-build" alternative will be for the Town of Narragansett not to provide new wastewater collection systems in the future service areas. The "no-build" alternative is inconsistent with the goals and policies of the

Comprehensive Plan, State Guide Plan, and the Rhode Island Coastal Resources Management Council's Special Area Management Plans for the Narrow River and Salt Pond Region.

The future service areas contain lands developed beyond carrying capacity that are developed or zoned at densities less than two acres, frequently at one residential unit per ½ to ⅛ acre or less. These densities have been found by the CRMC to exceed the natural ability of the soils and other environmental factors to alternate the effects of development. The consequence of this development is the contamination of the Narrow River and Point Judith Pond, particularly from individual on-site disposal systems that pre-date state enforced siting and design standards and/or approaching or have exceeded their life span. The "no-build" alternative will, therefore, be a major source of contamination to groundwater, Narrow River, and the salt ponds.

ALTERNATE ROUTES

All of the solutions for facilities improvements in the planning area, except for a "no-build" alternate, involve the conveyance of sewage through interceptors, lateral sewers, and pump stations. There are no alternate routes. In addition, the future service areas are adjacent to the existing wastewater collection system; therefore, the points of connection have been established.

6.3.2 TRANSPORTATION OF WASTEWATER

General

In the future adequacy determination of the interceptor systems and pump stations, it was determined that Congdon Street Pump Station, Stanton Avenue Pump Station and the Ouida Street Pump Station were inadequate to convey wastewater flows under future conditions. Harbour Island, Great Island and Baltimore Avenue area (three future service areas) will require pump stations to convey the sewage flows generated by Harbour Island and Great Island to connect to the South End Sewer System.

Congdon Street Pump Station: The inadequate existing pumps will be replaced with a new pumps to meet future demands. Also, the existing 4-inch force main will be replaced with a 6-inch force main approximately adequately sized to convey future flows.

Stanton Avenue Pump Station: The existing inadequate pumps will be replaced with new pumps to meet future demands.

Ouida Street Pump Station: The Ouida Street Pump Station is located in the vicinity of Beach Pond. The pump station is inadequate for future flows. The three existing pumps should be replaced with 150 HP dry pit submersible units. The controls should be replaced with soft starts and variable frequency drives. Check valves, plug valves and flow meters should be replaced as part of the pump installation. Force main running through the wetwell is deteriorated and should be replaced, and a Data Acquisition System should be installed.

Harbour Island Wastewater Collection System: Harbour Island is part of the future service in the South End Sewer System. The collection system for Harbour Island will consist of 8-inch conventional gravity sewers in combination with grinder pumps and pressure sewers. Grinder pumps will be required for the dwellings located along the shoreline.

To convey sewage generated by 320 residents at Harbour Island, a below-grade lift station will be required to be installed between Arrow Head Road and Beach Pond Road. The pump station will be required to accommodate an average flow of 115,200 GPD and a peak flow of 307,200 GPD. The design capacity of the station will be 215 GPM. A 6-inch force main will traverse along Brush Hill Road in an easterly direction onto Foddering Farm Road. On Foddering Farm Road, the force main will proceed in a northwest direction along Foddering Farm Road to the intersection of Cove Road and proceed south along Cove Road and cross Champlin Cove utilizing directional drilling to Briggs Farm. The total length of the 6-inch force main is 2,600 feet, including 1,000 feet of directional drilling.

Great Island Wastewater Collection System: The Great Island Wastewater Collection System will consist of 8-inch gravity sewers, grinder pumps and pressure sewers, and a below-grade lift station to convey flows to the existing Narragansett Collection System located on Great Island Road in the vicinity of the Galilee Pump

Station. The average sewage flow generated by this area is 135,000 GPD with an associated peak flow of 360,000 GPD. Grinder pumps will be required for the dwellings located along the shoreline and in areas where the depth of excavation of the gravity sewer would be cost prohibitive. It is estimated that approximately 100 grinder pumps will be required. A pump station will be required to convey the sewage from Great Island to the existing sewage system. The pump station will have a design capacity of 313,300 GPD (220 GPM) and will be installed to the north of the Great Island Road bridge. A 6-inch force main will traverse along Great Island Road crossing the bridge and terminating at the existing sewer manhole located in the vicinity of Galilee Pump Station. The total length of the 6-inch force main is approximately 2,500 feet.

Baltimore Avenue Area: The Baltimore Avenue Area Sewer System will consist of an 8-inch gravity sewer that will connect to the existing sewer manhole located at the intersection of Ocean Road and Clarke Road. The sewer system will serve 42 residential dwellings.

Alexander Drive Sewer Area: The Town has recently received a petition from the property owners on Alexander Drive relative to connecting to the new Clarke Road interceptor that was installed as part of the Briggs Farm Sewer Project. The benefitting property owners (twelve (12) in total) will be responsible for pro-rata shares of their own extension into Alexander Drive, as well as a pro-rata share of the Clarke Road interceptor component. The Alexander Drive Wastewater Collection System will consist of a gravity sewer. The sewer system will consist of approximately 450 linear feet of sewers, and will connect to the interceptor that was installed on Clarke Road in 2005 as part of the Briggs Farm Sewer Project.

Knowles Campground Wastewater Collection System: The Knowles Campground Wastewater Collection System will consist of gravity sewers serving 110 residential units. The sewer system will consist of approximately 3,400 linear feet of gravity sewers. Knowles Campground will be installing the sewer system and will be responsible for the construction as well as the long term maintenance of the system.

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7.0 ANTICIPATED ENVIRONMENTAL IMPACTS

RECOMMENDED PLAN

Interceptor sewers for conveying wastewater flows from planned system expansions and population increases throughout a twenty (20) year planning period are evaluated. In those areas where it is determined that the capacity of the existing system is inadequate, a program is developed for renovation of the trunk line system. The interceptor renovation program is based on a forty (40) year planning period.

Treatment systems for the southern section of Town were evaluated with respect to its ability to meet established effluent limitations and water quality objectives at both present and future flow rates and waste loads. If it is necessary to increase the capacity of the Scarborough Treatment Facility, alternative proposals will be developed and evaluated. The alternative that is the most environmentally sound and cost-effective proposal will be selected. Preliminary plans and cost estimates will be prepared for proposed system upgrades.

7.1 NO CONSTRUCTION ALTERNATIVE

The Town of Narragansett wants to improve the water quality of the adjoining coastal waters. As demonstrated in earlier sections, the greatest number of Individual Sewer Disposal Systems occurs on islands located in the coastal waters. Great Island with 375 homes and Harbor Island with 320 homes represents a potential total of 208,500 gallons per day entering the ground water at a very low elevation. The soils at these two locations are well drained and excessively permeable raising the potential to contaminate the coastal waters. Further, Scarborough Beach has closed on a number of occasions due to septic waste contamination from adjoining areas such as Baltimore Avenue and the Knowles Campground.

A review of the Baltimore Street area found that the water table is within one and a half (1.5') feet of the surface. With no addition of domestic sewers to this area, the contamination of the existing Individual Sewer Disposal Systems will continue to back up, pond in the yard and contribute contaminants to the flow into the Atlantic Ocean. A gravity sewer manhole is located eight hundred (800') feet to the south of Baltimore Avenue

on Ocean Road, so connection to the existing system can be accomplished with the installation of sewer lines on Baltimore Avenue.

Knowles Campground has no proper sanitation for grey water or septic wastes. Contamination from this area has been documented in the closure of Scarborough Beach and eighty-three of the one hundred and ten units have been cited with violations by the Department of Environmental Management. Efforts are underway to get this area a proper sewer disposal system. Plans are to install gravity sewer lines and manholes on the property and connect each of the units to the line.

The infrastructure analysis revealed that the Congdon Street and Stanton Avenue Pump Stations are inadequate at peak flow rates. High levels are already evident in the system during heavy rain and overflow could occur if peak flow increases. The pump stations are located within fifty (50') feet of the Atlantic Ocean which is not a desirable location for an overflow.

It is in the best interests of the Town to have a wastewater collection system that is adequate to handle the service area. A "no construction" alternative will result in the non-point source pollutants migrating into Point Judith Pond and the Atlantic Ocean potentially closing Scarborough Beach. Construction of pump stations for these projects will occur on land owned by the Town of Narragansett. Force mains and gravity sewers will be installed in the highway and will follow the existing alignments in the highway. Approximately five hundred (500') feet of cross country directional drilling will be used from the Harbor Island pump station to the Briggs Farm pump station.

7.2 DIRECT IMPACTS

7.2.1 TRAFFIC & DAILY ACTIVITIES

Traffic impacts will result from construction operations and police details can minimize these temporary traffic impacts. The impacts will be confined to the localized area of installation. There are no businesses in the vicinity of the proposed projects that will be impacted. Traffic control measures that comply with MUTAPS will be instituted prior to the construction and maintained during construction.

Baltimore Avenue Sewer Line: Construction will occur in the existing street. Traffic on Baltimore Avenue may require closing of the street for a portion of time due to the narrow configuration of the street and the need to install laterals across the road. The impact will be for residences on the street. This can be mitigated by prior notice to each residence of the upcoming construction and potential for road closure.

Harbor Island Sewer Line and Pump Station: Construction will occur on all of the streets on the island. Traffic will be impacted when the force main is installed because the narrow roads will need to be closed during the installation of the line and the accompanying laterals. Any restriction in travel may be alleviated by the use of detours using the loop streets that occur on the island, however, that option is limited for many of the dead end streets. Construction of the pump station will occur off the road and will not impact the flow of traffic during construction. Directional drilling to connect the pump station to the Briggs Farm pump station will occur off the road away from traffic.

Great Island Sewer Line and Pump Station: Construction will occur on all of the streets on the island. Traffic will be impacted when the force main is installed because the narrow roads will need to be closed during the installation of the line and the accompanying laterals. Any restriction in travel may be alleviated by the use of detours using the loop streets that occur on the island, however that option is limited for the dead end streets. Construction of the pump station will occur off the road and will not impact the flow of traffic during construction.

Congdon Street and Stanton Avenue Sewer Line and Pump Station: Traffic will be disrupted during construction because the road may need one lane closed. A short detour to reroute traffic in the construction area will minimally impact traffic. Any delays will be temporary in nature and quickly mitigated upon completion of the force main installation.

Knowles Campground: Traffic will not be impacted by the construction in the campground because the work will be done during the off-season when the units are not occupied. Daily activities normally come to an end in October and residents return to their permanent homes.

7.2.2 HISTORIC, ARCHEOLOGICAL, CULTURAL, RECREATIONAL

Baltimore Avenue Sewer Line: All the land involved is along the existing highway, therefore, no historical, cultural or recreation area will be lost by this project. This area contains no recorded sites, but is highly sensitive for the presence of archaeological sites as it contains freshwater and is near archaeological site RI 102, the large Narragansett Indian settlement at Black Point. An archaeological assessment study is required of this area to determine if an archaeological site may be located within the proposed sewer construction area. As sewer construction will take place within existing roadways, this assessment study should be conducted by a professional archaeologist to determine if intact surfaces with the potential to contain archaeological sites are present beneath the roads. This study must include background research, a walkover survey, an examination of road utility maps and the use of judgmental test pits to examine soil stratigraphy in selected locations.

Harbor Island Sewer Line and Pump Station: All the land involved for the sewer line is along the existing highway, therefore, no historical, cultural or recreation area will be lost by this project. The proposed pump station is on land owned by the Town of Narragansett that was previously disturbed, therefore, no historical, cultural or recreation area will be lost by this project. A review of the proposed project by the State Historical Preservation & Heritage Commission finds that there are two (2) archaeological sites on Harbor Island, therefore, before any sewer work is started, an archaeological assessment study is required of this area to determine if archaeological sites may be located within the proposed sewer construction area. As sewer construction will take place within existing roadways, this assessment study should be conducted by a professional archaeologist to determine if intact surfaces with the potential to contain archaeological sites are present beneath the roads. This study must include background research, a walkover survey, an examination of road utility maps and the use of judgmental test pits to examine soil stratigraphy in selected locations.

Great Island Sewer Line and Pump Station: All the land involved for the sewer line is along the existing highway, therefore, no historical, cultural or recreation area will be lost by this project. The proposed pump station is on land owned by the Town of Narragansett that was previously disturbed, therefore, no historical, cultural or recreation area will be lost by this project. A review of the proposed project by the State Historical Preservation & Heritage Commission finds that there are two (2) archaeological sites on Great Island, therefore, before any sewer work is started, an archaeological assessment study is required of this area to determine if archaeological sites may be located within the proposed sewer construction area. As sewer construction will take place within existing roadways, this assessment study should be conducted by a professional archaeologist to determine if

intact surfaces with the potential to contain archaeological sites are present beneath the roads. This study must include background research, a walkover survey, an examination of road utility maps and the use of judgmental test pits to examine soil stratigraphy in selected locations.

Congdon Street and Stanton Avenue Sewer Line and Pump Station: All the land involved for the sewer line is along the existing highway, therefore, no archeological, historical, cultural or recreation area will be lost by this project. The new pump station is on land owned by the Town of Narragansett near the existing pump station, therefore, no archeological, historical, cultural or recreation area will be lost by this project.

Knowles Campground: The installation of sewer lines and manholes will occur in the existing roads in the campground. A small section will traverse an adjoining property via an easement. The adjoining land has a driveway and backyard that will be impacted. Archeologically, this area is moderately sensitive. The impact to recreation will be positive because the new sewer system should eliminate contamination of Scarborough Beach from this source and the campground will not have discharge of septic wastes on the ground causing odors and health hazards.

7.2.3 SOILS AND HYDROLOGY

Agricultural Land

There are no agricultural lands within all of the project areas that could be affected by the project work. The sewer line installations occur in dense residential areas and the pump stations installations are on Town properties.

Soils

Baltimore Avenue Sewer Line: This project is on Rainbow Silt Loam and Stissing Silt Loam soils. Rainbow soils are moderately well drained and Stissing soils are poorly drained.[1, 2] Both soil types have slow to very slow

[1] Soil Survey of Rhode Island, USDA, Soil Conservation Service and Rhode Island Agricultural Experiment Station, July 1981

[2] Soil Hydrology, RIGIS, University of Rhode Island

permeability in the substratum. Stissing soils have a seasonal water table at the surface. A review of the State of Rhode Island GIS data on Forest and Wetland Resources indicates that there are wetlands to the north and south of the road outside of the project area.[3] A site visit indicated that the site has residential homes along both sides of a narrow street in close proximity to a new gravity line to the south on Clarke Road.

Harbor Island Sewer Line and Pump Station: The underlying soils of this area are the Merrimac Urban Land Complex, Agawam Fine Sandy Loam and Sudbury Sandy Loam. These soils have moderately rapid to rapid permeability in the surface, sub soil and the substratum. The Sudbury soil has a seasonal high water table at twenty (20") inches below the surface. With rapid permeability the Individual Sewer Disposal Systems will leach into the groundwater very quickly. The island is surrounded by the Point Judith Pond estuary complex, including Champlin Cove and Long Cove leading to potential nutrient loading of the estuary complex.

Great Island Sewer Line and Pump Station: This project is on predominantly Canton Urban Complex that is a well drained soil with moderately rapid to rapid permeability in the sub-soil and substratum. The balance of the soil type on the island consists of Canton-Charlton Fine Sandy Loam with 3 to 15% slopes and some small areas of Sudbury Sandy Loam. All are well drained soils with moderately rapid to rapid permeability in the substratum. The area of the island known as Little Comfort Island contains the higher sloped Canton-Charlton soil. This soil is subject to effluent from an Individual Sewer Disposal System flowing directly to the surface below the leach field due to the slope and permeability of the soil.

Congdon Street Sewer Line and Pump Station: The area around the pump station is located in the Paxton Urban Land Complex that is a well drained soil with moderately rapid permeability in the surface and slow to very slow permeability in the substratum. Little impact from the soil condition is anticipated during the renovations at the pump station because the area is disturbed. The force main will traverse some areas of Rainbow Silt Loam that is a moderately well drained soil with slow to very slow permeability in the substratum and a seasonal water table of twenty (20") inches below the surface.

Stanton Avenue Pump Station: The area around the pump station is located in the Paxton Urban Land Complex that is a well drained soil with moderately rapid permeability in the surface and slow to very slow

[3] Forest & Wetland Resources, RIGIS, University of Rhode Island

permeability in the substratum. Little impact from the soil condition is anticipated during the renovations at the pump station because the area is disturbed.

Knowles Campground: This project is on Paxton Urban Land Complex and Stissing Silt Loam soils. The Paxton Urban Land Complex that is a well drained soil with moderately rapid permeability in the surface and slow to very slow permeability in the substratum. Stissing soils are poorly drained and have a seasonal water table at the surface. Addition of sewer lines to this densely occupied area will greatly assist mitigation of the current contamination that emanates from this area.

Hydrology

Impacts of the proposed facilities on the hydrology of the area will be negligible. Construction of sewer lines in the high water table areas, such as Knowles Campground and Baltimore Avenue, will act as a drain when the groundwater reaches the layer of stone around the pipe, however, normal construction practices tend to prevent this water from moving horizontally.

7.2.4 EROSION CONTROL

It is anticipated that during construction of all the proposed projects that actions are needed to prevent exposed soils from migrating off site either by wind or rain. This will require dust control and erosion control measures to be instituted by way of stacked hay bales, silt fence and covering of stock piled materials.

Great Island Sewer Line and Pump Station: During construction extra care is needed prevent erosion on the unstable slopes on Little Comfort Island where the soils are very permeable and slopes approach 15%.

Harbor Island Sewer Line and Pump Station: The force main will go under Champlin Cove at the south end of the island to the pump station in Briggs Farm. This work will be done by directional drilling to install the force main. By installing the line by directional drilling, construction in the coastal feature between the island and the main land is avoided. The proposed route is less intrusive to the shoreline.

7.2.5 WATER QUALITY

Non-point pollution is obvious in many of the areas where these projects are proposed. Drainage and runoff from the land areas of the project area are significant sources of non-point source pollution. All of the proposed projects are designed to improve the water quality of the adjoining coastal waters by removing the septic waste leaching from inadequate systems into soils that promote non-point source pollution. Improved water quality of the adjoining areas may benefit aquatic life through the reduction of bacteria and nutrient loading.

Baltimore Avenue Sewer Line: The sewer lines installed in the road will connect to an existing manhole on Ocean Road. The manhole on Ocean Road is new and was built with a lateral stub to provide for the connection of the Baltimore Avenue sewer. The connection will occur in the ground at the manhole without the need for by-pass pumping. There is no exposure of spill occurring during this connection. All of the line installed in Baltimore Avenue will be new and dry until the laterals are connected to the homes.

Harbor Island Sewer Line and Pump Station: The force main will connect with a new pump station located in the Briggs Farm Complex. The tie in to the pump station is already in place in anticipation of the construction of the Harbor Island Sewer project. No effluent spills are expected during the construction of the sewer lines and pump station on the island because it will be new and dry. The connection to the Briggs Farm pump station will be to a connection provided for the Harbor Island system, so no spill are expected from this construction.

Great Island Sewer Line and Pump Station: The force main will connect to an existing gravity line on Point Judith Road. The gravity line has very low flow at the point of connection because it is the end of the present gravity system. No effluent spills are expected because the installation is occurring with a dry line to an existing gravity line that has very low flow. All lines and the pump station on the island will be installed dry until homes are connected to their laterals.

Congdon Street and Stanton Avenue Sewer Line and Pump Station: The force main and pump station will be installed while by-pass transfer of wastewater occurs between existing manholes. Spills during the by-pass

transfer may occur if damage to the above ground line occurs during the by-pass operation. Normally, the by-pass piping is placed outside of the influence of traffic where damage might occur and the experience with this type of operation is that spills very rarely occur. When a spill occurs, the pumps are immediately shut down and a planned clean up operation begins. Contractors experienced in by-pass transfer are prepared for each potential disaster that may occur and are quick to respond. The potential for run-off to the Atlantic Ocean does exist in this operation, so prudence during the by-pass transfer will be utmost.

Knowles Campground: A gravity sewer line will connect with the existing sewer service on DeSano Drive at the east side of the campground. Addition of sewer lines will improve the water quality of Scarborough Beach because this area has been identified as a source of contamination.

7.2.6 BUILDING DISPLACEMENT

No buildings, residences, or commercial structures will be displaced during any of these projects.

7.2.7 NOISE, AIR OR VISUAL POLLUTION

Baltimore Avenue Sewer Line and Knowles Campground: During construction there will be noise from the operation of heavy equipment preparing the trench for the sewer main. After construction the new sewer line will not produce noise because all operations occur underground. Air quality effects during construction are principally related to suspended dust particles due to trench excavation, stockpiling material and vehicular solids breakdown and transport. These effects are obviously local and of short duration, although potentially aggravating and annoying. Other effects on air quality during construction will be increased emissions of carbon monoxide and hydrocarbons from heavy duty vehicles and gasoline driven pumps and generators. These effects will not significantly change the area's atmosphere and are considered inconsequential. After construction the sewer main is buried in the road and no noise, air or visual impacts will occur.

Harbor Island, Great Island, Stanton Avenue and Congdon Street Sewer Line and Pump Station: During construction there will be noise from the operation of heavy equipment preparing the trench for the force main and construction of the pump station. After construction the new facility will not produce noise because all

operations occur within the building and consists of the operation of pumps. The building area is minimal in size and designed to be similar to the surrounding structures. Air quality effects during construction are principally related to suspended dust particles due to trench excavation, stockpiling material and vehicular solids breakdown and transport. These effects are obviously local and of short duration, although potentially aggravating and annoying. Other effects on air quality during construction will be increased emissions of carbon monoxide and hydrocarbons from heavy duty vehicles and gasoline driven pumps and generators. These effects will not significantly change the area's atmosphere and are considered inconsequential. After construction the force main is completely enclosed and will not cause air, noise or visual impacts. The pump station is constructed in such a way to blend with the surrounding area and operate with no impact to noise or air quality.

7.2.8 FLOODPLAIN

Floodplains are a concern for protection because they absorb and store storm water from either fresh water bodies or coastal water bodies. Narragansett has the potential to flood all along the coast in addition to the potential for wave action and tidal surges. Typically, the 100 year floodplain, A zone, is described as the area that is likely to flood once in a hundred years. Similarly, the 500 year floodplain, B zone, is described as the area that is likely to flood once in every five hundred years. Coastal areas are protected by the Coastal Resources Management Council and they manage development within 200 feet of the shoreline. Construction of the sewer lines within the floodplain will confine the sewer waste to the pipe line where contamination is unlikely. Currently, septic tanks, cesspools and leach fields in the floodplain expose a great deal of potential contamination during a flood.

Baltimore Avenue Sewer Line: These areas are classified as Zone C.[4] There is minimal flooding that may occur at this project area.

Harbor Island Sewer Line and Pump Station: This area has a mixed flood risk classification of A10, B and C. Minimal flooding may occur in the C zone. The B zone is the area between the 100 and 500 year flood and the A10 zone is identified as having a base flood elevation of 10 to 11 feet. Construction in the floodplain will

[4] Flood Insurance Rate Map, Federal Emergency Management Agency, June 16,1992

occur on current roads where floodplain compensation is not required. During construction, trenches need to be filled and contained quickly if the potential for flooding were to occur.

Great Island Sewer Line and Pump Station: This area has a mixed flood risk classification of A10, B and C. Minimal flooding may occur in the C zone. The B zone is the area between the 100 and 500 year flood and the A10 zone is identified as having a base flood elevation of 10 to 12 feet. Construction in the floodplain will occur on current roads where floodplain compensation is not required. During construction, trenches need to be filled and contained quickly if the potential for flooding were to occur.

Congdon Street Force Main and Pump Station: This area has a flood risk classification of A10. The A10 zone is identified as having a base flood elevation of 16 feet. At the seawall in front of the pump station wave action and tidal surge may occur as well, but the seawall protects Ocean Road from damaging effects of the waves. Construction in the floodplain will occur on current roads where floodplain compensation is not required. During construction, trenches need to be filled and contained quickly if the potential for flooding were to occur.

Stanton Avenue Pump Station: This area has a flood risk classification of A10. The A10 zone is identified as having a base flood elevation of 14 feet. Renovations at the station will not affect the floodplain.

Knowles Campground: This area is classified as Zone C. There is minimal flooding that may occur at this project area.

7.3 INDIRECT IMPACTS

7.3.1 URBANIZATION

Baltimore Avenue Sewer Line: This area is residential and has a few vacant lots that may be developed once the sewer line is installed. The effect of the sewer line is to improve the water quality of neighborhood and of Scarborough Beach.

Harbor Island and Great Island Sewer Line and Pump Station: The islands are densely populated with small lots. A few vacant lots may be developed as a result of the sewer line installation.

Congdon Street and Stanton Avenue Force Main and Pump Station: The new pump stations will be retrofitted with new pumps and the Congdon Street force main will be replaced. The inadequacy of these pump stations is the result of development in the surrounding areas served by the pump stations. Without the renovations at the pump stations and the replacement of the Congdon Street force main, additional development in the area will continue to overtax the stations and cause overflow.

Knowles Campground: The number of units in the Campground is fixed at the current level, so addition of sewers will not increase development of the area.

7.3.2 LOCAL SUPPLIERS

Improvements to the collection system obviously have the potential to provide short-term benefits to local skilled and unskilled workers with jobs in the construction trades. The project will require the skills of excavating contractors, pipe installers and paving companies. Construction will create a demand for materials such as pipe, soils, pumps and asphalt, plus the work will promote local economic benefits due to worker needs for food, beverage and personal equipment.

7.3.3 LOCAL SERVICES

Local vendors will receive minimal increase in business during construction. The work crew will be less than 15 people and will not increase demand for local services. No businesses will be impacted because these projects are in residential areas.

7.3.4 RECREATION

The primary beneficiary of the installation of sewer lines is the improvement to the coastal waters that abut the projects. Scarborough Beach has closed on summer days because of the non-point source pollution that has

come from Baltimore Avenue and Knowles Campground. Recreation opportunities in Point Judith Pond, Long Cove, Bluff Hill Cove and Champlin Cove are limited because of the non-point source pollution from Individual Sewer Disposal Systems on Harbor Island and Great Island. Overall, recreation and improved water quality are two of the main reasons for the construction of these projects.

7.3.5 LAND USE

Impacts to land use are predominantly construction related short-term impacts associated with pavement breaking, sewer trench excavating, pipe placement, trench backfilling and paving of the existing street. Nearly all of the construction occurs within existing roads and on properties already occupied by pump stations. Increased use of the surrounding lands may occur after the installation of sewer lines due to the ability to develop vacant lots that can be served by a sewer line.

7.3.6 ENERGY

Energy consumption during construction will be in the form of gasoline and diesel engines, electricity for small hand tools and potable water for testing, cleaning and drinking. After construction the pump stations will have pumps in constant operation. A small electric heater, an exhaust fan, fluorescent lighting and receptacles will operate in the pump stations. The existing pump stations and their force main will be abandoned in place, so an energy savings for their elimination is credited towards this project.

7.3.7 ECONOMICS

Minimal impact to the local economy during construction. After construction the increased sewer capacity will provide better recreation opportunities on both Point Judith Pond and Scarborough Beach. Tourism is one of the main economic engines in Narragansett and good water quality in the coastal ponds and beaches keeps tourism up.

7.3.8 PUBLIC SAFETY

Care is needed with flaggers, signs and warning devices. Traffic control is needed to permit the traffic access to residential homes. Fortunately, during a majority of the day there is little residential traffic.

Baltimore Avenue: Construction will hamper access on Baltimore Avenue. No opportunities exist for detours to permit access around the construction. Warning devices, handouts and signs will be critical during the preconstruction and construction phases to give adequate warning to the residents.

Harbor Island and Great Island Sewer Line and Pump Station: Traffic control will be critical on the narrow roads found on the islands. There are opportunities for detours, but there are also areas where construction will limit traffic on the island. Warning devices, handouts and signs will be critical during the preconstruction and construction phases to give adequate warning to the residents.

Congdon Street and Stanton Avenue Force Main and Pump Station: The pump stations are located off the road, but they do abut the road. Safety measures are needed because one lane of the road near the pump station may be impassable. Detours may be necessary when the Congdon Street force main is replaced.

Knowles Campground: Construction will occur during the off-season when the units are not occupied. Flaggers and warning signs are still necessary for the period of time the construction makes the connection on DeSano Street.

7.3.9 AESTHETICS

For all of the projects the paving of the roads will improve the surface and appearance of the road once the sewer lines are installed.

Baltimore Avenue Sewer Line: The installation of gravity sewer line and manholes will not change the view from the current view. When completed the sewer line is underground and only the manhole covers are exposed as a flush unit in the roadway.

Harbor Island, Congdon Street, Stanton Avenue and Great Island Sewer Lines and Pump Stations: The pump station buildings are constructed of materials similar to those in surrounding buildings and blends with the adjoining facilities. The installation of the force main and the gravity sewer will occur underground where they are not visible. When completed there will be little change from the present view.

Knowles Campground: The odors and exposure to hazardous spills will be eliminated with the installation of sewer lines in this area. Upon completion the lines will be underground and out of sight. Connections from the trailers will be visible, uniform in appearance and neat. Currently, the connections are visible, unsafe and problematic.

7.3.10 VISUAL AMENITIES

No change to the visual impact of this facility over the present conditions.

7.4 SUMMARY

Primary adverse impacts associated with the project to install the pump stations, force mains and interceptors are construction activity and temporary disruption of traffic. All wetland, coastal features and storm water catch basins need protection with soil erosion methods including silt fence and hay bales. The potential for soil erosion exists in the Harbor Island and Great Island areas because the soils are so permeable and on Little Comfort Island, the slope of the land must be carefully excavated to prevent loss of soil.

The project will provide increased sewer capacity in the Narragansett Wastewater Collection System. Installation of sewer lines in the critical land areas will improve water quality by collecting waste water before it leaches into the soil. The permeable soils are dominant on the islands that abut Point Judith Pond, so this work is important for improved water quality. The Knowles Campground and Baltimore Avenue areas have less permeable soils that are causing surface contamination that flushes into the Scarborough State Beach causing closure of a major recreational facility.

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8.0 PRELIMINARY IMPLEMENTATION PLANS

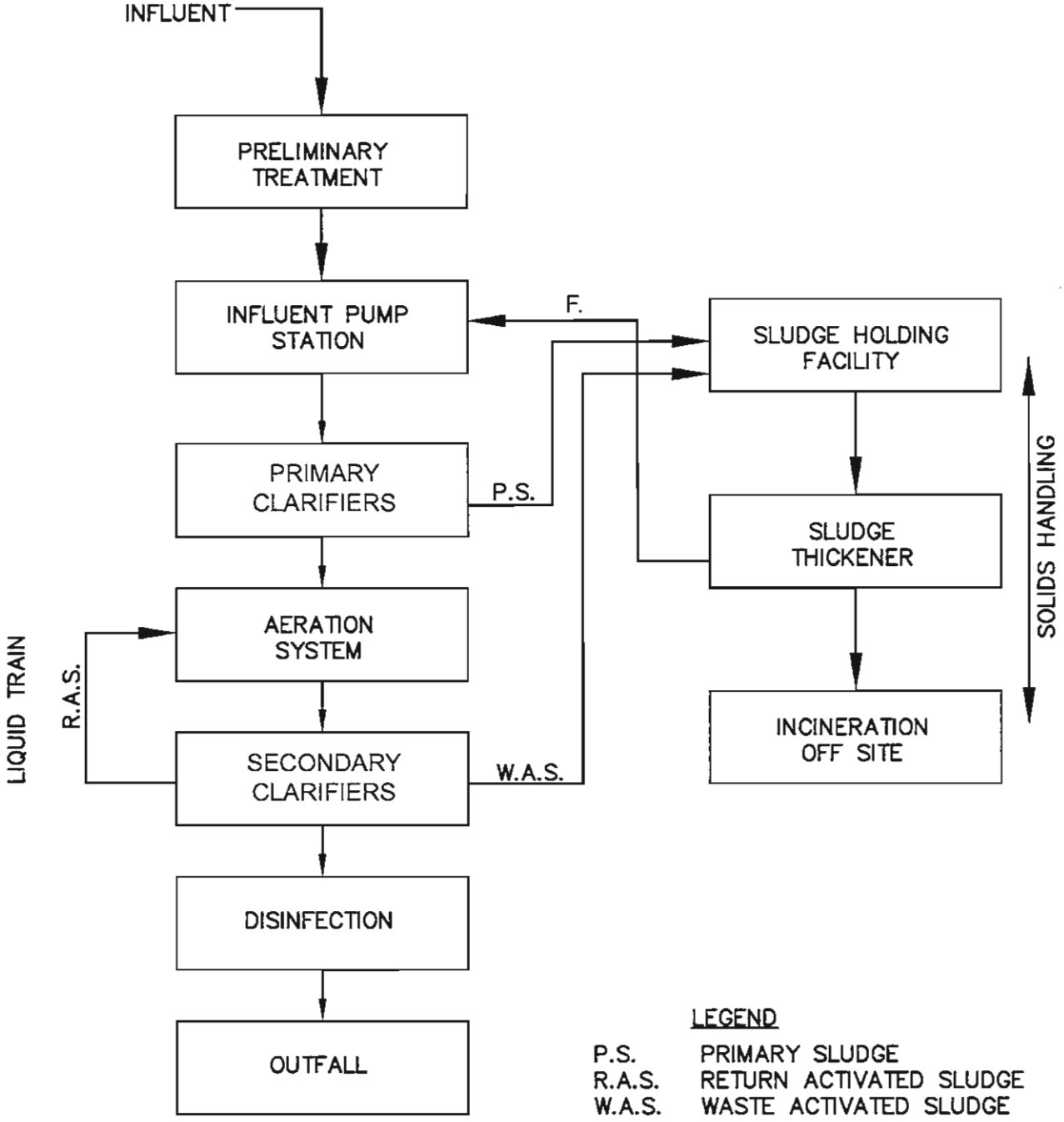
8.1 PRELIMINARY DESIGN

As discussed in Chapter 6, present the suggested modification to the Scarborough Wastewater Treatment Facility by altering the extended aeration process to a conventional activated sludge system. This can be accomplished with the addition of two primary settling tanks ahead of the aeration process. The addition of primary settling will reduce the BOD concentration by 30%. This will lower the BOD below the original design concentration. The remaining modification will focus on upgrading the existing equipment, such as the influent pump station, an additional secondary settling tank, and disinfection. Due to the proximity to the surrounding neighborhood, odor control will be a primary focus of any upgrade.

In summary (Figure 8-1, Process Schematic), the influent to the Scarborough Wastewater Treatment Facility enters at the mechanical screens where large objects are removed upstream from the primary settling tanks. Following the influent screens, the flow enters into the grit removal process where grit and inorganic materials settle out and are removed from the system.

Following the preliminary treatment, mechanical screening and grit removal, the flow is directed into either Wetwell No. 1 or No. 2 of the influent pump station. The pump station is of a dry pit design and contains two (2) variable and one (1) constant speed, 25 horsepower pumps which lift the wastewater into the oxidation ditches. The future design for this station will handle a range from 0.3 MGD (minimum) to 5.95 MGD (maximum) with two pumps, while the third pump will serve as a standby. In addition to the hydraulic capacity increase, the pump design selection will include an increase in the total head of the pump to accommodate the hydraulic requirement of two new primary clarifiers.

The flow will then enter the two (2) new 35-foot diameter primary settling tanks. The primary sedimentation basins are where settleable solids are removed from suspension by gravity two-phase generation. The surface setting rate at average dry weather flow is 910 gpd/sf, and at peak rate during wet weather the settling rate is 2,730 gpd/sf; both values at total capacity. Solids removed in the primary settling tanks will be pumped to the sludge holding tanks for subsequent processing.



LEGEND

P.S.	PRIMARY SLUDGE
R.A.S.	RETURN ACTIVATED SLUDGE
W.A.S.	WASTE ACTIVATED SLUDGE
F.	FILTRATE

Town of Narragansett
Rhode Island

Figure 8-1

PROCESS FLOW DIAGRAM

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CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
272 W. Exchange Street Suite 201 Providence, RI 02903-1025
Phone: 401-454-7000 Fax: 401-454-7415

Date: 2005

Scale: No Scale

Primary effluent is conveyed to the aeration system where the conversion of soluble BOD_5 occurs. The flow will then enter the existing aeration system for BOD reduction. The aeration effluent flows to the three (3) 40-foot diameter circular secondary settling tanks (two existing and one new), where the biological solids are separated out by quiescent gravity settling. A portion of the settled solids are returned to the aeration process to provide an activated biomass, while the remaining settled solids are pumped to the sludge holding tank for further processing by the horizontal belt thickener system.

The secondary settling tanks have been designed with a surface settling rate of 467 gpd/sf during average flow and 1,400 gpd/sf during peak flow conditions. The secondary effluent quality to this point will be a maximum of 30 mg/l for a total suspended solids and BOD_5.

Effluent from the secondary settling tanks will enter a mixing structure where chlorine will be introduced into the wastewater. The chlorine feed equipment and instrumentation system will be designed for breakpoint chlorination capability. The expanded chlorine contact time during peak wet weather flow will be 25 minutes and 73 minutes at average flow. Prior to its discharging to the ocean, sodium bisulfite is added to reduce the Total Residual Chlorine levels to 325 µg/l. the existing contact chamber will not meet the 15 minute minimum detention time peak flow. Therefore, additional tanks will be required to RIDEM requirements.

As previously mentioned, the primary and waste activated sludge will be thickened by a horizontal belt thickener. The thickened sludge will be conveyed to a storage tank and then transported by a private company for incineration.

Tables 8-1 and 8-2 summarize the hydraulic and organic loading for the planning period. Table 8-3 presents the corresponding loading per unit process for the design year 2025. The accompanying site plan for the same respective planning period is presented as Figure 8-2.

8.1.1 CAPITAL COST DISTRIBUTION

The total estimated capital cost summary per unit process for the Scarborough WWTF is presented in Table 8-4.

TABLE 8-1 FUTURE DESIGN WASTEWATER FLOWS FOR THE TOWN OF NARRAGANSETT				
	North End Regional WWTF 2025 MGD		South End Scarborough WWTF 2025 MGD (Plus 25%)	
	Average Daily	Peak Hourly	Average Daily	Peak Hourly
Residential/Commercial	1.303	3.258	1.290	3.203
Industrial	0.020	0.050	0.230	0.507
Infiltration	0.477	0.476	0.230	0.230
Inflow	-	0.683	-	1.310
TOTAL	**1.800**	**4.467**	**1.750**	**5.250**

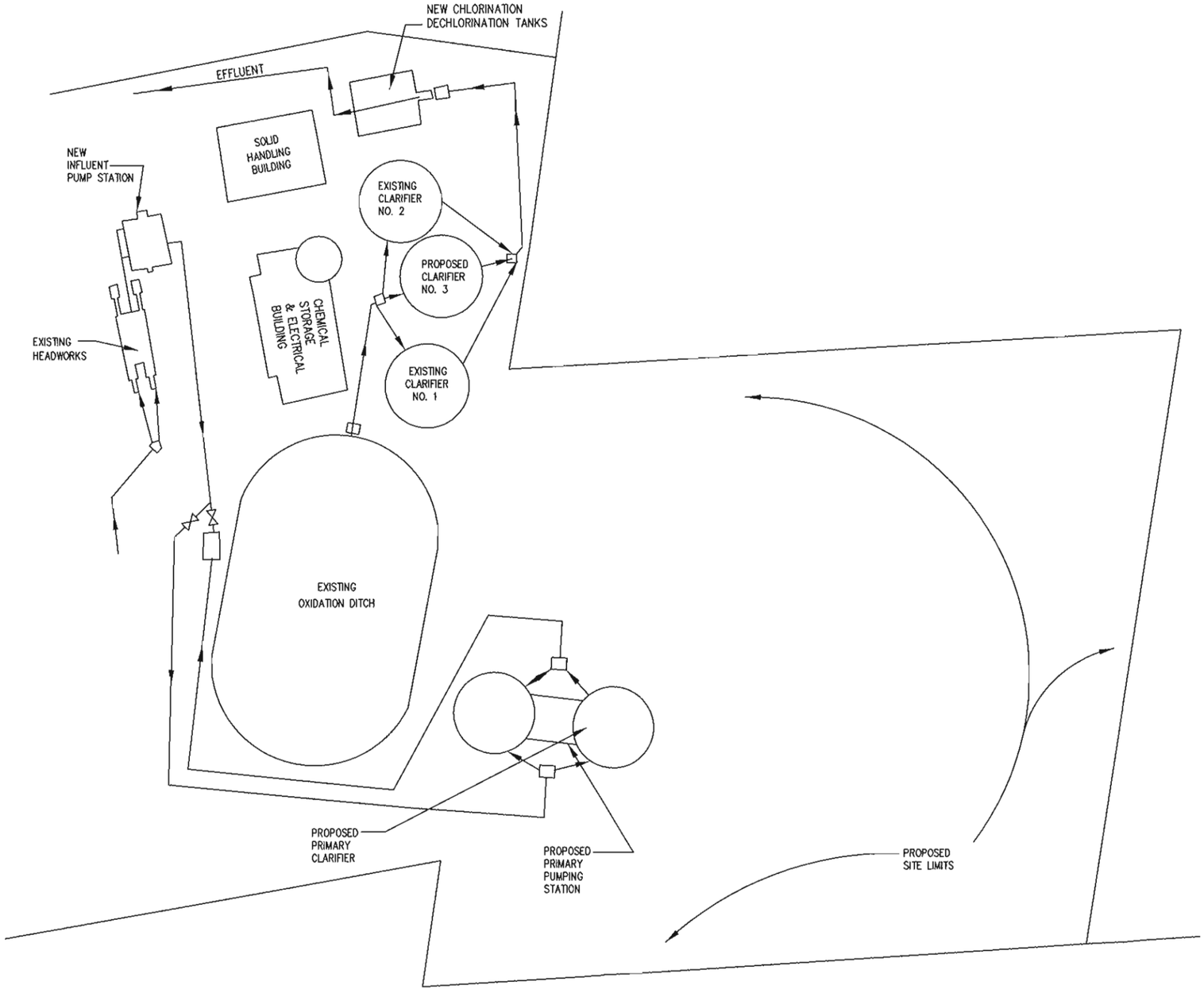
TABLE 8-2 FUTURE DESIGN WASTE LOADS (RESIDENTIAL, COMMERCIAL AND INDUSTRIAL)				
Year	North End Regional WWTF		South End Scarborough WWTF	
	BOD_5 Load (lb/d)	TSS Load (lb/d)	BOD_5 Load (lb/d)	TSS Load (lb/d)
2025	3,067	3,157	2,575	2,170

TABLE 8-3
SCARBOROUGH WASTEWATER TREATMENT FACILITY
FUTURE DESIGN DATA

			FUTURE DESIGN BASIS
Year			2025
Sewered Population			9,416
Flows (MGD)			
Average			1.750
Peak Hourly			5.250
Sewage Loads (lgs/day)			
Suspended Solids			2,575
BOD_5			2,170
Grit Chamber			
No. of Units			2
Capacity:	Each (MGD)		4.0
	Total (MGD)		8.0
Influent Pump Station			
No. of Pumps			3
Capacity (GPM)			1,825
Total (GPM)			5.250
Primary Settling Tanks			
Units in Service (total)			2
Dimensions (each):	Diameter (ft)		35
	Average Side Water Depth (ft)		11
	Surface Area (sf)		961
	Volume (gals)		79,072
	Weir Length (ft)		110
Capacities:			
Surface Loading Rate (gpd/sf) @ Average Flow			810
Weir Overflow Rate (gpd/lf) @ Average Flow			7,955
Aeration Tanks			
Units in Service (total)			4
Dimensions (each)	Tank Size		
	Length (ft)		40
	Channel Width (ft)		40
	Side Water Depth (ft)		12.5
	Tank Volume (gals)		149,600
Capacities (Operating)			
Detention Time (hrs) @ Avg. Flow			7.6
Detention Time (hrs) @ 1.25 Avg. Flow			6.1

TABLE 8-3
SCARBOROUGH WASTEWATER TREATMENT FACILITY
FUTURE DESIGN DATA

			FUTURE DESIGN BASIS
Aeration Tanks (Cont'd)			
BOD Applied (lbs/day)	Average		1,802
	Minimum		901
	Maximum		3,605
BOD Loading (Average Flow)	Lb/1,000 cu. ft.		17.5
Air Requirements (cfm)			
Minimum			640
Maximum			1,957
Units required @ 2,200 cfm			2
Units in service			1
Final Settling Tanks			
Units in Service (total)			3
Dimensions (each)	Diameter		40
	Side Water Depth (ft)		11.0
	Surface Area (sf)		1,256
	Volume (gals)		103,396
	Weir Length (ft)		126
Capacities (Operating)			
Surface Loading Rate (gpd/sf)		@Average Flow	467
		@ Peak Hourly Flow	1,393
Weir Loading Rate (gpd/ft)		@ Average Flow	4,642
		@ Peak Hourly Flow	13,925
Sludge Production			
Primary and Waste Sludge			
Dry Basis (lbs/day)			5,041
% Solids (gals/day)			60,477
Sludge Thickener			
Units in Service			2
Size (M)			2
Hydraulic Loading (gpm/M)			200
Chlorine Contact Tank			
No. of Tanks			4
Total Volume (gals)			89,760
Detention Time (min)	@ ADF		73
	@ PDF		25
Sodium Hypochloride (gpd)			78
Sodium Bisulfite (gpd)			25



Town of Narragansett
Rhode Island

Figure 8-2
NARRAGANSETT - SCARBOROUGH WWTF SITE PLAN

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Phone: 401-454-7000 Fax: 401-454-7410

Source: Town of Narragansett

Date: 2006

Scale: NO SCALE

TABLE 8-4 TOTAL CAPITAL COST SUMMARY PER UNIT PROCESS		
UNIT PROCESS	**TOTAL CAPITAL COST [2]**	
Headworks Screening Grit Removal Odor Control	$	640,000
Influent Pump Station		780,000
Primary Settling (2) Settling Tanks Sludge Pumps Scum Pumping System Odor Control		3,420,000
(1) Final Settling Tank WAS Pumps RAS Pumps		1,302,000
Chlorination		1,020,000
Solids Handling (Odor Control Scrubber)		
Sub-Total Auxiliaries [1]	$	7,162,000 860,000
Sub-Total Engineering Allowance 25% (Design, Construction Administration, Resident Eng.)	$	8,022,000 215,000
TOTAL	**$**	**8,237,000**

1 Includes 30% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

2 Includes 20% contingencies.

8.1.2 OPERATION AND MAINTENANCE COSTS

The expected maintenance, operation and replacement costs for the facility are listed by expenditure category in Table 8-5. These costs are based on the design capacity for the year 2025.

TABLE 8-5 OPERATION AND MAINTENANCE COSTS	
EXPENDITURE CATEGORY	**ANNUAL COST [1]**
Personnel	$ 466,430
Power	153,758
Other Utilities	13,700
Chemicals	89,700
Maintenance and Supplies	219,575
Solids Disposal Cost	77,652
Miscellaneous (Insurance, Professional Service, Land Lease, etc.)	345,254
Regional Plant Cost	839,541
TOTAL	**$ 2,205,610**

[1] Based on FY 2006 Budget Year

8.1.3 RECOMMENDED STAFFING

A great deal of time, effort and money will go into the design and construction of the Wastewater Treatment Facility. In support of this initial investment plus the annual operating costs, it is important for the plant to be staffed by qualified, competent personnel.

The staffing requirements have been prepared for the completion of the Hydraulic Upgrade based on an employee normal payroll year consisting of 52 weeks at 40 hours per week and a 5 days per week (Monday to Friday), 8 hours per day normal plant operation. The proposed staffing requirements are identical to the staffing recommendation of the year 2025.

The supervisory personnel at the plant shall consist of a Superintendent, Maintenance Supervisor, Process Controller/Pretreatment Coordinator and Foreman. The Superintendent shall have a direct responsibility for the administration, operation and maintenance of the entire plant. His role will be to coordinate plant operation and maintenance and reports directly to the Town Engineer.

The Process Controller/Pretreatment Coordinator will be responsible for routine plant testing program and research work, and will provide the Superintendent with information on treatment status and process efficiency.

Under the direction of the Maintenance Supervisor, the Plant Operators will perform all the preventive and corrective maintenance required both at the plant and in the collection system. In addition, the crews will be responsible for installation and testing of new or rebuilt mechanical and electrical equipment, as well as general maintenance on buildings, structures and grounds.

It has been established that the staff for the Scarborough Wastewater Treatment Facility shall consist of nine (9) employees total. Given below is the number of employees for each job category.

Superintendent	1
Clerical	1
Maintenance Supervisor	1
Process Controller/Pretreatment Coordinator	1
Foreman	1
Plant Operators	4
TOTAL	**9**

The proposed staffing is based on theoretical evaluations and records available from the existing Treatment Facility, as well as other sewage treatment plans of a comparable size and type.

8.2 INTERCEPTORS AND PUMP STATION PRELIMINARY DESIGN

The criteria used in the Future Interceptor and Pump Station Adequacy Analysis were utilized for design purposes because the build-out scenario was utilized. The important criteria are summarized below:

- Average daily wastewater flows were computed using 260 gallons per dwelling per day (gpdd) for South End and 215 gpdd for north end residential flows, including commercial establishments.
- Peak daily flows were determined by multiplying the average daily flow by a peaking factor as obtained from TR-16, published standards of the New England Interstate Water Pollution Control Commission.
- Existing infiltration/inflow (I/I) quantities previously determined will not increase or decrease.
- Future I/I flows were calculated based on 60 gallons per dwelling per day (25 gpcd x 2.42 persons/dwelling) for the future sewered dwellings within the south end and north end future service areas and unsewered dwellings located in the existing service area.

Sanitary sewers and pump stations have been designed to conform to requirements of the Rhode Island Department of Environmental Management (RIDEM) and the recommendations of the New England Interstate Water Pollution Control Commission published standard TR-16.

Design and Cost Computations

The estimate of probable project construction costs have been prepared including labor, materials and administrative expenses likely to be incurred by the Town of Narragansett. Actual recent bid prices for similar work in the area supplemented, as appropriate, by equipment suppliers, materials suppliers, and by standard cost estimating guides to prepare the estimate of probable cost were used. The construction costs are based on 2005 monies. The pipe in place cost includes trench excavation and backfill, cost of pipe installed, diverting, sheeting, stone bedding, sedimentation and erosion control, pavement removal, temporary pavement and traffic control.

An allowance of twenty-five percent (25%) has been provided for construction contingencies. The magnitude of this contingency factor directly reflects design and construction uncertainties attributable to the lack of detailed subsurface information and planimetric and topographical mapping at this stage of the project design development.

Harbour Island Wastewater Collection System

The Harbour Island Wastewater Collection System will consist of conventional gravity sewers and grinder pumps and pressure sewers serving 320 residential dwelling units. Approximately 50 grinder pumps will be required for dwellings located within low lying areas. During the design phase when detailed topographic mapping is available, the quantity of grinder pumps will be determined. The total length of the gravity system is 20,000 linear feet consisting of 8-inch sewer mains. The average flow generated by Harbour Island is 102,400 GPD, with an associated peak flow of 268,800 GPD. The Harbour Island Pump Station will transport the sewage flows via a force main to the Briggs Farm sewer system. The pump station will consist of two self-priming centrifugal sewage pumps, each rated at 268,800 GPD (190 GPM). The total estimated cost for the Harbour Island Wastewater Collection System is $7,585,600 as summarized in Table 8-6, or $31,000 per homeowner (includes interest at 3% for 20-years).

TABLE 8-6 ESTIMATE OF PROJECT COST FOR THE HARBOUR ISLAND WASTEWATER COLLECTION SYSTEM		
8" PVC Pipe	$	1,428,000
Sewer Wyes		32,000
6" PVC Pipe		400,000
6" Force Main, including directional drilling		590,000
Precast Concrete Manholes		225,000
Force Main Cleanout		5,000
Rock Excavation		87,500
Gravel Refill		180,000
Test Pits		20,000
Dewatering		200,000
Erosion Control		100,000
Traffic Control		150,000
Temporary Pavement		280,000
Pavement Restoration		976,000
Grinder Pumps		375,000
Pump Station		500,000
Sub-Total	$	5,548,500
Construction Contingencies (25%)		1,387,100
Sub-Total	$	6,935,600
Engineering Design Services		100,000
Construction Administration and Resident Inspection		550,000
TOTAL	**$**	**7,585,600**

Great Island Wastewater Collection System

The Great Island Wastewater Collection System will consist of conventional gravity sewers in combination with grinder pumps and pressure sewers to provide a cost effective system for 375 residential dwellings. It is anticipated that the dwellings located adjacent to the coastline will require grinder pumps and pressure sewers due to the existing topography. The sewer system will consist of approximately 26,000 linear feet of gravity sewers and approximately 100 grinder pumps. This sewer system will convey flows to the proposed Great Island Pump Station to be located prior to the Point Judith Pond Bridge crossing. The capacity of the pump station will be 313,000 GPD (220 GPM). The station will consist of two self-priming centrifugal sewage pumps. The force main will be installed within a steel casting and insulated with 2-inches of foam glass cellular

insulation as part of the bridge crossing. The assembly will be attached to the existing bridge with galvanized steel hangers as required. In addition, the steel casing will be primed and finish painted with an epoxy coating system. Table 8-7 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Great Island Wastewater Collection System is $8,750,000, or $30,000 per homeowner (includes interest of 3% for 20-years). Another option that will be examined is directional drilling under Point Judith Pond to avoid the bridge crossing.

TABLE 8-7
ESTIMATE OF PROJECT COST FOR THE
GREAT ISLAND WASTEWATER COLLECTION SYSTEM

Force Main	$	225,000
8" PVC Pipe		1,708,000
Sewer Wyes		37,500
6" PVC Pipe		470,000
Precast Concrete Manholes		250,000
Force Main Cleanout		10,000
Rock Excavation		95,000
Test Pits		40,000
Gravel Refill		220,000
Erosion Control		150,000
Dewatering		300,000
Traffic Control		150,000
1½" Temporary Pavement		323,500
Pavement Restoration		1,164,000
Pump Station		500,000
Grinder Pumps		750,000
Sub-Total	$	6,393,000
Construction Contingencies (25%)		1,598,300
Sub-Total	$	7,991,300
Engineering Design Services		120,000
Construction Administration and Resident Inspection		639,000
TOTAL	**$**	**8,750,300**

Baltimore Avenue Area Wastewater Collection System

The Baltimore Avenue Area Wastewater Collection System will consist of conventional gravity sewers serving 49 residential dwellings. The sewer system will consist of approximately 5,000 linear feet of gravity sewers. Table 8-8 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Baltimore Avenue Area Wastewater Collection System is $1,409,300, or $35,000 per homeowner (includes interest at 3% for 20-years).

TABLE 8-8
ESTIMATE OF PROJECT COST FOR THE
BALTIMORE AVENUE AREA WASTEWATER COLLECTION SYSTEM

8" PVC Pipe	$	350,000
Sewer Syes		4,900
6" PVC Pipe		65,000
Precast Concrete Manholes		50,000
Rock Excavation		35,000
Gravel Refill		30,000
Test Pits		10,000
Dewatering		50,000
Erosion Control		20,000
Traffic Control		25,000
Temporary Pavement		60,000
Permanent Pavement Restoration		253,200
State Roadway Restoration		54,300
Sub-Total	$	1,007,400
Construction Contingencies (25%)		251,900
Sub-Total	$	1,259,300
Engineering Design Services		50,000
Construction Administration and Resident Inspection		100,000
TOTAL	**$**	**1,409,300**

Knowles Campground Wastewater Collection System

The Knowles Campground Wastewater Collection System will consist of gravity sewers serving 110 residential units. The sewer system will consist of approximately 3,400 linear feet of gravity sewers. Knowles

Campground will be installing the sewer system and will be responsible for the construction as well as the long term maintenance of the system.

Alexander Drive Wastewater Collection System: The Alexander Drive Wastewater Collection System will consist of a gravity sewer serving twelve (12) existing residential units. The sewer system will consist of approximately 450 linear feet6 of sewers and will connect to the interceptor that was installed on Clarke Road in 2005 as part of the Briggs Farm Sewer Project.

8.2.1 PUMP STATIONS

The proposed below ground pump station will consist of a separate drywell and wetwell conforming to the Town's and Rhode Island Department of Environmental Management's requirements. The pump stations are designed to provide for telemetering of wastewater flow, alarms, etc. Each pump station will be equipped with an emergency generator for standby power when acceptable by design, and with a pumping connection to be used for a portable sewage pump.

The drywell will consist of two self-priming centrifugal sewage pumps capable of passing spheres three inches in diameter, with running meters and pressure gauges on suction and discharge piping, and a sump pump capable of passing ½-inch solids discharging to the wetwell. Check valves will be installed on discharge piping, plug valves on suction and discharge piping. A connection will be provided on the discharge piping including valves and piping to be used to drain the force main. A dehumidifier, heating system, aluminum railings and ladders will be installed.

The wetwell will consist of divided wells, interconnected and gated to facilitate repairs and cleaning. The electrical equipment within the wetwell will be non-corrosive and explosion proof conforming with the requirements for Class I Group D, Division I.

Ventilation will be provided for both chambers. Continuous operation will be designed for 12 air changes per hour and intermittent operation will be designed for 30 air changes per hours.

An alarm system will be provided for the pump station with the alarm signals transmitted through the telemetry system. The alarm will be activated in any one of the following incidents: high water in wetwell, loss of one or more phase of power supply, high water level in pump room sump, loss of the alarm transmission line, loss of air pressure in bubbler system, generator failure, loss of normal power and intrusion.

Stanton Avenue Pump Station

The proposed Stanton Avenue Pump Station sewage pumps will replaced.. The capacity of the station will be 624,000 GPD (440 GPM). The station will consist of two sewage pumps, each rated at 440 GPM with constant speed motors. During the installation of the new pumps, the contractor will be required to by-pass pump. The total estimated cost of the pump station is $625,000 (including engineering fees).

Congdon Street Pump Station

The existing inadequate Congdon Street pumps will be replaced with new pumps and the force main will be replaced. The new 6-inch ductile iron force main will replace the existing 4-inch ductile iron force main in the same trench. The renovated pump station will have a capacity of 436,000 GPD (305 GPM). The two pumps will be the vertical centrifugal type rated at 375 GPM each with 5 horsepower motors. The estimated cost of the project is $650,000.

Ouida Street Pump Station

The Ouida Street Pump Station will be renovated to accommodate the future flows. The pump station service area is in the North End Sewer System, including the Middlebridge area of South Kingstown. The existing pumps, motors, flow, meter, and variable speed drives will be replaced with new units having the capacity to convey the future flows. The station will consist of three variable speed pumps, each having a capacity of 2,279,000 GPD (1,585 GPM), with 150 horsepower motors. The station will be equipped with a Data Acquisition System which will transmit flows and alarms via radio system to the Scarborough Wastewater Treatment Facility and to the police station. Also, the inoperable mechanical bar screen will be replaced. The total cost of the improvements is $975,000.

The total project cost of the improvements to the Narragansett Sewage Collection System is $20,095,200 ($19,120,200 for the South End and $975,000 for the North End). Table 8-9 Summarizes the estimated construction and related engineering costs.

TABLE 8-9
SUMMARY OF THE PROJECT COSTS FOR THE RECOMMENDED IMPROVEMENTS TO NARRAGANSETT SEWAGE COLLECTION SYSTEM

	PROJECT COST
Harbour Island Sewers	$ 7,585,600
Great Island Sewers	8,750,300
Baltimore Ave. Area	1,409,300
Stanton Avenue Pump Station	625,000
Congdon Street Pump Station	650,000
Ouida Street Pump Station	975,000
TOTAL	**$ 20,035,200**

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9.0 ARRANGEMENTS FOR IMPLEMENTATION

9.1 INSTITUTIONAL RESPONSIBILITIES

The Town of Narragansett is responsible for providing an adequate collection and treatment system for areas of Town that either presently have sewers or are in need of sewers due to marginal on-site disposal problems. For the North End Sewer System, the Town is responsible for the operation and maintenance of the collection system. The processing of wastewater will be accomplished at the South Kingstown Regional WWTF. For the South End Sewer System, the Town is responsible for the operation and maintenance of the Scarborough WWTF and related collection system.

North End Sewer System

Narragansett will continue to be responsible for administering and maintaining the North End Collection Systems and associated pump stations. As a Regional Partner of the South Kingstown Regional WWTF, Narragansett will contribute to the capital cost for the design and construction of the unit process upgrades, which are required due to the increase of anticipated wastewater flows from this area, in accordance with the following formula:

$$\text{Regional Partner Share: } \frac{\text{Needed Flow Capacity - Previously Purchased Capacity}}{\text{Incremental New Flow Capacity}}$$

Capital cost for the design and construction of the unit process upgrades that do not pertain to the anticipated hydraulic expansion will be apportioned in accordance with the percentage of total flow for the future planning period 2025 (27.10% for the Town of Narragansett, 48.02% for the Town of South Kingstown, and 24.88% for the University of Rhode Island).

Annual operating and maintenance fees will be apportioned based on the monitored flow at the Ouida Street Pump Station minus the monitored flows from the South Kingstown Middlebridge Pump Station.

South End Sewer System

Narragansett will continue to be responsible for administration and maintenance of the South End Collection System, Pump Stations, and Wastewater Treatment Facility.

9.1.1 ORDINANCES AND POLICIES RELATING TO SANITARY SEWER ISSUES

The Code of Ordinances of the Town of Narragansett, Chapter 20 "Utilities", Article III "Sewers" provides the legal basis for defining sanitary sewer-related issues within the Town. In this format, the ordinances carry the weight of local laws, and can only be changed by a majority vote of the Town Council after two (2) separate duly advertised public readings of the section(s) in question. While the ordinances thus establish the framework for the Wastewater Division's operations, the Town has periodically developed policies (typically adopted by Town Council resolution) for implementing the specific wastewater goals and programs.

The sewer policy that is currently in effect (as of the publication date of this Wastewater Facilities Plan) was originally adopted on April 18, 1995. Since that time, the policy has been revised twice - once on July 15, 1996 and its latest revision on December 6, 1999 (see Appendix E). The sewer policy was developed as a mechanism to regulate the impact of the Town's growth on the wastewater infrastructure due to limitations on the hydraulic capacity within both of the major sewer areas (i.e., the Regional WWTF and the Scarborough WWTF). From an administrative standpoint, the 1975 Wastewater Facilities Plan no longer provided an adequate planning tool, as the population an demographics of Narragansett had changed significantly since its publication. The Town has developed a Sewer Policy to allow the Town a measure of control (apart from zoning laws) over the growth of the Town, particularly in sensitive areas, and to avoid a "crisis management" situation from developing relative to capacities at either treatment plant.

With the adoption of this Facilities Plan, it is expected that the Town will continue to use the format of a "sewer policy" to implement the recommendations therein. The policies can be readily amended by Town Council vote to reflect the wishes of the electorate and the economic realities of any particular time, consistent with the Facilities Plan objectives. Thus, the Facilities Plan and the Town's sewer policy or policies will go hand in hand in guiding the Town on sewer-related matters for the next twenty (20) years.

9.2 MAINTENANCE, OPERATION, AND REPLACEMENT

Operation and maintenance of the Scarborough WWTF will remain the responsibility of the Town of Narragansett and will be physically performed by the Wastewater Division. Costs of operation and maintenance of the Facility will be borne by the users of the system in accordance with the User Charge System.

An operating and maintenance manual which provides detailed management and training requirements for these facilities will be prepared at the time of construction.

9.3 STAFFING REQUIREMENTS

As the collection system expands and the number of pump stations increases, the Town may consider the need to establish a road crew whose purpose is to provide routine maintenance for the pump station laterals and interceptors.

Concerning the WWTF staffing, it is recommended that as the demands on the plant increases, additional personnel may be required to meet that need.

9.4 CAPITAL COST DISTRIBUTIONS

9.4.1 WASTEWATER TREATMENT FACILITY

Based upon the population projection through the 2025 planning period, Narragansett's flow totals have fluctuated below and above the allotted capacity of 1.6197 MGD and the South Kingstown Regional Wastewater Treatment Facility will need to be upgraded to meet an average daily flow of 6.641 MGD. Table 9-1 presents a redistribution of the Regional Participants' needs for this period. The redistribution reflects the University of Rhode Island's original capacity.

TABLE 9-1
PROJECTED NEEDS

Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	Current [1] Available Capacity (MGD)	2025 Capacity (MGD)	2025 Percentage (%)
South Kingstown	1.6933	41.00	0.4350	2.1283	3.189	48.02
Narragansett	0.7847	19.00	0.4350	1.2197	1.800	27.10
URI	1.6520	40.00	0.0000	1.6520	1.652	24.88
Totals	**4.13**	**100.00**	**0.8700**	**5.0000**	**6.641**	**100.00**

[1] Narragansett's projected needs do not include the 400,000 gallons leased from URI.

The preliminary design of the South Kingstown Regional Wastewater Treatment Facility (as presented in Section 8 of the 2006 South Kingstown Facilities Plan), divides the improvements into two categories. The first component corresponds to the hydraulic upgrades necessary to meet the population demands for 2025; the second component corresponds to the necessary upgrades associated with process improvements.

The unit processes that relate to hydraulic expansion are:

- Two (2) Primary Settling Tanks
- Two (2) Primary Sludge Pumps
- One (1) Waste Activated Sludge Pump
- One (1) Return Activated Sludge Pump
- Sludge Thickener
- Aeration System

The unit processes that relate to system upgrades are:

- Odor Control - Headworks/Influent Screen
- Odor Control - Primary Settling Tank
- Odor Control - Septage Receiving
- Odor Control - Sludge Holding Tanks
- Aeration Blower Replacement
- Septage Receiving Station
- Sludge Building Enclosure

Table 9-2 presents the regional cost breakdown. Those components that are directly related to a hydraulic upgrade are distributed to South Kingstown and Narragansett based on their projected need. For example, the increase over the current capacity is 1.641 MGD, of which 1.061 MGD (or 64.66%) relates to South Kingstown's needs, while 0.58 MGD (or 35.34%) relates to Narragansett's future needs.

TABLE 9-2
PROJECT COST SUMMARY FOR HYDRAULIC EXPANSION
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN (64.66%)	NARRAGANSETT (35.34%)	U.R.I.
Primary Settling				
• (2) Settling Tanks	$ 1,750,000	$ 1,131,550	$ 618,450	$
• Sludge Pumps	95,000	61,427	33,573	
Aeration System - Basin	1,750,000	1,131,550	618,450	
Diffusers	450,000	290,970	159,030	
Secondary Settling Tank				
• WAS Pumps	60,000	38,796	21,204	
• RAS Pumps	65,000	42,029	22,971	
Sludge Thickener	150,000	96,990	53,010	
Sub-Total	$ 4,320,000	$ 2,793,312	$ 1,526,688	$ 0
Auxiliaries [1] (12%)	518,400	335,198	183,202	0
Sub-Total	$ 4,838,400	$ 3,128,510	$ 1,709,890	$ 0
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	725,760	469,276	256,484	0
TOTAL	**$ 5,564,160**	**$ 3,597,786**	**$ 1,966,374**	**$ 0**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

Table 9-3 presents the regional cost distribution for process upgrades to the regional facility. For those process components that are considered upgrades to the original facility, the capital cost distribution is based upon the projected percentage of 2025 need as presented in Table 9-1. The only exception would be the aeration blower replacement and septage equipment. Since these components are the replacement of existing equipment and not considered an upgrade, the cost distribution will be based on the actual flow from each participant (as presented in Table 4-11: South Kingstown - 38.67%; Narragansett - 44.67%; URI - 16.66%).

The capital cost for the Scarborough Wastewater Treatment Facility is presented in Table 9-4.

TABLE 9-3
PROJECT COST SUMMARY FOR PROCESS UPGRADES
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN (48.02%)	NARRAGANSETT (27.10%)	U.R.I. (24.88%)
Headworks Odor Control / Influent Screen	$ 400,000	$ 192,080	$ 108,400	$ 99,520
Solids Handling Facilities (including Odor Control)	3,500,000	1,680,700	948,500	870,800
Aeration Blower Replacement	1,000,000	(38.67%) 386,700	(44.67%) 446,700	(16.66%) 166,600
Primary Odor Control	1,250,000	600,250	338,750	311,000
Septage	750,000	(38.67%) 290,025	(44.67%) 335,025	(16.66%) 124,950
Sub-Total	$ 6,900,000	$ 3,149,755	$ 2,177,375	$ 1,572,870
Auxiliaries [1] (12%)	828,000	377,971	261,285	188,744
Sub-Total	$ 7,728,000	$ 3,527,726	$ 2,438,660	$ 1,761,614
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	1,159,200	529,159	365,799	264,242
TOTAL	**$ 8,887,200**	**$ 4,056,885**	**$ 2,804,459**	**$ 2,025,856**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

TABLE 9-4
TOTAL CAPITAL COST SUMMARY - SCARBOROUGH FACILITY

UNIT PROCESS	TOTAL CAPITAL COST [2]
Headworks Screening Grit Removal Odor Control	$ 640,000
Influent Pump Station	780,000
Primary Settling (2) Settling Tanks Sludge Pumps Scum Pumping System Odor Control	3,420,000
(1) Final Settling Tank WAS Pumps RAS Pumps	1,302,000
Chlorination	1,020,000
Sub-Total	$ 7,162,000
Auxiliaries [1]	860,000
Sub-Total	$ 8,022,000
Engineering Allowance (Design, Construction Administration, Resident Eng.)	215,000
TOTAL	**$ 8,237,000**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

[2] Includes 20% contingencies.

9.4.2 COLLECTION SYSTEM IMPROVEMENTS

The Town of Narragansett has instituted the following when an existing developed neighborhood is being considered for sanitary sewers:

1. The area in question must be recognized by the Town of Narragansett (Town Council) via the current Sewer Policy as being prioritized for future sewer availability, and

2. Sufficient capacity must exist in the conveyance and treatment systems for the proposed additional flow, and

3. A petition (of at least the simple majority of the property owners) must be presented to the Town Council for consideration, then

4. The Town Council would then authorize the Engineering Department to develop a preliminary plan and construction cost estimate for the neighborhood in question, then

5. The Town would convey this information to the petitioners; if the petitioners are still in agreement with the project, the Town would include same in the annual Capital Improvement Program (CIP) budget request for the next fiscal year. Projects whose value exceeds a certain financial threshold (that is tied to the Town's debt issuance limit each year) would have to be submitted to the General Assembly for approval of a voter referendum.

6. The Engineering Department would present a re-payment, or assessment plan to the Town Council for adoption. Historically, Narragansett has established assessment programs for sanitary sewer projects wherein the abutting property owners only are responsible for the project costs. The costs are amortized over twenty (20) years, with the interest rate directly tied to the rate that the Town borrows the money at.

7. A Town-wide voter referendum would be held on the subject of borrowing the necessary funding for the project. Although the repayment mechanism is a benefitting property owner assessment plan, the Town as a whole must pledge its credit to the borrowing, hence the Town-wide bond referendum.

8. Should the referendum pass, the Town would begin the process for the design and construction of the sewers in question.

9. At the completion of construction, when all actual project costs have been tabulated, the assessment program amounts would be recalculated. Property owners are then given the choice to pay the assessment in a lump sum, or over twenty (20) years with interest. The assessment runs with the land; any outstanding balance when the property is transferred (by any means) is disclosed to the buyer, and he\she would either retire said balance in a lump sum, or assume the annual payments for the duration of the twenty (20) years. The loan can be repaid in full at any time by the property owner, without any pre-payment penalty.

10. Assessment programs have historically included a fixed "time for connection" wherein every developed property has to connect to the new sewers within one (1) year of availability.

The total estimated capital cost for the collection system improvements is presented in Table 9-5. These costs are the responsibility of the Town of Narragansett.

Tables 9-6 and 9-7 summarize the implementation schedule for the sewer connection system with rankings.

TABLE 9-5
SUMMARY OF THE PROJECT COSTS FOR
THE RECOMMENDED IMPROVEMENTS TO
NARRAGANSETT SEWAGE COLLECTION SYSTEM

	PROJECT COST
I/I Study and SSES for South End Sewer System	$ 250,000
Alexander Drive Sewers	90,000 [1]
Harbour Island Sewers	7,585,600
Great Island Sewers	8,750,300
Baltimore Ave. Area Sewers	1,409,300
Stanton Ave. Pump Station	625,000
Congdon St. Pump Station	650,000
Ouida St. Pump Station	975,000
TOTAL	**$ 20,375,200**

[1] This does not include the homeowners' contribution to the Clark Road interceptor which has been expended. The homeowners' portion of the Clark Road interceptor is$42,713.

TABLE 9-6
SUMMARY OF THE IMPLEMENTATION SCHEDULE FOR THE
SOUTH END SEWAGE COLLECTION SYSTEM

	IMPLEMENTATION YEAR
I/I Study and SSES for South End Sewer System	Within Next Five (5) Years
Alexander Drive Sewers	In Progress
Knowles Campground	In Progress
Harbour Island Sewers	As Requested by Property Owner
Great Island Sewers	As Requested by Property Owner
Baltimore Ave. Area Sewers	As Requested by Property Owner
Stanton Ave. Pump Station	Within Next Five (5) Years
Scarborough Facility Improvements	Within Next Fifteen (15) Years

TABLE 9-7
SUMMARY OF THE IMPLEMENTATION SCHEDULE FOR THE
NORTH END SEWAGE COLLECTION SYSTEM

	IMPLEMENTATION YEAR
Congdon St. Pump Station	Within Next Five Years
Ouida St. Pump Station	Fiscal Year 2007

9.4.3 FINANCIAL IMPACTS OF THE PROJECT

As part of this Wastewater Facilities Plan, financial impacts for both the Wastewater Treatment Facility (WWTF) and wastewater collection system have been considered. This review includes the yearly operational and maintenance costs for both the WWTF and collection system in addition to larger capitalization projects and conforms to financial arrangements expressed in the Community Comprehensive Plan.

Operational and Maintenance Improvements

Operational and maintenance improvements are typically smaller scale, maintenance related projects which are performed during the course of the fiscal year. The wastewater division identifies various projects and improvements to complete for the period July 1 through June 30 of each year during the budget preparation process.

Since these smaller projects do not require the sale of municipal bonds, funding (revenue) is provided through yearly user fees. Each user will be responsible for its proportional share of these cost improvements.

The Town user charge system is structured such that the revenue is equal to the expenses.

Capitalized Improvements

As defined by the Town finance department, capitalized improvements shall be those projects of a larger magnitude which typically require the sale of municipal bonds to fund the related improvements. Funding of the Town of Narragansett's portion of the South Kingstown Regional WWTF, Scarborough WWTF, interceptor sewers, and pump stations are paid through sewer bonds. Yearly debt service for the original infrastructure has and will continue to be paid via the user charge system.

It is anticipated that the yearly debt service for future capitalized improvements to both the WWTF and collection system will be via third party specific benefit assessments. For example, property owners in the

Harbour Island Area will be required to pay for those wastewater improvements which specifically provides them a benefit.

For those projects where all users will benefit, the system improvement cost will be distributed throughout the entire system through the annual sewer use charge.

As noted, the anticipated assessment fee for the future sewer service area is computed by taking into account the benefitted user and the total system improvements.

The cost distribution is based upon the present financial conditions where there are only loans available to the community. If grant monies become available, the cost to each user would be significantly reduced.

Cost to upgrade the South Kingstown Regional WWTF		$ 4,100,284
Cost to upgrade the Scarborough WWTF		8,237,000
Collection System Improvements:		
Stanton Avenue Pump Station	625,000	
Congdon Street Pump Station	650,000	
Ouida Street Pump Station	975,000	
Collection System Sub-Total		2,250,000
Total WWTF and Collection System Upgrade Costs		**$ 14,587,284**

Assuming a 20-year investment at 3.0 percent interest, this represents a total cost of $19,416,175 (or an annual cost of $970,809). The total connected dwelling units of 10,142 is comprised of the North End and South End Sewer Systems. Based upon these conditions, the annual cost per dwelling unit is $95.00. This will represent an increase in the baseline operating cost. For the purpose of this report, these costs reflect a total build-out. However, it should be recognized that the increased cost will be phased in over 20 years as specific projects are constructed. Another factor which can dramatically affect the cost is the revitalization of the State and Federal Grant Program.

The new sewer users would be responsible for the cost directly related to their service area. The anticipated cost and population to be serviced are as follows:

Harbour Island Sewers

Number of dwelling units	320		
Capital Improvements	$7,335,600.00		
Based on 20-year bonding at 3 percent interest, the total cost is:			$ 9,763,935.00
Annual cost per dwelling unit for benefitted improvement:		$ 1,525.61	
Annual sewer users cost per dwelling unit		345.00	
Total annual cost per dwelling unit:		$ 1,870.61	

Great Island Sewers

Number of dwelling units	375		
Capital Improvements	$8,426,300.00		
Based on 20-year bonding at 3 percent interest, the total cost is:			$11,215,694.00
Annual cost per dwelling unit for benefitted improvement:		$ 1,495.43	
Annual sewer users cost per dwelling unit		345.00	
Total annual cost per dwelling unit:		$ 1,840.43	

Baltimore Ave. Area Sewers

Number of dwelling units	49		
Capital Improvements	$1,409,300.00		
Based on 20-year bonding at 3 percent interest, the total cost is:			$ 1,875,827.00
Annual cost per dwelling unit for benefitted improvement:		$ 1,914.00	
Annual sewer users cost per dwelling unit		345.00	
Total annual cost per dwelling unit:		$ 2,259.00	

Alexander Drive Area Sewers

Number of dwelling units	12		
Capital Improvements			
Alexander Drive		$90,000.00	
Clark Road Interceptor		42,713.00 [1]	
Total Cost			$ 132,713.00
Initial cost per dwelling unit		$11,059.42	
Annual sewer users cost per dwelling unit		$ 661.17	

[1] This represents Alexander Drive area portion of the Clark Road Interceptor which has been installed as part of the Briggs Farm Sewer Project.

APPENDIX A

Intermunicipal Agreements

(Town of Narragansett / Town of South Kingstown / University of Rhode Island)

INTERMUNICIPAL AGREEMENTS
TOWN OF NARRAGANSETT/TOWN OF SOUTH KINGSTOWN/ UNIVERSITY OF RHODE ISLAND

1. Original Agreement - November 1972
2. Amendment/Interpretation Document - August 1974
3. Sludge Treatment & Disposal Agreement - June 1979
4. Letter of Understanding - January 1985
5. Cost-sharing Agreement (Solids Handling) - November 1989
6. Amendment re: Middlebridge Sewers Flow - June 1990
7. Cost -sharing Agreement (Aeration/Clarifiers) - Jan. 1991
8. Pretreatment Agreement - Sept. 1993
9. Lease of Flow Space (Narr./URI) - April 1995
10. Declor/Headworks Agreement - Feb. 1997 - 2/18/97 (97-02-50)
11. Capacity Agreement - Feb. 1997 - 2/18/97 (97-02-51)
12. Lease of Flow Space (Narr./URI) - July 2001 (2001-08-244)

11/27/72

SEWERAGE AGREEMENT

THIS AGREEMENT is made this 27th day of November, 1972, by the Towns of Narragansett and South Kingstown, Rhode Island, ("Narragansett" and "South Kingstown") under Chapters 116 and 171 of the Public Laws of 1969 as amended by Chapters and of the public laws of 1971.

I. South Kingstown shall construct, operate and maintain a sewerage system composed of the following elements:

A. A secondary sewage treatment plant with a design capacity of approximately 3.67 million gallons per day (average flow) in Narragansett at approximately the location shown in Figure 5 of the "Report on Waste Water Collection and Disposal Facilities for the Town of Narragansett, Rhode Island", dated September, 1968, by C. E. Maguire, Inc.

B. A marine outfall sewer to convey the treated sewage effluent to the Atlantic Ocean at a location near Tuckers Dock (State Pier No. 4);

C. A sewage pumping station and force main near Salt Pond and the South County Hospital to carry the South Kingstown flow (including the University of Rhode Island flow) to the treatment plant mentioned in A above;

D. An interceptor sewer along the Saugatucket River from the Salt Pond pumping station to Silver Lake Avenue;

E. An interceptor sewer along the Saugatucket River from Silver Lake Avenue to the Indian Run interceptor;

F. An interceptor sewer along the Saugatucket River and Kingstown Road from the Indian Run interceptor to the South Road interceptor;

G. An interceptor sewer along Kingstown Road from the South Road interceptor to Upper College Road; and

H. A pumping station and force main facilities located in the vicinity of Kingstown Road near White Horn Brook to pump the University sewage and portions of the Kingstown Village flow to the interceptor sewer mentioned in G above; including in each of the foregoing all necessary appurtenances. The foregoing elements may be constructed under separate or combined contracts. Appropriate cost allocations shall be made for the purpose of computing shares under IV below.

II. Narragansett hereby permits the location in Narragansett of the facilities mentioned in I (A) and (B) above and the major portion of the force main mentioned in I (C) above and South Kingstown may exercise the power of eminent domain in Narragansett for this purpose.

III. South Kingstown shall accept flow from Narragansett at the treatment plant described in I(A) above, or at such other points as may be determined by Narragansett with the approval of South Kingstown, which approval shall not be unreasonably withheld. South Kingstown shall install and maintain devices to measure the respective flows of the

parties involved in determining their shares of operating costs hereunder.

IV. Narragansett shall pay to South Kingstown nineteen (19) per cent of the net capital costs of the facilities described in I above through which Narragansett sewage is to flow in either treated or untreated form or in which Narragansett sewage is to be treated (hereinafter called the "common facilities").

V. Net capital costs shall include the costs of design, construction and equipment, engineering and supervisory costs, costs of acquiring real and personal property and all other costs of establishing a project and making it ready for operation (including the costs of borrowing in anticipation of federal and state aid), whether heretofore or hereafter incurred, less any federal and state grants which are received for the project. Without limiting the generality of the foregoing, net capital costs shall include the costs previously incurred by Narragansett for the C. E. Maguire, Inc., survey and such costs shall be credited against the payments to be made by Narragansett under IV above. If any federal or state grant is received for a project under this agreement by Narragansett, the amount received shall be promptly remitted to South Kingstown. Any federal or state grant received by either party for its own collection system and not for a project described in this agreement shall be retained by such party.

VI. Payments under IV above shall be made from time to time

by Narragansett upon receipt of a written request from South Kingstown describing in general terms the costs for which payment is to be made, stating that such costs have been incurred and showing the computation of the payment to be made to South Kingstown, accompanied (if requested by Narragansett) by a confirmatory certificate of an independent engineer or engineering firm.

VII. Narragansett shall pay to South Kingstown its share (as determined below) of the net operating costs incurred by South Kingstown in each fiscal year of South Kingstown on account of the common facilities. These payments shall be made in equal installments on the first days of July, October, January and April on the basis of reasonable annual estimates submitted by South Kingstown. If the payment actually due for any fiscal year is greater or less than the estimate, the difference shall be paid to South Kingstown or repaid by South Kingstown, as the case may be, as soon after the close of the South Kingstown fiscal year as it can be determined.

VIII. Operating costs shall include maintenance, repairs, supplies, renewals and replacements, administration and all other costs of operating the facilities, but shall not include principal and interest coming due on the bonds or notes issued by any party. Operating costs shall be appropriately allocated to the common facilities and the remainder of the system set forth in I above. For the fiscal years of South Kingstown

beginning before the system is completed and placed in regular operation, and for the fiscal year during which the system is completed and placed in regular operation, the share of the operating costs of the common facilities to be paid by Narragansett shall be nineteen (19) per cent. For each fiscal year of South Kingstown thereafter, the share of the net operating costs of the common facilities to be paid by Narragansett shall be in proportion to its share of the total flow into the common facilities during the prior fiscal year of South Kingstown. Its share of the flow shall be determined by the measuring devices referred to in III above.

IX. Both parties, in their use of the system, shall comply with such reasonable requirements as may be adopted by South Kingstown. No sewage shall be discharged into the system containing substances harmful to the system. The system shall be operated in such manner that the discharge into the ocean complies with all applicable state and federal standards and no sewage shall be discharged into the system which would prevent compliance with such standards or which would require unusual and unduly expensive procedures in order to comply.

X. South Kingstown shall maintain adequate records showing flows, capital costs, operating costs and the computation of the amounts due from Narragansett. Such records, the measuring devices mentioned in III above and all parts of the system which are not buried below ground shall be open to inspection by authorized representatives of Narragansett.

XI. Representatives of Narragansett and South Kingstown shall meet jointly from time to time at the request of either party to discuss steps to be taken to implement this agreement.

XII. In the event that any payment is not made by Narragansett when due and remains unpaid for 60 days thereafter, South Kingstown may withhold service to Narragansett until the deficiency is paid.

XIII. If the construction and operation of the system is not presently permitted by the zoning ordinances of Narragansett or South Kingstown, no liabilities shall be incurred by South Kingstown under this agreement except for engineering, land acquisition and other preliminary expenses until the required action is taken to permit the system.

XIV. This agreement shall be of permanent duration but its terms shall be subject to renegotiation as of July 1, 2008 and at thirty (30) year intervals thereafter. If the parties are unable to agree at least six (6) months prior to any such date, the terms of this agreement for the next interval shall be subject to arbitration under Paragraph XVIII.

XV. Neither the system nor any part thereof shall be disposed of except in accordance with an amendment of this agreement. But during the term of this agreement South Kingstown may dispose of any equipment which is worn out, obsolete or no longer needed to operate the system. The proceeds of any such disposition shall be used as an offset against operating costs.

XVI. If any provision of this agreement is held invalid in any circumstance, such invalidity shall not affect any other provisions or circumstances.

XVII. This agreement shall supersede the agreement previously made with regard to the same subject matter by Narragansett, South Kingstown and the Board of Regents for Education, which prior agreement is rescinded.

XVIII. Any controversy hereafter arising out of this agreement, or out of the refusal of any party to perform the whole or any part thereof, including a failure to agree under paragraph XIV, shall be settled by arbitration in South Kingstown, Rhode Island, pursuant to the rules then obtaining of the American Arbitration Association, subject in all respects to The Rhode Island Arbitration Act.

TOWN OF NARRAGANSETT

By _____
President, Town Council

TOWN OF SOUTH KINGSTOWN

By _____
President, Town Council

TELEPHONE 789-0217
AREA CODE 401

51 TOWER HILL ROAD
WAKEFIELD, RHODE ISLAND 02879

August 22, 1974

Mr. John E. Cullen
Narragansett Town Council
Rodman Street
Narragansett, Rhode Island

Dear Mr. Cullen:

As a result of a joint meeting between the Town Councils of Narragansett and South Kingstown on August 15, 1974, the Town Council of South Kingstown has agreed to adopt the following reasonable requirements in connection with the use of the system by the Town of South Kingstown and the Town of Narragansett and has agreed to accept the following as its interpretation of the rights and duties of the parties under the sewage agreement made the 27th day of November, 1972. The requirements and interpretation is as follows:

a. The Town of Narragansett will be guaranteed at least 19% of the treatment plant capacity and shall not be denied additional capacity if that capacity exists.

b. During the first year of operation of the plant, Narragansett will pay 19% of the operating cost. Until such time as the plant is operating to at least 50% capacity, Narragansett shall pay no more than 50% of the operating cost. Thereafter Narragansett shall pay in proportion to its use.

c. That South Kingstown shall not sub-lease capacity in the treatment plant to any other municipality without the consent of Narragansett.

d. The Town Managers and Town Councils of Narragansett and South Kingstown shall meet quarterly each year during the months of January, April, July, and October to discuss the operation of the sewage agreement made November 27, 1972, and its implementation. The Town of South Kingstown shall

report at said meetings on the construction and operation of the sewage treatment plant and marine outfall. Also, the representatives shall meet at such other times as requested by either party to discuss said matters.

If these regulations and interpretations are agreeable to the Town Council of Narragansett, please indicate your approval by signing the copy of this letter and returning it to us.

Very truly yours,

Town Council of South Kingstown

By _____
Walter Gray

The Town Council of the Town of Narragansett does hereby accept and agree to the regulations and interpretations herein above stated.

Town Council of Narragansett

By _____
John E. Cullen, President

SLUDGE TREATMENT AND DISPOSAL AGREEMENT

This agreement is made this 18th of June, 1979, between the Town of South Kingstown, Rhode Island, and the Town of Narragansett, Rhode Island.

I. The Town of South Kingstown agrees to:

A. Treat through its sludge treatment process primary and/or secondary sludge generated by the Scarborough Wastewater Treatment Plant of the Town of Narragansett and transported to the Wastewater Treatment Plant of South Kingstown located on Westmoreland Street, Narragansett, by the Town of Narragansett and deposited in its designated sludge holding tanks.

B. Develop, construct, maintain and operate a sludge disposal landfill site and/or dispose of treated sludge by other means acceptable to the State Dept. of Environmental Management, including transportation from the Town of South Kingstown Wastewater Treatment Plant.

C. Maintain records of capital and operating costs for the treatment and disposal of Wastewater Treatment Plant sludge and make them available to the Town of Narragansett authorized agents.

II. The Town of Narragansett agrees to:

A. Transport, in tank trucks or other approved means to meet standards of the State Dept. of Environmental Management, Div. of Pollution Control, primary and/or secondary sludge generated at its Scarborough Wastewater Treatment Plant and deposit in sludge holding tanks at the South Kingstown Wastewater Treatment Plant; such sludge to be free of screenings, rags and relatively free of grit.

B. Pay a proportionate share of the capital costs of developing a sludge disposal landfill and operating equipment, exclusive of Federal and State of Rhode Island participating funding; such proportionate share to be the ratio of the Scarborough Wastewater Treatment Plant design flow of 1.4 MGD to the total of the Scarborough and South Kingstown Wastewater Treatment Plant design flows for twenty (20) year life of (4.13 MGD plus 1.4 Mg) 5.53 MGD or 25.3 percent. The sludge disposal landfill design and costs shall be based on the report of C.E. Maguire, Inc. entitled Report on Design and Development of Sewage Sludge Landfill Operation, Rose Hill Rd., Town of South Kingstown, R.I., dated June, 1977, and approved by the State of Rhode Island Dept. of Environmental Management, Div. of Pollution Control including any alterations or modifications approved by the agency over the life of the sludge landfill.

The capital cost to be paid for shall include engineering, administration, interest, legal, contractual services, and construction cost not funded by State or Federal agencies.

The cost of initial development of the site through May 31, 1979 amounts to $65,196.39 and 25.3 percent of this amount or $16,494.69 shall be paid by the Town of Narragansett upon execution of this agreement. In subsequent years, capital costs shall be billed as expenditures occur and due within thirty (30) days of billing.

C. Pay a share of the operating costs for Scarborough Wastewater Treatment Plant primary and/or secondary sludge treatment processing and disposal, including lease of land, supplies, repairs, power, chemicals, transportation, operation of equipment, fuel, insurance, maintenance, depreciation and administration; such a share shall be based on the costs for sludge treatment processing and disposal less the cost of septic sludge treatment and disposal costs, charged per 1000 gallons of sludge multiplied by the sludge delivered from the Scarborough Wastewater Treatment Plant to the South Kingstown Wastewater Treatment Plant. Charges for sludge disposal shall be billed monthly on an estimated cost per 1000 gallons and adjusted at the end of each fiscal year. The initial charge shall be $8.75 per 1000 gallons delivered.

D. Maintain records and make available records of its Scarborough Wastewater Treatment Plant's total volume of sludge delivered to the Town of South Kingstown.

III. The Town of Narragansett in its use of the system shall comply with such reasonable requirements as may be adopted by South Kingstown. This shall include cleanup of any spillage at the holding tank dumping station occuring during delivery of sludge and coordinated as to time of delivery by the plant superintendents.

IV. This agreement shall be for a period, until July 1, 1997, but its term shall be subject to renegotiation or termination, except that either party to terminate this agreement must serve written notice to the other party two years prior to such termination.

V. Nothing in this agreement shall modify or have any effect on sewage agreement dated November 27, 1972, between the Towns of Narragansett and South Kingstown.

VI. If any provision of this agreement is held invalid in any circumstances, such invalidity shall not affect any other provision or circumstances.

VII. Any controversy hereafter arising out of this agreement or out of the refusal of any party to perform the whole or any part hereof, shall be settled by arbitration in South Kingstown, R.I., pursuant to the rules then pertaining of the American Arbitration Association, subject in all respects to the Rhode Island Arbitration Act.

TOWN OF NARRAGANSETT

by _____
President, Town Council

TOWN OF SOUTH KINGSTOWN

by _____
President, Town Council

Town of South Kingstown, R. I.

TOWN CLERK'S OFFICE

CLERK OF THE TOWN COUNCIL AND PROBATE COURT

Town Hall, 66 High Street

Wakefield, Rhode Island 02879

OSTER R. SHELDON

own Clerk & Probate Clerk

401-789-9331

At a REGULAR SESSION of the Town Council of the Town of South Kingstown, County of Washington, in the State of Rhode Island, held at the Town Hall, in and for said Town, on the 12th day of September A. D. 1977 at 7:30 P.M.

PRESENT: Messrs. Alfred J. Coffin, President
Duncan H. Doolittle, Vice President
Alexander M. Cruickshank
Charles J. Hamilton, Jr.
Gilbert V. Indeglia MEMBERS

It was VOTED: to authorize the President of the South Kingstown Town Council to sign a Sludge Treatment and Disposal Agreement with the Town of Narragansett covering the treatment of sludge generated at the Scarborough Wastewater Treatment plant at the South Kingstown Regional Wastewater Treatment Plant.

.A True Copy

ATTEST: Foster R. Sheldon

TOWN OF SOUTH KINGSTOWN

Certificate of Clerk

I, the Town Clerk of the Town of South Kingstown, Rhode Island, certify that at a regular meeting of the Town Council duly called and held on Sept. 12, 1977, at which a quorum was present, the following resolution was unanimously adopted, all of which appears in the official records of the Council in my custody:

> Resolved that the form of Sludge Treatment and Disposal Agreement with Narragansett presented to this meeting is approved; that the Town Clerk is directed to file a copy of the approved form of agreement with the records of this meeting; and that the President of the Town Council is authorized to execute an agreement substantially in such form on behalf of the Town.

I further certify that the agreement to which this certificate is attached is in the form presented to the aforesaid meeting of the Town Council, a copy of which form is on file with the records of the meeting and that the foregoing resolution has not been amended or revoked.

Dated: June 15, 1979

Elizabeth M. Wilson
Town Clerk

(Town Seal)

TOWN OF NARRAGANSETT

Certificate of Clerk

I, the Town Clerk of the Town of Narragansett, Rhode Island, certify that at a regular meeting of the Town Council duly called and held on June 18, , 1979, at which a quorum was present, the following resolution was unanimously adopted, all of which appears in the official records of the Council in my custody:

> Resolved that the form of Sludge Treatment and Disposal Agreement with South Kingstown presented to this meeting is approved; that the Town Clerk is directed to file a copy of the approved form of agreement with the records of the meeting; and that the President of the Town Council is authorized to execute an agreement substantially in such form on behalf of the Town.

I further certify that the agreement to which this certificate is attached is in the form presented to the aforesaid meeting, a copy of which is on file with the records of the meeting and that the foregoing resolution has not been amended or revoked.

Elaine M. Fayerweather
Town Clerk Deputy

(Town Seal)

Town of South Kingstown

Town Hall
66 High Street
Wakefield, Rhode Island 02879

Tel. 401-789-9331

January 29, 1985

Mr. Maurice J. Loontjens, Jr.
President
Narragansett Town Council
Town Hall
25 Fifth Avenue
Narragansett, RI 02882

Dear Mr. Loontjens:

The Town Council of the Town of South Kingstown herewith requests the Town Council of the Town of Narragansett to cosign this letter of understanding in regard to the Sewerage Agreement between the Towns of Narragansett and South Kingstown dated November 27, 1972, as modified by a letter of understanding dated August 22, 1974.

By way of background, the common components of the regional treatment plant were constructed and paid for based on the following percentage of total costs:

1.	South Kingstown	41%	1,693,300 gals. per day share
2.	URI	40%	1,652,000 gals. per day share
3.	Narragansett	19%	784,700 gals. per day share
		100%	4,130,000 gals. plant design

The University of Rhode Island, as a part of its payment agreement, has requested a reaffirmation of the original understanding that the university can increase its average flow to 1.652 million gallons per day (40% of 4.13 MGD) to the treatment plant without incurring additional capital expense.

In our letter agreement of August 22, 1974, it was agreed that Narragansett would be guaranteed at least 19% (.7847 million gallons per day) of the treatment plant capacity and shall not be denied additional capacity if that capacity exists.

During the 1983-84 fiscal year, the Town of Narragansett delivered an average of 905,000 gallons per day of wastewater to the regional treatment plant, or approximately 21.9% of total plant capacity. While sufficient excess space exists to accommodate Narragansett's excess flow over the short term, the adoption of a future plant expansion agreement is clearly warranted to protect the existing plant capacity ownership rights of South Kingstown and the university.

South Kingstown is proposing the adoption of a plant expansion agreement whereby:

1. When the regional treatment plant reaches 80% of design flow, or 3.3 MGD average flow, that an independent engineering study of the three regional partners' wastewater flow volumes, both present and future, be made to determine the size and scope of any planned expansion.

2. After determination of needed flow space and agreement by each regional partner, that a cost-sharing agreement be formally adopted whereby cost-sharing by regional partners would be based on the following:

$$\text{Regional Partner Share} = \frac{(\text{Needed Flow Space} - \text{Previously Purchased Space})}{\text{Total New Flow Space}}$$

To illustrate the above, consider a theoretical example as follows:

	Proportion of Flows Initial Plant Construction	Actual Use 1983-84	Illustration Flows at 6.2 MGD Capacity	Added Capacity per Participant 3-4	%Cost For Added Plant per Participant
	MGD	MGD	MGD	MGD	%
Narragansett	.785	.905	2.200	1.415	63.7
South Kingstown	1.693	1.000	2.500	.807	36.3
URI	1.652	.532	1.500	(.152)	--
	4.130	2.437	6.200	2.07	100.0

If this future plant expansion proposal is agreeable to the Town Council of Narragansett, please indicate your approval by signing the copy of this letter and returning it to us.

Very truly yours,

Town Council of South Kingstown

By Charles P. Kelley
Charles P. Kelley, President

The Town Council of the Town of Narragansett does hereby accept and agree to the future plant expansion proposal herein above stated.

Town Council of Narragansett

By Maurice J. Loontjens Jr.
Maurice J. Loontjens, Jr., President

REGIONAL WASTEWATER
TREATMENT PLANT (WWTP)

COST-SHARING AGREEMENT
BETWEEN THE
TOWN OF SOUTH KINGSTOWN
AND
TOWN OF NARRAGANSETT

WHEREAS: The Town Council of South Kingstown herewith requests the Town Council of the Town of Narragansett to cosign this letter of understanding in regard to the Sewerage Agreement between the Towns of Narragansett and South Kingstown relative to recent regional wastewater treatment plant operational equipment replacement.

WHEREAS: By way of background, the common original components of the regional treatment plant were constructed and paid for based on the following percentage of total costs:

1.	South Kingstown	41%	1,693,300 gals. per day share
2.	URI	40%	1,652,000 gals. per day share
3.	Narragansett	19%	784,700 gals. per day share
		100%	4,130,000 gals. plant design

The University of Rhode Island, as a part of its payment agreement, has requested a reaffirmation of the original understanding that the University can increase its average flow to 1.652 million gallons per day (40% of 4.13 MGD) to the treatment plant without incurring additional capital expense.

WHEREAS: The purchase and installation of a 2.0 meter belt filter press, polymer system and rotary reactor thickener are replacing the existing horizontal vacuum filters and polymer system which reached an ultimate equipment life based on actual flow volume from each of the individual regional partners.

WHEREAS: Each regional partner agrees to pay for said new equipment based on each user's average yearly flow volume percentage over the last three (3) year period as delineated below.

WHEREAS: Payment of solids handling improvements except rotary reactor thickener shall be billed to the Town of Narragansett on the normal quarterly invoice and is payable within fifteen (15) calendar days.

WHEREAS: Payment of the rotary reactor thickener and related services shall be billed to the Town of Narragansett on a separate invoice and shall be payable within fifteen (15) calendar days once the Town of South Kingstown's payment is made to the contractor.

TOTAL REGIONAL PARTNER WASTEWATER FLOWS

	1986-87 MGY	1987-88 MGY	1988-89 MGY	Average MGY	%
Narragansett	401.10	337.40	360.00	366.16	38.38
So. Kingstown	397.00	356.80	359.70	371.16	38.91
URI	205.60	213.00	231.30	216.63	22.71
	1003.70	907.20	951.00	953.95	100.0

Present project estimated costs are broken down as follows:

Belt Filter Press & Polymer System

Engineering Services		$ 42,300.00
Equipment Costs		$228,150.00
Construction Installation		$438,200.00
	TOTAL	$708,650.00

Rotary Thickener

Engineering Services	$ 16,600.00
Equip. & Construction Installation (Thickener was purchased by Contractor)	$134,900.00
	$151,500.00
TOTAL EQUIPMENT REPLACEMENT COST	$860,150.00*

*NOTE: These costs are actual contract costs and cost adjustments due to change orders may be encountered.

Respective cost-sharing would be as follows based on the past three (3) year flow history.

Narragansett

$860,150.00 X 38.38% = $330,125.57

South Kingstown

$860,150.00 X 38.91% = $334,684.37

University of Rhode Island

$860,150.00 X 22.71% = $195,340.07

The Town Council of the Town of South Kingstown does hereby accept and agree to the cost-sharing methodology as stated above for solids handling equipment replacement at the Regional Wastewater Treatment Plant.

Town Council of South Kingstown

By Barbara A. Hackey
Barbara A. Hackey, President

The Town Council of the Town of Narragansett does hereby accept and agree to the cost-sharing methodology as stated above for solids handling equipment replacement at the Regional Wastewater Treatment Plant.

Town Council of Narragansett

By _____
Timothy P. Haxton, President

TOWN COUNCIL APPROVED 11/20/89
AGENDA ITEM 89-436

AMENDMENT TO
SEWERAGE AGREEMENT

BETWEEN

THE TOWN OF NARRAGANSETT
AND
THE TOWN OF SOUTH KINGSTOWN

June, 1990

AMENDMENT TO SEWERAGE AGREEMENT

This AMENDMENT to the November 27, 1972 Sewerage Agreement, made and entered into this _____day of_____, 1990 by and between the Town of Narragansett (hereinafter referred to as NARRAGANSETT) and the Town of South Kingstown (hereinafter referred to as SOUTH KINGSTOWN) UNDER Chapters 116 and 171 of the Public Laws of 1969 as amended by the Public Laws of 1971.

WITNESSETH:

WHEREAS, it is deemed in the best interest of NARRAGANSETT and SOUTH KINGSTOWN, as well as the State of Rhode Island Department of Health and Department of Environmental Management and U.S.E.P.A. that each town dispose of its raw sewage and septage through existing public facilities at the Westmoreland Street Regional Wastewater Treatment Facility; and

WHEREAS, SOUTH KINGSTOWN intends to extend public sewerage facilities to serve the Middlebridge area of SOUTH KINGSTOWN, to mitigate pollution of the Narrow River resulting from failing and ineffective individual sewage disposal systems in the project area; and

WHEREAS, to provide sewer service to the Middlebridge area of SOUTH KINGSTOWN, transport of the project area's wastewater into and through the interceptor sewer system in NARRAGANSETT is required; and

WHEREAS, sufficient capacity was provided in the NARRAGANSETT Interceptor Sewer to accommodate peak flows from the Middlebridge area of SOUTH KINGSTOWN; and

WHEREAS, state and federal grant monies were allocated to, and paid for the NARRAGANSETT Interceptor Sewer and pertinent downstream transmission and treatment facilities in light of their 'regional' use, and the Towns must abide by the applicable state and federal laws, rules and regulations; and

WHEREAS, NARRAGANSETT deems it to be in the public interest to enter into an amendment to the 1972 Sewerage Agreement with SOUTH KINGSTOWN whereby NARRAGANSETT would receive and transport SOUTH KINGSTOWN's wastes from the Middlebridge area through the NARRAGANSETT Interceptor Sewer System.

NOW, THEREFORE, in consideration of the mutual covenants herein contained, it is agreed by and between the parties as follows:

TERMS OF CONTRACT

ARTICLE 1. DEFINITIONS AND REPRESENTATIONS:

The following are definitions and terms used in this Agreement together with representations and agreements pertaining thereto:

1.01 "Ammonia Nitrogen" shall mean the quantity of ammonia measured under standard laboratory procedure, expressed as nitrogen in milligrams per liter.

1.02 "Average Daily Flow" shall mean the total annual flow measured at a metering station divided by the number of days of the year.

1.03 "Biochemical Oxygen Demand" (denoted "BOD) shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20ºC, expressed in milligrams per liter.

1.04 "Building Drain" shall mean that part of the lowest horizontal piping of a drainage system which receives the discharge from soil, and other drainage pipes inside the walls of the building. This drain connection to the municipal sewer is prohibited.

1.05 "Building Sewer" shall mean that extension from the internal dwelling sanitary plumbing commencing at a point five (5) feet (1.5 meters) outside the inner face of the building wall and extending to the public sewer or other place of disposal.

1.06 "Chloride Demand" shall mean the amount of chlorine expressed in mg/l required to be added to water, sewage or other liquid to achieve a combined chlorine residual after fifteen (15) minutes contact of one (1) mg/l.

1.07 "Combined Sewer" shall mean a public sewer receiving both surface water and wastewater.

1.08 "Conveyance" shall mean the transportation of wastewater by interceptor sewers owned and operated by NARRAGANSETT, from the points of delivery by SOUTH KINGSTOWN to the wastewater treatment plant.

1.09 "Daily Average" shall mean the sum of the measurements made over any given twenty-four (24) hour period divided by the number of measurements made.

1.10 "Disposal" shall mean the disposition of wastewater after treatment by the wastewater treatment plant.

1.11 "Domestic Wastewater" shall mean the wastewaters discharged from sanitary conveniences, such as toilets, sinks, urinals, showers, and laundries; and from kitchens and cafeterias essentially free from industrial wastewater or toxic materials.

1.12 "Easement" shall mean an acquired legal right for the specific use of land owned by others.

1.13 "Industrial User" shall mean any non-governmental user of either town's sewage works, which contributes industrial wastes, identified in the Standard Industrial Classification Manual, Office of Management and Budget, as amended and supplemented, under the following divisions:

Division A. Agriculture, Forestry and Fishing.
Division B. Mining.
Division D. Manufacturing.
Division E. Transportation, Communications, Electric, Gas and Sanitary Services.
Division I. Services.

1.14 "Industrial Wastewater" shall mean the liquid wastes from industrial manufacturing, processing, trade, or business, as distinct from domestic wastewater.

1.15 "Infiltration" shall mean 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.

1.16 "Inflow" shall mean 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 and combined 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.

1.17 "Maximum Daily Flow" shall mean the highest total flow measured at a metering station over any given twenty-four (24) hour period.

1.18 "Middlebridge Flow" means the quantity of wastewater flowing into the NARRAGANSETT Interceptor Sewer from the Middlebridge area of SOUTH KINGSTOWN.

1.19 "Middlebridge Interceptor Sewer" for this agreement means an underground sewer pipe running in part under pressure from the SOUTH KINGSTOWN-NARRAGANSETT Town line through a small portion of NARRAGANSETT to an existing gravity interceptor sewer.

1.20 "Middlebridge Project" means the construction of sanitary sewer lines and other appurtenances located in SOUTH KINGSTOWN and NARRAGANSETT which are intended to convey wastewater from sources in SOUTH KINGSTOWN to the NARRAGANSETT Interceptor Sewer in Middlebridge Road, thereby to the Westmoreland Street Regional Wastewater Treatment Facility.

1.21 "Monthly Average" shall mean the sum of the measurements made over any given thirty (30) day period divided by the number of measurements made.

1.22 "Net Operating Cost" shall mean the total operation and maintenance cost incurred by NARRAGANSETT less payments received from (1) any grants from other sources; and (2) miscellaneous payments from other sources.

1.23 "Operation and Maintenance Expense" (O and M Expense) includes the total annual expenses actually incurred by SOUTH KINGSTOWN in the operation and maintenance of the regional treatment facility pursuant to a budget covering appropriate categories of annual operating and maintenance expense, which budget shall be adopted prior to the commencement of each Fiscal Year by means of established and acceptable procedures provided, however, that O and M Expense:

(a) Shall not exceed in the aggregate the total amount of the budget for each fiscal year; and
(b) shall not include any principal, interest or other charges in connection with any indebtedness incurred by SOUTH KINGSTOWN; and
(c) shall not include any SOUTH KINGSTOWN expenses not directly attributable to and included in such annual budget of the regional wastewater treatment and collection system.

1.24 "Peak Flow Rate" shall mean the maximum rate of flow and gallons recorded at flow metering stations during any calendar year.

1.25 "Person" shall mean any individual, firm, company, association, society, corporation or group.

1.26 "pH" shall mean the logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution.

1.27 "Phosphorous" shall mean the quantity of phosphorus measured under standard laboratory procedures, expressed as phosphorous in milligrams per liter.

1.28 "Public Sewer" shall mean a pipe or conduit for carrying wastes which is owned, maintained, and controlled by public authority.

1.29 "Replacement Costs" shall mean expenditures for obtaining and installing equipment, accessories or appurtenances which are necessary during the service life of the sewage works to maintain the capacity and performance for which said works were designed and constructed.

1.30 "Reserved Capacity" shall mean the capacity in NARRAGANSETT's works that has been allocated for SOUTH KINGSTOWN to utilize.

1.31 "Sanitary Sewer" shall mean a public sewer which carries wastewater and to which storm, surface, and groundwaters are not intentionally admitted.

1.32 "Septage" shall mean the wastes from holding tanks, such as chemical toilets, campers, or trailers, and wastes from septic tanks and cesspools.

1.33 "Service Life" shall mean the period of time during which the sewage works or a component of a waste treatment management program will be capable of performing a function.

1.34 "Sewage Works" shall mean all facilities for collecting, pumping, treating and disposing of wastewater.

1.35 "Shall" is mandatory: "May" is permissive.

1.36 "Storm Drain" (sometimes termed "Storm Sewer") shall mean a public drainage system which carries storm and surface waters and drainage, but excludes wastewater, other than unpolluted cooling water.

1.37 "Suspended Solids" (denoted as "SS") shall mean solids that either float on the surface of, or are in suspension in, water, wastewater, or other liquids, and which are removable by laboratory filtering, expressed in milligrams per liter.

1.38 "Treatment" shall mean the processing by SOUTH KINGSTOWN at the regional wastewater treatment plant of wastewater so that it is suitable for disposal.

1.39 "User Charges" shall mean charges levied in proportion to the use of sewage works. As required by Section 204 (b) (1) (A) of Public Law 95-217, as amended, and by regulations promulgated by the U.S. Environmental Protection Agency, such charges must, to the extent possible, distribute operation and maintenance (including replacement) cost to each user in proportion to its contribution to the total loading of the sewage works, where construction of such works has been financed in part by a federal grant.

1.40 "Wastewater" shall mean spent water and may be a combination of the liquid and water-carried wastes from residences, commercial buildings, industrial plants, and institutions; and infiltration and inflow; but excluding unpolluted storm, surface and subsurface waters.

ARTICLE 2. GENERAL PROVISIONS

2.1 SOUTH KINGSTOWN understands and agrees to the following obligations, limitations, and commitments, made in return for NARRAGANSETT's Agreement to Permit Connection by SOUTH KINGSTOWN to NARRAGANSETT's Sewage Works.

2.1.1 "Limitations and Rights" Nothing in this Agreement shall be construed as a grant by NARRAGANSETT of any exclusive right or privilege. SOUTH KINGSTOWN agrees to comply in all respects with NARRAGANSETT's "Ordinances, Regulations, and Policies That May Govern Sewer Usage."

2.1.2 "Charges and Fees" SOUTH KINGSTOWN agrees to make prompt payment of all charges described in and pursuant to this Agreement.

2.1.3 "Sewer Use By-Law" SOUTH KINGSTOWN agrees to adopt and enforce a by-law that embodies rules related to sewer use that comply with the limitations set forth in NARRAGANSETT's "Ordinances, Regulations, and Policies That May Govern Sewer Usage."

2.1.4 "Interceptor Responsibilities" SOUTH KINGSTOWN shall be responsible for the design, construction, operation, maintenance, and costs incurred for the Middlebridge Project as defined herein. A wastewater flow meter shall be installed at the Middlebridge Road Pump Station to determine and allocate costs for operation and maintenance to SOUTH KINGSTOWN for its wastewater volume.

2.1.5 "Flow and Wastewater Strength Limitations" SOUTH KINGSTOWN agrees that the wastewater flows from the Middlebridge area shall be considered as part of its regional volume percentage of treatment plant capacity. Further, SOUTH KINGSTOWN agrees to the following limitations of the Middlebridge Project's usage of NARRAGANSETT's Interceptor Sewer, unless through additional written Amendment to this Agreement or other limits that are mutually agreed upon.

1. Wastewater Volume

Facility	SOUTH KINGSTOWN (Middlebridge) Reserved Capacity	
	Ave. Daily Flow, MGD	Peak Flow, MGD
North Interceptor	0.149	0.690
Pump Station	0.149	0.690

2. Wastewater Strength

	Monthly Average	Daily Maximum
BOD, mg/l	250	500
SS, mg/l	300	600
Ammonia Nitrogen, mg/l	40	80
Phosphorus, mg/l	10	20

SOUTH KINGSTOWN agrees that none of its reserved capacity shall be transferred to any party without prior concurrence of NARRAGANSETT included as an amendment to this Agreement. Likewise, NARRAGANSETT agrees not to permit the use of SOUTH KINGSTOWN reserved capacity by any other party without the prior written concurrence of SOUTH KINGSTOWN in an Amendment to this Agreement.

2.1.6 "Control of Infiltration and Inflow" SOUTH KINGSTOWN agrees that it will operate and maintain its sewage works for the Middlebridge Project in accordance with customary engineering practices and within guidelines set forth as follows:

The sewage works of SOUTH KINGSTOWN connecting to NARRAGANSETT's sewage works shall receive no stormwater or groundwaters directly or indirectly from surface drains, ditches, or streams; storm or combined sewers; roof, areaway or foundation drains; or from any other means, except that the minimum practicable amount of infiltration/inflow, as authorized by law, or mutually agreed upon, shall be permitted. For all sewers constructed by SOUTH KINGSTOWN in the Middlebridge area, the maximum permitted rate of infiltration of groundwater upon completion of sewer installation shall be 150 gallons per inch diameter per mile per 24 hours.

2.1.7 "Conformance to law" SOUTH KINGSTOWN agrees to abide by, and conform to, all applicable laws of the United States and the State of Rhode Island, together with such "Ordinances, Regulations, and Policies That May Govern Sewage Usage" which NARRAGANSETT may promulgate from time to time with regard to its sewage works.

2.1.8 "Control of Deleterious Wastes" SOUTH KINGSTOWN may transmit wastewater to NARRAGANSETT's sewage works upon the condition that it shall comply with the "Ordinances, Regulations, and Policies That May Govern Sewer Usage," as adopted and amended by NARRAGANSETT.

ARTICLE 3. OBLIGATIONS AND RESPONSIBILITIES

3.1 "Obligations of Narragansett" NARRAGANSETT agrees to the following obligations, limitations and commitments, in return for the timely payment by SOUTH KINGSTOWN of the charges specified in this Agreement.

A. "Contract Service Area" NARRAGANSETT agrees to accept (at the point of delivery shown in Exhibit A), and transport wastewater from the Middlebridge area, subject to the volumetric and strength limitations agreed to in Section 2.1.5 of this Agreement, and in accordance with "Ordinances, Regulations, and Policies That May Govern Sewage Usage" either existing or future in NARRAGANSETT, and all water quality standards, and orders and decrees of any governmental authority having jurisdiction over the transmission of said wastes; provided, however, that the treatment of Middlebridge wastes shall be of such a type and degree as may be necessary to provide for the application of Best Practicable Waste Treatment Technology. SOUTH KINGSTOWN shall conform to all appropriate industrial wastewater pretreatment rules and regulations as established by the appropriate State and Federal regulatory agencies.

B. "Measurement of Wastewater Flows and Strengths" NARRAGANSETT agrees and understands that the measurement of wastewater flows and strength from SOUTH KINGSTOWN is the responsibility of NARRAGANSETT. Such flow measurements shall be made by a sewage meter located at the Middlebridge Pump Station.

Since the meter structure is within the political boundaries of SOUTH KINGSTOWN, SOUTH KINGSTOWN agrees to provide unlimited right of entrance and egress to NARRAGANSETT during normal business upon reasonable notice, except in cases of emergency.

Costs of meter maintenance, operation and reading shall be included in the costs of maintaining, repairing, and operating the particular sewage works in which the meter is placed. All such meters shall be maintained, inspected and calibrated at least annually, both at SOUTH KINGSTOWN's expense, by qualified representatives of the meter manufacturer or similar concern.

A copy of the inspection and calibration reports shall be on file at the South Kingstown Regional Wastewater Treatment Plant and a copy shall be sent to NARRAGANSETT.

If determined by NARRAGANSETT, in its sole discretion, that it is necessary to sample the strength of wastewater from the Middlebridge area, NARRAGANSETT shall undertake to do so on a periodic basis and at such points as it may find appropriate. Such samples, if needed, shall be taken by NARRAGANSETT in such manner and with such frequency as to ensure collection of a fair representation of SOUTH KINGSTOWN's Middlebridge area wastewater.

In the case of missing or inaccurate flow records or wastewater sampling data, due to faulty meter operation or otherwise, an estimate of flow shall be made by NARRAGANSETT and agreed upon by SOUTH KINGSTOWN based upon representative past records and an estimate of wastewater characteristics, if needed, shall likewise be made by NARRAGANSETT. In such case, the said estimates shall be used by NARRAGANSETT to establish SOUTH KINGSTOWN's payments to NARRAGANSETT for the period of missing inaccurate data.

C. "Records, Accounts and Audits" NARRAGANSETT shall keep books of record and account, in which complete and correct entries shall be made of all its transactions with SOUTH KINGSTOWN which, together with all other books and papers dealing with the sewage works, shall at all reasonable times be subject to the inspection of any officer or agent of SOUTH KINGSTOWN. If requested and paid for by SOUTH KINGSTOWN, NARRAGANSETT's accounts shall be audited annually by an independent accountant selected by NARRAGANSETT. Each such audit, in addition to the customer matters, shall show the income and expenditures related to the costs of providing sewerage services to the Middlebridge area.

3.2 "Responsibilities of SOUTH KINGSTOWN" SOUTH KINGSTOWN will not connect any combined sewer or separate drains into NARRAGANSETT's sewerage system and will not discharge into said sewerage system any volume of sewage, substances or wastes which are outside pre-treatment parameters delineated in the Town of South Kingstown Wastewater Ordinance, and the Town of Narragansett "Ordinances, Regulations, and Policies That May Govern Sewage Usage" governing the same.

3.3 "Obligations of Both Parties" NARRAGANSETT and SOUTH KINGSTOWN agree to the following obligations, limitations and commitments.

A. "Assignment of Users" In general, all users of sewage works in Middlebridge shall be served by collector sewers owned, operated and maintained by SOUTH KINGSTOWN, unless there is written agreement to the contrary, included as an amendment to this Agreement executed with the same formality.

B. "Responsibility for System Operation and Maintenance" NARRAGANSETT assumes no responsibility for operation and maintenance of sewage works constructed and owned by SOUTH KINGSTOWN. NARRAGANSETT shall not be responsible or liable in any way for act or acts beyond its control which may, in any way, cause an interruption or discontinuance of the service provided for in this Agreement, and the Town of South Kingstown agrees to indemnify and hold harmless the Town of Narragansett from any and all claims for property damage or personal injury resulting from an interruption or discontinuance of sewage works.

ARTICLE 4. AGREEMENT TERM

4.1 This Agreement shall be of permanent duration but its provisions shall be subject to renegotiation as of July 1, 2008 and run for a minimum at thirty (30) year intervals thereafter.

ARTICLE 5. IMPLEMENTATION

5.1 NARRAGANSETT agrees to allow a physical connection to its sewerage conveyance system with a portion of the capacity allocated to handle wastes from Middlebridge.

ARTICLE 6. USER CHARGES

6.1 SOUTH KINGSTOWN shall develop, in accordance with the provisions of federal regulations ("Code of Federal Regulations, Subpart I, 40 CFR 35.2122 and 35.2140, et seq.") as amended, an equitable User Charge System to assure that each recipient of waste treatment services within Middlebridge's sewer service area will pay its proportionate share of the costs of operations and maintenance (including replacement) of all waste conveyance services provided by NARRAGANSETT.

6.2 SOUTH KINGSTOWN must obtain approval of the Rhode Island DEM and the Region I Office of the U.S. Environmental Protection Agency for its User charge System for the above costs.

6.3 SOUTH KINGSTOWN, upon approval of its User Charge System, must incorporate said System in one or more municipal legislative by-laws.

6.4 The by-law(s) must include provisions whereby the maintenance of said System and the collection of the revenues can be reviewed by any governmental authority having jurisdiction.

ARTICLE 7. OPERATION AND MAINTENANCE COST APPORTIONMENT

7.1 NARRAGANSETT shall maintain an adequate cost accounting system for its transmission facilities downstream of the Middlebridge connections which shall be the basis for the determination and allocation of operating costs. NARRAGANSETT shall maintain separate cost accounting records for the operation of those portions of their sewer works that are shared by NARRAGANSETT and SOUTH KINGSTOWN and any other participants. The annual cost of operating these sewage works shall be apportioned between users on the basis of their actual, annual flows, as determined from records at the respective metering stations.

7.2 The operating costs shall be apportioned against participants on the basis of average daily flows, providing that the established parameters from any participant are not exceeded.

7.3 Actual annual flows from the Middlebridge Project shall be determined for SOUTH KINGSTOWN from records at the Middlebridge Pump Station, actual total annual flow for NARRAGANSETT shall be determined at Ouida Street Pump Station.

7.4 Operating costs for the conveyance facilities shall include the cost accounting related to the distribution and invoicing of operating costs. Operating costs shall be payable monthly, on a fiscal year basis, upon receipt by SOUTH KINGSTOWN of NARRAGANSETT's invoice. Bills shall be paid within sixty (60) days. Operating costs for the first eleven (11) months shall be determined by using NARRAGANSETT's approved yearly operation budget for the appropriate conveyance facilities (reduced to a monthly cost) and apportioning SOUTH KINGSTOWN's share on the basis of actual total monthly flow, as measured.

The final monthly invoice for the fiscal year shall be rendered by NARRAGANSETT within thirty (30) days of the end of the fiscal year and shall be determined on the basis of actual flows and expenditures. All previous monthly invoices shall be subject to adjustment and correction at the time of this final billing for the fiscal year. NARRAGANSETT shall forward to SOUTH KINGSTOWN, on or before March first, the projected estimate of operating costs and other costs for such fiscal year, so that SOUTH KINGSTOWN may make necessary preparations for the final monthly invoice for the fiscal year.

ARTICLE 8. ANNUAL COST REVIEW

8.1 Both towns agree that the apportionment of costs set forth in Article 7 shall be subject to review annually. After a review of the annual costs, if an adjustment to the costs appear to be necessary, said adjustment shall be made by NARRAGANSETT in the forthcoming billing for services.

ARTICLE 9. TERMINATION CLAUSE

9.1 Any obligations under this Agreement are conditioned upon the Town of South Kingstown conveyance of waste flows to NARRAGANSETT's sewerage system via the Town of South Kingstown Middlebridge wastewater sewage system.

9.2 Either party may terminate this Agreement by giving notice thereof to the other party in writing three (3) years prior to the termination date. Upon receipt of said notice, both parties will enter into discussion within thirty (30) days to assure proper termination of the Agreement.

ARTICLE 10. WASTE ANALYSIS

10.1 Both Towns agree that the determination of character and concentration of wastes will be in accordance with the latest edition of "Standard Methods for the Examination of Water and Sewage," as proposed, approved and published jointly by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation, or any other method established further to the following:

10.1.1 Samples shall be collected at the Metering Station on Middlebridge Road or other locations in such a manner so as to be repre-sentative of the actual quality of the wastes. NARRAGANSETT shall have access to said station, as required, to conduct intermittent or continuous waste sampling.

10.1.2 Portions of waste samples collected by one (1) Town as part of a sampling and analytical program, will be made available to the other Town at no cost and in adequate quantities for analysis for characteristics and concentrations. In the event of discrepancy which cannot be satisfactorily resolved, the parties will submit the samples to a mutually acceptable, disinterested, qualified third party for determination of the waste characteristics and concentrations.

ARTICLE 11. FLOW MEASUREMENTS

11.1 SOUTH KINGSTOWN and NARRAGANSETT agree that flow measurements shall be made as follows:

11.1.1 The volume of flow used in computing SOUTH KINGSTOWN's share of the operating costs shall be based upon readings obtained by suitable metering equipment. Such metering equipment shall be installed and maintained by SOUTH KINGSTOWN. NARRAGANSETT shall have access to said meters during normal business hours upon reasonable notice, except in cases of emergency.

11.1.2 In the event the metering equipment is temporarily out of order or service for any reason, the Middlebridge area estimated flow will be based on the average daily flow of the previous three (3) months.

ARTICLE 12. CONFORMANCE TO LAW

12.1 SOUTH KINGSTOWN agrees to abide by, and conform to, all applicable laws of the United States and the State of Rhode Island, together, with such "Ordinances, Regulations and Policies That May Govern Sewage Usage" as NARRAGANSETT may promulgate from time to time with regard to its sewerage works.

ARTICLE 13

If any provision of this Agreement is held invalid in any circumstance, such invalidity shall not affect any other provisions or circumstances.

ARTICLE 14

Any controversy hereafter arising out of this Agreement, or out of the refusal of any party to perform the whole or any part thereof, shall be settled by arbitration in South Kingstown, Rhode Island, pursuant to the rules then obtaining of the American Arbitration Association, subject in all respects to the Rhode Island Arbitration Act.

IN WITNESS WHEREOF, NARRAGANSETT and SOUTH KINGSTOWN have caused their proper representatives on the day and year first written above.

AGENDA ITEM
90-06-297

TOWN COUNCIL
APPROVED 6/18/90

APPROVED AS TO FORM

By: _____
Mark A. McSally, Esq.
Town Solicitor

FOR THE TOWN OF NARRAGANSETT

By: _____
Timothy P. Haxton
Town Council President

APPROVED AS TO FORM

By: _____
Robert B. Gates, Esq.
Town Solicitor

FOR THE TOWN OF SOUTH KINGSTOWN

By: _____
Barbara A. Hackey
Town Council President

9-28-90

REGIONAL WASTEWATER TREATMENT PLANT (WWTP)

PHASE 1 IMPROVEMENTS

COST-SHARING AGREEMENT BETWEEN THE TOWN OF SOUTH KINGSTOWN UNIVERSITY OF RHODE ISLAND AND TOWN OF NARRAGANSETT

WHEREAS: The Town Council of South Kingstown herewith requests the University of Rhode Island and the Town Council of the Town of Narragansett to co-sign this letter of understanding in regard to the Sewerage Agreement between the Towns of Narragansett and South Kingstown and the University of Rhode Island relative to recent regional wastewater treatment plant Phase I improvements.

WHEREAS: By way of background, the common original components of the regional treatment plant were constructed and paid for based on the following percentage of total costs:

1.	South Kingstown	41%	1,693,300 gals. per day share
2.	URI	40%	1,652,000 gals. per day share
3.	Narragansett	19%	784,700 gals. per day share
		100%	4,130,000 gals. plant design

The University of Rhode Island, as a part of its payment agreement, has requested a reaffirmation of the original understanding that the University can increase its average flow to 1.652 million gallons per day (40% of 4.13 MGD) to the treatment plant without incurring additional capital expense.

PHASE 1 COSTS FOR ORIGINAL 4.13 MGD

WHEREAS: The purchase and installation of fine bubble aeration diffuser panels, piping, and variable speed blower drives; two (2) eighty (80) foot diameter secondary clarifiers; treatment plant roof repair; and all associated engineering costs for said equipment and WWTP Engineering Facilities Plan which reached an ultimate equipment life based on actual flow volume from each of the individual regional partners.

WHEREAS: Each regional partner agrees to pay for 78.94% (.87 MGD) new capacity equipment related flow versus 4.13 MGD existing capacity equipment related flow) of said new equipment total cost based on each user's average yearly flow volume percentage over the last five (5) year period as delineated below.

WHEREAS: Payment of all proportionate Narragansett and University of Rhode Island Phase 1 Improvement costs shall be billed respectfully to the Town of Narragansett and the University of Rhode Island on an estimated cash flow schedule as provided by Keyes Associates, the project consultant engineering firm, payable within fifteen (15) calendar days.

PHASE 1 COSTS FOR ADDITIONAL .87 MGD

WHEREAS: The purchase and installation of fine bubble aeration diffuser panels, piping, and variable speed blower drives; two (2) eighty (80) foot diameter secondary clarifiers; and all associated engineering costs for said equipment which will accommodate an additional 0.87 MGD for two (2) of the three (3) individual regional partners as delineated below.

WHEREAS: The additional WWTP Phase I capacity of 0.87 MGD shall be split equally between the Town of South Kingstown and the Town of Narragansett. South Kingstown shall receive fifty (50) percent (0.435 MGD) and agrees to pay the associated proportionate cost.

WHEREAS: Narragansett shall receive fifty (50) percent (0.435 MGD) and agrees to pay the associated proportionate cost.

WHEREAS: In accordance with the Regional WWTP Facilities Plan generated by Keyes Associates in May, 1989, the University of Rhode Island has requested no additional WWTP capacity and consequently shall receive no additional volume and not pay any cost associated with the additional WWTP capacity expansion of 0.87 MGD.

WHEREAS: Payment of all proportionate Narragansett Phase 1 Improvement costs shall be billed to the Town of Narragansett on an estimated cash flow schedule as provided by Keyes Associates, the project consultant engineering firm, payable within fifteen (15) calendar days.

TOTAL REGIONAL PARTNER WASTEWATER FLOWS

	1984-85 MGY	1985-86 MGY	1986-87 MGY	1987-88 MGY	1988-89 MGY	Average MGY	%
Narragansett	268.4	369.2	401.1	337.4	360.0	347.22	38.44
S. Kingstown	311.3	335.4	397.0	356.8	359.7	352.04	38.97
URI	154.1	216.4	205.6	213.0	231.3	204.08	22.59
	733.8	922.1	1003.7	907.2	951.0	903.34	100.0

Estimated total cost-sharing would be as follows for each Regional WWTP Partner:

Narragansett

$ 524,845 (4.13 MGD) + $ 126,240 (0.435 MGD) = $ 651,085

South Kingstown

$ 532,131 (4.13 MGD) + $ 126,240 (0.435 MGD) = $ 658,371

University of Rhode Island

$ 308,480 (4.13 MGD) + $ 0 (0.0 MGD) = $ 308,480

TOTAL PHASE 1 COST = $ 1,617,935

NOTE: The above costs do not include change orders or additional work which may be encountered during actual construction.

The Town Council of the Town of South Kingstown does hereby accept and agree to the cost-sharing methodology as stated above for Phase I improvements at the Regional Wastewater Treatment Plant.

Town Council of South Kingstown

By Barbara A. Hackey
Barbara A. Hackey, President

The Town Council of the Town of Narragansett does hereby accept and agree to the cost-sharing methodology as stated above for Phase I improvements at the Regional Wastewater Treatment Plant.

TOWN COUNCIL APPROVED
1/7/91
AGENDA ITEM 90-12-596

Town Council of Narragansett

By
Timothy P. Haxton, President

O.U. Signature

The University of Rhode Island does hereby accept and agree to the cost-sharing methodology as stated above for Phase I improvements at the Regional Wastewater Treatment Plant.

By Richard Katzoff
Richard Katzoff
Assistant Vice President
Business Administration

REGIONAL WWTP PHASE I COST SHARING - 9-28-90

Expanded Facilities to 5.0 MGD
(equal to 21.06% of expanded unit process overall cost)

Item	T.S.K. 50.000%	U.R.I. 0.000%	Narr. 50.000%	Total 100.000%
Roof Repair	0	0	0	0
Aeration Panels	19,446	0	19,446	38,892
Clarifrs	103,025	0	103,025	206,051
Total Enginerng	14,677	0	14,677	29,354
NEL Rebate	10,908	0	10,908	21,817
Totals Addt. .87 MGD	126,240	0	126,240	252,480

Cost Sharing for Existing 4.13 MGD

The cost proportioning below is based on average yearly partner wastewater flow over the last five year depreciation period (July 1984- June 1989)

Item	T.S.K. 38.97%	U.R.I. 22.59%	Narr. 38.43%	Total 99.98%
Roof Repairs	11,691	6,778	11,531	30,000
Aeration Panels	71,950	41,710	70,965	184,624
Clarifrs	381,194	220,981	375,975	978,149
Total Enginerng	54,306	31,481	53,562	139,349
NEL Rebate	40,361	23,398	39,808	103,567
Facilities Plan	14,380	8,336	14,183	36,900
Contingen	38,971	22,592	38,437	100,000
Totals 4.13 MGD	532,131	308,480	524,845	1,365,455

TOTAL	T.S.K.	U.R.I.	Narr.	
PHASE 1	658,371	308,480	651,085	1,617,935

Wastewater
Pretreatment
Interjurisdictional Agreement
between
South Kingstown
and
Narragansett

This Agreement is entered into this 9TH day of SEPTEMBER, 1993, between the Town of South Kingstown and the Town of Narragansett.

RECITALS

WHEREAS, South Kingstown, as managing regional partner, operates the Westmoreland Street Regional Wastewater Treatment Facility, and

WHEREAS, Narragansett as a regional partner utilizes the Westmoreland Street Regional Wastewater Treatment Facility, and

WHEREAS, Narragansett shall continue to utilize the wastewater treatment system in accordance with projected wastewater flows as delineated in the Regional WWTF Facilities Plan and the Town of Narragansett Wastewater Facilities Plan, and

WHEREAS, Narragansett currently contributes wastewater which includes industrial wastewater to the Westmoreland Street Regional Wastewater Treatment Facility, and

WHEREAS, both regional partners recognize South Kingstown is authorized to implement and enforce a pretreatment program to control industrial waste under 40 CFR Part 403 and Rhode Island General Laws 45-6-2.3.

WHEREAS, there are other sewage agreements between the parties which are to remain in effect,

The parties therefore agree to the following terms and conditions:

1. Narragansett agrees to adopt and diligently enforce a pretreatment ordinance which is no less stringent than the Wastewater Management Ordinance of South Kingstown currently in effect.

2. Whenever South Kingstown amends its Ordinance, it will immediately notify Narragansett. For purposes of this Agreement, immediate notification means forwarding a copy of any amendments within five (5) business days of enactment thereof. Narragansett agrees that, if said amendments are applicable to any of the wastewater conveyed to the wastewater treatment facility from Narragansett users, it will enact amendments at least as stringent as those adopted by South Kingstown.

3. South Kingstown and Narragansett agree to periodically review their respective ordinances and jointly draft and adopt equivalent amendments to their respective ordinances when deemed necessary for the effective administration and operation of the pretreatment program. Such a review shall be conducted no less than once every five (5) years. However, either party may request a joint review whenever deemed necessary. Such a request shall be forwarded b the requesting party to all other regional partners stating the reason for the request and the date on which the review is requested to take place. Within five (5) business days of receipt of the request, the receiving party shall respond to the request, stating that the proposed date is satisfactory or proposing alternate date(s) for the review. In any case, the joint review should take place within thirty (30) calendar days of the request.

4. For wastewater flow originating in Narragansett and tributary to the Westmoreland Street Regional Wastewater Treatment Facility, Narragansett agrees to adopt and diligently enforce within its Wastewater Management Ordinance local limits which address at least the same pollutant parameters and are at least as stringent as the local limits enacted by South Kingstown. If any revisions or additions are made to South Kingstown's local limits, the Town of South Kingstown shall immediately notify Narragansett. For purposes of this Agreement, immediate notification means forwarding a copy of any revisions or additions to the local limits within five (5) business days of enactment. Narragansett agrees to adopt any revisions or additions made to South Kingstown's local limits if those amendments are applicable to any of the wastewater conveyed to the wastewater treatment facility from Narragansett users.

5. Narragansett agrees to perform technical and administrative duties necessary to implement and enforce Narragansett's ordinance regulating industrial users located in its jurisdiction including, but not limited to the following: (1) updating industrial waste survey; (2) providing technical services such as sampling and analysis; (3) permitting; (4) inspection and compliance monitoring; and (5) enforcement.

6. Narragansett shall maintain current information on industrial users located in its jurisdiction. Every year, Narragansett shall update the industrial waste survey for users located in its jurisdiction. A copy of this survey shall be forwarded to South Kingstown. Additionally, every time a new user is located in Narragansett, or anytime an existing user increase or changes in its discharge, or anytime requested by South Kingstown, Narragansett will require said industrial user to respond to an industrial user questionnaire.

   A copy of this questionnaire will be forwarded to South Kingstown for review. Narragansett agrees to allow South Kingstown access to all records or documents relevant to the permitting program, or any industrial user located in Narragansett or discharging through Narragansett to South Kingstown.

7. Narragansett shall inspect industrial users located in its jurisdiction. Narragansett will provide a list to South Kingstown of industrial users scheduled for inspection during the following calendar year on or before January 1st of each year. South Kingstown may make additions to the list at its options, and will forward the amended list to Narragansett within thirty (30) calendar days of its receipt. In a situation where inspections not contained on the list of annual inspections take place, Narragansett shall provide at least five (5) business day notice to South Kingstown. If an inspection is in response to an emergency situation and such notice is not possible, Narragansett will make every effort to notify South Kingstown of the impending inspection and give South Kingstown the opportunity to attend the inspection. If, at any time, South Kingstown identifies any user located in Narragansett for which inspection is desired but not scheduled, it will notify Narragansett of the need to conduct an inspection of that user's facility. If South Kingstown determines that an inspection must be conducted immediately, it shall make every effort to notify Narragansett of this need, and an opportunity to conduct this inspection.

8. All industrial users within Narragansett shall obtain an Industrial User Permit from the Town of Narragansett. All industrial users, regardless of status as significant or categorical, shall be issued permits prior to any discharge. Such permits shall contain effluent limitations, monitoring requirements and reporting requirements and shall also contain a statement of duration, a statement of nontransferability, a statement of applicable civil and criminal penalties, and any other reasonable conditions requested to be included in the permit by South Kingstown.

After Narragansett drafts the permit, it shall forward a copy thereof to South Kingstown for review and comment at least thirty (30) calendar days prior to expected date of issuance.

Within ten (10) calendar days of receipt of the proposed permit, South Kingstown shall either approve the permit or request Narragansett to make additions, deletions, or changes to the proposed permit. No permit shall be issued without the consent of both parties, which consent shall not be unreasonably withheld.

9. Narragansett shall sample and conduct other compliance monitoring. Narragansett will submit to South Kingstown its procedures for sampling and analyses, including all procedures in place for QA/QC. All procedures will conform to 40 CFR Part 136. South Kingstown reserves the right to both sample an industry itself or split a sample with Narragansett. In addition, within two (2) weeks of discovering a violation of its ordinance or any other pretreatment standard or requirement, Narragansett will notify South Kingstown of those violations and the response taken or anticipated (including a timeframe for such action).

10. Narragansett is required to enforce the provisions of its sewer use ordinance and all pretreatment standards and requirements.

11. South Kingstown, in consultation and with agreement of Narragansett, is authorized to take emergency action, whenever necessary, to stop or prevent any discharge which presents or may present an imminent danger to health or welfare of humans, or which reasonably appears to threaten the environment or threatens to interfere with the operations of the treatment plant. If such action is to protect public health, South Kingstown will provide informal notice (i.e., telephone call) to the industrial user and Narragansett of its intent to take emergency action. If the action is to protect the environment or the treatment works, notice shall be given to the industrial user and Narragansett. These parties shall have the opportunity to respond to South Kingstown's action, however such response may be limited to a hearing after the emergency powers of South Kingstown have been exercised.

12. The terms of this Agreement may be amended only by written agreement of the parties. In any event, this Agreement shall be reviewed and revised, as necessary, at least every five (5) years.

13. All other sewage agreements to the extent not inconsistent with this agreement shall remain in full force and effect.

Agreed to this 9/7/93 day of _____, 19____.

Charles "Ted" Wright
Town Council President
Town of Narragansett

Barbara A. Hackey
Town Council President
Town of South Kingstown

NARRAGANSETT TOWN COUNCIL
APPROVAL 9/7/93 #93-09-284

9-9-93

AGREEMENT

AGREEMENT, made and entered this 19 day of APRIL, 1995 between the UNIVERSITY OF RHODE ISLAND (the "University") and the TOWN OF NARRAGANSETT (the "Town"):

WHEREAS, by agreement between the Town of South Kingstown, Town of Narragansett and the University of Rhode Island, each has the right to deliver a specific number of gallons per day of its wastewater to the South Kingstown Regional Wastewater Treatment Facility (the "treatment facility") representing a portion of the total capacity of the said treatment facility; and

WHEREAS, the Town desires to obtain the right to use a portion of the University's unused capacity in the treatment facility upon the terms and conditions hereinafter set forth; and

WHEREAS, the University is willing to authorize the Town to use a portion of its unused capacity in the treatment facility upon the terms and conditions hereinafter set forth;

NOW THEREFORE, in consideration of the above, the mutual promises and covenants contained herein and for other good and valuable consideration, the parties agree as follows:

1.0 The University hereby authorizes, and to the extent necessary, assigns to the Town the exclusive right to use the portion of its unused capacity in the treatment facility, not to exceed 400,000 gallons per day ("excess capacity"), during the initial or any extended term of this agreement, subject to the terms and conditions hereinafter set forth.

2.0 The Town shall pay to the University the contract price of $425,000.00 for the initial term of this agreement in accordance with the schedule of payments set forth on

Exhibit A attached hereto and made a part hereof. If any payment is made more than fifteen (15) days beyond its due date, interest shall be charged at the rate of 12% per annum until said payment is made in full.

3.0 The initial term of this agreement shall be for the period of five years beginning on April 19, 1995 and ending April 19, 2000 unless further extended or earlier terminated in accordance with this agreement. The Town shall have the right to renew or extend this agreement for an additional five (5) year period (the "extended term") by providing the University with written notice of its intention to renew no later than three months prior to the expiration of the initial term of this agreement. The extended term shall provide for a new contract price to be negotiated by parties but shall otherwise be on the same terms and conditions. Additional extensions to this agreement may be granted thereafter upon such terms and conditions as the parties may further agree.

4.0 During any term of this agreement, the Town shall pay all user fees and other costs and expenses related to its actual use or right to the use of the excess capacity as well as any and all costs and expenses based upon the percentage usage of the total capacity of the treatment facility.

5.0 Except as otherwise provided, this agreement shall be terminated and be of no further force and effect upon the expiration of the initial or extended term. This agreement may be sooner terminated by the University for an event of default by the Town. If at any time during the initial or extended term of this agreement, the University reaches ninety (90%) percent use of its remaining capacity in the treatment facility, it may so notify the Town in writing together with a request to renegotiate the portion of its excess capacity to be used by the Town for the remainder of the then term of this agreement. If after a good faith effort, the University and the Town fail to successfully renegotiate the said portion of the excess capacity to be used by the Town within thirty (30) days from the date of its request to renegotiate, then this agreement shall terminate and be of no further force and effect.

6.0 The Town shall be in default of this agreement for any of the following events of default: (i) failure to pay the contract price in accordance with the schedule of payments; (ii) failure to pay any user fees or other costs and expenses as set forth in this agreement; (iii) failure to perform any other provision of this agreement.

7.0 The Town agrees that its continued use of the University's excess capacity in violation of or after expiration of any term of this agreement may be permanently enjoined by any court of competent jurisdiction, hereby acknowledging that money damages alone are an inadequate remedy. This remedy, however, shall be in addition to, and not in lieu of, any other right or remedy that the University may have against the Town for damages or equitable relief resulting from the Town's breach of this agreement.

8.0 Any notice required to be provided under the terms of this agreement shall be valid if in writing and mailed, postage prepaid, and addressed to either party as follows:

To the University:

Attn: Facilities and Operations
University of Rhode Island
Sherman Building
Kingston, Rhode Island 02881-0801

with a copy to:

Vice President for Business and Finance
University of Rhode Island
Carlotti Administration Building
Kingston, Rhode Island 02881-0801

To the Town of Narragansett:

Attn: Scott A. Hancock, Town Manager
Town of Narragansett
Town Hall, 25 Fifth Avenue
Narragansett, Rhode Island 02882-0727

with a copy to:

Attn: Jeffrey Ceasrine, Town Engineer
Town of Narragansett
Town Hall, 25 Fifth Avenue
Narragansett, Rhode Island 02882-0727

Either party may, from time to time, change the name of the person or office to which notice shall be provided by giving notice of said change in compliance with this provision.

9.0 No modification or alteration to this agreement, or any of its terms, shall be valid unless it is in writing and signed by both the Town and the University.

10.0 This instrument contains the entire agreement of the parties and is not subject to any prior or simultaneous terms, conditions, representations, understandings or agreements not expressly set forth herein.

11.0 This agreement has been reviewed by both parties with their own counsel or with the opportunity to seek the advice of counsel and shall not be construed against the drafter of this instrument.

12.0 This agreement shall be binding upon the parties hereto, their successors and assigns, and shall be governed by the laws of the State of Rhode Island.

IN WITNESS WHEREOF, the parties have caused this agreement and a duplicate copy hereof to be executed on the day and date first above written.

University of Rhode Island

Donna M. Williams
Witness

By: Kenneth N. Kermes
Kenneth N. Kermes, Vice President
Business & Finance

Town of Narragansett

Mary M. Beck
Witness

By: Stanley P. Haxton
(Name and Title)

Approved: [illegible]

td922-2

EXHIBIT A

Schedule of Payments

The five payments by the Town of Narragansett to the University of Rhode Island for the contract price referenced in Paragraph 2. of this Agreement will be due and payable in accordance with the following schedule:

First business day of July 1995.....$ 50,000.00

First business day of July 1996.....$ 75,000.00

First business day of July 1997.....$100,000.00

First business day of July 1998.....$100,000.00

First business day of July 1999.....$100,000.00

The Town of Narragansett is responsible directly to the Town of South Kingstown for any and all user fees and other costs and expenses associated with their actual percentage use of the waste water discharge capacity of the Regional Waste water Treatment Facility.

Costs and expenses described in Paragraph 4.0 of this Agreement that are associated with the Town of Narragansett's right to use the excess capacity described in Paragraph 1.0 of the Agreement will be identified and documented by the University and billed to the Town of Narragansett subsequent to their being billed to the University during the initial term and extended term of the Agreement. In the event of early termination of the Agreement, all amounts due and owing to the University as of the date of termination as defined herein will become due.

REGIONAL WASTEWATER TREATMENT FACILITY (WWTF)

VOLUMETRIC CAPACITY AGREEMENT BETWEEN THE TOWN OF SOUTH KINGSTOWN UNIVERSITY OF RHODE ISLAND AND TOWN OF NARRAGANSETT

Agreement made this 15th day of July, 1997, by and among the Town of South Kingstown (hereinafter referred to as "South Kingstown"), the Town of Narragansett (hereinafter referred to as "Narragansett") and the University of Rhode Island (hereinafter referred to as the "University").

RECITALS

WHEREAS: South Kingstown acting as the managing regional partner of the South Kingstown Regional Wastewater Treatment Facility (hereinafter referred to as "Regional WWTF") on behalf of Narragansett and the University is responsible for all operations of the Regional WWTF; and,

WHEREAS: South Kingstown as permit holder of the Regional WWTF Rhode Island Pollutant Discharge Elimination System Permit (RIPDES) No. RI 0100374, is ultimately responsible for meeting the compliance requirements of said permit for the Regional WWTF and continuously monitoring such compliance; and,

WHEREAS: Item 5, e., of the Regional WWTF Rhode Island Pollutant Discharge Elimination System Permit (RIPDES) No. RI 0100374, requires that "when the effluent discharged for a period of 90 consecutive days exceeds 80 percent of the designed flow, the permittee shall submit to the permitting authorities a projection of loadings up to the time when the design capacity of the treatment facility will be reached, and a program for maintaining satisfactory treatment levels consistent with approved water quality management plans."; and

WHEREAS: For purposes of this agreement, the Regional WWTF shall be considered to have an average daily design flow of 5.0 MGD; and

WHEREAS: Narragansett, the University and/or South Kingstown may be desirous of sub-leasing regional wastewater volumetric capacity from another regional partner, should unused capacity so exist; and

WHEREAS: The Rhode Island Department of Environmental Management (RIDEM) requires that South Kingstown, as RIPDES permit holder of the Regional WWTF, co-sign RIDEM Order of Approval(s) for projects within South Kingstown, Narragansett and the University, certifying that sufficient volumetric capacity exists at the Regional WWTF to receive new additional wastewater flow from said projects; and

WHEREAS: Table 1 attached hereto as Appendix A delineates regional partner Regional WWTF flow allocation for a 5.0 MGD WWTF,

NOW THEREFORE, in consideration of the above, the mutual promises and covenants contained herein and for other good and valuable consideration, the parties agree as follows:

1.0 Should any partner be desirous of purchasing and/or leasing unused volumetric capacity at the Regional WWTF from another partner, said partners shall be free to discuss and negotiate said purchase and/or lease. In the event a volumetric capacity lease (hereinafter referred to as "**VCL**") of available capacity at the Regional WWTF is agreed upon by the two (2) partners, Table 1 attached hereto shall be amended accordingly, and the other terms and conditions herein shall remain in full force and in effect. It is further agreed that Table 1 shall be amended should any VCL be terminated.

2.0 During the term of any VCL, and/or for the life of this agreement, unless modified by RIDEM, should any partner's volumetric wastewater contribution exceed eighty (80) percent of that partner's combined purchase and leased capacity for a period of ninety (90) consecutive days, and the overall Regional WWTF flow does not exceed eighty (80) percent of the permitted limit for that same ninety (90) day period, then all three (3) partners shall meet within thirty (30) days to review each partners' flow projections. If said review indicates that said partner's flow will continue to exceed eighty (80) percent of their combined purchased and leased capacity for the foreseeable future, and the flow projections from all partners still indicate that the Regional WWTF will remain within eighty (80) percent of it's permitted capacity, then said partner's flow will continue to be accepted in accordance with any existing operation and maintenance cost-sharing agreement(s). This paragraph shall also apply in the event that more than one (1) partner's volumetric wastewater contribution exceeds eighty (80) percent of each such partner's combined purchased and leased capacity.

3.0 During the term of this agreement, should any partner's volumetric wastewater contribution exceed eighty (80) percent of that partner's combined purchased and leased capacity for a period of ninety (90) consecutive days and the overall Regional WWTF flow exceed eighty (80) percent of the permitted limit for that same ninety (90) day period, then said partner will be responsible for financing the required engineering studies pursuant to Item 5,e, of the Regional WWTF RIPDES permit in effect at that time.

Should more than one (1) partner's volumetric contribution exceed eighty (80) percent of each such partner's combined purchased and leased capacity for a period of ninety (90) consecutive days and the overall Regional WWTF flow exceeds eighty (80) percent of the permitted limit for that same ninety (90) day period, then each said partner shall share the cost liability associated with financing the required engineering studies referenced above on a percentage basis according to each such partner's capacity needs. South Kingstown as managing partner shall administer the required professional services contracts; provided however that the scope of work thereunder shall be approved by the partner(s) who is/ are fiscally responsible.

4.0 Upon the completion of the engineering studies and subsequent approval by RIDEM of the engineering studies, should any partner's volumetric wastewater contribution exceed eighty (80) percent of that partner's combined purchased and leased capacity for a ninety (90) consecutive day period and during that same period the Regional WWTF flow exceed eighty (80) percent of the permitted limit, then said partner will be responsible for financing the physical expansion resulting from said approved engineering studies. Should more than one (1) partner's volumetric contribution exceed eighty (80) percent of each such partner's combined purchased and leased capacity for a period of ninety (90) consecutive days and the overall Regional WWTF flow exceeds eighty (80) percent of the permitted limit for that same ninety (90) day period, then each said partner shall share the cost liability associated with financing the required engineering studies referenced above and physical WWTF expansion on a percentage basis according to each such partner's capacity needs.

5.0 At such time as any other partner's volumetric wastewater contribution exceeds eighty (80) percent of that partner's combined purchased and leased capacity for a ninety (90) consecutive day period, said partner shall reimburse the original fiscally responsible partner(s) for its/ their pro-rated share of the cost of all engineering studies, design, construction, and other related services as required.

6.0 South Kingstown will not unreasonably withhold and agrees to execute RIDEM Division Water Resources, Order of Approval applications for Narragansett and/or University wastewater projects which contribute flow to the Regional WWTF, provided the *combined* total Regional WWTF estimated flow for 90 consecutive days and committed capacity for new wastewater projects from all regional partners does not exceed eighty (80) percent of the Regional WWTF design capacity.

7.0 No modification or alteration to this agreement, or any of its terms, shall be valid unless it is in writing and signed by Narragansett, the University and South Kingstown.

8.0 This instrument contains the entire agreement of the parties as to the specific subject matter of this instrument and is not subject to any prior or simultaneous terms, conditions, representations, understandings or agreements not expressly set forth herein.

9.0 This agreement has been reviewed by both parties with their own counsel or with the opportunity to seek the advise of counsel and shall not be construed against the drafter of this instrument.

10.0 This agreement shall be binding upon the parties hereto, their successors and assigns, and shall be governed by the laws of the State of Rhode Island

IN WITNESS WHEREOF, the parties have caused this agreement and duplicate copy hereof to be executed on this 15th day of July, 1997.

Town of South Kingstown

Barbara A. Hackey, President
South Kingstown Town Council

July 15, 1997
Date

Witness

Town of Narragansett

T. Brian Handrigan, President
Narragansett Town Council

6/11/97
Date

Witness
AGENDA ITEM 97-02-5d
2/18/97

University of Rhode Island

Kenneth N. Kermes, Vice President
Business & Finance

6/5/97
Date

Witness

APPENDIX A

TABLE 1

5.0 MGD WWTF REGIONAL PARTNER ALLOCATION

5.0 MGD WITHOUT URI/ NARRAGANSETT LEASED CAPACITY

	Original Capacity	Percent	5.0 MGD Increase	5.0 MGD Purchased Capacity	5.0 MGD Percent	80% ADF for 5.0 MGD	1995-96 Highest 3 Month Consecutive Average
South Kingstown	1.6933	41.000%	0.435	2.1283	42.566%	1.70264	1.111
University of RI	1.652	40.000%	0	1.652	33.040%	1.3216	0.762
Narragansett	0.7847	19.000%	0.435	1.2197	24.394%	0.97576	1.442
Totals	4.13	100.000%	0.87	5.00	100.000%	4.00	3.316

5.0 MGD WITH URI/ NARRAGANSETT LEASED CAPACITY

	Original Capacity	Percent	5.0 MGD Increase	5.0 MGD Leased Capacity	5.0 MGD Percent	80% ADF for 5.0 MGD	1995-96 Highest 3 Month Consecutive Average
South Kingstown	1 6933	41.000%	0.435	2.1283	42.566%	1.70264	1.111
University of RI	1.652	40.000%	0	1.252	25.040%	1.0016	0.762
Narragansett	0.7847	19.000%	0.435	1.6197	32.394%	1.29576	1.442
Totals	4.13	100.000%	0.87	5.00	100.000%	4.00	3.316

REGIONAL WASTEWATER
TREATMENT FACILITY (WWTF)

DECHLORINATION/CHLORINATION AND HEADWORKS
FACILITY IMPROVEMENTS

COST-SHARING AGREEMENT
BETWEEN THE
TOWN OF SOUTH KINGSTOWN
UNIVERSITY OF RHODE ISLAND
AND
TOWN OF NARRAGANSETT

AGREEMENT made this 15TH day of July, 1997, by and among the Town of South Kingstown (hereinafter " South Kingstown"), the University of Rhode Island (hereinafter "URI"), and the Town of Narragansett (hereinafter "Narragansett").

WHEREAS, the parties hereof agree to enter into this Cost-Sharing Agreement relative to the proposed Regional Wastewater Treatment Facility (hereinafter "WWTF") dechlorination and headworks improvements

NOW , THEREFORE, in consideration of the mutual covenants and agreements hereinafter set forth, the parties hereto acknowledge and agree to the following:

1. Reaffirmation of URI Flowage

(a) Pursuant to the original sewerage agreement dated November 27, 1972, URI may increase its average flow to 1.652 million gallons per day (40% of 4.13 MGD) to the treatment plant without incurring additional capital expense.

2. Dechlorination Improvements and Costs

(a) Dechlorination improvements have been mandated by the RI Department of Environmental Management, Division of Water Resources (hereinafter referred to as RIDEM) in accordance with Compliance Order No.RIO - 116 and dated May 1991, and;

(b) Said dechlorination improvements must be completed in accordance with a project schedule (attached hereto as Exhibit 1) as mandated by RIDEM and, and;

(c) Each regional partner agrees to pay for their proportional share of dechlorination improvements based upon their respective 5.0 MGD WWTF capacity allotment as further described in Exhibit 2 (attached hereto), and;

(d) Project costs as further described in Exhibit 2 are estimates only, and shall require reconciliation at the completion of project construction based upon actual costs, and;

(e) Payment of all proportionate Narragansett and URI dechlorination improvement costs shall be billed respectfully to Narragansett and URI as follows: 50% upon 25% of construction completion and the remaining 50% balance upon 75% of construction completion; both payable to the Town of South Kingstown within fifteen (15) calendar days of billing date.

(f) An Aqua Fund grant award in the amount of $50,000 for dechlorination improvements has been awarded to South Kingstown and will be proportionately distributed to each regional partner based upon their respective 5.0 MGD WWTF capacity allotment as further described in Exhibit 2 (attached hereto), and;

3. Headworks Improvements and Costs

(a) Headworks improvements to the WWTF are proposed to enhance influent non-biodegradable particulate matter removal and provide odor abatement facilities, and;

(b) Each regional partner agrees to pay for their proportional share of headworks improvements based upon their respective 5.0 MGD WWTF capacity allotment as further described in Exhibit 2, and;

(c) Project costs as further described in Exhibit 2 are estimates only, and shall require reconciliation at the completion of project construction based upon actual costs, and;

(d) Payment of all proportionate Narragansett and URI headworks improvement costs shall be billed respectfully to Narragansett and URI as follows: 50% upon 25% of construction completion and the remaining 50% balance upon 75% of construction completion; both payable to the Town of South Kingstown within fifteen (15) calendar days of billing date.

(e) An Aqua Fund grant award in the amount of $160,000 for headworks improvements has been awarded to South Kingstown and will be proportionately distributed to each regional partner based upon their respective 5.0 MGD WWTF capacity allotment as further described in Exhibit 2, and;

4. Storage Facility Improvements and Costs

(a) The operation and maintenance of the South Kingstown collection system continues to increase due to the age of the pumping and collection system infrastructure, and;

(b) New storage facilities are necessary to store rolling stock equipment needed to maintain the South Kingstown collection system in proper operating condition, and;

(c) The South Kingstown pumping and collection system services only the regional partners of South Kingstown and URI, and Narragansett receives no benefit of said collection system, and;

(d) Costs associated with the proposed storage facility will be apportioned between South Kingstown and URI based upon the respective flow contribution of South Kingstown and URI for the Silver Lake Pumping facility, and;

(e) Narragansett shall pay no costs associated with the proposed storage facility.

(f) Payment of all proportionate URI storage facility costs shall be billed to URI as follows: 50% upon 25% of construction completion and the remaining 50% balance upon 75% of construction completion; both payable to the Town South Kingstown within fifteen (15) calendar days of billing date.

(g) Project costs as further described in Exhibit 2 are estimates only, and shall require reconciliation at the completion of project construction based upon actual costs.

5. Narragansett FY 1995-96 Credit

(a) Narragansett agrees to apply its 1995-96 Fiscal Year Wastewater Operating credit in an amount of $23,588 to its prorated share of dechlorination and headworks improvement costs as further described in Exhibit 2.

IN WITNESS WHEREOF, the parties have hereunto set theirs hands and seals the day and year first above.

Town of South Kingstown

Barbara A. Hackey

Barbara A. Hackey, President
South Kingstown Town Council

July 15, 1997
Date

Witness

Town of Narragansett

T. Brian Handrigan, President
Narragansett Town Council

6/11/97
Date

Witness

AGENDA ITEM 97-02-50
2/18/97

University of Rhode Island

Kenneth N. Kermes

Kenneth N. Kermes, Vice President
Business & Finance

6/5/97
Date

Witness

EXHIBIT 2

REGIONAL WWTF DECHLORINATION/ HEADWORKS COST SHARING
Expanded Facilities to 5.0 MGD
DECHLORINATION/ HEADWORKS UPGRADE

REGIONAL PARTNER COST SHARING

	South Kingstown	Narragansett	University of RI	Total
Head/Dechlor. %	42.566%	24.394%	33.040%	100.000%
Headworks	159,623	91,478	123,900	375,000
Dechlor.	125,570	71,962	97,468	295,000
Total	285,192	163,440	221,368	670,000
Aqua Fund Grants	89,389	51,227	69,384	210,000
Headwrk/Dechlor Less Grants	195,804	112,212	151,984	460,000
Garage %	65.590%	0.000%	34.410%	100.000%
Garage	19,677	0	10,323	30,000
Total w/o Engineering	215,481	112,212	162,307	490,000
Percentage	43.976%	22.900%	33.124%	100.000%
Engineering	20,009	10,420	15,071	45,500
Grand Total	235,490	122,632	177,378	535,500

NOTE: The above costs do not include change orders or additional work which may be encountered during actual construction.

AGREEMENT

BETWEEN THE

UNIVERSITY OF RHODE ISLAND

AND

THE TOWN OF NARRAGANSETT

JULY 1, 2001

AGREEMENT

THIS AGREEMENT made and entered this first day of July, 2001, between the UNIVERSITY OF RHODE ISLAND (the "University") and the TOWN OF NARRAGANSETT (the "Town"):

WHEREAS, by agreement between the Town of South Kingstown, Town of Narragansett and the University of Rhode Island, each has the right to deliver a specific number of gallons per day of its wastewater to the South Kingstown Regional Wastewater Treatment Facility (the "treatment facility") representing a portion of the total capacity at of said treatment facility; and

WHEREAS, the Town desires to obtain the right to use a portion of the University's unused capacity in the treatment facility upon the terms and conditions hereinafter set forth; and

WHEREAS, the University is willing to authorize, the Town to use a portion of its unused capacity in the treatment facility upon the terms and conditions hereinafter set forth;

NOW THEREFORE, in consideration of the above; the mutual promises and covenants contained herein and for other good and valuable consideration, the parties agree as follows:

1.0 The University hereby authorizes, and to the extent necessary, assigns to the Town the exclusive right, to use the portion of its unused capacity in the treatment facility, not to exceed 400,000 gallons per day ("excess capacity"), during the initial or any extended term at this agreement, subject to the terms and conditions hereinafter set forth.

2.0 The Town shall pay to the University the contract price of ($100,000.00) for the initial term of this agreement in accordance with the schedule of payments set forth on Exhibit A attached hereto and made a part hereof. If any payment is made more than fifteen (15) days beyond its due date, interest shall be charged at the rate of 12% per annum until said payment is made in full.

3.0 The initial term of this agreement shall be for the period of five years beginning on July 1, 2001 and ending June 30, 2006 unless further extended or earlier terminated in accordance this agreement. The Town shall have the right to renew or extend this agreement for an additional five (5) year period (the "extended term") by providing the University with written notice at its intention to renew no later than three months prior to the expiration of the initial term of this agreement. The extended term shall provide for a new contract price to be negotiated by parties but shall otherwise be on the same terms and conditions. Additional extensions to this agreement may be granted thereafter upon such terms and conditions as the parties may further agree.

4.0 During any term of this agreement, the Town shall pay all user fees and other costs and expenses related to its actual use or right to the use of the excess capacity as well as any and all costs and expenses based upon the percentage usage of the total capacity of the treatment facility.

5.0 Except as otherwise provided, this agreement shall be terminated and be of no further force and effect upon the expiration of the initial or extended term. This agreement may be sooner terminated by the University for an event of default by the Town. If at any time during the initial or extended term at this agreement, the University reaches ninety (90%) percent use of its remaining capacity in the treatment facility, it may so notify the Town in writing together with a request to renegotiate the portion of its excess capacity to be used by the Town for the

remainder of the then term of this agreement. If after a good faith effort, the University and the Town fail to successfully renegotiate the said portion of the excess capacity to be used by the Town within thirty (30) days from the date of its request to renegotiate, then this agreement shall terminate and be of no further force and effect.

6.0 The Town shall be in default of this agreement for any of the following events of default: (i) failure to pay the contract price in accordance with the schedule of payments; (ii) failure to pay any user fees or other costs and expenses as set forth in this agreement; (iii) failure to perform any other provision of this agreement.

7.0 The Town agrees that its continued use of the University's excess capacity in violation of or after expiration of any term of this agreement may be permanently enjoined by any court of competent jurisdiction, hereby acknowledging that money damages alone are an inadequate remedy. This remedy, however, shall be in addition to, and not in lieu of, any other right or remedy that the University may have against the Town for damages or equitable relief resulting from the Town's breach of this agreement.

8.0 Any notice required to be provided under the terms of this agreement shall be valid if in writing and mailed, postage prepaid and addressed to either party as follows:

To the University:

Attn: Facilities Services
Sherman Building
University of Rhode Island
523 Plains Road
Kingston, Rhode Island 02881-0801

with (2) copies to:

Asst. Vice President for
Business Services
Carlotti Administration Bldg., Room 119
University of Rhode Island
75 Lower College Road
Kingston, Rhode Island 02881-0801

To the Town of Narragansett:

Attn: Town Manager
Town of Narragansett
Town Hall, 25 Fifth Avenue
Narragansett, Rhode Island 02882-0727

with (1) copy to:

Attn: Town Engineer
Town of Narragansett
Town Hall, 25 Fifth Avenue
Narragansett, Rhode Island 02882-0727

Either party may, from time to time, change the name or the person or office to which notice shall be provided by giving notice at said change in compliance with this provision.

9.0 No modification or alteration to this agreement, or any of its terms, shall be valid unless it is in writing and signed by both the Town and the University.

10.0 This instrument contains the entire agreement of the parties and is not subject to any prior or simultaneous terms, conditions, representations, understandings or agreements not expressly set forth herein.

11.0 This agreement has been reviewed by both parties with their own counsel or with the opportunity to seek the advice of counsel and shall not be construed against the drafter of this instrument.

12.0 This agreement shall be binding upon the parties hereto, their successors and assigns, and shall be governed by the laws of the State of Rhode Island.

IN WITNESS WHEREOF, the parties have caused this agreement and a duplicate copy hereof to be executed on the day and date first above written.

University of Rhode Island

Witness

By: _____
Assistant Vice President for Business Services

Town of Narragansett

Witness

By: _____

Approved as to form and legality
Mark A McSally
Town Solicitor

Town Council Authorization
Agenda Item 2001-08-244
August 6, 2001

EXHIBIT A

Schedule of Payments

Th. five payments by the Town of Narragansett to the University of Rhode Island for the contract price referenced in Paragraph 2.0. of this Agreement will be due and payable in accordance with the following schedule:

Fifteenth day of July, 2001	$100,000.00
Fifteenth day of July, 2002	$110,000.00
Fifteenth day of July, 2003	$110,000.00
Fifteenth day of July, 2004	$120,000.00
Fifteenth day of July, 2005	$120,000.00

Checks should be made payable to: **The University of Rhode Island.**

Payments should be sent to: **The University of Rhode Island, % Mr. Peyton Gibson, Coordinator, Facilities Services, 523 Plains Road, Kingston, Rhode Island 02881.** 874-4788

The Town of Narragansett is responsible directly to the Town of South Kingstown for any and all user fees and other costs and expenses associated with their actual percentage use of the waste water discharge capacity of the Regional Waste Water Treatment Facility.

Costs and expenses described in Paragraph 4.0. of this Agreement that are associated with the Town of Narragansett's right to use the excess capacity described in Paragraph 1.0. of the Agreement will be identified and documented by the University and billed to the Town of Narragansett subsequent to their being billed to the University during the initial term and extended term of the Agreement. In the event of early termination of the Agreement, all amounts due and owing to the University as of the date of termination as defined herein will become due.

APPENDIX B

RIPDES Permit No. RI0100188

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

December 27, 2005

CERTIFIED MAIL

Mr. Douglas Nettleton
Superintendent, Scarborough Wastewater Treatment Facility
Narragansett Town Hall
25 Fifth Avenue
Narragansett, RI 02882

RE: Scarborough Wastewater Treatment Facility
RIPDES Permit No. RI0100188

Dear Mr. Nettleton:

Enclosed is your final Rhode Island Pollutant Discharge Elimination System (RIPDES) Permit issued pursuant to the referenced application. The Department of Environmental Management, Office of Water Resources (DEM) received no comments on the draft permit during the public comment period which ended December 21, 2005 at 4:00 P.M. In accordance with State regulations, promulgated under Chapter 46-12 of the Rhode Island General Laws of 1956, as amended, require this permit to become effective on the date specified in the permit.

Also enclosed is information relative to hearing requests and stays of RIPDES Permits.

We appreciate your cooperation throughout the development of this permit. Should you have any questions concerning this permit, feel free to contact Joseph Camara of the State Permits Staff at (401) 222-4700, extension 7640.

Sincerely,

Eric A. Beck, P.E.
Supervising Sanitary Engineer
Permitting Section

EAB/jc

Enclosures

cc: EPA Permits Branch, Region I
Annie McFarland, RIDEM
Jeffry Ceasrine, Town of Narragansett
Joseph Camara, RIDEM

RECEIVED
JAN 12 2006
JAMES J. GEREMIA
& ASSOCIATES, INC.

RIFIN-Scarborough
RCVD JAN 3 2006

30% post-consumer fiber

SPECIAL CONDITION

Due to the fact that the suggested dilution water for this facility to use in conducting the bioassays is from the end of the dock at the URI's Narragansett Bay Campus, enclosed is a letter of Agreement (sample and original) to be signed and submitted to the Graduate School of Oceanography. Requests to use another source of dilution water will have to be approved by the Department of Environmental Management, Office of Water Resources.

RESPONSE TO COMMENTS

NO SIGNIFICANT COMMENTS WERE RECEIVED ON THE DRAFT PERMIT FOR THIS FACILITY; THEREFORE, NO RESPONSE WAS PREPARED.

The Department has made one insignificant administrative change to the permit that was public noticed on November 16, 2005. The change was made to section D.2. which required the first biennial Infiltration/Inflow report to be submitted on January 15, 2006. Due to the fact that the effective date of the permit is March 1, 2006. The first biennial Infiltration/Inflow report will be due January 15; 2008. The RIPDES permit No. RI0100188 that was issued on March 29, 2000 requires that the biennial Infiltration/Inflow report be submitted to RIDEM by the 15th day of January every other year. Therefore, the change to the permit does not decrease the number of Infiltration/Inflow reports that must be submitted to the Department.

HEARING REQUESTS

If you wish to contest any of the provisions of this permit, you may request a formal hearing within thirty (30) days of receipt of this letter. The request should be submitted to the Administrative Adjudication Division at the following address:

Bonnie Stewart, Clerk
Department of Environmental Management
Office of Administrative Adjudication
235 Promenade Street, 3rd Floor
Providence, Rhode Island 02908

Any request for a formal hearing must conform to the requirements of Rule 49 of the State Regulations.

STAYS OF RIPDES PERMITS

Should the Agency receive and grant a request for a formal hearing, the contested conditions of the permit will not automatically be stayed. However, the permittee, in accordance with Rule 50, may request a temporary stay for the duration of adjudicatory hearing proceedings. All uncontested conditions of the permit will be effective and enforceable in accordance with the provisions of Rule 49.

LETTER OF AGREEMENT

_____, hereafter referred to as Facility, upon execution of this Letter of Agreement with the Graduate School of Oceanography, the before named Facility has permission to obtain water samples from the pier at the Narragansett Bay Campus within the scope of the work to be performed as outlined below.

This Facility, once per quarter of the calendar year, will take a water sample from the Narragansett Bay Campus pier by dropping a bucket on a rope over the side of the pier. The amount of water sample to be collected would be approximately one liter. The date on which the samples would be taken each quarter would be coordinated by telephone call between the Facility and the Director of Facilities, Graduate School of Oceanography (792-6110). If the scope of the work changes from the aforementioned, the Facility will notify the Graduate School of Oceanography and a new Letter of Agreement will be executed.

The University of Rhode Island, or its authorized representative(s) shall not in anyway or manner be answerable or suffer loss, damage, expense, or liability for any loss or damage that may happen as a result of the study/service required under this agreement. The Facility shall assume all legally recognizable liability of every kind or nature arising from said study/service either by accident, negligence, theft, vandalism, or any cause whatever, and shall indemnify and defend the University or its authorized representative(s) from said liability. Both parties hereto recognize that this Facility, while engaged in carrying out and complying with any of the terms and conditions of this agreement, is an independent contractor and is not an officer, agent, or employee of the University.

Both parties hereto have the independent right to terminate this agreement on a thirty (30) days written notice.

Date:_____ Date:_____

_____ _____

(Signature of Authorized Facility Rep.) (Signature)

Van E. Chisholm, Coordinator
Narragansett Bay Campus
Administration
Graduate School of Oceanography
University of Rhode Island
South Ferry Road
Narragansett, RI 02882-1197
401-792-6888

AUTHORIZATION TO DISCHARGE UNDER THE
RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of Chapter 46-12 of the Rhode Island General Laws, as amended,

Town of Narragansett
Narragansett Town Hall
25 Fifth Avenue
Narragansett, RI

is authorized to discharge from a facility located at

Scarborough Wastewater Treatment Facility
990 Ocean Road
Narragansett, Rhode Island

to receiving waters named

Rhode Island Sound

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on March 1, 2006.

This permit and the authorization to discharge expire at midnight, five (5) years from the effective date.

This permit supersedes the permit issued on March 29, 2000.

This permit consists of 16 pages in Part I including effluent limitations, monitoring requirements, etc. and 10 pages in Part II including General Conditions.

Signed this 27th day of December, 2005.

Angelo S. Liberti

Angelo S. Liberti, P.E., Chief of Surface Water Protection Section
Office of Water Resources
Rhode Island Department of Environmental Management
Providence, Rhode Island

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number 001A.

   Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs./day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly *(Minimum)	Average Weekly *(Average)	Maximum Daily *(Maximum)	Measurement Frequency	Sample Type
Flow	1.4 MGD	---MGD				Continuous	Recorder
BOD_5	350 lbs/day	584 lbs/day	30 mg/l	45 mg/l	50 mg/l	3/Week	24-Hr. Comp.
BOD_5 - % Removal			85%			1/Month	Calculated
TSS	350 lbs/day	584 lbs/day	30 mg/l	45 mg/l	50 mg/l	3/Week	24-Hr. Comp.
TSS - % Removal			85%			1/Month	Calculated
Settleable Solids[1]				--- ml/l	--- ml/l	1/Day	Grab

--- Signifies a parameter which must be monitored and data must be reported; no limit has been established at this time.

Sampling for TSS and BOD_5 shall be performed Tuesday, Thursday and Sunday. All BOD_5 and TSS samples shall be taken on the influent and effluent with appropriate allowances for hydraulic detention (flow-through) time.

Sampling for Flow and Settleable Solids shall be performed Sunday-Saturday.

[1] Settleable solids monitoring has been included as a process-control parameter to aid in the assessment of the operation of the plant but no effluent limit has been established.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: Outfall 001A.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

2. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number 001A.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs./day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly *(Minimum)	Average Weekly *(Average)	Maximum Daily *(Maximum)	Measurement Frequency	Sample Type
Fecal Coliform			200 MPN[1] 100 ml	400 MPN[1] 100 ml	400 MPN[1] 100 ml	3/Week	Grab
Total Residual Chlorine (TRC)			325 ug/l		325 ug/l	Continuous	Recorder[2]
pH			(6.0 SU)		(9.0 SU)	2/Day	Grab

[1]The Fecal Coliform samples are to be taken on Tuesday, Thursday, and Sunday at the same time as the second TRC sample of the first shift. The Geometric Mean shall be used to obtain the "weekly average" and the "monthly average."

[2]The use of a continuous TRC recorder after chorination and prior to dechlorination is required to provide a record that proper disinfection was achieved at all times. Compliance with these limitations shall be determined by taking three grab samples over an eight hour shift, Monday - Friday (except holidays), equally spaced with a minimum of three hours between grabs, and on Saturdays, Sundays, and Holidays by taking at least two (2) grab samples each day with a minimum of two (2) hours between grabs. The maximum daily and average monthly values are to be computed from the averaged grab sample results for each day. The following methods may be used to analyze the grab samples: (1) DPD Spectrophotometric, EPA No. 330.5 or Standard Methods (18th Edition) No. 4500-Cl G; (2) DPD Titrimetric, EPA No. 330.4 or Standard Methods (18th Edition) No. 4500-Cl F; (3) Amperometric Titration, EPA No. 330.1 or Standard Methods (18th Edition) No. 4500-Cl D or ASTM No. D1253-86(92).

*Values in parentheses () are to be reported as Minimum/Maximum for the reporting period rather than Average Monthly/Maximum Daily.

Sampling for pH and Chlorine Residual shall be performed Sunday-Saturday.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: Outfall 001A.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

3. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number 001A.

   Such discharges shall be monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs. per day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
Oil and Grease					--- mg/l	1/Month	3 Grabs[1]
TKN (May 1-October 31)					--- mg/l	1/Month	24-Hr. Comp.
Nitrate, Total (as N) (May 1-October 31)					--- mg/l	1/Month	24-Hr. Comp.
Nitrite, Total (as N) (May 1-October 31)					--- mg/l	1/Month	24-Hr. Comp.
Nitrogen, Total (TKN+Nitrate+Nitrite, as N) (May 1-October 31)					--- mg/l	1/Month	Calculated

[1]Three (3) grab samples shall be equally spaced over the course of an eight (8) hour shift with a minimum of three (3) hours between samples. Each grab sample must be analyzed individually and the maximum values reported.

--- signifies a parameter which must be monitored and data must be reported; no limit has been established at this time.

Samples taken in compliance with the monitoring requirements specified above shall be taken Monday through Friday at the following location: Outfall 001A.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

4. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number 001A.

   Such discharges shall be monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs. per day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
Heptachlor			0.0756 ug/l[1]		1.06 ug/l[1]	Quarterly[2]	Grab
Heptachlor Epoxide			0.0396 ug/l[1]		1.06 ug/l[1]	Quarterly[2]	Grab

[1] The limit at which compliance/noncompliance determinations will be based is the quantitation limit, which is defined as 0.4ug/l for Heptachlor and 0.2ug/l for Heptachlor Epoxide. These values may be reduced by permit modification as more sensitive methods are approved by EPA and the State.

[2] After four consecutive monitoring periods during which time this effluent characteristic is not detected, at the MDL's in Part I.E., the permittee may request that monitoring for this effluent characteristic may be ceased. Upon written approval by DEM, monitoring will no longer be required.

Samples taken in compliance with the monitoring requirements specified above shall be taken Monday through Friday at the following location: Outfall 001A.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

5. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number 001A.

   Such discharges shall be monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs. per day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
LC_{50}[1] for Mysids					100% or Greater[2]	1/Quarter	24-Hr. Comp.

[1] LC_{50} is defined as the concentration of wastewater that causes mortality to 50% of the test organisms.

[2] The 100% or greater limit is defined as a sample which is composed of 100% effluent.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: Outfall 001A in accordance with Part I.B. of the permit.

6. a. The pH of the effluent shall not be less than 6.0 nor greater than 9.0 standard units at any time, unless these values are exceeded due to natural causes or as a result of the approved treatment processes.

b. The discharge shall not cause visible discoloration of the receiving waters.

c. The effluent shall contain neither a visible oil sheen, foam, nor floating solids at any time.

d. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and 5-day biochemical oxygen demand. The percent removal shall be based on monthly average values.

e. When the effluent discharged for a period of 90 consecutive days exceeds 80 percent of the designed flow, the permittee shall submit to the permitting authorities a projection of loadings up to the time when the design capacity of the treatment facility will be reached, and a program for maintaining satisfactory treatment levels consistent with approved water quality management plans.

f. The permittee shall analyze its effluent annually for the EPA Priority Pollutants as listed in 40 CFR 122, Appendix D, Tables II and III. The results of these analyses shall be submitted to the Department of Environmental Management by January 15th for the previous calendar year. All sampling and analysis shall be done in accordance with EPA Regulations, including 40 CFR, Part 136; grab and composite samples shall be taken as appropriate.

g. This permit serves as the State's Water Quality Certificate for the discharges described herein.

B. BIOMONITORING REQUIREMENTS AND INTERPRETATION OF RESULTS

1. General

Beginning on the effective date of the permit, the permittee shall perform four (4) acute toxicity tests per year on samples collected from discharge outfall 001A. The permittee shall conduct the tests during dry weather periods (no rain within fourty-eight (48) hours prior to or during sampling unless approved by RIDEM) according to the following test frequency and protocols. Acute data shall be reported as outlined in Section 9. Test results will be interpreted by the State. The State may require additional screening, range finding, definitive acute or chronic bioassays as deemed necessary based on the results of the initial bioassays required herein. Indications of toxicity could result in requiring a Toxicity Reduction Evaluation (TRE) to investigate the causes and to identify corrective actions necessary to eliminate or reduce toxicity to an acceptable level.

2. Test Frequency

On four (4) sampling events, (one (1) each calendar quarter) the permittee will conduct forty-eight (48) hour acute definitive toxicity tests on the species listed below, for a total of four (4) acute toxicity tests per year. This requirement entails performing one (1) species testing as follows:

Species	Test Type One (1) Specie Test (Four (4) Times Annually)	Frequency
Mysids (Mysidopsis bahia)	Definitive 48-Hour Acute Static (LC_{50})	Quarterly

3. Testing Methods

Acute definitive toxicity tests shall be conducted in accordance with protocols listed in the EPA document: Cornelius I. Weber, et. al., 1991. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, Fourth Edition (or the most recent edition), Office of Research and Development, Cincinnati, OH (EPA-600/4-90-027), incorporating any deviations from protocol listed herein, or additional methods if approved by the Director of RIDEM.

4. Sample Collection

For each sampling event a twenty-four (24) hour flow proportioned composite final effluent sample shall be collected during a dry weather (no rain forty-eight (48) hours prior to or during sampling unless approved by RIDEM). This sample shall be kept cool (at 4°C) and testing shall begin within twenty-four (24) hours after the last sample of the composite is collected. In the laboratory, the sample will be split into two (2) subsamples, after thorough mixing, for the following:

A: Chemical Analysis
B: Acute Toxicity Testing

All samples held overnight shall be refrigerated at 4°C. Grab samples must be used for pH and temperature.

5. Salinity Adjustment

Prior to the initiation of testing, the effluent must be adjusted to make the salinity of the effluent equal to that of the marine dilution water. The test solution must be prepared by adding non-toxic dried ocean salts to a sufficient quantity of 100% effluent to raise the salinity to the desired level. After the addition of the dried salts, stir gently for thirty (30) to sixty (60) minutes, preferably with a magnetic stirrer, to ensure that the salts are in solution. It is important to check the final salinity with a refractometer or salinometer. Salinity adjustments following this procedure and in accordance with EPA protocol will ensure that the concentrations (% effluent) of each dilution are real and allow for an accurate evaluation with the acute permit limit and acute monitoring requirements.

6. Dilution Water

Dilution water used for marine acute toxicity analyses should be of sufficient quality to meet minimum acceptability of test results (See Section 7). Natural seawater shall be used as the dilution water. This water shall be collected from Narragansett Bay off the dock at the URI's Graduate School of Oceanography on South Ferry Road, Narragansett. It is noted that the University claims no responsibility for the personal safety on this dock. The permittee shall observe the rules posted at the dock. If this natural seawater diluent is found to be, or suspected to be toxic or unreliable, an alternate source of natural seawater or, deionized water mixed with hypersaline brine or artificial sea salts of known quality with a salinity and pH similar to that of the receiving water may be substituted AFTER RECEIVING WRITTEN APPROVAL FROM RIDEM.

7. Effluent Toxicity Test Conditions for Mysids[1] (Mysidopsis bahia)

A.	Test Type	48-Hour Static Acute Definitive
B.	Salinity	25 ppt ± 10% for all dilutions
C.	Temperature (C)	25° ± 1°C
D.	Light Quality	Ambient laboratory illumination
E.	Photoperiod	8 - 16 Hour Light/24-Hour
F.	Test Chamber Size	250 ml
G.	Test Solution Volume	200 ml
H.	Age of Test Organisms	1 - 5 Days
I.	No. Mysids Per Test Chamber	10
J.	No. of Replicate Test Chamber Per Concentration	2
K.	Total No. Mysids Per Test Concentration	20
L.	Feeding Regime	Light feeding (two (2) drops concentrated brine shrimp nauplii, approx. 100 nauplii per mysid twice daily).
M.	Aeration	None, unless dissolved oxygen concentration falls below 40% of saturation at which time gentle single-bubble aeration should be started.
N.	Dilution Water	Narragansett Bay water as discussed above.
O.	Dilutions	Five (5) dilutions plus a control: 100%, 50%, 25%, 12.5%, 6.25% and 0% effluent.
P.	Effect Measured and Test	Mortality - no movement of body test duration or appendages on gentle prodding, 48-hour LC_{50} and NOAEL.
Q.	Test Acceptability	90% or greater survival of test organisms in control solution.
R.	Sampling Requirements	Samples are collected and used within 24 hours after the last sample of the composite is collected.
S.	Sample Volume Required	Minimum four (4) liters

[1]Adapted from EPA/600/4-90/027

8. Chemical Analysis

The following chemical analysis shall be performed for every sampling event.

Parameter	Effluent	Saline Diluent	Detection Limit (mg/l)
pH	X	X	—
Specific Conductance	X	X	—
Total Solids and Suspended Solids	X	X	—
Ammonia	X		0.1
Total Organic Carbon	X		0.5
Cyanide	X		0.01
Total Phenols	X		0.05
Salinity	X	X	PPT (0/00)

During the third calendar quarter bioassay sampling event, the final effluent sample collected during the same twenty-four (24) hour period as the bioassay sample, shall be analyzed for priority pollutants (as listed in Tables II and III of Appendix D of 40 CFR 122). The bioassay priority pollutant scan shall be a full scan and may be coordinated with other permit conditions to fulfill any priority pollutant scan requirements.

9. Toxicity Test Report Elements

A report of results will include the following:

- Description of sample collection procedures and site description.
- Names of individuals collecting and transporting samples, times, and dates of sample collection and analysis.
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests (quality assurance); light and temperature regime; dilution water description; other information on test conditions if different than procedures recommended.
- The method used to adjust the salinity of the effluent must be reported.
- All chemical and physical data generated (include detection limits).
- Raw data and bench sheets.
- Any other observations or test conditions affecting test outcome.

Toxicity test data shall include the following:

- Survival for each concentration and replication at time twenty-four (24) and forty-eight (48) hours.
- LC_{50} and 95% confidence limits shall be calculated using one of the following methods in order of preference: Probit, Trimmed Spearman Karber, Moving Average Angle, or the graphical method. All printouts (along with the name of the program, the date, and the author(s)) and graphical displays must be submitted.

When data is analyzed by hand, worksheets should be submitted. The report shall also include the No Observed Acute Effect Level (NOAEL), which is defined as the highest concentration of the effluent (in % effluent) in which 90% or more of the test animals survive.

- The Probit, Trimmed Spearman Karber, and Moving Average Angle methods of analyses can only be used when mortality of some of the test organisms are observed in at least two (2) of the (percent effluent) concentrations tested (i.e., partial mortality). If a test results in a 100% survival and 100% mortality in adjacent treatments ("all or nothing" effect), an LC_{50} may be estimated using the graphical method.

10. Special Condition

Due to the fact that the suggested dilution water for this facility to use in conducting the bioassays is from the end of the dock at the URI's Narragansett Bay Campus, a Letter of Agreement must be signed and submitted to the Graduate School of Oceanography. Requests to use another source of dilution water will have to be approved by the Department of Environmental Management, Office of Water Resources.

11. Reporting of Bioassay Testing

Bioassay Testing shall be reported as follows:

Quarter Testing to be Performed	Report Due No Later Than	Results Submitted on DMR for
January 1 - March 31	April 15	March
April 1 - June 30	July 15	June
July 1 - September 30	October 15	September
October 1 - December 31	January 15	December

Bioassay testing following the protocol described herein shall commence during the 1st testing quarter (January 1 – March 31) of 2006, and the first report shall be submitted to RIDEM no later than April 15, 2006.

A signed copy of these, and all other reports required herein, shall be submitted to:

RIPDES Program
Office of Water Resources
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, Rhode Island 02908-5767

D. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system shall be in compliance with the General Requirements of Part II and the following terms and conditions:

1. Maintenance Staff

The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit.

2. Infiltration/Inflow

The permittee shall minimize infiltration/inflow to the sewer system. A summary report of all actions taken to minimize infiltration/inflow during the previous two (2) years shall be submitted to RIDEM, Office of Water Resources, by the 15th day of January every other year. The first report is due January 15, 2008.

3. Bypasses

A bypass is defined as the intentional diversion of waste streams from any portion of a treatment facility. Bypasses are prohibited, and the Director may take enforcement action against the permittee for bypasses, unless the bypass occurs in accordance with Part II(m) of the permit. Prior to any bypass, the permittee shall contact the Operations and Maintenance (O&M) Section of DEM's Office of Water Resources to discuss the circumstances regarding the bypass. The O&M Section shall determine if the bypass is unavoidable and in compliance with Part II (m) of the permit.

E. SLUDGE

The permittee shall conform and adhere to all conditions, practices and regulations as contained in the State of Rhode Island Rules and Regulations for the Treatment, Disposal, Utilization and Transportation of Sewage Sludge. The permittee shall comply with its RIDEM Order of Approval for the disposal of sludge.

F. DETECTION LIMITS

The permittee shall assure that all wastewater testing required by this permit, is performed in conformance with the method detection limits listed below (the EPA method is noted for reference, other EPA approved methods found in 40 CFR Part 136 may be utilized). All sludge testing required by this permit shall be in conformance with the method detection limits found in 40 CFR 503.8. In accordance with 40 CFR Part 136, EPA approved analysis techniques, quality assurance procedures and quality control procedures shall be followed for all reports required to be submitted under the RIPDES program. These procedures are described in "Methods for the Determination of Metals in Environmental Samples" (EPA/600/4-91/010) and "Methods for Chemical Analysis of Water and Wastes" (EPA/600/4-79/020).

The report entitled "Methods for the Determination of Metals in Environmental Samples" includes a test which must be performed in order to determine if matrix interferences are present, and a series of tests to enable reporting of sample results when interferences are identified. Each step of the series of tests becomes increasingly complex, concluding with the complete Method of Standard Additions analysis. The analysis need not continue once a result which meets the applicable quality control requirements has been obtained. Documentation of all steps conducted to identify and account for matrix interferences shall be submitted along with the monitoring reports.

If, after conducting the complete Method of Standard Additions analysis, the laboratory is unable to determine a valid result, the laboratory shall report "could not be analyzed". Documentation supporting this claim shall be submitted along with the monitoring report. If valid analytical results are repeatedly unobtainable, DEM may require that the permittee determine a method detection limit (MDL) for their effluent or sludge as outlined in 40 CFR Part 136, Appendix B.

Therefore, all sample results shall be reported as: an actual value, "could not be analyzed", less than the reagent water MDL, or less than an effluent or sludge specific MDL. The effluent or sludge specific MDL must be calculated using the methods outlined in 40 CFR Part 136, Appendix B. Samples which have been diluted to ensure that the sample concentration will be within the linear dynamic range shall not be diluted to the extent that the analyte is not detected. If this should occur the analysis shall be repeated using a lower degree of dilution.

When calculating sample averages for reporting on discharge monitoring reports (DMRs):

1. "could not be analyzed" data shall be excluded, and shall not be considered as failure to comply with the permit sampling requirements;

2. results reported as less than the MDL shall be included as values equal to the MDL, and the average shall be reported as "less than" the calculated value.

For compliance purposes, DEM will replace all data reported as less than the MDL with zeroes, provided that DEM determines that all appropriate EPA approved methods were followed. If the re-calculated average exceeds the permit limitation it will be considered a violation.

LIST OF TOXIC POLLUTANTS

The following list of toxic pollutants has been designated pursuant to Section 307(a)(1) of the Clean Water Act. The Method Detection Limits (MDLs) represent the required Rhode Island MDLs.

Volatiles - EPA Method 624		MDLug/l (ppb)
1V	acrolein	10.0
2V	acrylonitrile	5.0
3V	benzene	1.0
5V	bromoform	1.0
6V	carbon tetrachloride	1.0
7V	chlorobenzene	1.0
8V	chlorodibromomethane	1.0
9V	chloroethane	1.0
10V	2-chloroethylvinyl ether	5.0
11V	chloroform	1.0
12V	dichlorobromomethane	1.0
14V	1,1-dichloroethane	1.0
15V	1,2-dichloroethane	1.0
16V	1,1-dichloroethylene	1.0
17V	1,2-dichloropropane	1.0
18V	1,3-dichloropropylene	1.0
19V	ethylbenzene	1.0
20V	methyl bromide	1.0
21V	methyl chloride	1.0
22V	methylene chloride	1.0
23V	1,1,2,2-tetrachloroethane	1.0
24V	tetrachloroethylene	1.0
25V	toluene	1.0
26V	1,2-trans-dichloroethylene	1.0
27V	1,1,1-trichloroethane	1.0
28V	1,1,2-trichloroethane	1.0
29V	trichloroethylene	1.0
31V	vinyl chloride	1.0

Acid Compounds - EPA Method 625		MDL ug/l (ppb)
1A	2-chlorophenol	1.0
2A	2,4-dichlorophenol	1.0
3A	2,4-dimethylphenol	1.0
4A	4,6-dinitro-o-cresol	1.0
5A	2,4-dinitrophenol	2.0
6A	2-nitrophenol	1.0
7A	4-nitrophenol	1.0
8A	p-chloro-m-cresol	2.0
9A	pentachlorophenol	1.0
10A	phenol	1.0
11A	2,4,6-trichlorophenol	1.0

Pesticides - EPA Method 608		MDL ug/l (ppb)
1P	aldrin	0.059
2P	alpha-BHC	0.058
3P	beta-BHC	0.043
4P	gamma-BHC	0.048
5P	delta-BHC	0.034
6P	chlordane	0.211
7P	4,4'-DDT	0.251
8P	4,4'-DDE	0.049
9P	4,4'-DDD	0.139
10P	dieldrin	0.082
11P	alpha-endosulfan	0.031
12P	beta-endosulfan	0.036
13P	endosulfan sulfate	0.109
14P	endrin	0.050
15P	endrin aldehyde	0.062
16P	heptachlor	0.029
17P	heptachlor epoxide	0.040
18P	PCB-1242	0.289
19P	PCB-1254	0.298
20P	PCB-1221	0.723
21P	PCB-1232	0.387
22P	PCB-1248	0.283
23P	PCB-1260	0.222
24P	PCB-1016	0.494
25P	toxaphene	1.670

Base/Neutral - EPA Method 625		MDL ug/l (ppb)
1B	acenaphthene *	1.0
2B	acenaphthylene *	1.0
3B	anthracene *	1.0
4B	benzidine	4.0
5B	benzo(a)anthracene *	2.0
6B	benzo(a)pyrene *	2.0
7B	3,4-benzofluoranthene *	1.0
8B	benzo(ghi)perylene *	2.0
9B	benzo(k)fluoranthene *	2.0
10B	bis(2-chloroethoxy)methane	2.0
11B	bis(2-chloroethyl)ether	1.0
12B	bis(2-chloroisopropyl)ether	1.0
13B	bis(2-ethylhexyl)phthalate	1.0
14B	4-bromophenyl phenyl ether	1.0
15B	butylbenzyl phthalate	1.0
16B	2-chloronaphthalene	1.0
17B	4-chlorophenyl phenyl ether	1.0
18B	chrysene *	1.0
19B	dibenzo (a,h)anthracene *	2.0
20B	1,2-dichlorobenzene	1.0
21B	1,3-dichlorobenzene	1.0
22B	1,4-dichlorobenzene	1.0
23B	3,3'-dichlorobenzidine	2.0
24B	diethyl phthalate	1.0
25B	dimethyl phthalate	1.0
26B	di-n-butyl phthalate	1.0
27B	2,4-dinitrotoluene	2.0
28B	2,6-dinitrotoluene	2.0
29B	di-n-octyl phthalate	1.0
30B	1,2-diphenylhydrazine (as azobenzene)	1.0
31B	fluoranthene *	1.0
32B	fluorene *	1.0
33B	hexachlorobenzene	1.0
34B	hexachlorobutadiene	1.0
35B	hexachlorocyclopentadiene	2.0
36B	hexachloroethane	1.0
37B	indeno(1,2,3-cd)pyrene *	2.0
38B	isophorone	1.0
39B	naphthalene *	1.0
40B	nitrobenzene	1.0
41B	N-nitrosodimethylamine	1.0
42B	N-nitrosodi-n-propylamine	1.0
43B	N-nitrosodiphenylamine	1.0
44B	phenanthrene *	1.0
45B	pyrene *	1.0
46B	1,2,4-trichlorobenzene	1.0

OTHER TOXIC POLLUTANTS
Updated: March 28, 2000

	MDL ug/l (ppb)
Antimony, Total	3.0 - EPA Method 200.9
Arsenic, Total	5.0 - EPA Method 206.9
Beryllium, Total	0.2 - Standard Methods 18th Ed. 3113B
Cadmium, Total	1.0 - EPA Method 200.9
Chromium, Total	5.0 - Standard Methods 18th Ed. 3113B
Chromium, Hexavalent***	50.0 - Standard Methods 16th Ed., 312.B
Copper, Total	20.0 - EPA Method 200.7
Lead, Total	5.0 - EPA Method 200.9
Mercury, Total	0.5 - EPA Method 245.1
Nickel, Total	20.0 - EPA Method 200.7
Selenium, Total	5.0 - EPA Method 200.9
Silver, Total	1.0 - Standard Methods 18th Ed. 3113B
Thallium, Total	1.0 - EPA Method 200.9
Zinc, Total	20.0 - EPA Method 200.7
Asbestos	**
Cyanide, Total	10.0 - EPA Method 335.4
Phenols, Total***	50.0 - EPA Method 420.2
TCDD	**
MTBE (Methyl Tert Butyl Ether)	1.0 - EPA Method 524.2

* Polynuclear Aromatic Hydrocarbons
** No Rhode Island Department of Environmental Management (RIDEM) MDL
*** Not a priority pollutant as designated in the 1997 Water Quality Regulations (Table 5)

NOTE:

All MDLs have been established in accordance with the definition of "Detection Limits" in the RIDEM Water Quality Regulations for Water Pollution Control. Unless otherwise noted the MDLs have been determined in reagent water by the Rhode Island Department of Health, Division of Laboratories. The MDL for a given analyte may vary with the type of sample. MDLs which are determined in reagent water may be lower than those determined in wastewater due to fewer matrix interferences. Wastewater is variable in composition and may therefore contain substances (interferents) that could affect MDLs for some analytes of interest. Variability in instrument performance can also lead to inconsistencies in determinations of MDLs.

To help verify the absence of matrix or chemical interference the analyst is required to complete specific quality control procedures. For the metals analyses listed above the analyst must withdraw from the sample two equal aliquots; to one aliquot add a known amount of analyte, and then dilute both to the same volume and analyze. The unspiked aliquot multiplied by the dilution factor should be compared to the original. Agreement of the results within 10% indicates the absence of interference. Comparison of the actual signal from the spiked aliquot to the expected response from the analyte in an aqueous standard should help confirm the finding from the dilution analysis. (Methods for Chemical Analysis of Water and Wastes EPA-600/4-79/020).

For Methods 624 and 625 the laboratory must on an ongoing basis, spike at least 5% of the samples from each sample site being monitored. For laboratories analyzing 1 to 20 samples per month, at least one spiked sample per month is required. The spike should be at the discharge permit limit or 1 to 5 times higher than the background concentration determined in Section 8.3.2, whichever concentration would be larger. (40 CFR Part 136 Appendix B Method 624 and 625 subparts 8.3.1 and 8.3.11).

F. MONITORING AND REPORTING

1. Monitoring

All monitoring required by this permit shall be done in accordance with sampling and analytical testing procedures specified in Federal Regulations (40 CFR Part 136).

2. Reporting

Monitoring results obtained during the previous month(s) shall be summarized and reported on Discharge Monitoring Report (DMR) Forms, postmarked no later than the 15th day of the month following the completed reporting period. A copy of the analytical laboratory report, specifying analytical methods used, shall be included with each report submission. The first report is due April 15, 2006. Signed copies of these, and all other reports required herein, shall be submitted to:

RIPDES Program
Office of Water Resources
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, Rhode Island 02908

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
235 PROMENADE STREET
PROVIDENCE, RHODE ISLAND 02908-5767

FACT SHEET

RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES) PERMIT TO DISCHARGE TO WATERS OF THE STATE

RIPDES PERMIT NO. **R10100188**

NAME AND ADDRESS OF APPLICANT:

Town of Narragansett
Narragansett Town Hall
25 Fifth Avenue
Narragansett, Rhode Island 02882

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Scarborough Wastewater Treatment Facility
990 Ocean Road
Narragansett, Rhode Island 02882

RECEIVING WATER: **Rhode Island Sound**

CLASSIFICATION: **SB1**

I. Proposed Action, Type of Facility, and Discharge Location

The above named applicant has applied to the Rhode Island Department of Environmental Management for renewal of a RIPDES Permit to discharge into the designated receiving water. The facility is engaged in the treatment of domestic and industrial sewage. The discharge is from the Scarborough Wastewater Treatment Facility at outfall 001A.

II. Description of Discharge

A quantitative description of the discharge in terms of significant effluent parameters based on DMR data from April 2000 through April 2005 is shown on Attachment A-1.

III. Permit Limitations and Conditions

The final effluent limitations and monitoring requirements may be found in the draft permit.

IV. Permit Basis and Explanation of Effluent Limitation Derivation

The Town of Narragansett owns and operates the Scarborough Wastewater Treatment Facility located on Ocean Road in Narragansett, Rhode Island. The discharge to Rhode Island Sound consists of treated sanitary sewage. Treatment consists of Coarse Screening, Comminution, Grit Removal, Extended Aeration, Secondary Settling, Chlorination, and Dechlorination.

The requirements set forth in this permit are from the State's Water Quality Regulations and the State's Regulations for the Rhode Island Pollutant Discharge Elimination System (RIPDES), both filed pursuant to Chapter 46-12, as amended. RIDEM's primary authority over the permit comes from EPA's delegation of the program in September 1984 under the Federal Clean Water Act (CWA).

Development of RIPDES permit limitations is a multi-step process consisting of: determining if Federal effluent guidelines apply; calculation of allowable discharge levels based on background data and available dilution; comparing existing and proposed limits; comparing discharge data to proposed limits; and developing interim limits as appropriate. A brief description of these steps is presented below. For a more detailed presentation, the "Scarborough Wastewater Treatment Facility Permit Development Document" is available upon request.

The "Average Monthly" and "Average Weekly" BOD_5 and TSS limitations plus pH limitations are based upon the secondary treatment requirements of Section 301 (b)(1)(B) of the Clean Water Act (CWA) as defined in 40 CFR 133.102 (a) - (c). The "Maximum Daily" BOD_5, and TSS limits and the fecal coliform limits are based on Rhode Island requirements for Publicly Owned Treatment Works (POTW's) under Section 401 (a)(1) of the CWA and in 40 CFR 124.53 and 124.56. The "Percent Removal" requirements are in accordance with 40 CFR 133.103. Settleable solids monitoring has been included as a process-control parameter that can aid in the assessment of the operation of the plant but need not have an effluent limit.

In order to evaluate the need for water quality based limits, it is necessary to determine the mixing which occurs in the immediate vicinity of the wastewater discharge (initial dilution). The Scarborough WWTF's effluent is discharged through a twenty-two (22) inch pipe which is approximately 2,200 feet offshore and is fitted with a diffuser. The diffuser pipe diameter ranges from twenty (20) inches to sixteen (16) inches and consists of three (3) twelve (12) inch diameter ports, each of which is 4.5 feet above the ocean bottom. A diagram of the pipe diffuser is included in Attachment A of the development document for this draft permit. As outlined in the fact sheet of Scarborough WWTF's September 30, 1994 permit, the DEM defined acute and chronic mixing zones in accordance with RI Water Quality Regulations and guidance provided by the U.S. EPA publication entitled "Technical Support Document for Water Quality-Based Toxics Control (1991)." The procedure used was to limit the acute mixing zone to a small area where rapid mixing occurs, and the chronic mixing zone to a larger area where ocean currents and diffusion provide additional mixing. Using the results of the EPA mixing zone guidance, the acute zone is defined as a circular region centered at the outfall with a radius of approximately 13.5 meters or 44 feet. The chronic zone is also circular, centered at diffuser midpoint, and has a radius of approximately 135 meters or 443 feet. In order to determine dilution factors for both mixing zones, the EPA computer model, CORMIX2, was applied.

As also discussed in the fact sheet of the September 30, 1994 permit, Rule 17 of the RIPDES Regulations requires the use of the design flow when establishing limits for POTWs. Based upon the design flow of 1.4 MGD (as noted in Order of Approval No. 436), the mean low water depth at the discharge pipe of twenty (20) feet, and a conservative estimate of ambient current velocity (0.16 feet per second), an acute dilution of 25:1 and a chronic dilution of 45:1 were determined using CORMIX2. Attachment A of the development document for this draft permit includes a figure illustrating the mixing zones. Attachment A of the development document for this draft permit, which is an excerpt from the development document for the September 30, 1994 permit, outlines the development of the mixing zones and dilution factors in greater detail.

Based on the above dilution factors and the saltwater aquatic life and non-class A human health criteria from the Rhode Island Water Quality Regulations allowable discharge concentrations were established using 80% allocation since no background data was available. 100% allocation of total residual chlorine (TRC) was used due to the fact that Chlorine is not expected to be found in ambient water and it is a non-conservative pollutant.

In accordance with 40 CFR 122.4(d)(1)(iii), it is only necessary to establish limitations for those pollutants in the discharge which have reasonable potential to cause or contribute to the exceedance of instream criteria. In order to evaluate the need for permit limits, the permit limits were compared to the Discharge Monitoring Report (DMR) data and the State User Fee Program data. Based on these comparisons, water quality limitations are not required for both Total Ammonia and Cyanide since the pollutants have been demonstrated not to have reasonable potential. Therefore, monitoring for the pollutants will only be required as part of the toxicity testing. However, water quality limitations have been deemed necessary for Heptachlor and Heptachlor Epoxide. After four consecutive monitoring periods during which time Heptachlor and Heptachor Epoxide are not detected, the permittee may request the monitoring for these effluent characteristics may be ceased. Upon written approval by DEM, monitoring will no longer be required.

Evaluation of the data collected for biotoxicity has revealed that the final effluent samples from the treatment plant have generally demonstrated acceptable toxicity for Mysids. The State policy is to require a LC_{50} of $\leq$ 100% effluent. The bioassay requirements in the permit of one (1) acute test to be completed on final effluent once per quarter, shall assure control of toxicity in the effluent. The actual data can be found in Attachment A-1. The biomonitoring requirements are set forth in 40 CFR 131.11 and in the State's Water Quality Regulations to assure control of toxicity in the effluent. If continued toxicity is demonstrated, then toxicity identification and reduction will be required.

The effluent monitoring requirements have been specified in accordance with RIPDES regulations as well as 40 CFR 122.41 (j), 122.44 (i), and 122.48 to yield data representative of the discharge. At this time, nutrient criteria have not been established for the receiving water. Seasonal (May through October) testing requirements for TKN, Nitrate, and Nitrite are necessary to determine nutrient loadings to the receiving water, and are consistent with the Department's policy requiring all facilities to perform baseline nutrient monitoring. This information will aid the Department in the determination of the necessity for future nutrient removal from the treatment plant effluent.

The permit contains requirements for the permittee to comply with the State's Sludge Regulations and RIDEM's Order of Approval for sludge disposal in accordance with the requirements of Section 405(d) of the Clean Water Act (CWA). Permits must contain sludge conditions requiring compliance with limits, state laws, and applicable regulations as per Section 405(d) of the CWA and 40 CFR 503. The RIDEM Sludge Order of Approval sets forth the conditions to ensure this compliance.

The Office has determined that all permit limitations are consistent with the Rhode Island Antidegradation policy.

The remaining general and specific conditions of the permit are based on the RIPDES regulations as well as 40 CFR Parts 122 through 125 and consist primarily of management requirements common to all permits.

V. Comment Period, Hearing Requests, and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the Rhode Island Department of Environmental Management, Office of Water Resources, 235 Promenade Street, Providence, Rhode Island, 02908-5767. In accordance with Chapter 46-17.4 of Rhode Island General Laws, a public hearing will be held prior to the close of the public comment period. In reaching a final decision on the draft permit the Director will respond to all significant comments and make these responses available to the public at DEM's Providence Office.

Following the close of the comment period, and after a public hearing, the Director will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments, provided oral testimony, or requested notice. Within thirty (30) days following the notice of the final permit decision any interested person may submit a request for a formal hearing to reconsider or contest the final decision. Requests for formal hearings must satisfy the requirements of Rule 49 of the Regulations for the Rhode Island Pollutant Discharge Elimination System (16 July 1984).

VI. **DEM Contact**

Additional information concerning the permit may be obtained between the hours of 8:30 a.m. and 4:00 p.m., Monday through Friday, excluding holidays from:

Joseph Camara
RIPDES Program
Office of Water Resources
Department of Environmental Management
235 Promenade Street
Providence, Rhode Island 02908
Telephone: (401) 222-4700, ext. 7640

11-7-05
Date

Eric A. Beck, P.E.
Supervising Sanitary Engineer
RIPDES Permitting Section
Office of Water Resources
Department of Environmental Management

ATTACHMENT A-1

DESCRIPTION OF DISCHARGE: Secondary treated domestic and industrial wastewater.
DISCHARGE: 001A - Secondary Treatment Discharge

AVERAGE EFFLUENT CHARACTERISTICS AT POINT OF DISCHARGE:

PARAMETER	AVERAGE[1]	MAXIMUM[2]
FLOW (MGD) MGD	0.60 MGD	1.02 MGD
BOD_5 (PPM)	6.25 mg/l	9.92 mg/l
TSS	10.07 mg/l	18.25 mg/l
Fecal Coliform	11.83 MPN/100 ml	83.82 MPN/100 ml
pH	6.56 S.U.(minimum)	7.36 S.U.(maximum)
Chlorine Residual	23.77 ug/l	85.41 ug/l
Ammonia, Total (as N)	3.34 mg/l	6.31 mg/l
Oil & Grease		2.80 mg/l
Nitrite, Total (as N)		0.68 mg/l
Nitrate, Total (as N)		11.85 mg/l
TKN		8.62 mg/l
Nitrogen, Total (TKN+Nitrate+Nitrite, as N)		19.91mg/l
Cyanide		11.16 ug/l

[1]Data represents the mean of the monthly average data from April 2000 – April 2005.
[2]Data represents the mean of the daily maximum data from April 2000 – April 2005.

Final Effluent
Mysid
Biotoxicity Data LC_{50} Values (in percent effluent)

2003			2004				2005
2nd qtr.	3rd qtr.	4th qtr.	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.
>100	>100	>100	>100	>100	>100	>100	>100

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DEFINITIONS

GENERAL REQUIREMENTS

(a) Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of Chapter 46-12 of the Rhode Island General Laws and the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

(1) The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

(2) The CWA provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Sections 301, 302, 306, 307 or 308 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment of not more than 1 year, or both.

(3) Chapter 46-12 of the Rhode Island General Laws provides that any person who violates a permit condition is subject to a civil penalty of not more than $5,000 per day of such violation. Any person who willfully or negligently violates a permit condition is subject to a criminal penalty of not more than $10,000 per day of such violation and imprisonment for not more than 30 days, or both. Any person who knowingly makes any false statement in connection with the permit is subject to a criminal penalty of not more than $5,000 for each instance of violation or by imprisonment for not more than 30 days, or both.

(b) Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Director. (The Director shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

(c) Need to Halt or Reduce Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

(d) Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

(e) Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures, and, where applicable, compliance with DEM "Rules and Regulations Pertaining to the Operation and Maintenance of Wastewater Treatment Facilities" and "Rules and Regulations Pertaining to the Disposal and Utilization of Wastewater Treatment Facility Sludge." This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

(f) Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause, including but not limited to: (1) Violation of any terms or conditions of this permit; (2) Obtaining this permit by misrepresentation or failure to disclose all relevant facts; or (3) A change in any conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

(g) Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

(h) Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

(i) Inspection and Entry

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

(2) Have access to and copy, at reasonable times any records that must be kept under the conditions of this permit;

(3) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

(4) Sample or monitor any substances or parameters at any location, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA or Rhode Island law.

(j) Monitoring and Records

(1) Samples and measurements taken for the purpose of monitoring shall be representative of the volume and nature of the discharge over the sampling and reporting period.

(2) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings from continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

(3) Records of monitoring information shall include:

(i) The date, exact place, and time of sampling or measurements;

(ii) The individual(s) who performed the sampling or measurements;

(iii) The date(s) analyses were performed;

(iv) The individual(s) who performed the analyses;

(v) The analytical techniques or methods used; and

(vi) The results of such analyses.

(4) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136 and applicable Rhode Island regulations, unless other test procedures have been specified in this permit.

(5) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall upon conviction, be punished by a fine of not more than $10,000 per violation or by imprisonment for not more than 6 months per violation or by both. Chapter 46-12 of the Rhode Island General Laws also provides that such acts are subject to a fine of not more than $5,000 per violation, or by imprisonment for not more than 30 days per violation, or by both.

(6) Monitoring results must be reported on a Discharge Monitoring Report (DMR).

(7) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136, applicable State regulations, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

(k) Signatory Requirement

All applications, reports, or information submitted to the Director shall be signed and certified in accordance with Rule 12 of the Rhode Island Pollutant Discharge Elimination System (RIPDES) Regulations. Rhode Island General Laws, Chapter 46-12 provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $5,000 per violation, or by imprisonment for not more than 30 days per violation, or by both.

(l) Reporting Requirements

(1) Planned changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility.

(2) Anticipated noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with the permit requirements.

(3) Transfers. This permit is not transferable to any person except after written notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under State and Federal law.

(4) Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(5) Twenty-four hour reporting. The permittee shall immediately report any noncompliance which may endanger health or the environment by calling DEM at (401) 277-3961, (401) 277-6519 or (401) 277-2284 at night.

A written submission shall also be provided within five (5) days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The following information must be reported immediately:

(i) Any unanticipated bypass which causes a violation of any effluent limitation in the permit; or

(ii) Any upset which causes a violation of any effluent limitation in the permit; or

(iii) Any violation of a maximum daily discharge limitation for any of the pollutants specifically listed by the Director in the permit.

The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

(6) Other noncompliance. The permittee shall report all instances of noncompliance not reported under paragraphs (1), (2), and (5), of this section, at the time monitoring reports are submitted. The reports shall contain the information required in paragraph (l)(5) of the section.

(7) Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, they shall promptly submit such facts or information.

(m) Bypass

"Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(1) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (2) and (3) of this section.

(2) Notice.

(i) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten (10) days before the date of the bypass.

(ii) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Rule 14.18 of the RIPDES Regulations.

(3) Prohibition of bypass.

(i) Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(A) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage, where "severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production;

(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(C) The permittee submitted notices as required under paragraph (2) of this section.

(ii) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph (3)(i) of this section.

(n) Upset

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

(1) Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph (2) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

(2) Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(a) An upset occurred and that the permittee can identify the cause(s) of the upset;

(b) The permitted facility was at the time being properly operated;

(c) The permittee submitted notice of the upset as required in Rule 14.18 of the RIPDES Regulations; and

(d) The permittee complied with any remedial measures required under Rule 14.05 of the RIPDES Regulations.

(3) Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

(o) Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. Discharges which cause a violation of water quality standards are prohibited. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different or increased discharges of pollutants must be reported by submission of a new NPDES application at least 180 days prior to commencement of such discharges, or if such changes will not violate the effluent limitations specified in this permit, by notice, in writing, to the Director of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by the permit constitutes a violation.

(p) Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner consistent with applicable Federal and State laws and regulations including, but not limited to the CWA and the Federal Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq., Rhode Island General Laws, Chapters 46-12, 23-19.1 and regulations promulgated thereunder.

(q) Power Failures

In order to maintain compliance with the effluent limitation and prohibitions of this permit, the permittee shall either:

> In accordance with the Schedule of Compliance contained in Part I, provide an alternative power source sufficient to operate the wastewater control facilities;

or if such alternative power source is not in existence, and no date for its implementation appears in Part I,

> Halt reduce or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

(r) Availability of Reports

Except for data determined to be confidential under paragraph (w) below, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the DEM, 291 Promenade Street, Providence, Rhode Island. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA and under Section 46-12-14 of the Rhode Island General Laws.

(s) State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law.

(t) Other Laws

The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, and local laws and regulations.

(u) Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

(v) Reopener Clause

The Director reserves the right to make appropriate revisions to this permit in order to incorporate any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA or State law. In accordance with Rules 15 and 23 of the RIPDES Regulations, if any effluent standard or prohibition, or water quality standard is promulgated under the CWA or under State law which is more stringent than any limitation on the pollutant in the permit, or controls a pollutant not limited in the permit, then the Director may promptly reopen the permit and modify or revoke and reissue the permit to conform to the applicable standard.

(w) Confidentiality of Information

(1) Any information submitted to DEM pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, DEM may make the information available to the pubic without further notice.

(2) Claims of confidentiality for the following information will be denied:

(i) The name and address of any permit applicant or permittee;

(ii) Permit applications, permits and any attachments thereto; and

(iii) NPDES effluent data.

(x) Best Management Practices

The permittee shall adopt Best Management Practices (BMP) to control or abate the discharge of toxic pollutants and hazardous substances associated with or ancillary to the industrial manufacturing or treatment process and the Director may request the submission of a BMP plan where the Director determines that a permittee's practices may contribute significant amounts of such pollutants to waters of the State.

(y) Right of Appeal

Within thirty (30) days of receipt of notice of a final permit decision, the permittee or any interested person may submit a request to the Director for an adjudicatory hearing to reconsider or contest that decision. The request for a hearing must conform to the requirements of Rule 49 of the RIPDES Regulations.

DEFINITIONS

1. For purposes of this permit, those definitions contained in the RIPDES Regulations and the Rhode Island Pretreatment Regulations shall apply.

2. The following abbreviations, when used, are defined below.

cu. M/day or M^3/day	cubic meters per day
mg/l	milligrams per liter
ug/l	micrograms per liter
lbs/day	pounds per day
kg/day	kilograms per day
Temp. °C	temperature in degrees Centigrade
Temp. °F	temperature in degrees Fahrenheit
Turb.	turbidity measured by the Nephelometric Method (NTU)
TNFR or TSS	total nonfilterable residue or total suspended solids
DO	dissolved oxygen
BOD	five-day biochemical oxygen demand unless otherwise specified
TKN	total Kjeldahl nitrogen as nitrogen
Total N	total nitrogen
NH_3-N	ammonia nitrogen as nitrogen
Total P	total phosphorus
COD	chemical oxygen demand
TOC	total organic carbon
Surfactant	surface-active agent
pH	a measure of the hydrogen ion concentration
PCB	polychlorinated biphenyl
CFS	cubic feet per second
MGD	million gallons per day
Oil & Grease	Freon extractable material
Total Coliform	total coliform bacteria
Fecal Coliform	total fecal coliform bacteria
ml/l	milliliter(s) per liter
NO_3-N	nitrate nitrogen as nitrogen
NO_2-N	nitrite nitrogen as nitrogen
NO_3-NO_2	combined nitrate and nitrite nitrogen as nitrogen

APPENDIX C

Summary of Infiltration/Inflow Work

NATIONAL WATER MAIN CLEANING CO.

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E-Mail: boston@nwmcc.com

Summary of Defects Sand Hill Cove Area

									Recommended Rehabilitation Costs										
Street	From MH	To MH	Size	Joint Length	Section Length	Defect Station	Observation	Observed Infiltration GPM	Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Lining footage	MH to MH Lining cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
"CHESTNUT AVENUE"	"1664"	"1725"	8"	6'	305 60	"157 32" "260 22"	"service connection with infiltration running inside, at 02 o'clock" "service connection with infiltration dripping inside, at 12 o'clock"	2.00 0.25					1 1	$285.00 $285.00					$570.00
"CHESTNUT AVENUE"	"1641"	"1623"	8"	6'	243 96	"86 65"	"scale/mineral deposits heavy at 12 at service connection												$0.00
"CHESTNUT AVENUE"	"1641"	"1659"	8"	6'	184 82	"30 92" "54 01"	"scale/mineral deposits light from 07 to 10 o'clock from hole in pipe "scale/mineral deposits at joint at 12 at 12 at light"		0.00	$0.00									$0.00
"CHESTNUT AVENUE"	"1623"	"1622"	8"	6'	109 33	"65.76" "65 26"	"Infiltration Running at 04 o'clock from service connection Cracked pipe leaking	0.50 1.75			1 1	$1,200.00 $150.00	1	$285.00					$1,635.00
"CHESTNUT AVENUE"	"1720"	"1721"	8"	3	223 58	"167 26"	"scale/mineral deposits at broken joint from 07 to 11 o'clock light"												$0.00
"ELM AVENUE"	"1621"	"1616"	8"	6'	395 35	"285 22"	"Infiltration Dripping at 12 o'clock from hole"												$0.00
"HEMLOCK AVENUE"	"1745"	"1743"	8"	13'	301 18	"82.62"	"pipe Broken, from 12 to 06 o'clock" Large hole 3' long				1	$1,200.00							$1,200.00
"LARCH AVENUE"	"1690"	"1710"	8"	6'	266 15	"183 42" "239 54"	"scale/mineral deposits medium from 09 to 03 o'clock from porous pipe "service connection leaking inside, at 12 o'clock"	0.75					1	$285.00					$285.00
"OAK AVENUE"	"1644"	"1643"	8"	6'	95 17	"15.96"	"service connection with infiltration dripping inside, at 12 o'clock"	0.25					1	$285.00					$285.00
"OAK AVENUE"	"1642"	"1641"	8"	6'	371 46	"41 46" "41 46" "41 46" "257 51"	"Infiltration Running from cracked pipe from 04 to 08 o'clock" reinstate service connection & seal Possible leaking service connection "service connection, at 12 o'clock with mineral deposits"	4.00 2.00 0.25			1 1	$1,200.00 $150.00	1 1	$285.00 $285.00					$1,920.00
"OAK AVENUE"	"1639"	"1640"	8"	6'	221.07	"14 56" "16.16" "16 16" "16 16" "209 92"	"Circumferential Fracture, at 12 at 12 at" reinstate service connection & seal "Infiltration Running from 02 to 10 o'clock from cracked pipe "service connection with possible infiltration" "service connection with infiltration dripping inside, at 01 o'clock with mineral deposits"	 5 00 0.25			1 1	$1,200.00 $150.00	1 1	$285.00 $285.00					$1,920.00
"SALTAIRE AVENUE"	"1711"	"1698"	12"	3'	246 07	"80.84" "179 3"	"service connection with infiltration running inside, at 12 o'clock" "service connection with infiltration dripping inside, at 12 o'clock"	1.50 0.25					1 1	$285.00 $285.00					$570.00
"SALTAIRE AVENUE"	"1698"	"1699"	12"	3'	266 24	"115 95" "117 26" "117 26" "117 26"	"Longitudinal Crack at joint, at 12 o'clock with infiltration" reinstate service connection & seal "service connection with infiltration running inside, at 12 o'clock" "Circumferential Crack, from 07 to 12 o'clock with infiltration"	1.50 1.50 4.00			1 1	$1,200.00 $150.00	1	$285.00					$1,635.00
"SALTAIRE AVENUE"	"1701"	"1702"	12"	3'	331 60	"67 97" "118 26" "124 29" "167 36"	service connection with infiltration running inside, at 12 o'clock "pipe broken at joint, at 03 o'clock with infiltration" "pipe broken at joint, at 08 o'clock with infiltration" "scale and mineral deposits from possible hole"	0.50 0.25 0 25 0.25			1 1	$1,200.00 $1,200.00	1	$285.00					$2,685.00
"SANDHILL COVE ROAD"	"1735"	"1734"	8"	6'	204 30	"44.07" "187 94" "187 44"	"Longitudinal Fracture at 10 o'clock with infiltration" "Infiltration Seeping at 04 o'clock" "pipe Broken, from 10 to 02 o'clock"	4.00 1.00			1 1	$1,200.00 $1,200.00							$2,400.00
"SPRUCE AVENUE"	"1706"	"1699"	8"	6'	122 66	"8 33" "9 84" "9 54"	""Circumferential Fracture, from 09 to 04 o'clock infiltration Running at 04 o'clock" reinstate service connection & seal service connection, at 12 o'clock suspect	2.00 2 00 5.00			1 1	$1,200.00 $150.00	1	$285.00					$1,635.00

									Recommended Rehabilitation Costs											
Street	From MH	To MH	Size	Joint Length	Section Length	Defect Station	Observation	Observed Infiltration GPM	Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Lining footage	MH to MH Lining cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
"SALTAIRE AVENUE"	"1711"	"1698"	12"	3	246 07	"60 84" "179.3"	service connection with infiltration running inside, at 12 o'clock service connection with infiltration running inside, at 12 o'clock	1.50 0.25					[redacted]	[redacted]					$570.00
"STANTON AVENUE"	"1705"	"1656"	15"	5'	356 10	"69.87" "247 77" "295 86" "323 57" "347 36" "67 77" "87.24" "162 74"	"Infiltration Running at joint at 12 o'clock" "Infiltration Running at joint at 02 o'clock" "Infiltration Running at joint from 02 to 05 o'clock" "Infiltration Running at joint at 01 o'clock" "Infiltration Running at joint at 11 o'clock" "scale/mineral deposits at joint from 08 to 04 o'clock light" "scale/mineral deposits light from 09 to 03 o'clock" "scale/mineral deposits at joint from 07 to 05 o'clock light"	1.00 2.00 2.00 3.00 2.00	[redacted]	[redacted]									$1,933.74
"STANTON AVENUE"	"1656"	"1638"	15"	6'	352.08	"14 96" "59 94"	"Infiltration Running at joint from 01 to 05 o'clock" service connection with infiltration running inside, at 9 o'clock	3.00 2.00	[redacted]	[redacted]			[redacted]	[redacted]					$2,186.23
"STANTON AVENUE"	"1638"	"1620"	15"	6'	339.43	"120.27"	"Infiltration Running at joint at 06 o'clock"	5.00	[redacted]	[redacted]									$1,832.92
"STANTON AVENUE"	"1618"	"1617"	15"	6'	112 04	"14 15"	"Infiltration Running at joint at 09 o'clock"	1.00	[redacted]	[redacted]									$605.02
"STANTON AVENUE"	"1616"	"1615"	15"	6'	246.47	"220 77"	"Infiltration Running at joint from 07 to 11 o'clock"	3.00	[redacted]	[redacted]									$1,330.94
"STANTON AVENUE"	"1615"	"1614"	15"	6'	112.04	"71 18"	"service connection capped, at 12 o'clock with infiltration" CHECK TO SEE IF SERVICE IS ACTIVE BEFORE COVERING	6.00			[redacted]	[redacted]							$1,200.00
"STANTON AVENUE"	"1619"	"1618"	15"	6'	92 16	"26 2" "54 31" 68 37	"scale/mineral deposits light from 08 to 04 o'clock" "scale/mineral deposits at joint at 12 at 12 at light" service connection with broken pipe and roots	0 25 0.25	[redacted]	[redacted]							1	$3,000.00	$3,589.82
"STANTON AVENUE"	"1620"	"1619"	15"	6'	121 07	"65.76"	"scale/mineral deposits at joint from 07 to 11 o'clock light"		0.00	$0.00									$0.00
"WILLOW AVENUE"	"1733"	"1723"	8"	13'	229 50	"78.21"	"pipe Broken, from 08 to 04 o'clock"				[redacted]	[redacted]							$1,200.00
Total footage defective pipe					6100 12														

Summary of Items and Costs

	Observed Infiltration GPM	Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Lino footage	MH to MH Line cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
Totals	73.25	1500.28	$8,101.51	17	$15,150.00	17	$4,845.00	0	$0.00	1	$3,000.00	$31,188.67

Gallons per day observed 105,480.00 GPD

Test & Seal Completed to April 05	1500.28	$8,101.51			17	$4,845.00	$12,946.51
Point repairs completed			12	$14,400 00			$14,400.00
Reinstate SC			5	$750.00			

total $27,346.51

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E-Mail: boston@nwmcc.com

Summary of Defects Pier Area

									NWMCC Recommended Rehabilitation Costs									
Street	From MH	To MH	Size	Joint Length	Section Length	Defect Station	Observation	Observed Infiltration GPM	Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Lining footage	MH to MH Lining cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
ATLANTIC AVENUE	1102	2015	8	2	338.13	Various	Roots		338.13	$3,905.40									
						338.13	Clean out no Manhole, Install Manhole										1	$5,000.00	$3,905.40
BLOSSOM WAY	990	1805	8	12	14.16	13.35	scale/mineral deposits at joint from 01 to 06 o'clock medium												
						13.35	Pipe changes to 6"												
						17.67	Incomplete insection do to dropped pipe. Repair and reTV										1	$3,000.00	$3,000.00
BOON STREET	1070	1092	8	3	468.43	168.56	Intruding break in connection at 10 o' clock leaking cut off intruding service	0.75					1	$285.00			1	$150.00	
						359.11	Circumferential Crack at joint, from 09 to 03 o'clock				1	$1,200.00							
						461.41	Circumferential Crack at joint, from 03 to 07 o'clock				1	$1,200.00							
						Various	Roots		468.43	$3,396.12									$6,231.12
BROWN AVENUE	1129	1128	8	3	235.62	15.10	scale/mineral deposits at joint at 12 at 12 at light, START		235.62	$1,708.25									$1,708.25
BROWN AVENUE	1129	1133	8	3	345.05	15.56	scale/mineral deposits at joint at 12 at 12 at light, START		345.05	$2,501.61									
						217.25	Infiltration Dripping at joint at 12 o'clock	0.50											
						287.03	Infiltration Dripping at joint at 01 o'clock	0.10											$2,501.61
CASWELL STREET	1074	1044	12	3	289.73	41.26	scale/mineral deposits at joint at 12 at 12 at medium		289.73	$2,303.35									
						53.71	scale/mineral deposits at joint from 07 to 04 o'clock medium												
						63.05	scale/mineral deposits at joint from 02 to 05 o'clock medium												
						100.59	scale/mineral deposits at joint from 09 to 03 o'clock medium												$2,303.35
CASWELL STREET	1087	1090	8	3	360.41	105.51	scale/mineral deposits at joint from 09 to 03 o'clock light		360.41	$2,612.97									
						107.62	scale/mineral deposits at joint from 01 to 03 o'clock light												
						Various	Roots												$2,612.97
CASWELL STREET	1087	1073	8	3	369.15	111.34	scale/mineral deposits at joint at 12 at 12 at light, START		369.15	$2,676.34									
						161.53	scale/mineral deposits at joint at 12 at 12 at light, END												
						179.30	scale/mineral deposits at joint from 06 to 10 o'clock light, START												
						241.25	Longitudinal Crack at joint, at 12 o'clock				1	$1,200.00							
						Various	Roots												$3,876.34
CASWELL STREET	1799	1132	15	6	303.09	204.20	Circumferential Crack at joint, from 02 to 10 o'clock				1	$1,200.00							
						207.71	Circumferential Crack at joint, from 01 to 11 o'clock				1	$1,200.00							$2,400.00
CASWELL STREET	1807	1802	6	3	352.58	27.27	Protruding Service> Cut out or dig up						1	$285.00			1	$150.00	
						141.05	Circumferential Crack at joint, from 10 to 02 o'clock				1	$1,200.00							
						161.03	scale/mineral deposits at joint from 05 to 07 o'clock medium												
						296.06	pipe Broken, from 10 to 03 o'clock				1	$1,200.00							
						Various	Roots		352.58	$2,556.21									$5,391.21
CASWELL STREET	1810	1133	8	3	256.00	112.64	scale/mineral deposits at joint at 12 at 12 at medium, START		256.00	$1,856.00									
						126.29	scale/mineral deposits at joint at 12 at 12 at medium												
						136.93	Protruding Service, cut out & seal						1	$285.00			1	$150.00	
							Note: Must seal from lower MH due to bends in pipe												$2,291.00
CASWELL STREET	1166	1167	8	3	89.24	23.89	Multiple Fractures at 12 at 12 at, START				1	$1,200.00							
						32.53	Multiple Fractures at 12 at 12 at, END				1	$1,200.00							
						58.23	pipe broken at joint, from 09 to 05 o'clock				1	$1,200.00							
						82.02	Multiple Cracks, at 12 at 12 at				1	$1,200.00							$4,800.00
CASWELL STREET	UPST	1044	8	12	168.15	26.00	scale/mineral deposits at joint at 12 at 12 at light		168.15	$479.23									
						112.94	scale/mineral deposits at joint from 08 to 04 o'clock light												$479.23
CEDAR STREET	974	973	8	12	195.86	56.32	service connection with infiltration running around, at 03 o'clock	0.50					1	$285.00					$285.00
CENTRAL STREET	1075	1073	8	3	258.01	46.78	scale/mineral deposits at joint from 06 to 12 o'clock heavy		258.01	$1,870.57									
						48.69	scale/mineral deposits at joint from 06 to 12 o'clock heavy												
						53.41	scale/mineral deposits at joint from 06 to 12 o'clock medium												
						59.03	scale/mineral deposits at joint from 07 to 04 o'clock heavy												
						61.24	scale/mineral deposits at joint at 12 at 12 at medium, START												
						66.86	scale/mineral deposits at joint at 12 at 12 at medium, END												
						90.25	scale/mineral deposits at joint from 06 to 01 o'clock heavy												
						112.24	scale/mineral deposits at joint from 12 to 04 o'clock medium												

Summary of Defects Pier Area

									NWMCC Recommended Rehabilitation Costs									
Street	From MH	To MH	Size	Joint Length	Section Length	Defect Station	Observation	Observed Infiltration GPM	Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Lining footage	MH to MH Lining cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
						121.38	Infiltration Running at joint at 07 o'clock	0.50											
						142.66	service connection with infiltration running inside, at 02 o'clock	1.00					1	$285.00					
						157.92	scale/mineral deposits at joint at 12 at 12 at medium												$2,155.57
CENTRAL STREET	1076	1075	8	3	238.64	67.46	Longitudinal Crack, at 12 o'clock				1	$1,200.00							
						155.11	Infiltration Running at joint from 07 to 09 o'clock	2.00	238.64	$1,730.14									
						201.19	scale/mineral deposits at joint from 09 to 03 o'clock medium												
						222.57	scale/mineral deposits at joint from 07 to 11 o'clock heavy												
						224.88	scale/mineral deposits at joint from 06 to 10 o'clock heavy												
						226.59	scale/mineral deposits at joint from 12 to 05 o'clock heavy												
						Various	Roots												$2,930.14
CENTRAL STREET	1077	1076	8	3	232.81	116.06	scale/mineral deposits at joint at 12 at 12 at heavy		232.81	$1,687.87									
						Various	Roots												$1,687.87
CENTRAL STREET	1080	1077	8	3	253.09	163.84	Circumferential Crack at joint, from 08 to 10 o'clock				1	$1,200.00							
						Various	Roots		253.09	$1,834.90									$3,034.90
CENTRAL STREET	1081	1080	8	3	265.04	Various	Roots		265.04	$1,921.54									
						15.26	Protruding Service, cut off & seal						1	$285.00			1	$150.00	$2,356.54
CONGDON STREET	1801	1014	8	3	360.00	88.35	Infiltration Dripping at joint at 11 o'clock, .25 in	0.50	360.00	$2,610.00									
						149.06	Circumferential Crack at joint, from 12 to 04 o'clock				1	$1,200.00							
						210.53	Circumferential Crack at joint, from 08 to 01 o'clock				1	$1,200.00							
						229.10	Infiltration Dripping at joint at 12 o'clock	0.25											
						Various	Roots												$5,010.00
CONGDON STREET	1017	1018	10	12	106.81	5.32	Circumferential Crack at joint, from 08 to 04 o'clock				1	$1,200.00							$1,200.00
CONGDON STREET	1802	1801	8	3	315.00	223.18	Infiltration Dripping at joint at 12 o'clock	0.25	315.00	$2,283.75									
						166.85	Protruding Service, cut off & seal						1	$285.00			1	$150.00	
						Various	Roots												$2,718.75
CONGDON STREET	1803	1802	8	3	250.00	Various	Roots		250.00	$1,812.50									
						73.69	Protruding Service, was cut off, seal						1	$285.00					$2,097.50
CONGDON STREET	1808	2133	8	3	141.86	58.73	pipe broken at joint, from 10 to 03 o'clock				1	$1,200.00							
							reinstate service connection & seal					$150.00	1	$285.00					
						89.35	scale/mineral deposits at joint at 12 at 12 at light		141.86	$1,026.49									
						92.06	scale/mineral deposits at joint at 12 at 12 at light												
						141.86	Clean out no Manhole, Install New Manhole										1	$5,000.00	$7,663.49
CONGDON STREET	1808	1020	8	3	379.88	99.49	scale/mineral deposits at joint from 05 to 05 o'clock medium		379.88	$2,754.13									
						101.70	scale/mineral deposits at joint from 06 to 09 o clock medium												
						127.50	scale/mineral deposits at joint from 03 to 09 o'clock medium												
						133.32	scale/mineral deposits at joint at 12 at 12 at medium, START												
						347.26	Circumferential Crack at joint, from 07 to 11 o'clock				1	$1,200.00							
						361.02	scale/mineral deposits at joint at 12 at 12 at medium, END												$3,954.13
CONTINENTAL STREET	1023	2132	6	3	195.06	5.02	Infiltration Running at joint from 10 to 02 o'clock	1.00	195.06	$1,414.19									
						18.37	scale/mineral deposits at joint at 12 at 12 at medium												
						51.60	scale/mineral deposits at joint at 12 at 12 at light, START												
						71.28	scale/mineral deposits at joint at 12 at 12 at light, END												
						165.75	Infiltration Running at joint at 08 o'clock	1.00											
						195.06	Clean out no Manhole, Install New Manhole										1	$5,000.00	$6,414.19
CONTINENTAL STREET	1023	1022	8	3	222.26	210.43	Circumferential Crack at joint, from 06 to 11 o'clock				1	$1,200.00							
						Various	Roots		222.26	$1,611.39									$2,811.39
DEBORAH STREET	1042	1036	8	3	332.00	189.64	Protruding Service, cut off & seal						1	$285.00			1	$150.00	
						215.75	Multiple Cracks, from 12 to 12 o'clock				1	$1,200.00							
						233.01	scale/mineral deposits at joint from 09 to 12 o'clock medium		332.00	$2,407.00									
						235.22	scale/mineral deposits at joint from 09 to 12 o'clock medium												
						325.58	Service connection with infiltration dripping inside at 03 o' clock	0.25					1	$285.00					
						Various	Roots												$4,327.00
FIFTH AVENUE	1084	1101	8	3	304.29	156.92	Circumferential Crack at joint, from 04 to 06 o'clock				1	$1,200.00							$1,200.00
FIFTH AVENUE	1079	2018	8	3	252.29	Various	Roots		252.29	$1,829.10									
						170.17	Protruding Service, cut off & seal						1	$285.00			1	$150.00	$2,264.10
FIFTH AVENUE	1079	1080	8	3	301.27	Various	Roots		301.27	$2,184.21									$2,184.21

Summary of Defects Pier Area

Street	From MH	To MH	Size	Joint Length	Section Length	Defect Station	Observation	Observed Infiltration GPM	NWMCC Recommended Rehabilitation Costs: Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Lining footage	MH to MH Lining cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
FIFTH AVENUE	1084	2016	8	3	230.00	Various	Roots		230.00	$1,667.50									$1,667.50
FRANK LOW STREET	1806	1803	6	3	321.02	Various	Roots		321.02	$2,327.40									$2,327.40
KINGSTON ROAD	1088	1090	8	3	265.00	6.22	scale/mineral deposits at joint at 12 at 12 at medium, START		265.00	$1,921.25									
						11.85	Infiltration Running at joint from 04 to 08 o'clock	4.00											
						47.69	Circumferential Crack at joint, from 09 to 02 o'clock												
						47.69	Offset Joint 3" unable to repair by non dig methods											$3,000.00	
						47.69	Infiltration Running at joint at 09 o'clock	2.00											
						Various	Roots												$4,921.25
KINGSTON ROAD	1089	1091	8	2	232.51	7.73	pipe broken at joint, from 04 to 08 o'clock				1	$1,200.00							
						108.93	Circumferential Crack at joint, from 08 to 11 o'clock				1	$1,200.00							
						167.93	Broken pipe at joinlat joint, from 05 to 08 o'clock				1	$1,200.00							
						Various	Roots		232.51	$2,685.49									$6,285.49
KINGSTON ROAD	1091	1092	8	2	230.60	37.95	Circumferential Crack at joint, from 11 to 01 o'clock				1	$1,200.00							
						44.37	Circumferential Crack at joint, from 06 to 10 o'clock				1	$1,200.00							
						135.93	Infiltration Running at joint at 08 o'clock	2.00	230.60	$2,663.43									
						148.18	Infiltration Running at joint from 04 to 08 o'clock	3.00											
						200.19	Service Connection broken inside										1	$1,500.00	
						203.60	Infiltration Running at joint at 09 o'clock	2.00											
						205.51	Circumferential Crack at joint, from 04 to 08 o clock with infiltration	0.50			1	$1,200.00							$7,763.43
KINGSTON ROAD	1100	1088	8	3	472.25	5.12	Circumferential Crack at joint, from 09 to 05 o'clock				1	$1,200.00							
						5.12	Infiltration Running at joint at 04 o'clock	2.00	472.25	$3,423.81									
						5.42	Infiltration Running at joint from 04 to 08 o'clock	2.00											
						9.34	Infiltration Running at joint from 03 to 09 o'clock	2.00											
						11.24	Infiltration Running at joint at 03 o'clock	2.00											
						65.16	Circumferential Crack at joint, from 06 to 09 o'clock				1	$1,200.00							
						110.03	Circumferential Crack at joint, from 12 to 06 o'clock				1	$1,200.00							
						145.17	Circumferential Crack at joint, from 06 to 10 o'clock				1	$1,200.00							
						167.36	Circumferential Crack at joint, from 01 to 05 o'clock				1	$1,200.00							
						194.16	Longitudinal Crack at joint, at 01 o clock				1	$1,200.00							
						242.85	Infiltration Running at joint from 04 to 08 o'clock	2.00											
						333.11	Circumferential Crack at joint, from 04 to 06 o'clock				1	$1,200.00							
						413.22	Infiltration Running at joint from 04 to 05 o'clock	2.00											
						421.55	Infiltration Running at joint from 04 to 08 o'clock	2.00											
						433.90	Infiltration Running at joint from 04 to 08 o'clock	2.00											
						440.03	Infiltration Running at joint at 05 o'clock	1.00											
						460.51	scale/mineral deposits at joint from 06 to 10 o'clock medium												
						462.81	scale/mineral deposits at joint from 06 to 10 o'clock medium												
						Various	Roots												$11,023.81
KINGSTON ROAD	1101	1100	8	3	252.59	31.93	Infiltration Running at joint at 09 o'clock	1.00	252.59	$1,831.28									
						46.56	Infiltration Running at joint at 09 o'clock	1.00											
						Various	Roots												$1,831.28
KINGSTON ROAD	1102	1101	8	3	155.41	5.02	Circumferential Crack at joint, from 03 to 06 o'clock				1	$1,200.00							$1,200.00
KINGSTOWN ROAD	1105	1104	8	3	49.29	37.35	scale/mineral deposits at joint from 02 to 05 o'clock light		49.29	$357.35									
						40.26	scale/mineral deposits at joint at 12 at 12 at light												
						43.57	scale/mineral deposits at joint at 12 at 12 at light												
						Various	Roots												$357.35
KINGSTOWN ROAD	1105	1114	8	3	199.48	25.10	Longitudinal Crack at joint, at 05 o clock				1	$1,200.00							
						109.43	scale/mineral deposits at joint at 12 at 12 at light		199.48	$1,446.23									
						130.11	scale/mineral deposits at joint at 12 at 12 at light												
						142.36	scale/mineral deposits at joint at 12 at 12 at light, START												
						152.70	scale/mineral deposits at joint at 12 at 12 at light, END												
						199.48	Clean out no Manhole, Install New Manhole										1	$5,000.00	
																			$7,646.23
KINGSTOWN ROAD	1104	1103	8	3	151.49	6.22	scale/mineral deposits at joint at 12 at 12 at light		151.49	$1,098.30									
						9.44	scale/mineral deposits at joint at 12 at 12 at light, START												
						21.89	scale/mineral deposits at joint at 12 at 12 at light, END												
						37.95	pipe Broken, from 04 to 08 o'clock				1	$1,200.00							
						38.95	pipe broken at joint, from 04 to 07 o'clock												
						84.43	Circumferential Crack at joint, from 03 to 09 o'clock				1	$1,200.00							
						100.09	Circumferential Crack at joint, from 04 to 07 o'clock				1	$1,200.00							
						126.40	Circumferential Crack at joint, from 04 to 07 o'clock				1	$1,200.00							
																			$5,898.30
MEMORIAL SQUARE	1058	1060	18	3	199.07	95.57	service connection with infiltration running around, at 02 o'clock	1.00					1	$285.00					$285.00

Summary of Defects Pier Area

									NWMCC Recommended Rehabilitation Costs									
Street	From MH	To MH	Size	Joint Length	Section Length	Defect Station	Observation	Observed Infiltration GPM	Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Lining footage	MH to MH Lining cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
NARRAGANSETT AVENUE	1121	1120	8	3	229.48	138.94	scale/mineral deposits at joint from 02 to 06 o'clock medium		229.48	$1,663.73									
						141.96	scale/mineral deposits at joint at 12 at 12 at light, START												
						159.53	scale/mineral deposits at joint at 12 at 12 at light, END												
						170.77	scale/mineral deposits at joint from 04 to 07 o'clock medium												
						172.58	scale/mineral deposits at joint at 12 at 12 at light, START												
						224.18	scale/mineral deposits at joint at 12 at 12 at light, END												
						224.78	Pipe size change to 6" inspection abandon field check for access												$1,663.73
NARRAGANSETT AVENUE	1121	1123	8	3	252.09	194.66	Circumferential Crack at joint, from 06 to 09 o clock				1	$1,200.00							$1,200.00
NARRAGANSETT AVENUE	1123	1126	8	3	411.21	221.87	service connection capped with infiltration dripping inside, at 01 o'clock	0.25					1	$285.00					$285.00
NARRAGANSETT AVENUE	1126	1130	8	3	349.07	133.00	scale/mineral deposits at joint at 3 at 9 at light		349.07	$2,530.76									
						139.00	scale/mineral deposits at joint at 9 at 6 at light												
						213.54	Circumferential Crack, from 12 to 06 o'clock				1	$1,200.00							
							reinstate service connection					$150.00							
						306.00	Circumferential Crack at joint, from 07 to 11 o'clock				1	$1,200.00							$5,080.76
NARRAGANSETT AVENUE	1131	1130	8	3	344.55	5.42	Circumferential Crack, at 12 at 12 at				1	$1,200.00							
						Various	Roots		344.55	$2,497.99									$3,697.99
NARRAGANSETT AVENUE	1164	1160	10	3	170.67	5.92	Multiple Fractures at 12 at 12 at								170.67	$14,506.95			
						35.24	Circumferential Crack at joint, from 01 to 05 o'clock												
						40.96	Longitudinal Crack at joint, at 11 o'clock												
						48.49	Longitudinal Crack, at 12 o'clock, START												
						65.06	Longitudinal Crack, at 12 o'clock, END												
						73.89	Multiple Cracks, at 12 at 12 at, START												
						98.29	Multiple Cracks, at 12 at 12 at, END												
						113.95	Multiple Cracks, from 09 to 04 o'clock, START												
						157.90	intruding service at 01 o' clock cut off										1	$150.00	
						169.67	Multiple Cracks, at 12 at 12 at, END												$14,656.95
OCEAN ROAD	969	971	8	3	367.04	245.96	break in service connection at 12 o'clock with infiltration running around	5.00					1	$285.00					
						267.35	service connection with infiltration running around, at 10 o'clock	0.50					1	$285.00					
						341.14	service connection with infiltration running around, at 10 o'clock	0.50					1	$285.00					$855.00
OCEAN ROAD	1008	1009	12	3	268.35	89.25	Circumferential Crack at joint, from 03 to 06 o'clock				1	$1,200.00							
						220.26	Circumferential Crack, at 12 at 12 at				1	$1,200.00							
							reinstate service connection					$150.00							$2,550.00
OCEAN ROAD	1009	1019	12	3	264.14	20.48	Longitudinal Crack at joint, at 12 o'clock				1	$1,200.00							
							reinstate service connection					$150.00							
						56.62	Longitudinal Crack at joint, at 12 o'clock				1	$1,200.00							
							reinstate service connection					$150.00							$2,700.00
OCEAN ROAD	1020	71	12	3	63.95	48.19	Longitudinal Crack, at 12 o clock				1	$1,200.00							
						49.59	Circumferential Crack, at 12 at 12 at												$1,200.00
OCEAN ROAD	1028	71	12	3	326.38	173.88	Infiltration Running at joint at 12 o'clock	2.00	326.38	$2,594.72									$2,594.72
OCEAN ROAD	1029	1028	12	3	201.69	55.22	Circumferential Crack, from 06 to 11 o'clock				1	$1,200.00							$1,200.00
OTHMAR STREET	1173	1174	8	3	223.46	Various	Roots		223.46	$1,620.09									$1,620.09
ROBINSON STREET	1085	1100	8	3	335.20	171.47	Circumferential Crack at joint, from 03 to 09 o'clock				1	$1,200.00							
						188.14	Longitudinal Crack at joint, at 09 o'clock				1	$1,200.00							
						Various	Roots		335.20	$2,430.20									$4,830.20
ROBINSON STREET	1078	2019	8	3	201.39	Various	Roots		201.39	$1,460.08									
						29.6	service connection with roots, at 02 o'clock leaking	0.50					1	$285.00					
						201.39	Clean out no Manhole, Install New Manhole										1	$5,000.00	$6,745.08
ROBINSON STREET	1127	1100	8	3	301.87	11.75	Circumferential Crack at joint, from 03 to 09 o'clock				1	$1,200.00							
						80.52	Circumferential Crack at joint, from 03 to 09 o'clock				1	$1,200.00							
						152.60	Circumferential Crack at joint, from 01 to 06 o'clock				1	$1,200.00							
						235.22	Circumferential Crack at joint, from 03 to 09 o'clock				1	$1,200.00							
						Various	Roots		301.87	$2,188.56									$6,988.56
ROCKLAND STREET	1043	2020	8	3	214.83	25.40	scale/mineral deposits at joint from 12 to 12 o'clock heavy		214.83	$1,557.52									
						53.61	scale/mineral deposits at joint from 12 to 12 o'clock heavy												
						214.83	Clean out no Manhole, Install New Manhole										1	$5,000.00	$6,557.52

Summary of Defects Pier Area

									NWMCC Recommended Rehabilitation Costs										
Street	From MH	To MH	Size	Joint Length	Section Length	Defect Station	Observation	Observed Infiltration GPM	Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Lining footage	MH to MH Lining cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
ROCKLAND STREET	1086	1088	8	3	351.27	135.33	scale/mineral deposits at joint at 12 at 12 at light		351.27	$2,546.71									
						221.47	scale/mineral deposits at joint from 12 to 05 o'clock light												
						244.16	scale/mineral deposits at joint at 12 at 12 at light												
						278.29	scale/mineral deposits at joint at 12 at 12 at medium												
						287.53	scale/mineral deposits at joint at 12 at 12 at medium, START												
						345.76	scale/mineral deposits at joint at 12 at 12 at medium, END												$2,546.71
RODMAN STREET	1040	1041	8	3	254.10	116.76	Circumferential Crack at joint, from 02 to 05 o'clock				1	$1,200.00							
						162.64	Circumferential Crack at joint, from 02 to 04 o'clock				1	$1,200.00							
						180.81	Circumferential Crack at joint, from 02 to 05 o'clock				1	$1,200.00							
						Various	Roots		254.10	$1,842.23									$5,442.23
RODMAN STREET	1040	2017	8	3	159.53	159.43	Infiltration Seeping at joint from 01 to 02 o'clock, .25 in	0.50	159.53	$1,156.59									
						159.53	Clean out no Manhole, Install New Manhole										1	$5,000.00	$6,156.59
RODMAN STREET	1041	1042	8	3	237.73	29.11	Infiltration Running at joint at 04 o'clock	1.00	237.73	$1,723.54									
						65.96	pipe Broken, from 03 to 07 o'clock				1	$1,200.00							$2,923.54
RODMAN STREET	1042	1043	8	3	236.73	56.52	Infiltration Running at joint at 09 o'clock	1.00	236.73	$1,716.29									
						78.71	Infiltration Seeping at joint at 08 o'clock	0.25											
						119.27	Infiltration Seeping at joint at 09 o'clock	0.50											
						125.39	Infiltration Running at joint at 09 o'clock	1.00											
						131.62	Infiltration Seeping at joint at 09 o'clock	0.25											
						162.94	scale/mineral deposits at joint from 07 to 07 o'clock medium												
						166.25	scale/mineral deposits at joint from 07 to 11 o'clock medium												
						179.40	scale/mineral deposits at joint from 12 to 12 o'clock heavy												
						182.21	scale/mineral deposits at joint from 12 to 12 o'clock light												
						188.54	scale/mineral deposits at joint from 12 to 12 o'clock light												$1,716.29
RODMAN STREET	1043	1044	10	3	255.20	22.69	broken pipe, from 4 to 7 o' clock, heavy				1	$1,200.00							
						48.79	scale/mineral deposits at joint from 12 to 04 o'clock light		255.20	$2,028.84									
						55.82	scale/mineral deposits at joint from 11 to 04 o'clock light												
						59.83	scale/mineral deposits at joint from 02 to 06 o'clock light												
						64.45	scale/mineral deposits at joint from 12 to 12 o'clock light												
						77.30	scale/mineral deposits at joint from 12 to 12 o'clock medium, START												$3,228.84
SOUTH PIER ROAD	991	992	8	12	178.70	61.74	scale/mineral deposits medium from 07 to 11 o'clock from hole in pipe				1	$1,200.00							$1,200.00
SOUTH PIER ROAD	992	993	8	12	261.02	81.22	Infiltration Running from shear break 06 to 08 o'clock	1.00			1	$1,200.00							$1,200.00
SUMMER STREET	1801	1804	8	12	147.38	121.68	Circumferential Crack, from 11 to 01 o'clock				1	$1,200.00							
							pipe changes to 6" check for access to upstream MH for repair												$1,200.00
WATSON AVENUE	1083	1103	8	5	420.24	27.41	Circumferential Crack at joint, at 12 at 12 at				1	$1,200.00							
						236.53	Circumferential Crack at joint, from 05 to 06 o'clock				1	$1,200.00							
						270.66	scale/mineral deposits at joint from 01 to 05 o'clock light		420.24	$1,928.90									
						329.99	intruding service leaking around service												
							cut intruding service 329 and seal						1	$285.00			1	$150.00	
						415.23	broken pipe at joint				1	$1,200.00							
						vairous	roots												$5,963.90

Total footage defective pipe 17641.76

Summary of Items and Costs

	Observed Infiltration GPM	Test & Seal footage	Test & Seal cost	Short Line units	Short Line cost	Seal SC units	Seal SC cost	MH to MH Line footage	MH to MH Line cost	Excavate & Repair Units	Excavate & Repair cost	Total Costs
Totals	56.35	13687.59	$99,978.62	67.00	$81,150.00	19.00	$5,415.00	170.67	$14,506.95	18.00	$38,850.00	$239,900.57

Gallons per day observed 81,144.00 GPD

APPENDIX D

Sewer Ordinance

Division 7. Service Connections

Sec. 78-156. Ownership.
Sec. 78-157. Application.
Sec. 78-158. Location.
Sec. 78-159. Time of installation.
Sec. 78-160. Size.
Sec. 78-161. Meter setting and location.
Sec. 78-162. Turning of water on or off.
Sec. 78-163. Meter.
Sec. 78-164. Frozen meters; responsibility for cost of repair or replacement.
Sec. 78-165. Temporary services.
Sec. 78-166. Access.
Sec. 78-167. Charges.
Secs. 78-168—78-180. Reserved.

Division 8. Hydrants

Sec. 78-181. Installation.
Sec. 78-182. Obstruction.
Sec. 78-183. Private fire hydrants.
Sec. 78-184. Damage claim.
Sec. 78-185. Use.
Sec. 78-186. Charges.
Secs. 78-187—78-200. Reserved.

Division 9. Backflow Prevention

Sec. 78-201. Generally.
Sec. 78-202. Services for which backflow prevention devices are required.
Sec. 78-203. Costs; ownership of devices.
Sec. 78-204. Access to property.
Sec. 78-205. Permit required.
Sec. 78-206. Customer's responsibility.
Sec. 78-207. Technical standards.
Secs. 78-208—78-220. Reserved.

Division 10. Penalties

Sec. 78-221. Violations.
Sec. 78-222. Fines; penalties; imprisonment.
Sec. 78-223. Liability for loss and damage.
Secs. 78-224—78-245. Reserved.

Article III. Sewers

Division 1. Generally

Sec. 78-246. Authority.
Sec. 78-247. Definitions.
Sec. 78-248. Use of public sewers required.

Sec. 78-249. Protection from damage.
Sec. 78-250. Penalties for violation of article.
Secs. 78-251—78-265. Reserved.

Division 2. Administration

Sec. 78-266. Right of entry of inspectors.
Secs. 78-267—78-280. Reserved.

Division 3. Rates and Charges

Sec. 78-281. User charges.
Sec. 78-282. Assessments.
Sec. 78-283. Sewer fee schedule.
Sec. 78-284. Annual permit fees; permit application fees; annual monitoring fees for commercial/industrial users.
Secs. 78-285—78-300. Reserved.

Division 4. Sewer Fund

Sec. 78-301. Established.
Sec. 78-302. Tax collector to issue bills and make collections.
Sec. 78-303. Separate account.
Secs. 78-304—78-320. Reserved.

Division 5. Main and Building Sewer Connections

Sec. 78-321. Permit.
Sec. 78-322. Drainlayers.
Sec. 78-323. Liability of property owners and developers.
Sec. 78-324. Costs and expenses of installation for building sewers.
Sec. 78-325. Separate sewer for each building; exception.
Sec. 78-326. Use of old building sewers.
Sec. 78-327. Standards for installation and connections; generally.
Sec. 78-328. Procedure for removing sewage when drain is inadequate.
Sec. 78-329. Stormwater and groundwater connections.
Sec. 78-330. Inspections.
Sec. 78-331. Barricades; replacement of excavations.
Sec. 78-332. Cleanouts.
Sec. 78-333. Construction by private parties; cost recovery.
Secs. 78-334—78-350. Reserved.

Division 6. Use Regulations

Sec. 78-351. Discharge of stormwater, surface water and other waters.
Sec. 78-352. Prohibited discharges; generally.
Sec. 78-353. Compliance and enforcement.
Sec. 78-354. Interceptors.
Sec. 78-355. Control manhole.
Sec. 78-356. Monitoring equipment and records.
Sec. 78-357. Standards for tests and measurements.
Sec. 78-358. Protection from accidental discharge, slug or noncompliant discharges.

Sec. 78-359. Dilution of discharge.
Sec. 78-360. Federal standards.
Sec. 78-361. Discharges; changes in volume and character.
Sec. 78-362. Wastewater discharge permit; requirements and conditions.
Sec. 78-363. Permit suspension or revocation.
Sec. 78-364. User data and information to be public; exception.
Secs. 78-365—78-380. Reserved.

Division 7. Storm Drains and Connections

Sec. 78-381. Permit.
Sec. 78-382. Restrictions.
Sec. 78-383. Standards for installation and connections; generally.
Sec. 78-384. Inspections.
Sec. 78-385. Barricades; replacement of excavations.
Sec. 78-386. Costs and expenses of installation for storm drains.
Sec. 78-387. Liability of property owners and developers.
Secs. 78-388—78-400. Reserved.

Division 8. Sewer Lot Development Fee

Sec. 78-401. Statement of purpose.
Sec. 78-402. Levied.

(e) The installation of a residential dual check valve may result in a potential closed plumbing system. Each customer shall make provisions for thermal expansion within his closed loop system by installing a thermal expansion device and/or pressure relief valves.
(Code 1986, § 20-192)

Secs. 78-208—78-220. Reserved.

DIVISION 10. PENALTIES

Sec. 78-221. Violations.

Any person found in violation of any provision of this article shall be served by the town with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof, notwithstanding the provisions of section 78-49.
(Code 1986, § 20-201)

Sec. 78-222. Fines; penalties; imprisonment.

Any person who shall continue any violation beyond the time limit provided for in section 78-221 shall be subject to a fine, penalties, and/or imprisonment consistent with section 18-28 of the Code of Ordinances for each violation. Each day in which such violation shall continue shall be deemed a separate offense.
(Code 1986, § 20-202)

Sec. 78-223. Liability for loss and damage.

Any person violating any of the provisions of this article shall become liable, in addition to any fines or imprisonment imposed, to the town for any expense, loss or damage occasioned the town by reason of such violation.
(Code 1986, § 20-203)

Secs. 78-224—78-245. Reserved.

ARTICLE III. SEWERS*

DIVISION 1. GENERALLY

Sec. 78-246. Authority.

The authority for this article can be found in part in the G.L. 1956, §§ 45-6-2.3 and 46-12-23.
(Code 1986, § 20-374)

*__State law reference__—Sewage, G.L. 1956, § 45-14-1 et seq.

Sec. 78-247. Definitions.

(a) The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Applicant or *customer* means the owner as defined in this section, as it applies to building connections and any charges or fees including user fees, and may mean the lessee or user of the property when some commercial or industrial use is involved that requires testing, analyses, monitoring, metering, pretreatment and/or usage surcharges.

Authorized representative means:

(1) A principal executive officer of at least the level of vice-president, if the user is a corporation;

(2) A general partner or proprietor;

(3) A duly authorized representative of the individual designated above if such representative is responsible for the overall operation of the facilities from which the discharge originates.

BOD (biochemical oxygen demand) means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five days at 20 degrees Celsius, expressed in milligrams per liter.

Building drain means that part of the lowest horizontal piping of a drainage system which receives the discharge from soil waste, and other sanitary drainage pipes inside the walls of the building and conveys it to the building sewer, beginning five feet outside the inner face of the building wall.

Building sewer means the extension from the building drain to the public sewer or other place of disposal.

Categorical standards means the national categorical pretreatment standards and pollutant discharge limits as promulgated by EPA which apply to a specific category of industrial users.

Categories of commercial/industrial users means:

(1) *Category 1:* Commercial/industrial users discharging or having the potential of discharging conventional (BOD_5 and TSS) pollutant concentrations in excess of 250 mg/l.

(2) *Category 2:* Commercial/industrial users discharging production processing wastewater or using solvents, toxic chemicals and/or hazardous chemicals that could potentially be discharged into the sewers.

(3) *Category 3:* Commercial/industrial users discharging or having the potential to discharge concentrations of oil and grease and other solids which may cause interference with the collection system or at the treatment facility.

(4) *Category 4:* Commercial/industrial users with only sanitary wastes and/or nontoxic discharges.

COD (chemical oxygen demand) means the oxygen equivalent consumed by organic matter in a sample during strong chemical oxidation.

Combined sewer means a sewer receiving both surface runoff and sewage. This type of sewer is normally disallowed.

Commercial unit means each unit of a commercial building separated by vertical walls and having wastewater facilities, or each floor of a multistoried commercial building having wastewater facilities.

Composite sample means a combination of individual samples of wastewater taken at selected intervals for some specified period of time in order to minimize the effect of the variability of the sample stream. Individual samples may have equal volumes or may be proportioned to the flow at the time of sampling.

Domestic wastes means liquid wastes from the noncommercial preparation, cooking and handling of food; or containing human excrement and similar matter from the sanitary conveniences of dwellings, commercial buildings, industrial facilities and institutions. It shall not contain groundwater, stormwater, surface water, cooling water or industrial wastewater.

Drainlayer means a person who has a valid drainlayer's license issued by the town.

Environmental protection agency (EPA) means the United States Environmental Protection Agency or, where appropriate, the administrator or other duly authorized official of such agency.

Floatable oil means oil, fat or grease in a physical state such that it will separate by gravity from wastewater by treatment in an approved pretreatment facility. A wastewater shall be considered free of floatable oil if it is properly pretreated prior to entry into the sewage facilities and does not interfere with the sewage facilities.

Garbage means solid wastes from the domestic and commercial preparation, cooking and dispensing of food and from the handling, storage and sale of produce.

Grab sample means a sample which is taken from a waste stream on a one-time basis without regard for the flow in the waste stream and without consideration of time.

Industrial user means any user that discharges industrial waste as defined in this section to the town's wastewater facilities.

Industrial wastes means the liquid wastes from industrial manufacturing processes, trade or business as distinct from domestic sanitary sewage.

Infectious waste means 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:

(1) *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 a nonabsorbed liquid form in more than trace quantities.

(2) *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.

(3) *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.

(4) *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.

(5) *Pathological waste* consists of tissues, organs, body parts, removed during surgery and autopsy.

Infectious waste treatment means any method, technique, or process designed to eliminate the infectious hazard, i.e., to change the biological character or composition of waste so as to remove any disease-causing potential and to render such waste noninfectious by killing the infectious agents present in the waste.

Interference means any inhibition or disruption of the treatment processes or operations which may contribute to a violation of any provision of the town's state pollutant discharge elimination system (RIPDES) permit or the RIPDES permit issued to the Town of South Kingstown for their operation of the regional wastewater treatment facilities.

ISDS means an individual sewage disposal system permitted by the state department of the environment.

Mg/l means milligrams per liter.

Natural outlet means any outlet into a watercourse, pond, ditch, lake or other body of surface water or groundwater.

Owner means any person who, alone or jointly, has a legal title to any premises, or has control of any premises, such as an agreement to purchase, agent, executor, administrator, trustee, lessee or guardian of the estate or a holder of a legal title.

Person means an individual, trust, firm, joint stock company, corporation (including a quasi-government corporation), partnership, association, syndicate, municipality, municipal or

state agency, fire district, club, nonprofit agency or any subdivision, commission, department, bureau, agency or department of state of federal government (including quasi-government corporation) or of any interstate body.

pH means the logarithm of the reciprocal of the concentration of hydrogen ions in moles per liter of solution.

Pretreatment means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater to a less harmful 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 geological, except as prohibited by 40 CFR 403.6(d).

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.

Properly shredded garbage means the wastes from the preparation, cooking, and dispensing of food that have been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half inch in any dimension.

Public sewer means a sewer in which all owners of abutting properties have equal rights and is controlled by public authority, to the extent that such sewer and appurtenances are located within publicly owned rights-of-way and/or within dedicated sewer easements.

Rhode Island Pollutant Discharge Elimination System (RIPDES) means the state system for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing discharge permits and imposing and enforcing pretreatment requirements pursuant to G.L. 1956, § 46-12-1 et seq. and the Clean Water Act, 33 USC 1251 et seq.

Sanitary sewer means a sewer which carries sewage and to which stormwater, surface water and groundwater are not intentionally admitted.

Sanitary sewer force main means a pipe or conduit under pressure which carries wastewater and to which stormwater, surface water and groundwater are not intentionally admitted.

Septage waste means the wastewater from a domestic individual sewage disposal system.

Sewage and *wastewater* mean a combination of the water-carried wastes from residences, business buildings, institutions and industrial establishments, together with such groundwater, surface water and stormwater as may be unintentionally present.

Sewage treatment plant means any arrangement of devices and structures used for treating sewage or wastewater.

Sewage works means all facilities for collecting, pumping, treating and disposing of sewage or wastewater.

Sewer means a pipe or conduit for carrying wastewater.

Shall is mandatory; *may* is permissive.

Significant industrial user means any industry:

(1) That is subject to categorical standards as defined by the Environmental Protection Agency; and/or

(2) That discharges a nondomestic wastestream greater than or equal to 25,000 gallons per day (0.025 mgd); and/or

(3) That contributes a nondomestic wastestream which makes up five percent or more of the average dry weather hydraulic or organic (BOD, suspended solids, etc.) capacity of the treatment plant; and/or

(4) That has a reasonable potential, in the opinion of the town, to adversely affect the wastewater treatment plant (inhibition, interference, pass-through of pollutants, sludge contamination, or endangerment of treatment plant workers); and/or

(5) Whose wastewater concentration of BOD and suspended solids exceeds 250 mg/l; and/or

(6) Discharging prohibited pollutants but is not subject to federal EPA categorical standards; and/or

(7) With sanitary or nontoxic discharges using solvents, toxic chemicals and/or hazardous chemicals that could potentially be discharged into the sewers.

Slug means any discharge of water, sewage or industrial waste which, in concentration of any given constituent or in quantity of flow exceeds for any period of duration longer than 15 minutes, more than five times the average 24-hour concentration of flows during normal operation.

Storm drain (storm sewer) means a sewer which carries stormwater and surface water and drainage, but excludes sewage and industrial wastes, other than unpolluted cooling water.

Suspended solids means solids that either float on the surface of, or are in suspension in water, sewage or other liquids and which are removable by laboratory filtering.

Town means the town, or any duly authorized representative of the town, including the town engineer and the wastewater superintendent.

Toxic means any substance listed as toxic under section 307(a)(1) of the Clean Water Act, as amended, 33 USC 1251 et seq., listed under the Hazardous Substances Right-to-Know Act, G.L. 1956, § 28-21-1 et seq., and as may otherwise be designated by the town.

Unpolluted drainage means drainage from any catch basin, lake, pond, swamp, swimming pool, outlet for surface runoff or groundwater which contains no wastes or wastewaters.

User means any person as defined in this section who contributes, causes or permits, directly or indirectly, the introduction of wastewater into the town's wastewater facilities.

Wastewater facilities and *town's wastewater facilities* mean the structures, pipes, equipment and processes that collect, transport and treat domestic, commercial and industrial wastewa-

ter, and dispose of the waste residuals. The terms shall apply to both the regional wastewater treatment facilities operated by the Town of South Kingstown and the Scarborough wastewater treatment facilities operated by the Town of Narragansett.

Watercourse means a channel in which a flow of water occurs, either continuously or intermittently.

(b) Terms not otherwise defined in this section shall be as adopted in the most recent edition of "Standard Methods for Examination of Water and Wastewater," published by the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation; 40 CFR 403 and 40 CFR 408.
(Code 1986, § 20-211)

Cross reference—Definitions generally, § 1-2.

Sec. 78-248. Use of public sewers required.

(a) It shall be unlawful for any person to place, deposit or permit to be deposited in any unsanitary manner on public or private property within the town or in any area under the jurisdiction of the town, any human or animal excrement, garbage or other objectionable waste creating a nuisance or health hazard.

(b) It shall be unlawful to discharge to any natural outlet within the town or into or in close proximity to any of the tidewaters of the town or in any area under the jurisdiction of the town, any garbage, sewage or other polluted water, except where suitable treatment has been provided in accordance with the provisions of this article, and except where the appropriate federal or state pollutant discharge elimination system permit has been received. A valid copy of any such permit and any modifications thereto must be filed with the town.

(c) The owner of all houses, buildings or properties used for human occupancy, employment, recreation or other purposes, situated within the town, shall be required at his expense to install suitable toilet facilities therein in accordance with the Rhode Island State Building Code, Plumbing Code Regulation SBC-3, January 1, 1992, as amended. Where allowed and/or required pursuant to the current town facilities plan for wastewater management, and/or current sewer policy, and/or applicable ordinance, resolution or town council adopted policy or program, such owner is hereby required to connect such facilities directly to the closest available public sewer, as determined by the town, in accordance with the provisions of this article. The time allowed for such connections shall be 90 days after the date of official notice to do so, unless otherwise stipulated by the town council. If such house, building or property had been previously serviced by an individual sewage disposal system (ISDS), upon connection to the public sewer such ISDS shall be abandoned, and the septic tank shall be pumped out, cleaned and filled with suitable material.

(d) The owner of all houses, buildings or properties used for human occupancy, employment, recreation or other purposes, situated within the town, wherein subsection (c) of this section is not applicable, shall install at his expense suitable toilet facilities therein and shall connect the same to an individual sewage disposal system (ISDS) as approved by the state department

of the environment. Except as provided for in this subsection or in subsection (e) of this section, it shall be unlawful to construct, operate or maintain an ISDS or other such facility intended or used for the disposal of sewage.

(e) The owner of an individual sewage disposal system shall have such system pumped out at his own expense at least once every four years and furnish proof of same to the building inspector's office. The owner of an ISDS shall maintain such system in proper working condition in accordance with existing regulations. Septic tanks shall remain accessible at all times and any impervious surfaces covering an ISDS is prohibited. The use of any septic tank additives and the disposal of hazardous waste is prohibited as is garbage disposal unit discharges except for existing units. The owner shall abide by all conditions for installation required under the applicable provisions of the zoning ordinance, environmental overlay districts section.

(f) All sewers meeting the standards of the town in public or private streets connected to a public sewer shall be public sewers within the meaning of this article and be subject to all the rules and regulations of this article and of the town. All existing sewers or building sewers connected to public sewers shall be subject to all the rules and regulations of this article and the town.
(Code 1986, § 20-212)

Sec. 78-249. Protection from damage.

No person shall maliciously, willfully or negligently break, damage, destroy, uncover without authorization, deface or tamper with any structure, appurtenance or equipment which is a part of the drainage system or sewage works. Any person convicted of violating the provisions of this section shall be subject to the penalties set forth within this article, as well as be responsible for all costs associated with any replacement or repair work caused by such damage.
(Code 1986, § 20-213)

Sec. 78-250. Penalties for violation of article.

(a) Any person found to be violating any provision of this article shall be served by the town with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction of such violation. The offender shall, within the period of time stated in such notice, permanently cease all violations. Subsequent actions taken by the town may include:

(1) The issuance of a complaint and summons to appear in the town municipal court;

(2) Suspension of wastewater service;

(3) Issuance of an order or compliance schedule pursuant to section 78-353;

(4) Revocation of discharge permit (if applicable);

(5) Termination of wastewater service;

(6) Assessment of costs as defined in this section, penalties and/or fines.

(b) Any person who shall continue any violation beyond the time limited provided or in subsection (a) of this section shall be guilty of an ordinance violation and shall be subject to a fine. The amount of the fine shall be based upon the severity of the violation as determined by the town and the compliance action required by the town to ensure that the violation is corrected. Violations that present an immediate hazard to the public and/or to the safety and operations of the wastewater facilities will be subject to a fine in an amount not to exceed $5,000.00 for each violation. Each day in which any such violation shall continue shall be deemed a separate offense.

(c) Any person violating any of the provisions of this article shall become liable to the town for any expense, loss or damage, including the costs of litigation occasioned the town by reason of such violation.

(d) Notwithstanding any of the provisions of this section, the town may institute any appropriate action, including requests for injunctive relief or other proceedings to prevent, restrain or abate violations of this article. Such action may include, when the town determines that any violation presents or would present an operational hazard to the wastewater facilities, the issuance of a written notice of suspension of wastewater service. Any person notified of a suspension of the wastewater treatment service and/or their wastewater discharge permit shall immediately stop or eliminate their discharge and/or cease the violations stipulated therein. 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, at no cost to the town, to prevent or minimize damage to the wastewater facilities or harm to any individuals. The town may reinstate the wastewater discharge permit and/or the wastewater treatment service upon proof of the elimination of the noncomplying discharge and payment for any expenses or damages resulting from the discharge of those wastes. A detailed written statement submitted by the user describing the causes of the harmful contribution and the measures taken to prevent future occurrence shall be submitted to the town within 30 days of the date of occurrence. In the event of an emergency situation, the town is required only to give verbal notice in order to immediately and effectively halt a discharge which presents an imminent danger to the town's facilities, the environment, or the health and welfare of persons.

(e) If any person discharges industrial wastes or other wastes into the town's wastewater facilities contrary to the provisions of this article, any federal or state pretreatment requirements, or any order of the town, the town solicitor may commence legal action for injunctive relief in the superior court. Nothing in this article shall be construed to limit the right of the town to enforce, or avail themselves of the benefits of any and all other applicable laws and ordinances.

(f) Sewer maintenance expenses which result from a user violation of any of the prohibited or limited discharge requirements in this article will be charged to the user in violation. Such maintenance may be related, but not necessarily limited to, stoppage, plugging, breakage, any

reduction in sewer capacity or any other damage to sewers or wastewater facilities of the town. The costs charged to the user in violation may include the costs and expenses for complete restoration of the impaired facilities to a functional condition.

(g) Any person who knowingly makes any false statements, representation or certification in any application, record, report, plan or other document filed or required to be maintained pursuant to this article, or wastewater discharge permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required under this article shall be subject to the provisions of this section.

(h) The interest charge for late payment, as defined within division 3 of this article, or 60 calendar days, whichever is greater, of any penalties or monetary sums assessed against any user, except for regular sewer use charges, shall be the same as is set for such regular sewer use charges.
(Code 1986, § 20-214)

Secs. 78-251—78-265. Reserved.

DIVISION 2. ADMINISTRATION*

Sec. 78-266. Right of entry of inspectors.

(a) Duly authorized employees of the town bearing proper credentials and identification shall be immediately permitted to enter all commercial and industrial properties for the purposes of inspection, observation, measurement, sampling, review of discharge records and analytical data, and testing in accordance with the provisions of this article. The town shall have no authority to inquire into any processes including metallurgical, chemical, oil, refining, ceramic, paper or other industries beyond that point having a direct bearing on the kind and source of discharge to the sewers or waterways or facilities for waste treatment.

(b) Duly authorized employees of the town bearing proper credentials and identification shall be immediately permitted to enter all private properties through which the town holds an easement for the purpose of, but not limited to, inspection, observation, measurement, sampling, repair and maintenance of any portion of the sewage works lying within such easement.
(Code 1986, § 20-226)

Secs. 78-267—78-280. Reserved.

*__Cross reference__—Administration, ch. 2.

DIVISION 3. RATES AND CHARGES*

Sec. 78-281. User charges.

(a) *Established.*

(1) The sewer user charge rates are established and are on file in the town clerk's office.

(2) The assessment of sewer use charges for all properties shall begin on the date that the actual building sewer is connected to the main sewer, regardless of the occupancy or condition of the property being served. Such assessment of charges shall continue uninterrupted until the actual building sewer is physically disconnected from the main sewer.

(b) *Annual review.* The rates of sewer use charges shall be reviewed annually for the purpose of adjusting such rates. In conjunction with preparation of the annual budget, the town manager shall propose changes in rate structure for the financing of proposed expenditures. The adjusted rates shall be designed to ensure that each recipient of wastewater treatment service will pay his proportionate share of the cost of operation, maintenance and replacement of treatment works.

(c) *Surcharges.* The town reserves the right to develop and implement a surcharge system for the purpose of assessing users subject to wastewater discharge permits under division 6 of this article their proportionate share of operation, maintenance, replacement, and/or capital improvement costs.
(Code 1986, §§ 20-241—20-243)

Sec. 78-282. Assessments.

The assessment for sanitary sewer installation shall be as is provided for in state law, or as otherwise approved or adopted by the town council.
(Code 1986, § 20-244)

Sec. 78-283. Sewer fee schedule.

(a) Sewer user charge rates as provided for in subsections 78-281(a)(1) and 78-281(b) shall be as follows:

(1)	Minimum charge per unit per year	$345.00
(2)	Usage block allowed per year for minimum charge	10,000 cubic feet of water consumption

*__State law reference__—Authority to levy charges, unpaid charges create lien, G.L. 1956, § 45-14-1.

(3)	Excess rate: 10,001—20,000 cubic feet of water consumption ...	$2.75/100 cubic feet of water consumption
(4)	Excess rate: 20,001—30,000 cubic feet of water consumption ...	$3.25/100 cubic feet of water consumption
(5)	Excess rate: Over 30,001 cubic feet of water consumption	$2.75/100 cubic feet of water consumption

(b) The minimum charge per unit will be billed on a quarterly basis, with the bills being sent in the months of July, October, January, and April. Payment on each quarter's bill will be due on or before September 1, December 1, March 1 and June 1, respectively. Any payment not made in a timely manner shall bear interest at the rate of 18 percent per annum on the unpaid balance. The excess rates per usage blocks will be billed on a quarterly basis as such excess usage is accrued. A prior year (FY 1992-1993) minimum charge of $324.00 per unit, which would have been billed in July 1993, will be billed over a three-year period, by quarter, beginning in July 1993. The amount due each quarter should be $27.00. Any payment not made in a timely manner shall bear interest at the rate of 18 percent per annum on the unpaid balance.

(c) A charge of BODs in excess of 250 mg/l shall be assessed at $0.43 per pound of BODs.

(d) A charge for total suspended solids in excess of 250 mg/l shall be assessed at $0.91 per pound of total suspended solids.
(Code 1986, § 20-245)

Sec. 78-284. Annual permit fees; permit application fees; annual monitoring fees for commercial/industrial users.

(a) Categories of commercial/industrial users are as follows:

(1) *Category 1.* Commercial/industrial users discharging or having the potential of discharging conventional (BOD_5 and TSS) pollutant concentrations in excess of 250 mg/l.

(2) *Category 2.* Commercial/industrial users discharging production processing wastewater or using solvents, toxic chemicals and/or hazardous chemicals that could potentially be discharged into the sewers.

(3) *Category 3.* Commercial/industrial users discharging or having the potential to discharge concentrations of oil and grease and other solids which may cause interference with the collection system or at the treatment facility.

(4) *Category 4.* Commercial/industrial users with only sanitary wastes and/or nontoxic discharges.

(b) The following fee schedule, which shall be kept on file in the office of the town clerk, shall apply:

(1) Annual permit fees.

a. Category 1—$3,000.00.

b. Category 2—$500.00.

c. Category 3—$300.00.

d. Category 4—No charge.

(2) Permit application fees.

a. Category 1—$300.00.

b. Category 2—$300.00.

c. Category 3—$300.00.

d. Category 4—$300.00.

(3) Annual monitoring fees.

a. Category 1—$3,780.00.

b. Category 2—No charge.

c. Category 3—No charge.

d. Category 4—No charge.

(Code 1986, § 20-246)

Secs. 78-285—78-300. Reserved.

DIVISION 4. SEWER FUND

Sec. 78-301. Established.

A sewer fund shall be established as a depository for all annual charges, fees, assessments and receipts obtained for the use, service or facilities generated by the sewage works. This fund shall be operated as an enterprise fund, and expenses shall be paid or debited from the fund for the operations, maintenance and replacement costs in relation to sewers.
(Code 1986, § 20-256)

Sec. 78-302. Tax collector to issue bills and make collections.

The tax collector shall issue bills and make collections for all charges, fees, assessments and penalties as a result of operation of the sewage works in accordance with existing laws and established charges.
(Code 1986, § 20-257)

Sec. 78-303. Separate account.

The town treasurer will maintain in a separate account all receipts and disbursements as a result of operation of the sewage fund. Disbursements shall be for the sole purpose of costs for administration, operation, maintenance, materials and supplies, interest, depreciation and any other annual costs for the sewage works and sewage treatment and collection facilities. (Code 1986, § 20-258)

Secs. 78-304—78-320. Reserved.

DIVISION 5. MAIN AND BUILDING SEWER CONNECTIONS*

Sec. 78-321. Permit.

(a) *Required.* No unauthorized person shall uncover, make any connections with or opening into, use, repair, disconnect, alter or disturb any public sewer or appurtenances thereof and/or building sewers without first obtaining a written permit from the town.

(b) *Application.*

(1) The owner of any house, building or property wishing to obtain a sewer permit shall make application on the prescribed forms furnished by the town. The owner shall also submit any plans, specifications or other information considered pertinent in the judgement of the town. The appropriate sewer permit and inspection fees, which shall be on file in the town clerk's office, shall be paid to the town at the time of application. Separate permit applications are required for main sanitary sewer extensions, and for each individual building sewer or connection line proposed. Such sewer permits are for the purposes described in subsection (a) of this section only; however, additional permits as described within division 6 of this article may apply prior to the actual use of any main or building sewer by any user.

(2) Accompanying each application for a permit required by this division shall be a location plan showing the lot lines and dimensions, location of water pipes and other underground utilities or structures, location of permanent buildings and location of building sewers and storm drains.

(Code 1986, §§ 20-271, 20-272)

Sec. 78-322. Drainlayers.

(a) Building sewers and connections shall be made only by drainlayers licensed to perform such work in the town or master plumbers licensed by the state. Application for a drainlayer's license shall be made to, and upon forms prescribed by, the town engineer or his designee.

*Cross reference—Buildings and building regulations, ch. 10.

Upon approval by the town engineer or his designee, a five-year drainlayer's license shall be issued to the applicant. To obtain such a license approval each applicant, in addition to filing such application, shall:

(1) Take and pass with a score of at least 70 percent an exam to be administered by the town engineer or his designee;

(2) Pay to the wastewater division a licensing fee which is on file in the town clerk's office;

(3) The responsibility for maintaining a valid license, and/or the renewal of same rests solely with the applicant.

(b) A minimum of 48 hours shall be allowed for the processing of each application, and, upon approval, a license shall issue to the applicant. During the course of any work related to main or building sewers, the licensed drainlayer doing the work must have in his possession a valid drainlayer's license or master plumber's license. The licensed individual must be present at the site for all operations, unless otherwise released by the town's inspector.

(c) An accurate record of all drainlayer's licenses shall be kept both at the engineering office and the office of the town clerk. Notice must be given to the wastewater division at least 48 hours prior to the beginning of any work on a sewer. No inspections will be scheduled until the permit application has been duly signed and returned to the town. All sewer permits shall be posted in a visible manner at the site of any and all sewer work. Such information as the town has with regard to the existence or location of main or building sewers will be furnished to drainlayers upon request, but at their risk as to the accuracy of the information. No materials shall be used or work covered until inspected and approved by the town engineer or his inspector, and the drainlayer's return portion of each building sewer connection permit shall be promptly returned to the wastewater division after the work has been thoroughly inspected and the return has been signed by the inspecting authority.

(d) Failure to comply with any provisions of this article by the drainlayer or master plumber may result in the forfeiture of the right, as determined by the town engineer or his designee, to perform building or main sewer work within the town. The town also reserves the right to withhold the issuance of any sewer permits to any drainlayer or master plumber found in violation of any provisions of this article.
(Code 1986, § 20-273)

Sec. 78-323. Liability of property owners and developers.

Any settlement over the sewer in any street or public way within one year after such sewer is laid or repaired shall be repaired at the expense of the developer or owner of the property authorized to install or repair such sewer. The developer or owner shall be held liable for any accident or damage which may occur in consequence of the laying or repairing of such sewer during the time the trench is open and for such period of one year after the work has been completed.
(Code 1986, § 20-274)

Sec. 78-324. Costs and expenses of installation for building sewers.

All costs and expenses incidental to the installation, connection and subsequent operation and maintenance of the building sewer, including any costs related to the existence or location of any sewer, shall be borne by the owner. The owner shall indemnify the town from any loss or damage including, but not limited to, any loss or damage to any sewer or public sewer that may directly or indirectly be occasioned by the installation, connection, operation and/or maintenance of the building sewer.
(Code 1986, § 20-275)

Sec. 78-325. Separate sewer for each building; exception.

A separate and independent building sewer shall be provided for every building, except where one building stands at the rear of another or at an interior landlocked lot and no private sewer is available or can be constructed to the rear building through an adjoining alley, courtyard or driveway, then the building sewer from the front building may be extended to the rear building and the whole considered as one building sewer, subject to the approval of the town engineer or his designee. The owner of such rear or interior lot shall obtain a sewer easement from the front lot owner, and shall record the same in the land evidence records of the town prior to the town's issuance of a permit.
(Code 1986, § 20-276)

Sec. 78-326. Use of old building sewers.

Old building sewers may be used in connection with new buildings only when they are found on examination and test by the town to meet all requirements of this division. The costs of any such tests or examinations shall be borne by the applicant.
(Code 1986, § 20-277)

Sec. 78-327. Standards for installation and connections; generally.

(a) The size, slope, alignment and materials of construction of a building or main sewer and the methods to be used in excavation, placing of pipe, jointing, testing and backfilling the trench shall all conform to the requirements of the Rhode Island State Building Code, the "Guides for the Design of Wastewater Treatment Works," (TR-16; latest version), as promulgated by the New England Interstate Water Pollution Control Commission, or other applicable town standards and regulations. The provisions of the "Sanitary Sewer System General Specifications and Construction Installation Procedures" (January 1990; as amended), promulgated by the town engineering department shall also apply.

(b) Minimum gravity building sewer size shall be four inches for single-family dwelling and six inches for multiple-family dwellings or other type of building. Minimum slope shall be 1.67 feet per 100 feet, or as required under subsection (a) of this section. Connection to sewers shall be made only with a Y branch, unless otherwise approved by the town. The minimum distance of a building sewer from a waterline shall be ten feet and from a public water supply well shall be 50 feet. Where sewer lines cross waterlines, they must be constructed of durable corrosion

resistant materials with watertight joints, preferably below waterlines. Sewer lines crossing other pipes should have a minimum separation of 12 inches with a sand cushion or other approved bedding between the pipes. The minimum size for main line gravity extensions shall be eight inches, and all such extensions shall terminate with a manhole.

(c) Connections to sewer force mains shall be permitted only under the conditions set forth within the current sewer policy as adopted by the town council.

(d) Prior to commencing work in any public right-of-way or easement, the applicant shall secure the necessary road opening/road cut permits, or state department of transportation physical alterations permit, as applicable. Dig-Safe shall also be contacted, and any other utility companies shall also be notified by the installer. Backfilling and restoration operations shall conform to the standards of the agency having jurisdiction.

(e) Main sewers and appurtenances, where approved in writing by the town engineer or his designee pursuant to the current sewer policy and/or the facilities plan for wastewater management, may be extended or constructed by developers, property owners, or other private organizations or entities, provided that the design and construction criteria conform to the standards for the same as developed by the town. The developers, property owners, or other private organizations or entities, by written agreement, shall dedicate, deed and transfer such main sewers and appurtenances to the town without qualification or condition, in which case, the town council may vote to accept the same. All easements for such main sewers and appurtenances shall be obtained by the applicant at no cost to the town, and shall in turn be dedicated to the town in a form approved by the town solicitor, in which case the town council may vote to accept the same.
(Code 1986, § 20-278)

Sec. 78-328. Procedure for removing sewage when drain is inadequate.

In all buildings in which any building drain is too low to permit gravity flow at the minimum slope to the public sewer, sanitary sewage carried by such a building drain shall be lifted or pumped by an approved means by the owner and discharged to the building sewer. Where fixtures are installed in basements or in other areas close to the main sewer grade, approved backflow or check valves shall be installed at the owner's expense on the owner's sewer lateral. The owner shall secure the appropriate plumbing or sewer permits for such an installation.
(Code 1986, § 20-279)

Sec. 78-329. Stormwater and groundwater connections.

No person shall make connection of roof downspouts, exterior foundation drains, basement sump pumps, areaway drains or other sources or surface runoff or groundwater to a building sewer or building drain which in turn is connected directly or indirectly to a public sanitary sewer. Such connections as may exist at the time of adoption of this ordinance from which this section derives shall be disconnected from such sanitary sewers within three months of the date of such adoption, failing which, the penalties described in this article shall apply.
(Code 1986, § 20-280)

Sec. 78-330. Inspections.

Notwithstanding the provisions of section 78-322, the applicant for the building or main sewer permit required under the provisions of this division shall notify the wastewater division when the building or main sewer is ready for inspection and connection to the public sewer. Any work that has not been inspected by the town shall be subject to removal and reinstallation for inspection purposes, at the owner's sole cost.
(Code 1986, § 20-281)

Sec. 78-331. Barricades; replacement of excavations.

All excavation for building or main sewer installations 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, pursuant to the provisions of section 78-327 and chapter 66 of this Code of Ordinances, or to the state department of transportation, as applicable.
(Code 1986, § 20-282)

Sec. 78-332. Cleanouts.

Cleanouts shall be installed when directed by the town, where the distance from the building to the main sewer is greater than 100 feet, or where bends greater than 45 degrees are used in the building sewer, and at each property line. Cleanouts shall be made by installing a Y and one-eighth bend 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 system, at curves on the building sewer and on straight part of house sewer to the main sewer. The cleanout shall be brought up from the building sewer to four inches below the ground and be properly capped. Locations of all cleanouts shall be recorded and turned over to the town.
(Code 1986, § 20-283)

Sec. 78-333. Construction by private parties; cost recovery.

(a) All property owners who receive permission from the town to tie into a sewer line which has been constructed by a private party shall reimburse the private parties who have paid for the sewer line extension a pro rata share of the cost of construction of the sewer line and sewer laterals. The intent of this section is to require that all people and users of the system who connect to the system within five years from the date of the approval of the private party's request to construct the sewer line shall share equally in the cost of the installation of the sewer line and sewer laterals. For the purposes of this section, the term "sewer lateral" shall be defined as that portion of the building sewer between the main sewer and the property line.

(b) The individuals constructing the sewer line and sewer laterals shall obtain all necessary permits from the engineering department, the department of public works, and any other federal, state, or local permits that may be required.

(c) Upon completion of the sewer line and sewer laterals and upon inspection and acceptance of the sewer line and sewer laterals by the engineering department, the individuals constructing the sewer line and sewer laterals shall submit an executed deed of dedication to the town for the sewer lines and sewer laterals.

(d) Upon acceptance of the sewer lines by the town, it shall be unlawful for any person, for a period of five years from the date of the approval of the private party's request, to construct a sewer line or to tie into the sewer line, and the engineering department shall not issue sewer connection permits for such tie-ins, unless and until the person seeking to tie in to the line shall have paid his proportionate share of the cost of the installation to the person or persons who have constructed the sewer line and sewer laterals and provided written proof thereof to the engineering department.

(e) For purposes of determining the pro rata share of the cost that shall be applied to individuals seeking to connect to the sewer line, the engineering department shall, prior to the commencement of construction, make a determination as to the number of additional units that may be eligible to connect to this sewer line. The proportionate share of each unit's cost shall then be determined by multiplying the total cost of the construction by a fraction, the numerator of which shall be the number one, and the denominator of which shall be the total number of units that may be eligible to tie in to the sewer line. The inclusion of a lot for purposes of this section and the determination of the proportionate share shall not in any way be construed to be a determination that the lot and/or unit is buildable.

(f) In addition to payment of the pro rata share of the cost provided for in this section, all individuals seeking to connect to the sewer line shall also be required to pay the sewer lot development fee as provided for in the applicable provisions of this Code.
(Ch. 804, § 1, 1-16-2001)

Secs. 78-334—78-350. Reserved.

DIVISION 6. USE REGULATIONS

Sec. 78-351. Discharge of stormwater, surface water and other waters.

(a) No person shall discharge or cause to be discharged any stormwater, surface water, groundwater, roof runoff, subsurface drainage, contaminated cooling water or unpolluted industrial process waters into any sanitary sewer. Dye tests or other approved testing methods shall be sufficient evidence of nonconforming connections.

(b) Stormwater and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as storm sewers or to a natural outlet approved by the town. Industrial cooling water or unpolluted process water may be discharged, on approval of the town, to a storm sewer or natural outlet.
(Code 1986, § 20-301)

Sec. 78-352. Prohibited discharges; generally.

(a) The town may limit, reject or prohibit any direct or indirect discharge of pollutants, or combination of pollutants, as defined by applicable federal or state regulations, or as described in this section, into the wastewater facilities. Such decision to limit, reject or prohibit such wastes shall be made solely by the town, and will generally be based upon the waste's potential ability to harm the sewers or wastewater facilities, or have an adverse effect on the receiving waters, or otherwise endanger life, limb or public property, or constitute a nuisance. In rendering a decision, the town will give consideration to such factors as the quantities of the subject wastes in relationships to the flow and capacity of the sewers, nature of the sewage treatment processes, capacity of the wastewater treatment facilities, degree of treatability of the wastes and other pertinent factors.

(b) No user shall discharge or cause to be discharged, either directly or indirectly, to any sewer any substance or wastewater which would interfere with the operation or performance of the wastewater facilities or pass through the same. In addition, no user shall discharge or cause to be discharged any substance that would cause either the Town of Narragansett or the Town of South Kingstown to violate its Rhode Island Pollutant Discharge Elimination System (RIPDES) permit for either wastewater treatment facility, or compromise receiving water quality standards, or contaminate the wastewater sludge to an extent which restricts sludge disposal options. The following substances and wastes are specifically prohibited from discharge into the wastewater system:

(1) Explosive mixtures. Any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid or gas: Liquids, solids or gases which, by reason of their nature or quantity, are, or may be, sufficient either alone or by interaction with other substances, to cause fire or explosion or be injurious in any other way to the sewer facilities or to the operation of the discharge into the sewer system, be more than five percent nor any single reading over ten percent of the lower explosive limit (L.E.L.) of the meter. Also prohibited is the discharge of wastewater, which alone or by interaction with other wastewater, has a closed cup flashpoint of less than 140 degrees Fahrenheit (60 degrees Celsius) using test methods specified in 40 CFR 261.21. Prohibited materials include, but are not limited to, gasoline, petroleum products, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, and sulfides.

(2) Any waters or wastes containing toxic or poisonous solids, liquids or gases in sufficient quantity, either singly or by interaction with any sewage treatment process, that would constitute a hazard to humans or animals, or create a public nuisance or create any hazard in the receiving waters of the sewage treatment plant, or that violate the limits set forth in any federal, state or other discharge limitation program.

(3) Any waters or wastes having pH lower than 5.5 or higher than 9.5, or having any other corrosive or abrasive property capable of causing damage or hazard to structures, equipment, and personnel of sewage works.

(4) Solids or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers, or damage or clogging of sewage pumps or other interference with the proper operation of the sewage works such as, but not limited to ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, bones, hair and fleshings, entrails, paper dishes, cups, milk containers, fish waste and seafood processing byproducts, etc., either whole or ground by garbage grinders.

(5) Any liquid or vapor having a temperature higher than 150 degrees Fahrenheit (65 degrees Celsius) or containing heat in amounts that would singly or in combination with other discharges inhibit biological activity in the wastewater treatment facilities.

(6) Any water or waste containing floatable oils, fats, wax, grease or oils, or products of mineral oil origin whether emulsified or not, or containing substances which may solidify or become viscous at temperatures between 32 degrees Fahrenheit and 150 degrees Fahrenheit (0 degrees and 65 degrees Celsius).

(7) Any garbage that has not been properly shredded in a manner approved by the town; the installation and operation of any garbage grinder equipped with a motor of three-fourths horsepower or greater shall be subject to the review and approval of the town.

(8) Any waters or wastes containing iron, chromium, copper, zinc, and similar heavy metals, 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 work exceeds the limits established by the treatment plant process for such materials.

(9) Any waters or wastes containing strong acid-iron pickling, wastes or concentrated plating solutions whether neutralized or not.

(10) Any toxic substances in amounts exceeding standards promulgated by the administrator of the U.S. Environmental Protection Agency pursuant to section 307(a) of the Act, and chemical elements or compounds, phenols or other odor-producing substances, or any other substances which are not susceptible to treatment or which may interfere with the biological processes or efficiency of the treatment system, or that will pass through the system.

This also includes any wastewater having a lethal concentration of 50 percent as determined by the toxicity test of 96 hours or less using 100 percent of the industrial user's discharge and aquatic test species chosen by the town.

(11) Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by the town in compliance with applicable state or federal regulations.

(12) Materials which exert or cause:

a. Unusual concentrations of inert suspended solids such as, but not limited to, Fuller's earth, lime slurries, and lime residues or of dissolved solids such as, but not limited to, sodium chloride and sodium sulfate;

b. Excessive discoloration such as, but not limited to, dye wastes and vegetable tanning solutions;

c. Unusual BOD, COD or total suspended solids removal or chlorine requirements in such quantities as to constitute a significant load on the sewage treatment works;

d. Unusual volume of flow or concentration of wastes constituting slugs;

e. Unusual or obnoxious odor-producing materials.

(13) BOD or total suspended solids in excess of 250 mg/l each, unless otherwise permitted under this article through the issuance of a wastewater discharge permit, but in no case greater than 1,000 mg/l each.

(14) Any water or wastes containing any of the following substances in concentrations greater than listed below or as delineated on the commercial or industrial user's discharge permit or as may be stipulated from time to time by the town and kept on file in the office of the town clerk:

For flow tributary to the regional wastewater treatment facilities:

Substance	*Monthly Average (mg/l)*	*Maximum Daily (mg/l)*
Arsenic	0.1	0.1
Cadmium	0.07	0.09
Chromium (total)	1.71	2.77
Copper	2.07	3.38
Lead	0.43	0.44
Mercury	0.013	0.047
Nickel	1.0	1.0
Silver	0.24	0.43
Zinc	0.65	0.65
Cyanide	0.465	0.465
Sulfide (total)	3.107	3.107
Dissolved Sulfide	1.0	1.0
Oil and Grease	100.0	100.0
Total Toxic Organics	2.13	2.13
Total Organics	1.0	1.0

For flow tributary to the Scarborough wastewater treatment facilities:

Substance	*Monthly Average (mg/l)*	*Maximum Daily (mg/l)*
Arsenic	0.1	0.1
Cadmium	0.07	0.09
Chromium (total)	1.71	2.77

Substance	*Monthly Average (mg/l)*	*Maximum Daily (mg/l)*
Copper	2.07	3.38
Lead	0.43	0.44
Mercury	0.013	0.047
Nickel	1.0	1.0
Silver	0.24	0.43
Zinc	0.65	0.65
Cyanide	0.465	0.465
Sulfide (total)	3.107	3.107
Dissolved Sulfide	1.0	1.0
Oil and Grease	100.0	100.0
Total Toxic Organics	2.13	2.13
Total Organics	1.0	1.0

Limits for other hazardous or toxic organic compounds shall be set by the town on a case-by-case basis as a part of a commercial or industrial user discharge permit, using federal or state priority pollutant standards or actual wastewater treatment plant operating capacities, as guidelines.

(15) Waters or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment processes employed.

(16) Any material identified as hazardous waste according to 40 CFR 261.

(17) Any infectious or medical waste except such waste which receives infectious waste pretreatment and meets the approval of the town.

(Code 1986, § 20-302; Ch. 793, §§ 1, 2, 6-19-2000)

Sec. 78-353. Compliance and enforcement.

(a) If any waters 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 section 78-352 and which in the judgment of the town may have a deleterious effect upon the sewage works, processes, equipment or receiving waters or which otherwise create a hazard to life or constitute a public nuisance, the town may, at its sole discretion:

(1) Reject the wastes;

(2) Require pretreatment to an acceptable condition for discharge to the public sewers;

(3) Require control over the quantities and rates of discharge.

(b) All users, either in existence at the time of the adoption of this article, or in the future, shall provide necessary wastewater treatment or pretreatment as required to comply with the provisions of this article, any applicable federal categorical pretreatment standards, and all other applicable federal, state and local pretreatment standards within the time limitations as specified by the applicable pretreatment standards. All facilities required to pretreat waste-

water to an applicable level acceptable to the town shall be provided, operated and maintained at the user's expense. Detailed plans showing the pretreatment facilities and operating procedures shall be submitted to the town or review and approval, prior to construction of the facility. The approval of such plans and operating procedures shall in no way relieve the user from the responsibility of modifying the facility as necessary to produce a sanitary sewer discharge that complies with the provisions of this article, any applicable federal categorical pretreatment standards, and all other applicable federal, state and local pretreatment standards. Any subsequent changes in the pretreatment facilities or method of operation shall be reported to and approved by the town prior to the user's initiation of the changes. All records relating to compliance with pretreatment standards shall be made available to officials of the EPA or approval authority upon request.

(c) The town reserves the right to impose compliance schedules upon any user or to establish more stringent time schedules than exist in the federal or state pretreatment standards.

(d) The town reserves the right to develop and require implementation of a compliance schedule or consent agreement for any user as defined within this section. Such compliance schedule or consent agreement may order the user to alter his processes, install pretreatment monitoring, or testing equipment, or take other such action as may be deemed necessary and appropriate by the town to ensure compliance with this division. Such compliance schedule or consent agreement may be used independently or in conjunction with a wastewater discharge permit issued pursuant to this division. The issuance of a compliance schedule or consent agreement by the town shall not relieve the user of any other obligations under this article. The following general conditions shall apply to any such compliance schedule or consent agreement.

(1) The schedule or agreement shall contain increments of progress in the form of dates for the commencement and completion of major events leading to the installation, construction, and/or operation of pretreatment facilities required for the user to comply with the provisions of this article. Such events shall include such tasks as hiring an engineer, completing preliminary plans, completing final plans, executing contracts for major components, obtaining permits and commencing and completing construction.

(2) Not later than 14 days following each milestone date in the schedule and the final date for compliance, the user shall submit a progress report to the town engineer including, as a minimum, whether or not it complied with the increment of progress to be met on such date and, if not, the date on which it expects to comply with this increment of progress, the reason for delay, and the steps being taken by the user to bring the construction back into compliance with the schedule.

(Code 1986, § 20-303)

Sec. 78-354. Interceptors.

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 grease, any flammable

wastes, sand, or other harmful ingredients. All interceptors shall be of a type and capacity approved by the town and shall be located so as to be readily and easily accessible for cleaning and inspection. All restaurants, cafeterias, institutional kitchens, clubs, bars, car washes, and any other food or food service operation shall provide grease traps in accordance with the applicable Building Official Code Administration (BOCA) and BOCA National Plumbing Code Section P1002 in the kitchen waste line before entry to the sewer. All grease, oil, and sand collected therein is to be removed as necessary and disposed of in accordance with the appropriate laws, but in no case disposed of within the sewer system. All costs associated with the installation, operation and maintenance of such grease, oil and sand interceptors and traps shall be borne by the user. All such devices shall be cleaned at least twice per year. Maintenance records must be kept for a minimum of three years, and must be made available to authorized employees of the town upon demand.
(Code 1986, § 20-304)

Sec. 78-355. Control manhole.

When required by the town, the owner of any property serviced by a building sewer carrying commercial or industrial wastes shall install a suitable control manhole together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling and measurement of the wastes. Such manhole, when required, shall be accessible and safely located, and shall be constructed in accordance with plans approved by the town. The manhole shall be installed by the owner at his expense, and shall be maintained by such owner so as to be safe and accessible at all times.
(Code 1986, § 20-305)

Sec. 78-356. Monitoring equipment and records.

All commercial and industrial users discharging into a public sewer shall perform such monitoring of their discharges as the town may require, including installation, use and maintenance of monitoring equipment. The results of such monitoring shall be submitted to the town in accordance with the terms of the user's wastewater discharge permit and in compliance with the frequency schedule stated therein, and shall contain, at a minimum, the following information:

(1) The name and address of the business.

(2) The location of the business.

(3) The nature, average rate of production and standard industrial classification of the operation carried out by the business.

(4) The average and maximum flow of the discharge from the business to the treatment works in gallons per day.

(5) The nature and concentration of the pollutants in the discharge from each regulated process from such business and identification of the applicable pretreatment standards and requirements. The concentration shall be reported as a maximum or

average level as provided for in the applicable pretreatment standard. If an equivalent concentration limit has been calculated in accordance with the pretreatment standard, this adjusted concentration limit shall also be submitted to the town for approval.

(6) A statement prepared by an authorized representative of the business as defined in 40 CFR 403.12(1)(m), and certified to by an engineer registered in the state indicating whether the pretreatment standards are being met on the basis established in these standards, and if not, whether additional operation and maintenance or pretreatment is required for the business to meet the pretreatment standards and requirements.

(7) If additional pretreatment or operation and maintenance is required, scheduling and completion dates in accordance with 40 CFR 403.12 shall be provided.

(8) Any additional information pursuant to the requirements stated within the user's discharge permit.

(Code 1986, § 20-306)

Sec. 78-357. Standards for tests and measurements.

(a) All measurements, tests and analysis of the characteristics of waters and wastes to which reference is made in this article shall be determined in accordance with 40 CFR 136, and shall be determined at the control manhole provided or upon suitable samples taken at the control manhole.

(b) If a special manhole has not been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewage works and to determine the existence of hazards to life, limb and property. The particular analysis involved will determine whether a 24-hour composite of all outfalls of a premises is appropriate or whether a grab sample should be taken. Normally, but not always, BOD and suspended solids analysis are obtained from periodic grab samples. Sampling and analysis may be required by the town to be performed by an independent laboratory approved by the town, with all costs borne by the user. All sampling pertaining to pretreatment should be taken at a location which reflects the final, treated wastewater stream prior to its merging with either the sewage of the industry or the sewage in the main sewer system.

(Code 1986, § 20-307)

Sec. 78-358. Protection from accidental discharge, slug or noncompliant discharges.

(a) All residential, commercial and industrial users shall provide protection from the accidental discharge of prohibited materials or other substances regulated by this article. Facilities to prevent accidental discharge of prohibited materials shall be provided and maintained at the owner's or user's own cost and expense, for all such user's that store, handle or use any such prohibited or regulated material. Detailed plans showing facilities and operating procedures necessary to provide this protection shall be submitted to the town for

review and approval before construction of the facility. No such user who commences contribution to the wastewater facilities after the effective date of this article shall be permitted to make such contribution until accidental discharge procedures have been approved by the town. All existing users shall submit such plans and information relative to this protection within 180 days after the effective date of this article. Review and approval of such plans and operating procedures shall not relieve the user from the responsibility to modify his facility as necessary to meet the requirements of this article. In the case of accidental discharge, it is the responsibility of the user to immediately telephone and notify the wastewater treatment works of the incident. The notification shall include location of discharge, type of wastes, concentration and volume, and corrective actions undertaken.

(b) Within five days following an accidental discharge, the user shall submit to the town engineer a detailed written report describing the cause of the discharge and the measures to be taken by the user to prevent similar future occurrences. Such notification shall not relieve the user of any expense incurred by the town because of such discharge or any other expense which may be incurred as a result of damage to the wastewater facilities, fish kills, or any other damage to person or property; nor shall such notification relieve the user of any fines, civil penalties, or other liability which may be imposed by this article or other applicable law. A notice shall be permanently posted on the user's bulletin board or other prominent place advising employees whom to call in the event of a prohibited discharge. Employers shall ensure that all employees who may cause or suffer such a prohibited discharge to occur are advised of the emergency notification procedure.

(c) All residential, commercial and industrial users shall immediately telephone and notify the town in the event of any slug load discharges or discharge of waste or wastewater which violates any of the provisions or prohibitions set forth within this division.
(Code 1986, § 20-308)

Sec. 78-359. Dilution of discharge.

No user shall ever increase the use of process water or, in any other way, attempt to dilute a discharge as a means for complying with any prohibited discharge requirement of this article or any federal or state pretreatment requirements or standard.
(Code 1986, § 20-309)

Sec. 78-360. Federal standards.

Any promulgated federal categorical pretreatment standard shall immediately supersede the limitations imposed under this article if more stringent than these limitations or sources in a particular industrial subcategory.
(Code 1986, § 20-310)

Sec. 78-361. Discharges; changes in volume and character.

Any user that proposes to change his discharge in terms of volume or character of pollutants shall notify the town in writing at least 30 days in advance of such proposed change. Such change may not be instituted until a new or amended discharge permit has been issued by the town.
(Code 1986, § 20-311)

Sec. 78-362. Wastewater discharge permit; requirements and conditions.

(a) All industrial and commercial users proposing to connect or to contribute to the wastewater facilities shall obtain a wastewater discharge permit before connecting to or contributing to such facilities. All existing industrial, commercial and significant industrial users connected to or contributing to the wastewater facilities shall obtain a wastewater discharge permit within 30 days after the effective date of this article.

(b) Users required to obtain a wastewater discharge permit shall complete and file with the town an application in the form prescribed by the town. Such application shall be accompanied by the appropriate fee as determined by the town.

(c) Within nine months of the promulgation of a national categorical pretreatment standard, the wastewater discharge permit of users subject to such standards shall be revised to require compliance with such standards within the time frame prescribed by such standard. Where a user, subject to a national categorical pretreatment standard, has not previously submitted an application for a wastewater discharge permit, the user shall be required to do so within 30 days after the promulgation of the applicable national categorical pretreatment standard. In addition, the user with an existing wastewater discharge permit shall file with the town, within 30 days after the promulgation of an applicable federal categorical pretreatment standard, a new discharge permit application.

(d) Permits shall be issued for a specified time period, not to exceed three years. A permit may be issued for a period less than a year or may be stated to expire on a specific day. The user shall apply for permit reissuance a minimum of 180 days prior to the expiration of the user's existing permit. The terms and conditions of the permit may be subject to modification by the town during the term of the permit as limitations or requirements as identified in this article are modified or other just cause exists. The user shall be informed of any proposed changes in his permit at least 30 days prior to the effective date of change. Any changes or new conditions in the permit shall include a reasonable time schedule for compliance.

(e) Wastewater discharge permits are issued to a specific user for a specific operation. A wastewater discharge permit shall not be reassigned or transferred or sold to a new owner, new user, different premises, or a new or changed operation without the approval of the town. Any succeeding owner or user shall also comply with the terms and conditions of the existing permit.

(f) Wastewater discharge permits shall be expressly subject to all provisions of this article and all other applicable ordinances, regulations, user charges, and fees established by the town.

(g) The town may deny or condition any wastewater discharge permit if, in the opinion of the town, such discharge would not be in compliance with any applicable federal, state or local pretreatment or discharge standards, or where such discharge could cause the wastewater facilities to violate its RIPDES permit, or inhibit or interfere with the operation and maintenance of the wastewater facilities, or concentrate in the sludge so as to interfere with the disposal of same by the approved methods. The town reserves the right to impose further conditions pursuant to the issuance of a wastewater discharge permit as follows:

(1) Require pretreatment so that the wastes can be accepted within the wastewater treatment facilities;

(2) Regulate the quantity and rate of discharge; and/or

(3) Require payment above and beyond the basic user fees for capital improvements or process costs, by the imposition of a surcharge or other like fee, for transporting and treating such discharges.

(h) Permit conditions. Wastewater discharge permits shall be subject to all provisions of this article and all other applicable ordinances, regulations and fees established by the town. Permits may contain the following:

(1) The unit charge or schedule of user charges and fees directly or by reference for the wastewater to be discharged to the town's wastewater facilities;

(2) Limits on the average and maximum wastewater constituents and characteristics. Limits shall be derived from federal categorical standards, and/or calculated local limit values using EPA-approved methodology;

(3) Limits on average and maximum rate and time of discharge or requirements for flow regulations and equalization;

(4) Requirements for installation and maintenance of inspections and sampling facilities pursuant to section 78-355;

(5) Specifications for monitoring programs pursuant to section 78-356 which may include sampling locations, frequency of sampling, number, types and standards for tests and reporting schedule;

(6) Compliance schedules pursuant to section 78-353;

(7) Requirements for submission of technical reports or discharge reports;

(8) Requirements for maintaining and retaining plant records relating to wastewater discharge as specified by the town, and affording town access thereto;

(9) Requirements for notification of the town of any new introduction of wastewater constituents or any substantial change in the volume or character of the wastewater constituents being introduced into the wastewater treatment system;

(10) Requirements for notification of accidental discharges pursuant to section 78-358;

(11) Other conditions as deemed appropriate by the town to ensure compliance with this article.

(Code 1986, § 20-312)

Sec. 78-363. Permit suspension or revocation.

(a) The town shall suspend a wastewater discharge permit when such suspension is necessary in order to stop a discharge which violates any provision of this article or causes the town to violate any condition of its RIPDES permit. Notice of the suspension will normally be given in writing; however, in an emergency, the notice of suspension shall be verbal. Any discharger notified of a suspension of his permit shall immediately stop such discharge. In the event of a failure of the discharger to comply voluntarily with the suspension order, the town shall take such steps pursuant to section 78-250 as deemed necessary to ensure compliance. The town may reinstate the permit upon written proof of satisfactory compliance with all discharge requirements of this article.

(b) Any user who violates any of the following conditions of this article or applicable state and federal regulations, is subject to having his permit revoked:

(1) Failure of a user to factually report the wastewater volume, constituents, and characteristics of his discharge;

(2) Failure of the user to report any changes in operations or wastewater volumes, constituents and characteristics;

(3) Continued or significant noncompliance with any portion of this article;

(4) Failure to allow authorized town personnel immediate access for the purpose of inspection or monitoring;

(5) Failure to pay any and all costs, fees, assessments or penalties;

(6) Failure to correct violations that have already resulted in the suspension of the permit;

(7) Failure to comply with any order or compliance schedule issued by the town.

(Code 1986, § 20-313)

Sec. 78-364. User data and information to be public; exception.

(a) Information and data on a user obtained from reports, questionnaires, permit applications, permits and monitoring programs and from inspections shall be available to the public or other governmental agency 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 of the user. Industrial user confidentiality requests will be honored in accordance with G.L. 1956, § 46-12-19.

(b) Any information submitted to the town pursuant to Rule 16 of the state pretreatment regulations and authorized by G.L. 1956, § 46-12-19 et seq. may be claimed as confidential by the submitter. This claim must be asserted at the time of submission in the manner described in this section. If no claim is made at the time of submission, the town or authorized state or federal agency may make the information available to the public without further notice. Effluent data, however, shall at all times be available to the public without restriction.

(c) A business confidentiality claim may be asserted by attaching or placing on this information a cover sheet, or a stamped or typed legend upon each page, or other suitable form of notice employing language such as "trade secret," "proprietary" or "company confidential." Allegedly confidential portions of otherwise nonconfidential documents should clearly be identified as such, and may be submitted separately to facilitate identification and handling by the town. If confidential treatment is desired only until a certain date or until the occurrence of a certain event, this should be stated on the notice as well.

(d) Information covered by such claims will be disclosed only on the extent, and by means of the procedures, set forth in the federal EPA regulations at 40 CFR 2.

(e) Wastewater constituents and characteristics will not be recognized as confidential information.
(Code 1986, § 20-314)

Secs. 78-365—78-380. Reserved.

DIVISION 7. STORM DRAINS AND CONNECTIONS

Sec. 78-381. Permit.

(a) *Required.* No unauthorized person shall uncover, make any connections with or opening into, use, repair, disconnect, alter or disturb any public storm drain, channel, ditch, or appurtenances thereof without first obtaining a written permit from the town. Such permit will be required for the connection of roof downspouts, foundation drains, sump pumps, areaway drains, or other sources of surface runoff or groundwater to the public storm drain system.

(b) *Application.*

(1) The owner of any house, building or property wishing to obtain a storm drain permit shall make application on the prescribed forms furnished by the town, supplemented by any plans, specifications, or other information considered pertinent in the judgement of the town. The appropriate storm drain permit and inspection fees, which shall be on file in the town clerk's office, shall be paid to the town at the time of application. Separate permit applications are required for main storm drain extensions and appurtenances, and for each individual building connection line proposed. Such storm drain permits are for the purposes described in subsection (a) of this section only;

however, additional requirements as described within ordinance number chapter 587, zoning, appendix A to the Code of Ordinances may apply prior to the actual use of any storm drain by any user.

(2) Accompanying each application for a permit required by this division shall be a location plan showing the lot lines and dimensions, location of water pipes and other underground utilities or structures, location of permanent buildings and location of building sewers and storm drains.

(Code 1986, §§ 20-341, 20-342)

Sec. 78-382. Restrictions.

(a) Only groundwater and unpolluted surface, process or cooling water, as defined in division 6 of this article, may be discharged to storm drains.

(b) No obstruction, fill material or brush shall be deposited in any natural or artificial drainage channel without approval of the town. Where any new construction would interfere with the natural drainage pattern, a detailed plan showing the diversion contemplated shall be submitted to the town for approval, pursuant to ordinance number chapter 587, zoning, section 7.7, supplemental drainage requirements, appendix A to the Code of Ordinances. Where the natural drainage channel is not well defined, a proposed location for the drainage shall be submitted, together with the structures required to ensure adequate drainage.

(Code 1986, § 20-343)

Sec. 78-383. Standards for installation and connections; generally.

(a) The size, slope, alignment and materials and methods of construction for storm drains or related storm drainage facilities and appurtenances shall all conform to the latest edition of the "Standard Specifications for Road and Bridge Construction," as published by the state department of transportation, or other applicable town standards and regulations. In amplification thereof, the provisions of the "Highway Division General Specifications and Construction Installation Procedures" (January 1990; as amended), promulgated by the town engineering department, shall apply.

(b) The design of storm drains, culverts, ditches, detention ponds, and related appurtenances shall conform to the requirements of ordinance number chapter 587, zoning, section 7.7, supplemental drainage requirements, appendix A to the Code of Ordinances.

(c) Prior to commencing work in any public right-of-way or easement, the applicant shall secure the necessary road opening/road cut permits, or state department of transportation physical alterations permit, as applicable. Dig-Safe shall also be contacted, and any other utility companies shall also be notified by the installer. Backfilling and restoration operations shall conform to the standards of the agency having jurisdiction.

(d) Storm drains and appurtenances, where approved in writing by the town engineer pursuant to chapter 587, zoning ordinance number, appendix A to the Code of Ordinances, may be extended or constructed by developers, property owners, or other private organizations or

entities, provided that the design and construction criteria conform to the standards for same as developed by the town. The developers, property owners or other private organizations or entities, by written agreement, shall dedicate and deed such storm drains and appurtenances to the town without qualification or condition, in which case, the town council may vote to accept the same. All easements for such storm drains and appurtenances shall be obtained by the applicant at no cost to the town, and shall in turn be dedicated to the town in a form approved by the town solicitor, in which case the town council may vote to accept the same.
(Code 1986, § 20-344)

Sec. 78-384. Inspections.

The applicant for the storm drain permit required under the provisions of this division shall notify the engineering department or provide other such notification as may be identified on the permit when the storm drainage system is ready for inspection, but at least prior to covering any work. Any work that has not been inspected by the town shall be subject to removal and reinstallation for inspection purposes at the owner's sole cost.
(Code 1986, § 20-345)

Sec. 78-385. Barricades; replacement of excavations.

All excavations for storm drainage system installations 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, pursuant to the provisions of section 78-383 and chapter 66 of this Code of Ordinances, or to the state department of transportation, as applicable.
(Code 1986, § 20-346)

Sec. 78-386. Costs and expenses of installation for storm drains.

All costs and expenses incidental to the installation and connection of the storm drainage system, including any costs related to the existence or location of any drain, shall be borne by the owner. The owner shall indemnify the town from any loss or damage that may directly or indirectly be occasioned by the installation of the storm drainage system.
(Code 1986, § 20-347)

Sec. 78-387. Liability of property owners and developers.

Any settlement over the storm drain in any street or public way within one year after such drain is laid or repaired shall be repaired at the expense of the developer or owner of the property authorized to install or repair such drain. The developer or owner shall be held liable for any accident or damage which may occur in consequence of the laying or repairing of such drain during the time the trench is open and for such period of one year after the work has been completed.
(Code 1986, § 20-348)

Secs. 78-388—78-400. Reserved.

DIVISION 8. SEWER LOT DEVELOPMENT FEE

Sec. 78-401. Statement of purpose.

(a) The town has incurred and will continue to incur great expense to install and improve a public sewer system in certain areas of the town.

(b) Owners of buildable lots adjacent to the public sewer system have been charged a sewer assessment for each such buildable lot.

(c) There are many parcels of real property, improved and unimproved, which are not adjacent to the public sewer system, or are adjacent but have not yet connected to the public sewer system but which, in the future, may connect into the public sewer system without being charged a sewer assessment.

(d) The town intends to distribute the cost of construction, improvements, maintenance and operating costs of the public sewer system in a manner which is fair and equitable to all property owners who connect into and make use of the public sewer system.

(e) A sewer lot development fee, so-called, shall be assessed in accordance with the provisions of this division against all property owners who request to or who are required to connect into the public sewer system and whose lot or units have not been charged a sewer assessment on an individual basis.
(Code 1986, § 20-361)

Sec. 78-402. Levied.

(a) In the case of an unimproved residential lot or in the case of a lot with an existing residential building, the applicant for a sewer connection permit shall pay a sewer lot development fee of $3,500.00 per lot or per unit, whichever is applicable, as a precondition to the issuance of the sewer connection permit. At the option of the applicant, the fee of $3,500.00 for each lot or unit may be paid in four annual installments of $875.00 each, together with interest on the unpaid balance at the rate of 12 per centum per annum.

(b) In the case of commercial units (except restaurants) the applicant for a sewer connection permit shall pay a sewer lot development fee of $0.80 per square foot of overall floor space for each such commercial unit.

(1) In the case of restaurants and industrial units, and except as provided for below, the applicant for a sewer connection permit shall pay a sewer lot development fee of $1.00 per square foot of overall floor space. In the case of applicants who at the time of application and each year thereafter use less than 40,000 cubic feet of water per year, the $1.00 per square foot fee shall only be assessed against the first 30,000 square feet of floor space. If the applicant's or its successor's or assign's water usage in any year exceeds 40,000 cubic feet per year, then the sewer lot development fee shall be recalculated and reassessed based upon the total square feet of the overall floor space without limitations.

(2) When the overall square footage of the commercial, restaurant or industrial unit is equal to or greater than 10,000 square feet, at the option of the applicant, the sewer lot development fee may be paid in four annual installments, together with interest on the unpaid balance at the rate of 12 per centum per annum.

(3) For the purpose of this division, industrial units are defined as those uses or units located on a parcel of real estate which are zoned as I-A or I-B on the official zoning map of the town.

(c) In the case of an unimproved residential lot or in the case of a lot with an existing residential building within the area known as Envine Estates and further described by ordinance number chapter 580, an ordinance relating to the construction of sewers by private parties in the Envine Estates area of assessor's plat N-G, the applicant for a sewer connection permit, if applied for prior to November 1, 1989, shall pay a sewer lot development fee of $1,000.00 per lot or per unit, whichever is applicable, as a precondition to the issuance of the sewer connection permit. At the option of the applicant, the fee of $1,000.00 for each lot or unit may be paid in four annual installments of $250.00 each, together with interest on the unpaid balance at the rate of six per centum per annum.

(d) The town council may waive the sewer lot development fee from local government divisions within the town.

(Code 1986, § 20-362)

[The next page is 3263]

APPENDIX E

Town of Narragansett Sewer Policy

TOWN OF NARRAGANSETT
SEWER POLICY

(Effective April 18, 1995)
(Revised July 15, 1996 (Section 3c))
(Revised December 6, 1999 (Section 3c))

WHEREAS, the Town of Narragansett has undergone a dramatic increase in community growth since the construction of the Regional Wastewater Treatment Facilities and the Scarborough Wastewater Treatment Facilities, and

WHEREAS, said wastewater treatment facilities of the Town have a limited capacity, and

WHEREAS, the combined wastewater flows from the North End of Town and the Narragansett Pier area now equal or exceed the Town's allotted share of the capacity of the Regional Wastewater Treatment Facilities, and

WHEREAS, the average daily flow of wastewater into the Scarborough Wastewater Treatment Facilities during the peak month has already exceeded 1,000,000 gallons per day (71% of design capacity) despite efforts to limit flows beneath this threshold, and

WHEREAS, the Town can expect additional wastewater flows into both sewer systems from projects which have been approved but are yet to be developed, in particular, the North End Sewer Project, and

WHEREAS, there exists in the Town of Narragansett neighborhoods with severe on-site sewage disposal problems, most of which neighborhoods were designated for sewer services by the original sewer plans adopted by the Town in 1974 and 1975, and further identified by the Town's studies since the adoption of the previous sewer policies (July 6, 1987 and April 2, 1990), including the Facilities Plan for Wastewater Management (adopted January 1994) and the Comprehensive Plan (adopted January 1994), and

WHEREAS, the Town recognizes the need for implementing a long-term sewer development plan and administrative policy to provide a rational, equitable, and orderly procedure for providing sewer utility service to areas of the Town of Narragansett, and

WHEREAS, detailed engineering studies have been completed to address the issue of the enhancement and expansion of both treatment facilities, and

WHEREAS, the first phase of said enhancements and expansions have recently been completed, and

WHEREAS, the Town has as a consequence allowed for certain limited expansion of it's conveyance system in terms of new extensions and new connections to specific existing sewers, and

WHEREAS, the Town has investigated the options for securing additional flow capacity at the Regional Wastewater Treatment Facilities, including the lease of unused flow space from another regional partner or partners, with the intent of said investigation to continue the progress of the North End Sewer Project,

Now therefore the Town Council of the Town of Narragansett adopts the following resolution and policy:

1. There are hereby created two Sanitary Sewer Areas in the Town of Narragansett, hereinafter called "Sewer Area".

   Said Sewer Areas are officially delineated in a map on file in the Engineering Department hereto entitled "Sanitary Sewer Area Boundaries of Narragansett", which areas are further defined as:

AREA I.

Those areas in Narragansett serviced by the Regional Wastewater Treatment Facilities and certain areas not yet sewered but prioritized for sewer extensions under the "Facilities Plan for Wastewater Management" (adopted January 1994), and other such areas as may be designated by the Town from time to time, and as amended by elements of the Coastal Resources Management Program, and

AREA II.

Those areas serviced by the Scarborough Wastewater Treatment Facilities and certain areas not yet sewered but designated for sewer extensions under the "Facilities Plan for Wastewater Management" (adopted January 1994) as amended by elements of the Coastal Resources Management Program, and other such areas as designated by the Town from time to time.

2. Any parcel of land located within the Sewer Areas which abuts a sewer line may be permitted to tie in to the Narragansett Sewer system provided no other sewage disposal options are available, and:

   a) The requested sewer connection is in an area where the existing sewer line and associated pumping and treatment facilities are of sufficient capacity, elevation and design as determined by the Town Engineer, to accommodate the wastewater flow.

b) The owner of the parcel agrees to abide by all conditions, restrictions, standards, specifications, design criteria, and to pay all fee schedules which may be established by the Town of Narragansett.

c) Connections into sewer force mains shall be permitted only under the following conditions:

i. The connection requested is into a pressure sewer line specifically designed to accommodate lateral connections (i.e. low pressure sewer system).

ii. The connection requested is into a valve access manhole that has been designed to accept additional pressurized connections.

d) Permits issued under this Section will be on a one (1) permit per unit basis, with no more than one (1) permit issued per platted lot, with all said lots legally platted, filed, and recorded prior to the adoption of this Policy.

3. Extensions of sanitary sewers to parcels of land within the Sewer Area which do not abut existing sewer shall be permitted only under the following conditions:

a) Parcels of land within the unsewered areas of the Sewer Area may be connected as the capacity of the Town's sewage facilities becomes available. It shall be the policy of the Town of Narragansett to support the extension of sewer lines into areas previously prioritized for sewer service, including but not limited to the area to be served by the North End Sewer Project.

b) All proposals to extend sewer lines into areas covered by this Policy shall conform to all technical and administrative standards and procedures as may be established by the Town, including but not limited to all provisions of Section 2 of this Policy.

c) Extensions may be granted for a length not to exceed three hundred and fifty (350) linear feet from a public sewer physically installed and accepted prior to the adoption of the April 18, 1995 Policy and located within an established public road or right-of-way, provided said extension is also installed within an established public road or right-of-way. Effective December 6, 1999, no sewer extensions shall be granted for new projects (one (1) or more lots) within Sewer Area I as defined herein (areas serviced by the Regional Wastewater Treatment Facilities).

d) The location of all existing public sewers will be as determined by the Town, unless otherwise approved by the Town Engineer.

e) Extensions will be granted only for those lots legally platted, filed, and recorded prior to the adoption of this Policy.

f) Permits for any and all lots fronted by any new extension installed under this Section will be issued on a one(1) permit per unit basis, with no more than one (1) permit issued per platted lot, with all said lots legally platted, filed, and recorded prior to the adoption of this Policy.

g) All extensions are subject to inspection and approval by the Town. After said approval, the extension becomes the property of the Town, subject to the administrative and technical standards and procedures set forth by the Town; the party who obtained the extension permit (applicant) shall forfeit all rights to said extension, including but not limited to the ability to control future connections and/or extensions and the ability to obtain financial or other considerations for same.

h) The applicant shall bear the full responsibility for all costs, including but not limited to survey, design, construction, inspection, and generation of as-built records associated with the extension.

4. There shall be no sewer connections or extensions to parcels of land not located within the Sewer Areas.

5. Nothing within this Policy shall supersede or alter any applicable provisions of the Town of Narragansett Ordinance Chapter 599, "An Ordinance Relating to the Construction of Sewer Lines by Private Parties in the Pettaquamscutt Cove Area of Assessor's Plat A", adopted July 18, 1988.

6. Nothing within this Policy shall supersede or alter any applicable provisions of the Town Council decision that was ratified, approved, and confirmed on June 26, 1985, specifically regarding low pressure sewers in the Edgewater Plat.

7. Any excess capacity that has been assigned or allocated to the Town of Narragansett beyond that which has been reserved for the North End Sewer Project shall in turn be reserved without qualification until a future Sewer Policy or Sewer Policy amendment is approved.

In order to carry out this Policy, the Town of Narragansett resolves to:

1. Continue to administer the Facilities Plan for Wastewater Management relative to the development of sewer facilities consistent with the previously mentioned studies, to the extent possible to most effectively service areas within the boundaries of the Sewer Areas, and

2. To pursue further reduction of groundwater infiltration and illegal discharges into the Town's wastewater collection system, and

3. To maintain and implement a Sewer Lot Development Fee structure whereby future development will fund future municipal improvements and capital expenditures directly attributable to those developments.

4. Develop and implement a specific project application and ranking system that would evaluate, among other things, said project's conformance with the Facilities Plan for Wastewater Management, the Comprehensive Plan, and associated absolute and relative benefits to the Town.

APPENDIX F

Public Meeting / Public Hearing Materials

Legal Notices

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EPARTMENT

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Kingstown School
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ad, Wakefield, RI
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ingstown School
not discriminate on the basis of race, color, creed, national origin, age, sex, disability or sexual orientation. By submission of your bid, you agree not to discriminate in named areas.

Individuals requesting interpreter services for the hearing impaired must notify (401)792-9660 or (401)792-9696 (TDD) seventy-two (72) hours in advance of hearing date.

PLANNING BOARD AGENDA

A special meeting of the Narragansett Planning Board will be held on Tuesday, May 30, 2006 at 6:00 p.m. in the board room of the Narragansett Town Hall.

APPROVAL OF MINUTES:
April 11, 2006

WASTEWATER MANAGEMENT PLAN OVERVIEW & RECOMMENDATION TO THE TOWN COUNCIL:
James Geremia – J.J. Geremia and Associates

RECOMMENDATIONS TO TOWN COUNCIL

ZONING MAP AMENDMENT:
Point Group LLC – Assessor's Plat L, Lot 323 for a change of zone from BA (business) to R-10 (residential) at 1221 Ocean Road

ZONING TEXT AMENDMENT:
Text amendment to Section 2.2 Definitions – Definition of "Marine Office"

Text amendments to Section 2.2 Definitions, Section 4.5 High Watertable Limitations Overlay District, and Section 7.7 Supplementary Drainage Requirements

COMPREHENSIVE PLAN
Discussion of draft text amendments to chapters 1, 2, 3, 9, 11 & 13

DISCUSSION:
Proposed changes to the Zoning Ordinance Section 4.3 Coastal and Freshwater Wetlands Overlay District

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NOTICE OF PUBLIC HEARING OF THE TOWN OF NARRAGANSETT

NOTICE is hereby given that there will be a Public Hearing by and before the Zoning Board of Review of the Town of Narragansett at 7:00 p.m. on Thursday, June 22, 2006 in the board room of the Narragansett Town Hall, 25 Fifth Avenue, Narragansett, Rhode Island to consider and act upon the following applications:

PUBLIC HEARINGS:

Litner – Assessor's Plat C, Lot 1-A for relief under Chapter 731, a variance from Section 6.4 Dimensional Regulations and a special use permit to amend a previous Zoning Board decision from Section 12.5 Special Use permits to legalize a dwelling that is under construction located at 7 Wanda Street

Shawcross – Assessor's Plat N-S, Lot 164 for relief under Chapter 731, a variance and special use permit from Section 4.3 Coastal & Freshwater Wetlands Overlay District to construct a new single-family dwelling and make improvements to Wolfe Road to access the property located at Wolfe Road

Cambio – Assessor's Plat J, Lot 24 for relief under Chapter 731, a variance and special use permit from Section 4.3 Coastal & Freshwater Wetlands Overlay District, a variance and special use permit from Section 4.4 Coastal Resources Overlay District and a special use permit from Section 4.5 High Watertable Limitations Overlay District to make improvements to an existing single-family dwelling and install an associated ISDS located at 113 Sand Hill Cove Road

Said petitions are on file in the office of Community Development in the Town Hall and may be inspected by you during regular office hours.

Individuals requesting interpreter services for the hearing impaired must notify the Department of Community Development at 401-789-1044, X633 forty-eight hours in advance of the hearing date.

Donald L. Goodrich, Chairman
Narragansett Zoning Board of Review

NOTICE OF PUBLIC HEARING OF THE TOWN OF NARRAGANSETT

NOTICE is hereby given that there will be a Public Hearing by and before the Zoning Board of Review of the Town of Narragansett at 7:00 p.m. on Thursday, June 8, 2006 in the board room of the Narragansett Town Hall, 25 Fifth Avenue, Narragansett, Rhode Island to consider and act upon the following applications:

PUBLIC HEARINGS:

APPEAL OF THE DECISION OF THE BUILDING OFFICIAL:
Rosati appealing the issuance of a building permit for Boston Neck Investments LLC – Assessor's Plat N-I, Lot 25 located at 665 Boston Neck Road

Frye – Assessor's Plat R-2, Lot 430 for relief under Chapter 731, a special use permit and variance from Section 4.3 Coastal & Freshwater Wetlands Overlay District, a special use permit and variance from Section 4.4 Coastal Resources Overlay District, and variances from Section 6.4 Dimensional Regulations to make improvements to an existing single-family dwelling located at 57 Basin Road

Trotta – Assessor's Plat H, Lot 13-24A for relief under Chapter 731, variances from Section 6.4 Dimensional Regulations to make improvements to an existing single-family dwelling located at 43 Inez Street

Said petitions are on in the office of Community Development in the Town Hall and may be inspected by you during regular office hours.

Individuals requesting interpreter services for the hearing impaired must notify the Department of Community Development at 401-789-1044, X633 forty-eight hours in advance of the hearing date.

Donald L. Goodrich, Chairman
Narragansett Zoning Board of Review

TOWN OF NARRAGANSETT

WASTEWATER MANAGEMENT FACILITIES PLAN

PUBLIC MEETING

MAY 30, 2006

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
272 West. Exchange St., Suite 201, Providence, RI 02903-1025
Phone: 401-454-7000 • Fax: 401-454-7415

FACILITIES PLAN OVERVIEW - PUBLIC MEETING HANDOUT

INTRODUCTION

The purpose of this Wastewater Management Facilities Plan is to determine the future needs for upgrading and expanding the North End Sewer System that contributes to the South Kingstown Regional Wastewater Treatment Facility and the South End Sewer System that contributes to the Scarborough Treatment Facility.

NORTH END SEWER SYSTEM

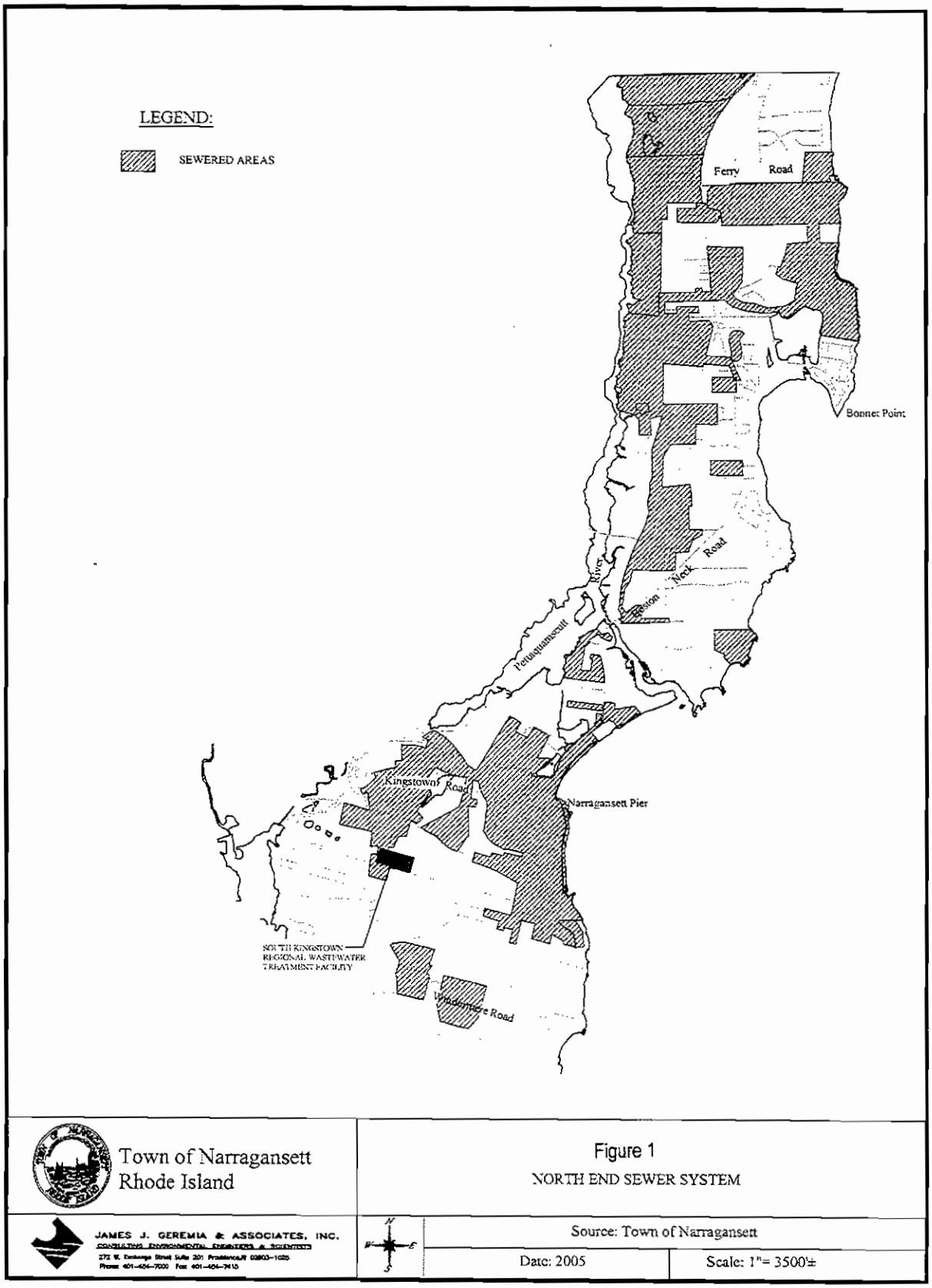
The wastewater generated by the northern end of Town is serviced by the South Kingstown Regional Wastewater Treatment Facility (Figure 1). In January 1969, the Rhode Island General Assembly passed an enabling act which established a wastewater district, permitting South Kingstown to operate and maintain a publicly owned sewage treatment works subsequent to the enabling legislation.

In November 1972 an agreement was developed between the Towns of Narragansett and South Kingstown and the University of Rhode Island to permit the Town of South Kingstown to maintain and operate a wastewater treatment plant. The following is the cost distribution.

South Kingstown	41%	1.693 MGD
University of Rhode Island	40%	1.652 MGD
Narragansett	19%	0.785 MGD
	Total	**4.130 MGD**

In 1997, the Rhode Island Department of Environmental Management (RIDEM) granted an increase in the capacity to South Kingstown's permit from 4.13 MGD to 5.0 MGD. This provided an additional flow of 0.87 MGD which could be distributed to each of the participants. Since the University of Rhode Island did not need any additional capacity, South Kingstown and Narragansett were able to increase their capacity equally, revising the flow distribution accordingly.

South Kingstown	42.57%	2.1283 MGD
University of Rhode Island	33.04%	1.6520 MGD
Narragansett	24.39%	1.2197 MGD
	Total	**5.0000 MGD**



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The increase in wastewater allocated to Narragansett (increased by 435,000 gallons per day) was still not sufficient to meet the needs of the community.

In July 2001, the Town of Narragansett signed an agreement with the University of Rhode Island to lease 400,000 gpd through June 30, 2006 for a total cost of $560,000. The following table shows the current flow distribution, including the 2001 leased amount from the University.

TABLE 1
CURRENT FLOW DISTRIBUTION

Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	2001 URI-Narragansett Lease (MGD)	Current Available Capacity (MGD)	Current Available Percentage (%)
South Kingstown	1.6933	41.00	0.4350	0.000	2.1283	42.57
Narragansett	0.7847	19.00	0.4350	0.400	1.6197	32.39
URI	1.6520	40.00	0.0000	(0.400)	1.2520	25.04
Totals	**4.13**	**100.00**	**0.8700**	**0.00**	**5.0000**	**100.00**

Leasing 400,000 gallons from the University is a stop gap measure to avoid having Narragansett funding the entire plant expansion. Narragansett is the only regional partner at this time that has to expand sewer services to meet the needs of the community.

Narragansett's flow totals have fluctuated below and above the allotted capacity of 1.6197 MGD. This fluctuation can be attributed to a number of factors such as inflow/infiltration and seasonal demographics. During the period 2002 - 2003, the Town's actual flow was 103.1% of its available capacity. However, it is important to understand that this reflects the 400,000 of leased capacity from the University that is only on loan and may be withdrawn at the end of June 2006 (pursuant to the terms of the lease agreement). In reality, Narragansett is using 137% of its purchased capacity.

As such, the following general strategies and options exist for Narragansett with respect to future flow capacity at the Regional WWTF:

1. No Action – Under this scenario, the following is presented:

   a) Narragansett will need to continue the strict enforcement/application of its Sewer Policy, which restricts new connections in the tributary area to properties with existing sewer frontage.

   b) Narragansett will continue to grow (market-driven), especially given the proliferation of Innovative/Alternative (I/A) Individual Sewage Disposal Systems (ISDS) designs being approved by the State.

   c) The Ouida Street Pump Station will need to be upgraded.

   d) Narragansett will need to continue its lease of flow space from URI.

   e) A physical expansion of the Regional WWTF will not be needed for the foreseeable (10-15 years) future.

   f) Narragansett will not have a great deal of flexibility when dealing with affordable housing or other development initiatives.

2. Physical WWTF Expansion – Under this scenario, the following is presented:

   a) Narragansett will be building overall physical capacity that will not be needed for the foreseeable future.

   b) Narragansett is the only regional partner that will need additional capacity; hence, Narragansett will pay for all of it.

   c) The Ouida Street Pump Station will still need to be upgraded.

d) The additional capacity will not be available for 4-5 years, based on design, permitting, and construction projections.

e) It should be noted that there will be certain Regional WWTF capital upgrades that may or may not be directly related to capacity that will be needed in the upcoming years.

3. Flow Allocation Agreement – Under this scenario, the flow allocation agreement with the regional partners would be re-negotiated, with the objective being for Narragansett to lease and/or purchase a share of the other partners' unused capacity. The following would apply:

a) The capacity would be available immediately, allowing Narragansett flexibility in dealing with affordable housing and other developmental initiatives.

b) Narragansett would need to restructure its Sewer Policy to prioritize how this additional capacity would be allocated.

c) The Ouida Street Pump Station will still need to be upgraded.

4. I/I Removal – This is actually a component of all of the above scenarios, subject to an on-going review of the cost-effectiveness of each solution (i.e. performing I/I work that has a reasonable cost-per-gallon ratio). There is the potential here for outside participation, to wit:

a) The Town of Narragansett could develop a "capacity-credit" program, wherein an applicant that meets certain defined criteria (i.e. affordable housing, creative commercial initiatives, etc.) could pay to remove I/I in exchange for sewage capacity being made available. This could be tied to the empirical peak flow factor that has been developed for the Pier area within this *Facilities Plan* report, namely 2.5 times the Average Daily Flow. In other words, if an applicant that meets whatever criteria is established needs relief from the Town's Sewer Policy, he/she would have to provide for 2.5 times their projected flow in I/I removal. The independent I/I studies that have been conducted by the Town provides the ability to calculate defensible numerical I/I removal cost-per-gallon figures. Additional information on this would be

presented to the Town Council in a separate report." Based upon a build-out for the North End and the projected needs of the Regional Partners through the year 2025, the South Kingstown Regional Wastewater Treatment Facility will need to be upgraded to meet an average daily flow of 6.199 MGD.

The preliminary design of the South Kingstown Regional Wastewater Treatment Facility, as presented in the South Kingstown Regional Wastewater Facilities Plan dated 2006, divides the improvements into two categories. The first component corresponds to the hydraulic upgrades necessary to meet the population demands for 2025; the second component corresponds to the necessary upgrades associated with process improvements.

The unit processes that relate to hydraulic expansion are:

Two (2) Primary Settling Tanks
Two (2) Primary Sludge Pumps
One (1) Waste Activated Sludge Pump
One (1) Return Activated Sludge Pump
Sludge Thickener
Aeration System

The unit processes that relate to system upgrades are:

Odor Control - Headworks
Odor Control - Primary Settling Tank
Odor Control - Septage Receiving
Odor Control - Sludge Holding Tanks
Septage Receiving Station
Sludge Building Enclosure

Table 2 presents the regional cost breakdown relating to the hydraulic expansion. Those components that are directly related to a hydraulic upgrade are distributed to South Kingstown and Narragansett based on their projected need. For example, the increase over the current capacity is 1.199 MGD, of which 0.619 MGD (or 51.6%) relates to South Kingstown's needs, while 0.58 MGD (or 48.4%) relates to Narragansett's future needs.

Table 3 presents the regional cost breakdown for the process components that are considered upgrades to the original facility, the capital cost distribution is based on the 2025 percentage.

TABLE 2
PROJECT COST SUMMARY FOR HYDRAULIC EXPANSION
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN	NARRAGANSETT	U.R.I.
Primary Settling				
• (2) Settling Tanks	$1,600,000	$ 832,000	$ 768,000	$
• Sludge Pumps	95,000	49,400	45,600	
Aeration System -				
• Basin	1,200,000	619,200	580,800	
• Diffusers	450,000	234,000	216,000	
Secondary Settling Tank				
• WAS Pumps	60,000	31,200	28,800	
• RAS Pumps	65,000	33,800	31,200	
Sludge Thickener	150,000	77,400	72,600	
Sub-Total	$3,620,000	$1,877,000	$ 1,743,000	$ 0
Auxiliaries [1] (12%)	434,400	225,240	209,160	0
Sub-Total	$4,054,400	$2,102,240	$ 1,952,160	$ 0
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	608,160	315,336	292,824	0
TOTAL	**$4,662,560**	**$2,417,576**	**$ 2,244,984**	**$ 0**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

TABLE 3
PROJECT COST SUMMARY FOR PROCESS UPGRADES
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN	NARRAGANSETT	U.R.I.
Headworks Odor Control	$ 200,000	$ 88,600	$ 58,200	$ 53,200
Solids Handling Facilities (including Odor Control)	3,500,000	1,550,500	1,018,500	931,000
Primary Odor Control	750,000	332,250	218,250	199,500
Septage	500,000	221,500	145,500	133,000
Sub-Total	$4,950,000	$2,192,850	$ 1,440,450	$ 1,316,700
Auxiliaries [1] (12%)	594,000	263,142	172,854	158,004
Sub-Total	$5,544,000	$2,455,992	$ 1,613,304	$ 1,474,704
Eng. Allowance(15%) (Design, Construction Admin., Resident Eng.)	831,600	368,398	241,996	221,206
TOTAL	**$6,375,600**	**$2,824,390**	**$ 1,855,300**	**$ 1,695,910**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

WASTEWATER COLLECTION SYSTEM NORTH END

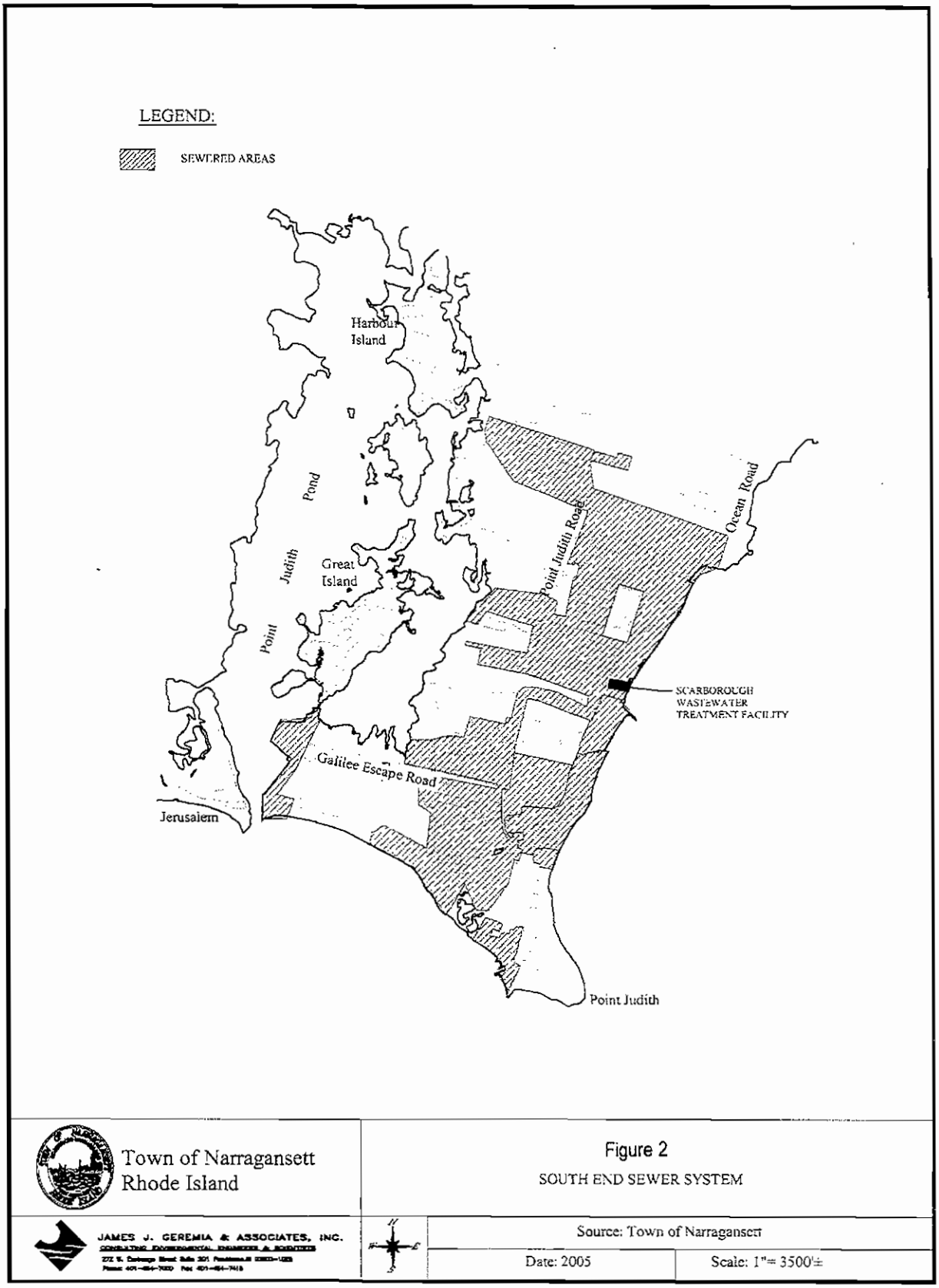
Ouida Street Pump Station: The Ouida Street Pump Station will be renovated to accommodate the future flows. The pump station service area is in the North End Sewer System, including the Middlebridge area of South Kingstown. The existing pumps, motors, flow, meter, and variable speed drives will be replaced with new units having the capacity to convey the future flows. The station will consist of three variable speed pumps, each having a capacity of 2,279,000 GPD (1,585 GPM), with 150 horsepower motors. Currently, the station is being equipped with a Data Acquisition System which will transmit flows and alarms via radio system to the Scarborough Wastewater Treatment Facility and to the police station. Also, the inoperable mechanical bar screen will be replaced. The total cost of the improvements is $975,000.

SOUTH END SEWER SYSTEM

The southern end of the Town is serviced by the Scarborough Wastewater Treatment Facility (Figure 2) which is owned and operated by the Town of Narragansett. This facility services the residential and commercial units in the southern portion of Town as well as the fishing industry at the Port of Galilee.

The Scarborough treatment system for the southern section of Town was evaluated with respect to its ability to meet established effluent limitations and water quality objectives at both present and future flow rates and waste load. As in the north end, the Facilities Plan has projected the need through 2025. For the purposes of this report, 2025 is considered to be the build-out year for the South End. The corresponding sewered population in the South End is projected to be 9,416 individuals, and the corresponding number of housing units sewered is 3,891.

An analysis of the treatment facility indicates that under presently observed influent loads, the existing Scarborough Wastewater Treatment Facility is operated with a maximum achievable efficiency. In fact, with the implementation of the Industrial Pretreatment Program and the compliance from the industries, the peak daily BOD_5 and Total Suspended Solids loadings no longer exceed the plant's design parameters. The treatment system is performing well under the design parameters. Based on that determination, it has been concluded that only minor upgrades would be required to further optimize plant performance through process control and will permit the facility to meet its projected loadings through 2025.



Town of Narragansett
Rhode Island

Figure 2
SOUTH END SEWER SYSTEM

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

Z:\Projects\Narragansett\Waste Water Management Plan\F101-1.dwg, 12/28/2005 10:24:51 AM, 5530

Integrated in this planning period is RIDEM's requirement to begin the planning process for upgrading a treatment facility when the facility reaches 80% of its design capacity. In the case of the Scarborough facility, this will occur when the flows reach 1.12 MGD. Since there is no immediate need to upgrade and expand the facility, the capital plan will focus on replacing the equipment as it reaches its useful life and upgrade other areas within the process. As part of the replacement process, each new component will be increased in its hydraulic capacity from the original design flows (1.4 MGD) by 25% (or 1.75 mgd) to ensure that those components are upgraded and will not be controlled by the 80% factor through the planning year 2025.

Based on the detailed review of the existing facilities, performance records, maintenance records, previous engineering studies, and pertinent regulatory requirements, process modifications will be required.

Influent Pump Station: The influent pump station is of a dry pit design and contains two (2) variable and one (1) constant speed, 25 horsepower pumps which lift the wastewater into the oxidation ditches. At the present, the facility performs satisfactorily, however, it has reached its useful life and needs to undergo a major overhaul. The upgrade will be designed to handle a range from 0.3 MGD (minimum) to 5.25 MGD (maximum) with two pumps, while the third pump will serve as a standby.

Headworks - Odor Control: In an effort to reduce the odor associated with the raw influent, it is recommended that the headworks be enclosed and the off-gases from the enclosed headworks and influent pump station be processed through a two-stage odor control system dedicated to the headworks.

Primary Clarifier: The addition of two (2) primary clarifiers and related primary sludge pumps is to be included within the long range Capital Improvement Plan. The idea behind this concept is that depending on the ratio of a soluble to suspended BOD_5 concentrations of the raw sewage, the sufficiently sized primary clarifiers can reduce up to 75% of solids and up to 35% of organic loads delivered for treatment to the activated sludge system, thereby eliminating the necessity of expanding the aeration capacity to meet the future treatment requirements. The primary clarifiers will be designed for an average daily flow of 1.75 mgd and a peak loading of 5.25 mgd. The avoidance of odors is critical in the consideration of any process upgrades. Therefore, the primary clarifier weir will be sealed with a launder cover designed from fiberglass reinforced plastic. The cover will be gastight designed to entrap 94 to 98% of the odor generated at the weirs. The entrapped gas under the weir covers will be withdrawn off through a two stage odor abatement system.

Secondary Clarification: The upgrade and expansion of the secondary clarification facilities will be required as part of the Capital Improvement Plan. One additional 40-foot diameter, 11-foot side water depth clarifier will work in conjunction with the two existing clarifiers. The third clarifier will allow the plant to maintain its effluent quality at peak hydraulic loadings and still take one unit out of service for maintenance.

Disinfection: Based upon the 25% increase in capacity, the two chlorine tanks will achieve the 37 minute detention time at average daily flow, however, at peak flows provides for only 12 minutes of detention time. Based upon RIDEM criteria of 15 minutes peak flow, the existing chlorine tanks are to be expanded to meet the 25% criteria. The construction of the chorine contact tank should occur before or in conjunction with the addition of the secondary clarifier to allow for placement of the secondary clarifier in the location of the existing chlorine contact tank.

Table 4 presents a breakdown of the capital cost.

TABLE 4 TOTAL CAPITAL COST SUMMARY - SCARBOROUGH FACILITY		
UNIT PROCESS	**TOTAL CAPITAL COST [2]**	
Headworks Screening Grit Removal Odor Control	$	640,000
Influent Pump Station		780,000
Primary Settling (2) Settling Tanks Sludge Pumps Scum Pumping System Odor Control		3,420,000
(1) Final Settling Tank WAS Pumps RAS Pumps		1,302,000
Chlorination		1,020,000
Sub-Total Auxiliaries [1]	$	7,162,000 860,000
Sub-Total Engineering Allowance (Design, Construction Administration, Resident Eng.)	$	8,022,000 215,000
TOTAL	**$**	**8,237,000**

1 Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

2 Includes 20% contingencies.

WASTEWATER COLLECTION SYSTEM SOUTH END

The future sewered area in the South End (such as Harbour Island, Great Island and Baltimore Avenue area) will require pump stations to convey the sewage flows generated by Harbour Island and Great Island to connect to the South End Sewer System.

Harbour Island Wastewater Collection System: The Harbour Island Wastewater Collection System will consist of conventional gravity sewers and grinder pumps and pressure sewers serving 320 residential dwelling units. Approximately 50 grinder pumps will be required for dwellings located within low lying areas. The average flow generated by Harbour Island is 102,400 GPD, with an associated peak flow of 268,800 GPD. The Harbour Island Pump Station will transport the sewage flows via a force main to the Briggs Farm sewer system. The pump station will consist of two self-priming centrifugal sewage pumps, each rated at 268,800 GPD (190 GPM). The total estimated cost for the Harbour Island Wastewater Collection System is $7,585,600 ($30,512 per home).

Great Island Wastewater Collection System: The Great Island Wastewater Collection System will consist of conventional gravity sewers in combination with grinder pumps and pressure sewers to provide a cost effective system for 375 residential dwellings. This sewer system will convey flows to the proposed Great Island Pump Station to be located prior to the Point Judith Pond Bridge crossing. The capacity of the pump station will be 313,000 GPD (220 GPM). The total estimated cost of the Great Island Wastewater Collection System is $8,750,000 ($29,909 per home).

Baltimore Avenue Area Wastewater Collection System: The Baltimore Avenue Area Wastewater Collection System will consist of conventional gravity sewers serving 49 residential dwellings. The sewer system will consist of approximately 5,000 linear feet of gravity sewers. Table 1-8 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Baltimore Avenue Area Wastewater Collection System is $1,409,300 ($35,000 per home).

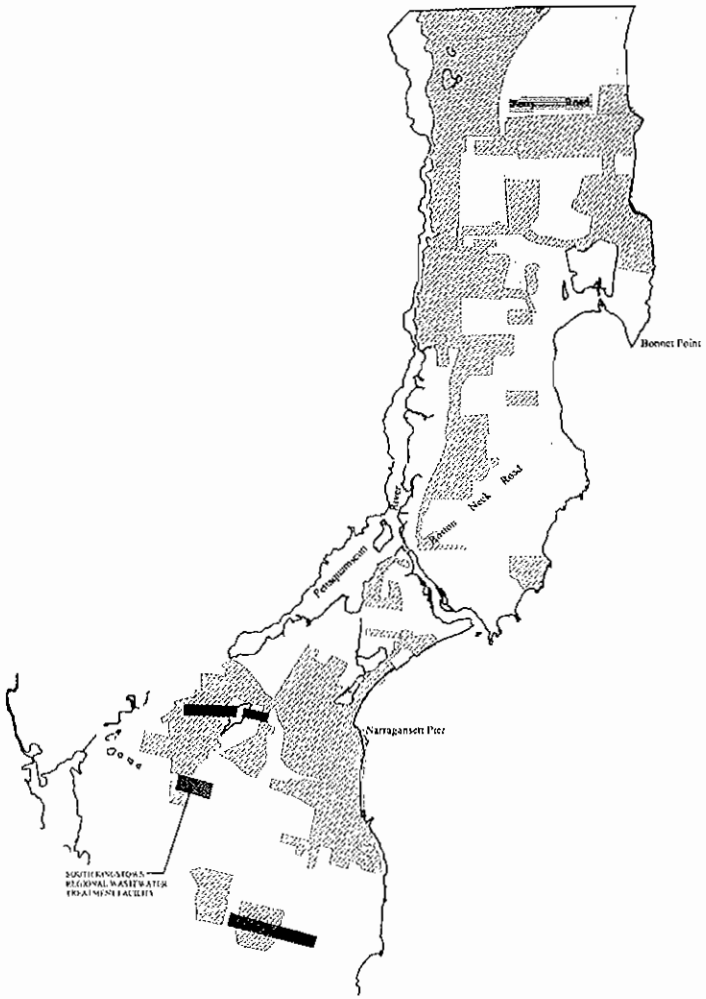
Knowles Campground Wastewater Collection System: The Knowles Campground Wastewater Collection System will consist of gravity sewers serving 110 residential units. The sewer system will consist of approximately 3,400 linear feet of gravity sewers. Knowles Campground began installing the sewer system in February 2006 and will be responsible for the construction as well as the long term maintenance of the system.

Town of Narragansett Wastewater Management Facilities Plan Public Meeting

Wastewater System

- North End
  - From Windermere Road North to the North Kingstown Town Line
- South End
  - From Windermere Road South to Point Judith

North End Wastewater System



North End System

- Collection system is owned by the Town
- Treatment is a Regional Partnership
- The current Ownership is as follows:

• South Kingstown	42.57%	2.1283 MGD
• University of Rhode Island	33.04%	1.6520 MGD
• Narragansett	24.39%	1.2197 MGD
• **Total**		**5.0000 MGD**

Current Flow Distribution

TABLE 1
CURRENT FLOW DISTRIBUTION

Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	2001 URI-Narragansett Lease (MGD)	Current Available Capacity (MGD)	Current Available Percentage (%)
South Kingstown	1.6933	41.00	0.4350	0.000	2.1283	42.57
Narragansett	0.7847	19.00	0.4350	0.400	1.6197	32.39
URI	1.6520	40.00	0.0000	(0.400)	1.2520	25.04
Totals	**4.13**	**100.00**	**0.8700**	**0.00**	**5.0000**	**100.00**

Regional Options

- No Action
- Physical WWTF Expansion
- Flow Allocation Agreement
- Inflow/Infiltration Removal

No Action

- Strict Enforcement of the Town's Sewer Policy
- Uses of Innovative ISDS Systems
- Continue to Lease from URI

Physical WWTF Expansion

- Town will be responsible for to upfront the cost of the Regional Expansion
- Capacity will not be available for 4-5 years

Flow Allocation Agreement

- Allow Narragansett Flexibility in dealing with new connections
- Restructure the Sewer Policy

Inflow/Infiltration Removal

- Establish a Capacity-credit program

Physical WWTF Expansion Cost Hydraulic

TABLE 2
PROJECT COST SUMMARY FOR HYDRAULIC EXPANSION
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN	NARRAGANSETT	U.R.I.
Primary Settling				
• (2) Settling Tanks	$1,600,000	$ 832,000	$ 768,000	$
• Sludge Pumps	95,000	49,400	45,600	
Aeration System -				
• Basin	1,200,000	619,200	580,800	
• Diffusers	450,000	234,000	216,000	
Secondary Settling Tank				
• WAS Pumps	60,000	31,200	28,800	
• RAS Pumps	65,000	33,800	31,200	
Sludge Thickener	150,000	77,400	72,600	
Sub-Total	$3,620,000	$1,877,000	$ 1,743,000	$ 0
Auxiliaries [1] (12%)	434,400	225,240	209,160	0
Sub-Total	$4,054,400	$2,102,240	$ 1,952,160	$ 0
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	608,160	315,336	292,824	0
TOTAL	**$4,662,560**	**$2,417,576**	**$ 2,244,984**	**$ 0**

Physical WWTF Expansion Cost Process Upgrades

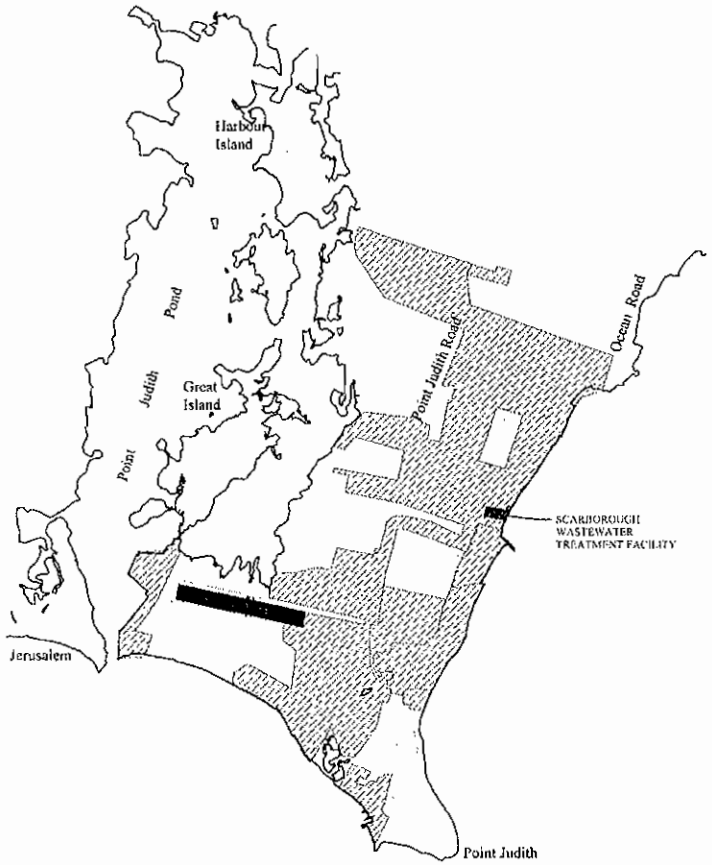
TABLE 3
PROJECT COST SUMMARY FOR PROCESS UPGRADES
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN	NARRAGANSETT	U.R.I.
Headworks Odor Control	$ 200,000	$ 88,600	$ 58,200	$ 53,200
Solids Handling Facilities (including Odor Control)	3,500,000	1,550,500	1,018,500	931,000
Primary Odor Control	750,000	332,250	218,250	199,500
Septage	500,000	221,500	145,500	133,000
Sub-Total	$4,950,000	$2,192,850	$ 1,440,450	$1,316,700
Auxiliaries [1] (12%)	594,000	263,142	172,854	158,004
Sub-Total	$5,544,000	$2,455,992	$ 1,613,304	$1,474,704
Eng. Allowance(15%) (Design, Construction Admin., Resident Eng.)	831,600	368,398	241,996	221,206
TOTAL	**$6,375,600**	**$2,824,390**	**$ 1,855,300**	**$ 1,695,910**

Collection System Upgrades

- Ouida St Pump Station

South End Wastewater System



South End System

- Collection system is owned by the Town
- Treatment is owned by the Town

Wastewater Treatment Facility Scarborough Plant

- Influent Pump Station
- Headworks - Odor Control
- Primary Clarifiers
- Secondary Clarifier
- Disinfection

Physical WWTF Upgrade Cost

TABLE 4
TOTAL CAPITAL COST SUMMARY - SCARBOROUGH FACILITY

UNIT PROCESS	TOTAL CAPITAL COST [2]
Headworks Screening Grit Removal Odor Control	$ 640,000
Influent Pump Station	780,000
Primary Settling (2) Settling Tanks Sludge Pumps Scum Pumping System Odor Control	3,420,000
(1) Final Settling Tank WAS Pumps RAS Pumps	1,302,000
Chlorination	1,020,000
Sub-Total	$ 7,162,000
Auxiliaries [1]	860,000
Sub-Total	$ 8,022,000
Engineering Allowance (Design, Construction Administration, Resident Eng.)	215,000
TOTAL	**$ 8,237,000**

South End Collection System

- Harbour Island Wastewater Collection System
- Great Island Wastewater Collection System
- Baltimore Avenue Area Wastewater Collection System
- Knowles Campground Wastewater Collection System

Harbour Island Wastewater Collection System

- $7,585,600 ($30,512 per home)

Great Island Wastewater Collection System

- 8,750,000 ($29,909 per home)

Baltimore Avenue Area Wastewater Collection System

- $1,409,300 ($35,000 per home)

Town of Narragansett
Wastewater Management
Facilities Plan
Public Meeting
Questions

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LEGAL NOTICES LEGAL NOTICES LEGAL NOTICES LEGAL NOTICES LEGAL NOTICES LEGAL NOTICES

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ARMÓN LAW OFFIC
Attorney for the Hol
of the Mortg
150 California Street
Newton, MA 02458
(617) 558-0500
200703-0865 - BLU

NOTICE OF CONDEMNATION

arragansett Bay Commis-
, Plat No. 2007-02; Loca-
City of Providence,
de Island - Dupont Drive
Chambers Street. Affect-
arcels: Assessor's Plat 50
728 owned by TEG Real-
LLC; Assessor's Plat 50
724 owed by First States
stors 5200, LLC; Asses-
Plat 43, Lots 228 & 229
d by Greatrex Corpora-
- The Narragansett Bay
mission pursuant to au-
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uly 10, 2007. did on Au-
20, 2007, take permanent
temporary easements in
locations indicated above
sewer use purposes. A
plete description of the
ng may be obtained from
Narragansett Bay Com-
ion, One Service Road,
idence, RI 02905.

NOTICE OF CONDEMNATION

arragansett Bay Commis-
, Plat No. 2007-01; Loca-
City of Providence,
de Island - Gulf Avenue,
cted parcels: Assessor's
38 Lot 2 owned by Butler
pital/Butler Health Cen-
Assessor's Plat 40 Lot 293
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ce. - The Narragansett Bay
mission pursuant to au-
ization received from the
e Properties Committee
uly 10, 2007, did on Au-
20, 2007, take permanent
temporary easements in
locations indicated above
sewer use purposes. A
plete description of the
ng may be obtained from
Narragansett Bay Com-
ion, One Service Road,
idence, RI 02905.

MORTGAGEE'S SALE

25 King Phillip Street
Providence, RI 02909
be sold at public auction
n September 25, 2007 at

150 California Street
Newton, MA 02458
(617) 558-0500
200705-0535 - RED

MORTGAGEE'S SALE

34-36 Bowdoin Street
Providence, Rhode Island

Will be sold at public auction on September 19, 2007, at 12:00 p.m. local time, on the premises, by virtue of the power of sale contained in a mortgage made by STEPHEN I. OMONKHEGBE, dated November 2, 2005, and recorded in the Records of Land Evidence of the City of Providence, State of Rhode Island, in Book 7680, Page 1, the conditions of said mortgage having been broken:

That certain parcel of land with all buildings and improvements thereon more particularly described in said mortgage deed recorded in said Book 7680 at Page 1.

The above premises will be sold subject to all taxes, assessments and other encumbrances which may constitute a prior lien thereon, and will be conveyed subject to any easements, restrictions of record, tenancies and rights of redemption for unpaid federal taxes, if any, as shall, notwithstanding this provision, constitute valid liens or encumbrances thereon after said sale.

Terms of sale: deposit of Five Thousand Dollars ($5,000.00) in cash, certified check or bank check at time and place of sale. Other terms and conditions will be announced at the sale.

By order of the holder of the mortgage, who hereby gives notice of intention to bid at said sale or any postponement or adjournment thereof.

PARTRIDGE SNOW & HAHN LLP
Attorneys for Holder of the Mortgage
180 South Main Street
Providence, RI 02903
(401) 861-8293

STATE OF RHODE ISLAND
Probate Court of the

Newton, MA 02458
(617) 558-0500
200705-0098- GRN

MORTGAGEE'S SALE

22-24 Ledge Street
Providence, RI 02904

Will be sold at public auction on September 18, 2007 at 11:00 AM local time, on the premises, by virtue of the power of sale contained, in a certain mortgage given by Aletha Browne to Mortgage Electronic Registration .Systems, Inc., as Nominee for Accredited Home Lenders, Inc. dated October 26, 2004 and recorded in the Land. Evidence Records for the City of Providence, State of Rhode Island in **Book 6896 at Page 0218, ET SEQ.,** the conditions of said mortgage having been broken:

That certain parcel of land, with all the buildings and improvements thereon, more particularly described, in deed recorded in said Registry at **Book 6896 at Page 216, ET SEQ.**

The above premises will be sold subject to all taxes, assessments, and other encumbrances which may constitute a prior lien thereon, and will be conveyed subject to any easements, restrictions of record, tenancies, and rights of redemption for unpaid federal taxes, if any, as shall, notwithstanding this provision, constitute valid liens or encumbrances thereon after said sale.

Terms of sale: a deposit of Ten Thousand Dollars ($10,000.00) in cash or certified check or bank check at the time and place of sale. Other terms and conditions to be announced immediately prior to said sale.

By order of the holder of the mortgage, who hereby gives notice of intention to bid at said sale or any postponement or adjournment thereof.

ABLITT & CHARLTON, P.C.
Attorney for the Holder of the Mortgage
92 Montvale Avenue, Suite 2950

on September 19, 2007 at 4:00 p.m. local time on the premises at 243 South Clarendon Street, Cranston, Providence County, Rhode Island, said parcel to be sold by virtue of a power of sale contained in a certain mortgage made and executed by Marc J. Spirito, which mortgage is dated January 12, 2006, and recorded January 13, 2006 at 11:24 AM in Book 3258 at Page 235 in the Cranston Records of Land Evidence, the conditions of said mortgage having been broken:

That certain parcel of land with all buildings and improvements thereon more particularly described in said mortgage deed recorded in Book 3258 at Page 235 in the Cranston Records of Land Evidence.

The above premises will besold subject to all taxes, assessments, water and sewer charges and other encumbrances which may constitute a prior lien thereon, and will be conveyed subject to any restrictions and easements of record, liens concerning said realty and rights of redemption for unpaid federal taxes, if any, as shall, notwithstanding this provision, constitute valid liens or encumbrances thereon after said sale.

Terms of sale shall include a down payment of Five Thousand ($5,000.00) Dollars upon the acceptance of the successful bid, payable in cash or by bank certified check at the time and place of sale. The balance shall be paid by the purchaser by certified, bank treasurer's or cashier's check within thirty (30) days after the date of the sale. Other terms and conditions to be announced immediately prior to said sale.

By order of the holder of the mortgage which gives notice of its intention to bid at such sale or any postponement or adjournment thereof.

HARMON LAW OFFICES, P.C.
Attorney for the Holder of the Mortgage
150 California Street

tained in a mortgage made by LUCA GRECO and CLAUDINE M. GRECO dated November 23, 2004 and recorded in the Records of Land Evidence of the City of Cranston, State of Rhode Island, in Book 2842, Page 24, the conditions of said mortgage having been broken:

That certain condominium unit and interest in and to the common elements within said condominium property more particularly described in said mortgage deed recorded in said Book 2842 at Page 24.

The above premises will be sold subject to all taxes, assessments and other encumbrances which may constitute a prior lien thereon, and will be conveyed subject to any easements, restrictions of record, tenancies and rights of redemption for unpaid federal taxes, if any, as shall, notwithstanding this provision constitute valid liens or encumbrances thereon after said sale.

Terms of sale: deposit of Five Thousand Dollars ($5,000.00) in cash, certified check or bank check at time and place of sale. Other terms and conditions will be announced at the sale.

By order of the holder of the mortgage, who hereby gives notice of intention to bid at said sale or any postponement or adjournment thereof.

PARTRIDGE SNOW & HAHN LLP
Attorneys for Holder of the Mortgage
180 South Main Street
Providence, RI 02903
(401) 861-8293

MORTGAGEE'S SALE

44-48 Barbara Street
Providence, Rhode Island

Will be sold at public auction on September 19, 2007 at 4:00 p.m. local time on the premises at 44-48 Barbara Street, Providence, Providence County, Rhode Island, said parcel to be sold by virtue of a power of sale contained in a certain

(617) 558-0500
200704-0669 - RED

TOWN OF NARRAGANSETT, RHODE ISLAND WASTEWATER MANAGEMENT FACILITIES PLAN PUBLIC HEARING

Date:
September 12, 2007
Time:
5:00 P.M.
Place:
Narragansett Town Hall
25 Fifth Ave.
Narragansett,
Rhode Island 02882
Purpose:

To review the funding of the Town's Wastewater Management Facilities Plan. The Hearing is being held in compliance with the Rhode Island Department of Environmental Management-Division of Water Resources.

The Final Draft Wastewater Management Facilities Plan can be reviewed Monday through Friday (9:00 AM to 4:00 PM) at the Narragansett Town Hall, Engineering Department, 25 Fifth Ave., Narragansett, Rhode Island.

MORTGAGEE'S SALE

43 Herbert Street
Providence, Rhode Island

Will be sold at public auction on September 12, 2007 at 2:00 p.m. local time on the premises at 43 Herbert Street, Providence, Providence County, Rhode Island, said parcel to be sold by virtue of a power of sale contained in a certain mortgage made and executed by Marcela Garces, which mortgage is dated April 15, 2005, and recorded April 15, 2005 at 9:56 in Book 7218 at Page 332 in the Providence Records of Land Evidence, the conditions of said mortgage having been broken:

That certain parcel of land with all buildings and improvements thereon more particularly described in said mortgage deed recorded in

(617) 558-0500
200706-1866 - PRP

MORTGAGEE'S SALE

226-228 High Street
South Kingstown, RI
Tax Assessor's
Plat 56-2, Lot 128

Will be sold at public auction on September 12, 2007 at 11:00 a.m. local time on the premises by virtue of the power of sale contained in a mortgage deed made by K. Erik Wallin and Carolyn J. Wallin to KMB Property Management, LLC to secure said debt, dated June 1, 2006 and recorded on June 1, 2006 in Book 1240, Page 289 in the Land Evidence Records of the Town of South Kingstown, County of Washington, and the State of Rhode Island, further assigned on June 1, 2006 said assignment recorded on June 1, 2006 in Book 1240, Page 294; the conditions of said mortgage and subsequent assignment having been broken: particularly described in Book 1240, Page 289 and Book 1240, Page 294 as follows:

That certain tract or parcel of land, together with all the buildings and improvements thereon situated located in the Town of South Kingstown, County of Washington, State of Rhode Island, said tract or parcel of land containing one fourth of an acre, more or less, bounded and described as follows:

Northerly on land now or formerly of Joseph E. Costanza et ux., Easterly on High Street, Southerly on Whitford Street:, Westerly on land now or formerly of Everett E. Briggs.

The premises herein above described are the same as were conveyed by George E. Harvey to Emilio Masiello et ux. See Land Evidence Records of the Town of South Kingstown, RI, Deed Book No. 110 at page 610.

The premises herein above described are the same as were conveyed by Emilio Ma-

e part by certi
k treasurer's or cashier's
ck within thirty (30) days
r the date of the sale. Oth-
erms and conditions to be
ounced immediately prior
aid sale.
ty order of the holder of
mortgage which gives no-
of its intention to bid at
sale or any postpone-
t or adjournment thereof.
ARMÓN LAW OFFICES,
P.C.
Attorney for the Holder
of the Mortgage
150 California Street
Newton, MA 02458
(617) 558-0500
200707-1875 - ORE

MORTGAGE FORECLOSURE SALE

560 Seven Mile Road
Scituate, Rhode Island 02831
Assessor's Plat: 9-1
Lot: 108 Scituate
Lot 38 Plat 31 Cranston

Will be sold, subject to any and all prior liens and encumbrances, at public auction on September 25, 2007 at 10:00 AM on the premises by exercise of the power of sale in a mortgage executed by Stephen R. Divona and Marguerite Divona dated December 1, 2004 and recorded in the Scituate, RI Land Evidence Records in Book 265 at Page 1035 and in Cranston, RI Land Evidence Records in Book 2851 at Page 7. Cash, certified or bank check of $5,000.00 required to bid. Other terms and conditions will be announced at the sale.

NICHOLAS BARRETT
Attorney for the Holder of the Mortgage
999 South Broadway
East Providence,
Rhode Island 02914
www.auctionsri.com

STATE OF RHODE ISLAND
Probate Court of the TOWN OF SCITUATE
NOTICE OF MATTERS PENDING AND FOR HEARING IN SAID COURT

The Court will be held in session at Council Room, 195 Danielson Pike, North Scituate, Rhode Island on the date specified in notices below at 10:00 A.M. for hearing said matters.

Adams, Sophia A. estate: Milan Earl Adams, Jr., has qualified as executor; creditors must file their claims in the office of the Probate Court within the time required by law beginning August 28, 2007.

Soprano, Hazel estate: Suzanne Soprano has qualified as executrix; creditors must file their claims in the office of the Probate Clerk within the time required by law beginning

THE HANDOUT PROVIDED AT THE SEPTEMBER 12, 2007 FACILITIES PLAN PUBLIC HEARING CONSISTED OF:

CHAPTER 1 - EXECUTIVE SUMMARY

APPENDIX G

Public Hearing Transcript

FACILITIES PLAN
FOR
WASTEWATER MANAGEMENT

TOWN OF
NARRAGANSETT, RHODE ISLAND

PUBLIC HEARING TRANSCRIPT
SEPTEMBER 12, 2007

APPENDIX H

Intergovernmental Correspondence

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

COASTAL RESOURCES MANAGEMENT COUNCIL
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, R.I. 02879-1900

(401) 783-3370
FAX: (401) 783-3767

May 16, 2007

RECEIVED
MAY 16 2007
JAMES J. GEREMIA
AND ASSOCIATES, INC.

Mr. James J. Geremia
James J. Geremia & Associates, Inc.
272 West Exchange Street, Suite 201
Providence, RI 02903-1025

Re: **Revised Narragansett Wastewater Management Facilities Plan**

Dear Mr. Geremia:

Thank you for submitting the revised Town of Narragansett Facilities Plan for Wastewater Management, dated March 2007. As you know, the CRMC had previously reviewed Sections 4 and 5, Existing Condition and Future Conditions, respectively, and forwarded comments in regard to conformance with the RI Coastal Resources Management Program. Portions of the Town's northern sewer service area are located within the CRMC Narrow River Special Area Management Plan (SAMP), while portions of the southern service area (primarily west of Point Judith Road) are located within the Salt Pond Region SAMP.

We had requested that language be inserted into the document to recognize the existing CRMC prohibitions for the extension of sewer lines within CRMC designated Self-Sustaining Lands or Lands of Critical Concern, as identified in either SAMP. Section 920.1 details the prohibition and sets forth specific conditions by which a project could be approved. In addition, we had requested language referencing Section 325 of the coastal program which requires CRMC review of any municipal or private sewer extension within a SAMP. We appreciate the fact that the wastewater facilities plan document has now been amended to include the requested revisions.

Recognizing that some inconsistencies still exist between the amended wastewater facilities plan and policies of the CRMC Narrow River and Salt Pond Region SAMP, the CRMC is satisfied that the plan identifies CRMC review authority and applicable policy and standards for municipal or private sewer line extensions. The amended wastewater facilities plan as a whole, however, is still not entirely consistent with RI Coastal Resources Management Program. Accordingly, there may be some proposed sewer line extensions within certain areas that do not meet the four criteria in Section 920.1, and thus the CRMC would not be able to approve such extensions. I recommend that when specific sewer line extension projects are planned for CRMC-designated Self-Sustaining Lands or Lands of Critical Concern, town and CRMC staff meet to determine if the project can meet the four criteria for approval.

Please contact me or James Boyd of my staff should you have any questions concerning this determination. Our office telephone is 783-3370.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

/pjc
cc: Michael Tikoian, CRMC Chairman
Jeff Willis, CRMC Deputy Director
James Boyd, CRMC Coastal Policy Analyst
Jeffry Ceasrine, Narragansett Town Engineer
Arthur Zeman, RIDEM
Michael Deluca, Narragansett Planning Director

File WFP
CRMC Comments

Jim Geremia

From: James Boyd [jboyd@crmc.ri.gov]
Sent: Wednesday, February 21, 2007 11:53 AM
To: Jim@GeremiaEngineering.com; art.zeman@dem.ri.gov; jceasrine@muni.ri.net
Cc: Grover Fugate; jboyd@crmc.ri.gov
Subject: S. Kingstown and Narragansett wastewater facility plans

Gentlemen: Thank you for meeting with Grover and me this morning to discuss the issue concerning CRMC Special Area Management Policy and the proposed wastewater facility plans for SK and Narr. As we discussed, the CRMC would like to see language in both facility plans that acknowledges the existing prohibition for new sewer lines in CRMC-designated Self-sustaining and Critical Concern lands and the conditions necessary to met the exception to the prohibition, as contained in Section 920.1 in both the Narrow River and Salt Pond Region SAMPs. I suggest the following specific language to be included in the facilities plans:

> The Coastal Resources Management Council prohibits the installation of sewers in lands designated as Critical Concern and Self-sustaining, as identified in the CRMC Narrow River and Salt Pond Region Special Area Management Plans (reference Section 920.1), unless all of the following conditions are met:
>
> (i) the property meets the RIDEM regulatory siting requirements for the installation of a conventional ISDS,
>
> (ii) the proposal is agreeable to both the town and the CRMC,
>
> (iii) a deed restriction is attached to the property ensuring no further subdivision, and
>
> (iv) the properties to be sewered are within 500 feet of an existing sewer line or are within a subdivision which abuts the sewer easement.

As we discussed, we would appreciate a map depicting the Critical Concern and Self-sustaining lands (Jim Geremia has been emailed with the needed GIS shape files) overlain with Narragansett plat-lot coverage (to coincide with Table 5-1 in the facilities plan) for those affected areas where sewer lines could be extended. Please advise me if you need anything further. Thank you.

Regards - Jim

James Boyd
Coastal Policy Analyst
RI Coastal Resources Management Council
Voice: 401.783.3370
Fax: 401.783.3767
Email: jboyd@crmc.ri.gov
Web: www.crmc.ri.gov

RECEIVED
FEB 16 2007
JAMES J. GEREMIA
AND ASSOCIATES, INC

State of Rhode Island and Providence Plantations

COASTAL RESOURCES MANAGEMENT COUNCIL
Oliver Stedman Government Center
4808 Tower Hill Road
Wakefield, RI 02879
(401) 783-3370

Michael M. Tikoian
Chairman

Grover J. Fugate
Executive Director

February 14, 2007

Mr. James J. Geremia
James J. Geremia & Associates, Inc.
272 West Exchange Street, Suite 201
Providence, RI 02903-1025

Re: Proposed Narragansett Wastewater Management Facilities Plan

Dear Mr. Geremia:

Thank you for your January 25, 2007 letter and attachments concerning the proposed wastewater management facilities plan for the town of Narragansett. Your attachments included Section 1 – Executive Summary and Section 5 – Future Conditions," dated May 16, 2006. As you know from previous correspondence and discussions with Jim Boyd of my staff, portions of the northern service area are located within the CRMC's Narrow River Special Area Management Plan (SAMP), while portions of the southern service area (primarily west of Point Judith Road) are located within the Salt Pond Region SAMP.

I understand that Jim has forwarded to you GIS files for the applicable CRMC SAMP boundaries and land use categories to assist in an analysis of the proposed sewer service areas and to facilitate our discussion at a scheduled meeting next week (February 21) here at CRMC. As depicted on Figure 5-1 (Future Sewered Areas), significant portions of the proposed sewer line expansion areas lie within CRMC designated Self-Sustaining Lands or Lands of Critical Concern (See Section 920.1 of the Narrow River and Salt Pond region SAMP).

Section 920.1 in both the Narrow River and Salt Pond Region SAMPs prohibit sewer line installations, unless all of the following conditions are met:

(i) the property meets the RIDEM regulatory siting requirements for the installation of a conventional ISDS;

(ii) the proposal is agreeable to both the town and the CRMC;

(iii) a deed restriction is attached to the property ensuring no further subdivision; and

(iv) the properties to be sewered are within 500 feet of an existing sewer line or are within a subdivision which abuts the sewer easement.

Accordingly, the CRMC finds that the proposed regional wastewater facilities plan referenced above is inconsistent with and contravenes the policies of both the CRMC's Narrow River and Salt Pond Region SAMPs. I look forward to our February 21 meeting to discuss the potential impacts of the proposed sewer line expansion within the SAMPs and developing a resolution to the conflicting requirements of the CRMCs management plan and the town's proposed wastewater management facilities plan. Please contact me or James Boyd of my staff should you have any questions concerning this determination. Our office telephone is 783-3370.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

GJF/lam

cc: Michael Tikoian, CRMC Chairman
Jeff Willis, CRMC Deputy Director
James Boyd, CRMC Coastal Policy Analyst
Jeffry Ceasrine, Narragansett Town Engineer
Arthur Zeman, RIDEM
Michael Deluca, Narragansett Planning Director

TOWN OF NARRAGANSETT
Town Hall • 25 Fifth Avenue • Narragansett, RI 02882
Tel. (401) 789-1044 • TDD (401) 782-0610 • Fax (401) 782-0664
THE DEPARTMENT OF COMMUNITY DEVELOPMENT

MEMORANDUM

TO: Anne Marie Silviera, President
Honorable Town Council

FROM: Terence Fleming, Chairman
Narragansett Planning Board

DATE: July 19, 2006

SUBJECT: Recommendation on Facilities Plan for Wastewater Management

BACKGROUND

This year the Town and its consultant, James J. Geremia & Assoc., have prepared a comprehensive update of the Facilities Plan for Wastewater Management. This document represents a long-range look at wastewater conveyance and treatment systems and issues from the current conditions and capacity to future build-out scenarios. The Plan is used as a guide for the annual Capital Improvement Program (CIP) submittals and as the basis for the annual submittal to RIDEM for ranking in the Project Priority List, (PPL). The last comprehensive update of this plan was in 1994. Since that time the Town has implemented several improvements and expansions such as Briggs Farm, Point Judith and the North End to name a few.

The Planning Board held a public hearing on May 30, 2006 at which Mr. James Geremia presented an overview of the most current draft of the plan. Discussion ensued on the plan and it was set down for a vote at the July meeting.

RECOMMENDATION

At their regular monthly meeting held Tuesday, July 18, 2006, the Planning Board took under consideration the draft Facilities Plan for Wastewater Management, March 2006. Following staff review and discussion, and upon motion by Mr. Bourbonnais, seconded by Dr. O'Neill, the Planning Board voted to recommend APPROVAL of the Plan.
(Unanimous)

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
HISTORICAL PRESERVATION & HERITAGE COMMISSION
Old State House • 150 Benefit Street • Providence, R.I. 02903-1209
TEL (401) 222-2678 FAX (401) 222-2968
TTY (401) 222-3700 Website www.preservation.ri.gov

June 20, 2006

Mr. James J. Geremia
Geremia and Associates Inc.
272 W. Exchange St. Suite 201
Providence, RI 02903

Re: Wastewater Facilities Plan
Narragansett

Dear Mr. Geremia:

The Rhode Island Historical Preservation & Heritage Commission staff has reviewed the Wastewater Facilities Plan that has been prepared for the Town of Narragansett. We have the following comments.

We have reviewed our files for the four areas planned for future sewer construction. These areas are Harbour Island, Great Island, the Baltimore Avenue area and the Knowles Campground. Our site files contain records of five archaeological sites on Harbour Island and Great Island. These sites - RI 106, RI 107, RI 109, RI 922 and RI 1596 include areas that have been noted and studied by professional archaeologists as well as places where amateur archaeologists located evidence of Indian settlements in the 1920s. The Baltimore Avenue area contains no recorded sites but is highly sensitive for the presence of archaeological sites as it contains freshwater and is near archaeological site RI 102, the large Narragansett Indian settlement at Black Point. The Knowles Campground area is moderately sensitive.

An archaeological assessment study is required of all four areas to determine if archaeological sites may be located within the proposed sewer construction area. As sewer construction will take place within existing roadways, this assessment study should be conducted by a professional archaeologist to determine if intact surfaces with the potential to contain archaeological sites are present beneath the roads. This study must include background research, a walkover survey, an examination of road utility maps and the use of judgmental test pits to examine soil stratigraphy in selected locations.

These comments are provided in accordance with the National and Rhode Island Historic Preservation Acts. If you have any questions or comments, please contact Richard E. Greenwood, Project Review Coordinator of this office.

Very truly yours,

for Edward F. Sanderson
Executive Director
Deputy State Historic Preservation Officer

Cc: John Brown, NITHPO

(060620.05)

RECEIVED
JUN 26 2006
JAMES J. GEREMIA
AND ASSOCIATES, INC.

RHODE ISLAND STATEWIDE PLANNING PROGRAM
One Capitol Hill
Providence, Rhode Island 02908
401-222-6480

Memorandum

JAMES J. GEREMIA
& ASSOCIATES, INC.
272 West Exchange St., Ste 207
Providence, RI 02903-1025
Rec'd 6/15/06

To: Art Zeman, Principal Engineer,
Wastewater Treatment Facilities Program
DEM Office of Water Resources

From: NH Nancy Hess, Principal Environmental Planner

Date: June 13, 2006

Subject: Town of Narragansett- Wastewater Management Plan Update
1.0 Executive Summary & 5.0 Future Conditions – May 16, 2006

This memo reviews amendments to the Narragansett Wastewater Facility Plan (WWFP). Narragansett operates a wastewater collection system with the treatment of wastewater split between the South Kingstown Regional and the Scarborough Wastewater Treatment Facilities. The purpose of the amendment is to address future capacity for the North End Sewer System and upgrades to the Scarborough Treatment Plant.

I reviewed the report for consistency with the State Guide Plan Elements concerning natural and water resources as noted below. This memo summarizes my findings for consistency with the State Guide Plan. If you have any questions or require further clarification, please let me know. Thank you for the opportunity to comment.

125 - Scituate Reservoir Watershed Management Plan

There is no conflict with this element since Narragansett is not located in the Scituate Reservoir Watershed.

161- Forest Resources Management Plan

There is no conflict with this element since the amendment involves placing a sewer system within established road right-of-ways and will not effect the management of the forest resources of the State.

162 - Rivers Policy and Classification Plan

There is no conflict with the goals and policies of this Element to protect and enhance the quality and the use of Rhode Island's freshwater bodies.

171 –Rhode Island Comprehensive Solid Waste Management Plan

The update has no conflicts with this element and the goals of the State concerning source reduction, recycling, land filling, management of special waste, and financing costs of solid waste.

715 – Comprehensive Conservation and Management Plan for Narragansett Bay
731 – Rhode Island Nonpoint Source Pollution Management Plan

The concerns identified in both of these elements are being addressed together, as they are closely related. There is no conflict with these elements, as completion of the project will implement more effective wastewater pollution management activities, which are primary goals of these elements.

721 -- Water Supply Policies for Rhode Island
722 -- Water Supply Plan for Rhode Island
723 – Water Emergency Response Plan for the State of Rhode Island

The concerns of these elements are addressed together as all they are closely related. The issues of these elements concern the availability of drinking water, the protection of drinking water, as well as, the operation of drinking water systems. The amendments raise no conflicts with the elements concerning water supply and protection of drinking water supplies.

OTHER COMMENTS

Page 5-21, In 2002 the Town adopted a Wastewater Management District. This has been effect for approximately 3.5 years now. This section should provide more details and an evaluation of the effectiveness of the District. Items such as the number of inspections preformed, the number of repairs resulting from inspections, the number of ISDS upgrade /replacements resulting from the inspections, and the number of pump outs resulting should be described along with any non-compliance issues faced within the District and actions for addressing the non-compliance.

Cc: Jeffry Ceasrine, Narragansett Town Engineer
James J. Geremia, James J. Geremia & Associates, INC. ✓

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

March 14, 2007

Mr. James Boyd
State of Rhode Island and Providence Plantations
COASTAL RESOURCES MANAGEMENT COUNCIL
Oliver H. Stedman Government Center
4808 Tower Hill Rd. - Suite 3
Wakefield, RI 02879-1900

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Mr. Boyd:

Again, I would like to thank you for your time to review CRMC's revisions to the Narragansett Wastewater Management Facilities Plan. We have received your comments and are now forwarding the revisions to Chapter 4 (pages 37 through 40) and Chapter 5 (entire chapter) for CRMC's approval.

If you have any questions concerning these revisions, please do not hesitate to contact our office.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosures

cc: Arthur G. Zeman, P.E. (RIDEM) - w/enc.
Jeffry Ceasrine, P.E. (Town Engineer)

NARR\GC\04-006A(CRMC)-02.wpd

272 W. Exchange Street, • Suite 201 • Providence, RI 02903-1025
Telephone: 401.454.7000 • Facsimile: 401.454.7415

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

January 25, 2007

Mr. James Boyd
State of Rhode Island and Providence Plantations
COASTAL RESOURCES MANAGEMENT COUNCIL
Oliver H. Stedman Government Center
4808 Tower Hill Rd. - Suite 3
Wakefield, RI 02879-1900

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Mr. Boyd:

As per our discussions of January 24, 2007, we are re-submitting (for your review and comment) the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

As I indicated, we look forward to your response to our Plan.

Should you have any questions during your review process, please do not hesitate to contact me.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosure

cc: Jeffry Ceasrine, P.E. (Town Engineer)

NARR\GC\04-006A(CRMC)-01.wpd

272 W. Exchange Street - Suite 201 - Providence, RI 02903-1022
Telephone: 401.454.7000 - Facsimile: 401.454.7415

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

June 29, 2006

Mr. James Soctomah
Narragansett Indian Tribe
P.O. Box 700
Wyoming, RI 02898

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Mr. Soctomah:

On behalf of the Town of Narragansett, James J. Geremia & Associates, Inc. (JGA) is currently preparing a Facilities Plan for Wastewater Management for the Town.

Enclosed, please find the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

We request that you review this information as required by the State Revolving Fund, in order to ensure that these future sewer improvements shall not adversely impact any concerns of the Tribal Historic Preservation Office. In doing so, please realize that the vast majority of all planned improvements shall be conducted within existing roadways which already contain underground utilities.

Should you have any questions, please do not hesitate to contact me at (401) 454-7000.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosure

cc: Jeffry Ceasrine, P.E. (Town Engineer)
Arthur G. Zeman, P.E. (RIDEM)

NARR\GC\LETTER TO FP REVIEWERS.wpd

272 W. Exchange Street, • Suite 201 • Providence, RI 02903-1025
Telephone: 401.454.7000 • Facsimile: 401.454.7415

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

May 16, 2006

Ms. Nancy Hess
Principal Environmental Planner
Rhode Island Statewide Planning Program
One Capitol Hill
Providence, RI 02908

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Ms. Hess:

On behalf of the Town of Narragansett, James J. Geremia & Associates, Inc. (JGA) is currently preparing a Facilities Plan for Wastewater Management for the Town.

Enclosed, please find the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

We request that you review this information as required by the State Revolving Fund, in order to ensure that these future sewer improvements shall not adversely impact any concerns of the State Guide Plan. In doing so, please realize that the vast majority of all planned improvements shall be conducted within existing roadways which already contain underground utilities.

Should you have any questions, please do not hesitate to contact me at (401) 454-7000.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosure

cc: Jeffry Ceasrine, P.E. (Town Engineer)
Arthur G. Zeman, P.E. (RIDEM)

NARRIGC\LETTER TO FP REVIEWERS.wpd

272 W. Exchange Street. - Suite 201 - Providence, RI 02903-1025
Telephone: 401.454 7000 - Facsimile: 401.454.7415

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

May 16, 2006

Mr. Edmund T. Parker, Jr., P.E.
Chief Engineer
Rhode Island Department of Transportation
Two Capitol Hill, Rm. 226
Providence, RI 02903-1124

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Mr. Parker:

On behalf of the Town of Narragansett, James J. Geremia & Associates, Inc. (JGA) is currently preparing a Facilities Plan for Wastewater Management for the Town.

Enclosed, please find the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

We request that you review this information as required by the State Revolving Fund, in order to ensure that these future sewer improvements shall not adversely impact any concerns of the Department of Transportation. In doing so, please realize that the vast majority of all planned improvements shall be conducted within existing roadways which already contain underground utilities.

Should you have any questions, please do not hesitate to contact me at (401) 454-7000.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosure

cc: Jeffry Ceasrine, P.E. (Town Engineer)
Arthur G. Zeman, P.E. (RIDEM)

NARR\GC\LETTER TO FP REVIEWERS.wpd

272 W. Exchange Street, • Suite 201 • Providence, RI 02903-1025
Telephone: 401.454.7000 • Facsimile: 401.454.7415

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

May 16, 2006

Mr. Edward F. Sanderson
Executive Director
Deputy State Historic Preservation Officer
Historical Preservation & Heritage Commission
Old State House
150 Benefit St.
Providence, RI 02903-1209

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Mr. Sanderson:

On behalf of the Town of Narragansett, James J. Geremia & Associates, Inc. (JGA) is currently preparing a Facilities Plan for Wastewater Management for the Town.

Enclosed, please find the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

We request that you review this information as required by the State Revolving Fund, in order to ensure that these future sewer improvements shall not adversely impact any concerns of the Historical Preservation & Heritage Commission. In doing so, please realize that the vast majority of all planned improvements shall be conducted within existing roadways which already contain underground utilities.

Should you have any questions, please do not hesitate to contact me at (401) 454-7000.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosure

cc: Jeffry Ceasrine, P.E. (Town Engineer)
Arthur G. Zeman, P.E. (RIDEM)

NARRIGC\LETTER TO FP REVIEWERS.wpd

272 W. Exchange Street, • Suite 201 • Providence, RI 02903-1025
Telephone: 401.454.7000 • Facsimile: 401.454.7415

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

May 16, 2006

Mr. John Brown
Tribal Council Member
Narragansett Indian Tribe
P.O. Box 268
Charlestown RI 02813

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Mr. Brown:

On behalf of the Town of Narragansett, James J. Geremia & Associates, Inc. (JGA) is currently preparing a Facilities Plan for Wastewater Management for the Town.

Enclosed, please find the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

We request that you review this information as required by the State Revolving Fund, in order to ensure that these future sewer improvements shall not adversely impact any concerns of the Tribal Historic Preservation Office. In doing so, please realize that the vast majority of all planned improvements shall be conducted within existing roadways which already contain underground utilities.

Should you have any questions, please do not hesitate to contact me at (401) 454-7000.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosure

cc: Jeffry Ceasrine, P.E. (Town Engineer)
Arthur G. Zeman, P.E. (RIDEM)

NARR\GCLETTER TO FP REVIEWERS.wpd

272 W. Exchange Street, • Suite 201 • Providence, RI 02903-1025
Telephone: 401.454.7000 • Facsimile: 401.454.7415

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

May 16, 2006

Mr. Richard Enser
RIDEM - Office of Planning and Development
NATURAL HERITAGE PROGRAM
235 Promenade St.
Providence, RI 02908-5737

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Mr. Enser:

On behalf of the Town of Narragansett, James J. Geremia & Associates, Inc. (JGA) is currently preparing a Facilities Plan for Wastewater Management for the Town.

Enclosed, please find the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

We request that you review this information as required by the State Revolving Fund, in order to ensure that these future sewer improvements shall not adversely impact any concerns of the Natural Heritage Program. In doing so, please realize that the vast majority of all planned improvements shall be conducted within existing roadways which already contain underground utilities.

Should you have any questions, please do not hesitate to contact me at (401) 454-7000.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosure

cc: Jeffry Ceasrine, P.E. (Town Engineer)
Arthur G. Zeman, P.E. (RIDEM)

NARR\GC\LETTER TO FP REVIEWERS.wpd

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JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

May 16, 2006

Mr. Grover J. Fugate
Executive Director
State of Rhode Island and Providence Plantations
COASTAL RESOURCES MANAGEMENT COUNCIL
Oliver H. Stedman Government Center
4808 Tower Hill Rd. - Suite 3
Wakefield, RI 02879-1900

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Dear Mr. Fugate:

On behalf of the Town of Narragansett, James J. Geremia & Associates, Inc. (JGA) is currently preparing a Facilities Plan for Wastewater Management for the Town.

Enclosed, please find the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

We request that you review this information as required by the State Revolving Fund, in order to ensure that these future sewer improvements shall not adversely impact any concerns of the Coastal Resources Management Council. In doing so, please realize that the vast majority of all planned improvements shall be conducted within existing roadways which already contain underground utilities.

Should you have any questions, please do not hesitate to contact me at (401) 454-7000.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

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JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS

May 16, 2006

NOAA/NMFS
Habitat Conservation Division
212 Rogers Avenue
Milford, CT 06460

Re: Facilities Plan for Wastewater Management
Town of Narragansett, Rhode Island

Gentlemen:

On behalf of the Town of Narragansett, James J. Geremia & Associates, Inc. (JGA) is currently preparing a Facilities Plan for Wastewater Management for the Town.

Enclosed, please find the draft of the Executive Summary (Section 1) and Section 5 which delineates the proposed future sewer areas for the Town.

We request that you review this information as required by the State Revolving Fund, in order to ensure that these future sewer improvements shall not adversely impact any concerns of the Habitat Conservation Division In doing so, please realize that the vast majority of all planned improvements shall be conducted within existing roadways which already contain underground utilities.

Should you have any questions, please do not hesitate to contact me at (401) 454-7000.

Very truly yours,

JAMES J. GEREMIA & ASSOCIATES, INC.

James J. Geremia, P.E.
Principal

Enclosure

cc: Jeffry Ceasrine, P.E. (Town Engineer)
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FACILITIES PLAN
FOR
WASTEWATER MANAGEMENT
(SECTION 1 - EXECUTIVE SUMMARY)
(SECTION 5 - FUTURE CONDITIONS)

TOWN OF
NARRAGANSETT, RHODE ISLAND

MAY 16, 2006

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
272 West. Exchange St., Suite 201, Providence, RI 02903-1025
Phone: 401-454-7000 • Fax: 401-454-7415

1.0 EXECUTIVE SUMMARY

1.1 PLAN OVERVIEW

This Facilities Plan, prepared by James J. Geremia & Associates, Inc. for the Town of Narragansett, is a comprehensive study of both present and future needs for upgrading and expanding of the North End Sewer System (which contributes to the South Kingstown Regional Wastewater Treatment Facility), the South End Sewer System and Scarborough Wastewater Treatment Facility. The study demonstrates the most cost-effective and environmentally sound solution for achieving the Rhode Island Department of Environmental Management's (RIDEM) water quality objectives.

This study has been conducted and formatted to meet the requirements of the State Revolving Loan Program to ensure funding support for the various projects noted herein.

1.2 SERVICE AREA

1.2.1 NORTH END SEWER SYSTEM

Wastewater generated by the northern end of Town is serviced by the South Kingstown Regional Wastewater Treatment Facility. In January 1969, the Rhode Island General Assembly passed an enabling act which established a wastewater district, permitting South Kingstown to operate and maintain a publicly owned sewage treatment works. The agreement indicates that the cost disbursement for capital expenses were to be proportioned based on percentages of total design flow. Operating costs for the Town of Narragansett, including maintenance, repairs, supplies and administration would be based upon the actual metered flow from the Ouida Street Pump Station.

Subsequent to the initial agreement with the Town of South Kingstown, a letter of agreement (dated 22 August 1974) agreed to guarantee at least 19% (0.785 MGD) of the treatment plant capacity, and stipulates that South Kingstown would not deny additional capacity if that capacity exists in the facility. This 1974 agreement did not have any provision for the purchase of unused capacity and the reassessment of the other partners.

During the 1984 fiscal year, the Town of Narragansett discharged an average of 905,000 gallons per day to the treatment facility, that represented 21.9% of the total plant capacity. It was acknowledged by South Kingstown that sufficient excess space existed to accommodate Narragansett's excess flow over the short term. However, South Kingstown indicated that plans had to be formulated and adopted in order to address the future plant expansion agreement and to protect the existing plant capacity ownership rights of South Kingstown and the University. To that end, the Towns (in January 1985) entered into an agreement that laid out when and how the plant expansion would occur.

In 1989, Narragansett voters approved a bond referendum for $9.8 Million implemented an aggressive plan to sewer the north end. This referendum was brought about as a result of the chronic problems the residents were experiencing with failed ISDS systems, high groundwater, and the impact these failed systems had on the Narrow River.

This increase in sewer connections resulted in the Town exceeding its reserve capacity of 784,700 gpd. To alleviate the need to upgrade South Kingstown RWWTF, the Town entered into an agreement (in April 1995) with the University of Rhode Island to lease their unused capacity in the treatment facility. This lease agreement allowed Narragansett to increase its capacity at the RWWTF by 400,000 gallons per day. The agreement allowed this use for a five year period at a cost of $425,000 (paid over that period).

In 1997, as a result of process improvements at the Regional Facility, the Rhode Island Department of Environmental Management (RIDEM) granted an increase in the capacity to South Kingstown's permit from 4.13 MGD to 5.0 MGD. This provided an additional flow of 0.87 MGD which could be distributed to each of the participants. Since the University of Rhode Island did not need any additional capacity, South Kingstown and Narragansett were able to increase their capacity equally.

The increase in wastewater allocated to Narragansett (increased by 435,000 gallons per day) was still not sufficient to meet the needs of the community. Therefore, in July 2001, when the lease between the University of Rhode Island and Narragansett came up for renewal, Narragansett signed a new agreement that again leased 400,000 gpd through June 30, 2006 for a total cost of $560,000. The following Table 1-1 shows the current flow distribution, including the 1995 and 2001 leased amounts from the University.

TABLE 1-1 CURRENT FLOW DISTRIBUTION						
Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	1995/2001 URI-Narragansett Leases (MGD)	Current Available Capacity (MGD)	Current Available Percentage (%)
South Kingstown	1.6933	41.00	0.4350	0.000	2.1283	42.57
Narragansett	0.7847	19.00	0.4350	0.400	1.6197	32.39
URI	1.6520	40.00	0.0000	(0.400)	1.2520	25.04
Totals	**4.13**	**100.00**	**0.8700**	**0.00**	**5.0000**	**100.00**

Leasing 400,000 gallons from the University is a stop gap measure to avoid having Narragansett responsible for funding a physical plant expansion or purchasing unused capacity. Narragansett is the only regional partner at this time that has to expand sewer services to meet the needs of the community.

Narragansett's flow totals have fluctuated below and above the allotted capacity of 1.6197 over the past ten (10) years. This was a direct factor in the Town's lease of flow space from URI, as well as the adoption of a restrictive Sewer Policy governing extensions and connections in the area tributary to the Regional WWTF. While both the Town of South Kingstown and URI are projecting future flow increases, it is not expected that either of those regional partners will need additional flow space within the study period used to develop this plan. As such, the following general strategies and options exist for Narragansett with respect to future flow capacity at the Regional WWTF:

1. No Action – Under this scenario, the following is presented:

   a) Narragansett will need to continue the strict enforcement/application of its Sewer Policy, which restricts new connections in the tributary area to properties with existing sewer frontage.

   b) Narragansett will continue to grow (market-driven), especially given the proliferation of Innovative/Alternative (I/A) Individual Sewage Disposal Systems (ISDS) designs being approved by the State.

c) The Congdon Street and Ouida Street Pump Stations will still need upgrades (see Section 1.4 of this Executive Summary).

d) Narragansett will need to continue its lease of flow space from URI.

e) A physical expansion of the Regional WWTF will not be needed for the foreseeable (10-15 years) future.

f) Narragansett will not have a great deal of flexibility when dealing with affordable housing or other development initiatives.

2. Physical WWTF Expansion – Under this scenario, the following is presented:

a) Based on the information presented herein (Table 4-11; with the WWTF at 59.9% of capacity), Narragansett would be building overall physical capacity that will not be needed for the foreseeable future.

b) Narragansett is the only regional partner that will need additional capacity; hence, Narragansett will pay for all of it.

c) The Congdon Street and Ouida Street Pump Stations will still need upgrades.

d) The additional capacity will not be available for 4-5 years, based on design, permitting, and construction projections.

e) It should be noted that there will be certain Regional WWTF capital upgrades that may or may not be directly related to capacity that will be needed in the upcoming years. These are addressed in greater detail within this *Facilities Plan* (Tables 1-3 and 1-4).

3. Flow Allocation Agreement – Under this scenario, the flow allocation agreement with the regional partners would be re-negotiated, with the objective being for Narragansett to lease and/or purchase a share of the other partners' unused capacity. The following would apply:

   a) The capacity would be available immediately, allowing Narragansett flexibility in dealing with affordable housing and other developmental initiatives.

   b) Narragansett would need to restructure its Sewer Policy to prioritize how this additional capacity would be allocated.

   c) The Congdon Street and Ouida Street Pump Stations will still need upgrades.

4. I/I Removal – This is actually a component of all of the above scenarios, subject to an on-going review of the cost-effectiveness of each solution (i.e. performing I/I work that has a reasonable cost-per-gallon ratio). There is the potential here for outside participation, to wit:

   a) The Town of Narragansett could develop a "capacity-credit" program, wherein an applicant that meets certain defined criteria (i.e. affordable housing, creative commercial initiatives, etc.) could pay to remove I/I in exchange for sewage capacity being made available. This could be tied to the empirical peak flow factor that has been developed for the Pier area within this *Facilities Plan* report, namely 2.5 times the Average Daily Flow. In other words, if an applicant that meets whatever criteria is established needs relief from the Town's Sewer Policy, he/she would have to provide for 2.5 times their projected flow in I/I removal. The independent I/I studies that have been conducted by the Town provides the ability to calculate defensible numerical I/I removal cost-per-gallon figures. Additional information on this would be presented to the Town Council in a separate report." Based upon a build-out for the North End and the projected needs of the Regional Partners through the year 2025, the South Kingstown Regional Wastewater Treatment Facility will need to be upgraded to meet an average daily flow of 6.199 MGD. Table 1-2 presents Narragansett's projected needs, not including the 400,000 leased from URI.

TABLE 1-2 PROJECTED NEEDS						
Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	Current [1] Available Capacity (MGD)	2025 Capacity (MGD)	2025 Percentage (%)
South Kingstown	1.6933	41.00	0.4350	2.1283	3.189	48.02
Narragansett	0.7847	19.00	0.4350	1.2197	1.800	27.10
URI	1.6520	40.00	0.0000	1.6520	1.652	24.88
Totals	**4.13**	**100.00**	**0.8700**	**5.0000**	**6.641**	**100.00**

[1] Narragansett's projected needs do not include the 400,000 gallons leased from URI.

The preliminary design of the South Kingstown Regional Wastewater Treatment Facility, as presented in the South Kingstown Regional Wastewater Facilities Plan dated 2006, divides the improvements into two categories. The first component corresponds to the hydraulic upgrades necessary to meet the population demands for 2025; the second component corresponds to the necessary upgrades associated with process improvements.

The unit processes that relate to hydraulic expansion are:

- Two (2) Primary Settling Tanks
- Two (2) Primary Sludge Pumps
- One (1) Waste Activated Sludge Pump
- One (1) Return Activated Sludge Pump
- Sludge Thickener
- Aeration System

The unit processes that relate to system upgrades are:

- Odor Control - Headworks/Influent Screen
- Odor Control - Primary Settling Tank
- Odor Control - Septage Receiving
- Odor Control - Sludge Holding Tanks
- Aeration Blower Replacement
- Septage Receiving Station
- Sludge Building Enclosure

Table 1-3 presents the regional cost breakdown relating to the hydraulic expansion. Those components that are directly related to a hydraulic upgrade are distributed to South Kingstown and Narragansett based on their projected need. For example, the increase over the current capacity is 1.641 MGD, of which 1.061 MGD (or 64.66%) relates to South Kingstown's needs, while 0.58 MGD (or 35.34%) relates to Narragansett's future needs.

TABLE 1-3
PROJECT COST SUMMARY FOR HYDRAULIC EXPANSION
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN (64.66%)	NARRAGANSETT (35.34%)	U.R.I.
Primary Settling				
• (2) Settling Tanks	$ 1,750,000	$ 1,131,550	$ 618,450	$
• Sludge Pumps	95,000	61,427	33,573	
Aeration System - Basin	1,750,000	1,131,550	618,450	
Diffusers	450,000	290,970	159,030	
Secondary Settling Tank				
• WAS Pumps	60,000	38,796	21,204	
• RAS Pumps	65,000	42,029	22,971	
Sludge Thickener	150,000	96,990	53,010	
Sub-Total	$ 4,320,000	$ 2,793,312	$ 1,526,688	$ 0
Auxiliaries [1] (12%)	518,400	335,198	183,202	0
Sub-Total	$ 4,838,400	$ 3,128,510	$ 1,709,890	$ 0
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	725,760	469,276	256,484	0
TOTAL	**$ 5,564,160**	**$ 3,597,786**	**$ 1,966,374**	**$ 0**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

Table 1-4 presents the regional cost breakdown for the process components that are considered upgrades to the original facility, the capital cost distribution is based upon the projected percentage of 2025 need as presented in Table 9-1. The only exception would be the aeration blower replacement and septage equipment. Since these components are the replacement of existing equipment and not considered an upgrade, the cost distribution will be based on the actual flow from each participant (as presented in Table 4-11: South Kingstown - 38.67%; Narragansett - 44.67%; URI - 16.66%).

TABLE 1-4
PROJECT COST SUMMARY FOR PROCESS UPGRADES
REGIONAL WASTEWATER TREATMENT FACILITY

UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN (48.02%)	NARRAGANSETT (27.1%)	U.R.I. (24.88%)
Headworks Odor Control / Influent Screen	$ 400,000	$ 192,080	$ 108,400	$ 99,520
Solids Handling Facilities (including Odor Control)	3,500,000	1,680,700	948,500	870,800
Aeration Blower Replacement	1,000,000	(38.67%) 386,700	(44.67%) 446,700	(16.66%) 166,600
Primary Odor Control	1,250,000	600,250	338,750	311,000
Septage	750,000	(38.67%) 290,025	(44.67%) 335,025	(16.66%) 124,950
Sub-Total	$ 6,900,000	$ 3,149,755	$ 2,177,375	$ 1,572,870
Auxiliaries [1] (12%)	828,000	377,971	261,285	188,744
Sub-Total	$ 7,728,000	$ 3,527,726	$ 2,438,660	$ 1,761,614
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	1,159,200	529,159	365,799	264,242
TOTAL	**$ 8,887,200**	**$ 4,056,885**	**$ 2,804,459**	**$ 2,025,856**

[1] Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

1.3 SOUTH END SEWER SYSTEM

The Scarborough treatment system for the southern section of Town was evaluated with respect to its ability to meet established effluent limitations and water quality objectives at both present and future flow rates and waste load. As in the north end, the Facilities Plan has projected the need through 2025. For the purposes of this report, 2025 is considered to be the build-out year for the South End. The corresponding sewered population in the South End is projected to be 9,416 individuals, and the corresponding number of housing units sewered is 3,891.

An analysis of the treatment facility indicates that under presently observed influent loads, the existing Scarborough Wastewater Treatment Facility is operated with a maximum achievable efficiency. In fact, with the implementation of the Industrial Pretreatment Program and the compliance from the industries, the peak daily BOD_5 and Total Suspended Solids loadings no longer exceed the plant's design parameters. The treatment system is performing well under the design parameters. Based on that determination, it has been concluded that only minor upgrades would be required to further optimize plant performance through process control and will permit the facility to meet its projected loadings through 2025.

The planning period for the evaluation is based on a 20-year period of projected growth and effluent quality. Based upon the current usage projection over the 20-year planning period, the wastewater projections finds that the plant will not exceed its designed hydraulic or organic capacity. The recent re-issuance of the facility's new permit (August 2005) has confirmed that nutrient removal will not be required during the five-year permit. Therefore, for the future planning period, the Town will focus on the replacement of existing equipment within their annual capital budget.

Integrated in this planning period is RIDEM's requirement to begin the planning process for upgrading a treatment facility when the facility reaches 80% of its design capacity. In the case of the Scarborough facility, this will occur when the flows reach 1.12 MGD. Since there is no immediate need to upgrade and expand the facility, the capital plan will focus on replacing the equipment as it reaches its useful life and upgrade other areas within the process. As part of the replacement process, each new component will be increased in its hydraulic capacity from the original design flows (1.4 MGD) by 25% (or 1.75 mgd) to ensure that those components are upgraded and will not be controlled by the 80% factor through the planning year 2025.

1.3.1 SCARBOROUGH TREATMENT PLANT UPGRADES

Based on the detailed review of the existing facilities, performance records, maintenance records, previous engineering studies, and pertinent regulatory requirements, process modifications will be required. The current system is adequate to meet the current and projected flows with a hydraulic capacity of 4.0 mgd. Due to the age of the system, the equipment should be replaced as part of the next ten year capital improvement project. The design should be based on a peak hydraulic capacity to 5.25 mgd (based upon 125% of the current maximum capacity of 4.2 MGD).

Influent Pump Station: The influent pump station is of a dry pit design and contains two (2) variable and one (1) constant speed, 25 horsepower pumps which lift the wastewater into the oxidation ditches. At the present, the facility performs satisfactorily, however, it has reached its useful life and needs to undergo a major overhaul. The upgrade will be designed to handle a range from 0.3 MGD (minimum) to 5.25 MGD (maximum) with two pumps, while the third pump will serve as a standby.

Headworks - Odor Control: In an effort to reduce the odor associated with the raw influent, it is recommended that the headworks be enclosed and the off-gases from the enclosed headworks and influent pump station be processed through a two-stage odor control system dedicated to the headworks.

Primary Clarifier: The addition of two (2) primary clarifiers and related primary sludge pumps is to be included within the long range Capital Improvement Plan. The idea behind this concept is that depending on the ratio of a soluble to suspended BOD_5 concentrations of the raw sewage, the sufficiently sized primary clarifiers can reduce up to 75% of solids and up to 35% of organic loads delivered for treatment to the activated sludge system, thereby eliminating the necessity of expanding the aeration capacity to meet the future treatment requirements. The primary clarifiers will be designed for an average daily flow of 1.75 mgd and a peak loading of 5.25 mgd. The avoidance of odors is critical in the consideration of any process upgrades. Therefore, the primary clarifier weir will be sealed with a launder cover designed from fiberglass reinforced plastic. The cover will be gastight designed to entrap 94 to 98% of the odor generated at the weirs. The entrapped gas under the weir covers will be withdrawn off through a two stage odor abatement system.

Secondary Clarification: The upgrade and expansion of the secondary clarification facilities will be required as part of the Capital Improvement Plan. One additional 40-foot diameter, 11-foot side water depth clarifier will work in conjunction with the two existing clarifiers. The third clarifier will allow the plant to maintain its effluent quality at peak hydraulic loadings and still take one unit out of service for maintenance.

Disinfection: Based upon the 25% increase in capacity, the two chlorine tanks will achieve the 37 minute detention time at average daily flow, however, at peak flows provides for only 12 minutes of detention time. Based upon RIDEM criteria of 15 minutes peak flow, the existing chlorine tanks are to be expanded to meet the 25% criteria. The construction of the chorine contact tank should occur before or in conjunction with the addition

of the secondary clarifier to allow for placement of the secondary clarifier in the location of the existing chlorine contact tank.

Table 1-5 presents a breakdown of the capital cost.

TABLE 1-5
TOTAL CAPITAL COST SUMMARY - SCARBOROUGH FACILITY

UNIT PROCESS	TOTAL CAPITAL COST [2]
Headworks Screening Grit Removal Odor Control	$ 640,000
Influent Pump Station	780,000
Primary Settling (2) Settling Tanks Sludge Pumps Scum Pumping System Odor Control	3,420,000
(1) Final Settling Tank WAS Pumps RAS Pumps	1,302,000
Chlorination	1,020,000
Sub-Total	$ 7,162,000
Auxiliaries [1]	860,000
Sub-Total	$ 8,022,000
Engineering Allowance (Design, Construction Administration, Resident Eng.)	215,000
TOTAL	**$ 8,237,000**

1 Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

2 Includes 20% contingencies.

1.3.2 WASTEWATER COLLECTION SYSTEM

In the future adequacy determination of the interceptor systems and pump stations, it was determined that the Congdon Street Pump Station (north end), Stanton Avenue Pump Station and Ouida Street Pump Station (north end) were inadequate to convey wastewater flows under future conditions. The future sewered area in the South End (such as Harbour Island, Great Island and Baltimore Avenue area) will require pump stations to convey the sewage flows generated by Harbour Island and Great Island to connect to the South End Sewer System.

Congdon Street Pump Station: The existing inadequate Congdon Street pumps will be replaced with new pumps and the force main will be replaced. The new 6-inch ductile iron force main will replace the existing 4-inch ductile iron force main in the same trench. The renovated pump station will have a capacity of 436,000 GPD (305 GPM). The two pumps will be the vertical centrifugal type rated at 375 GPM each with 5 horsepower motors. The estimated cost of the project is $650,000.

Stanton Avenue Pump Station: The proposed Stanton Avenue Pump Station sewage pumps will be replaced. The capacity of the station will be 624,000 GPD (440 GPM). The station will consist of two sewage pumps, each rated at 440 GPM with constant speed motors. During the installation of the new pumps, the contractor will be required to by-pass pump. The total estimated cost of the pump station is $625,000 (including engineering fees).

Ouida Street Pump Station: The Ouida Street Pump Station will be renovated to accommodate the future flows. The pump station service area is in the North End Sewer System, including the Middlebridge area of South Kingstown. The existing pumps, motors, flow, meter, and variable speed drives will be replaced with new units having the capacity to convey the future flows. The station will consist of three variable speed pumps, each having a capacity of 2,279,000 GPD (1,585 GPM), with 150 horsepower motors. Currently, the station is being equipped with a Data Acquisition System which will transmit flows and alarms via radio system to the Scarborough Wastewater Treatment Facility and to the police station. Also, the inoperable mechanical bar screen will be replaced. The total cost of the improvements is $975,000.

Harbour Island Wastewater Collection System: The Harbour Island Wastewater Collection System will consist of conventional gravity sewers and grinder pumps and pressure sewers serving 320 residential dwelling units. Approximately 50 grinder pumps will be required for dwellings located within low lying areas. The average flow generated by Harbour Island is 102,400 GPD, with an associated peak flow of 268,800 GPD. The Harbour Island Pump Station will transport the sewage flows via a force main to the Briggs Farm sewer system. The pump station will consist of two self-priming centrifugal sewage pumps, each rated at 268,800 GPD (190 GPM). The total estimated cost for the Harbour Island Wastewater Collection System is $7,585,600 ($30,512 per home) as summarized in Table 1-6.

TABLE 1-6
ESTIMATE OF PROJECT COST FOR THE
HARBOUR ISLAND WASTEWATER COLLECTION SYSTEM

8" PVC Pipe	$	1,428,000
Sewer Wyes		32,000
6" PVC Pipe		400,000
6" Force Main, including directional drilling		590,000
Precast Concrete Manholes		225,000
Force Main Cleanout		5,000
Rock Excavation		87,500
Gravel Refill		180,000
Test Pits		20,000
Dewatering		200,000
Erosion Control		100,000
Traffic Control		150,000
Temporary Pavement		280,000
Pavement Restoration		976,000
Grinder Pumps		375,000
Pump Station		500,000
Sub-Total	$	5,548,500
Construction Contingencies (25%)		1,387,100
Sub-Total	$	6,935,600
Engineering Design Services		100,000
Construction Administration and Resident Inspection		550,000
TOTAL	**$**	**7,585,600**

Great Island Wastewater Collection System: The Great Island Wastewater Collection System will consist of conventional gravity sewers in combination with grinder pumps and pressure sewers to provide a cost effective system for 375 residential dwellings. This sewer system will convey flows to the proposed Great Island Pump Station to be located prior to the Point Judith Pond Bridge crossing. The capacity of the pump station will be 313,000 GPD (220 GPM). Table 1-7 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Great Island Wastewater Collection System is $8,750,000 ($29,909 per home).

TABLE 1-7
ESTIMATE OF PROJECT COST FOR THE
GREAT ISLAND WASTEWATER COLLECTION SYSTEM

Force Main	$	225,000
8" PVC Pipe		1,708,000
Sewer Wyes		37,500
6" PVC Pipe		470,000
Precast Concrete Manholes		250,000
Force Main Cleanout		10,000
Rock Excavation		95,000
Test Pits		40,000
Gravel Refill		220,000
Erosion Control		150,000
Dewatering		300,000
Traffic Control		150,000
1½" Temporary Pavement		323,500
Pavement Restoration		1,164,000
Pump Station		500,000
Grinder Pumps		750,000
Sub-Total	$	6,393,000
Construction Contingencies (25%)		1,598,300
Sub-Total	$	7,991,300
Engineering Design Services		120,000
Construction Administration and Resident Inspection		639,000
TOTAL	**$**	**8,750,300**

Baltimore Avenue Area Wastewater Collection System: The Baltimore Avenue Area Wastewater Collection System will consist of conventional gravity sewers serving 49 residential dwellings. The sewer system will consist of approximately 5,000 linear feet of gravity sewers. Table 1-8 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Baltimore Avenue Area Wastewater Collection System is $1,409,300 ($35,000 per home).

TABLE 1-8
ESTIMATE OF PROJECT COST FOR THE
BALTIMORE AVENUE AREA WASTEWATER COLLECTION SYSTEM

8" PVC Pipe	$	350,000
Sewer Syes		4,900
6" PVC Pipe		65,000
Precast Concrete Manholes		50,000
Rock Excavation		35,000
Gravel Refill		30,000
Test Pits		10,000
Dewatering		50,000
Erosion Control		20,000
Traffic Control		25,000
Temporary Pavement		60,000
Permanent Pavement Restoration		253,200
State Roadway Restoration		54,300
Sub-Total	$	1,007,400
Construction Contingencies (25%)		251,900
Sub-Total	$	1,259,300
Engineering Design Services		50,000
Construction Administration and Resident Inspection		100,000
TOTAL	**$**	**1,409,300**

Knowles Campground Wastewater Collection System: The Knowles Campground Wastewater Collection System will consist of gravity sewers serving 110 residential units. The sewer system will consist of approximately 3,400 linear feet of gravity sewers. Knowles Campground began installing the sewer system in February 2006 and will be responsible for the construction as well as the long term maintenance of the system.

5.0 FUTURE CONDITIONS

5.1 FUTURE SEWERED POPULATION AND SERVICE AREA

The projection of population is based on a host of differing objective and subjective factors. This task is made especially difficult in a community like Narragansett, where fluctuations due to the influx of summer residents and winter rentals to college students tend to skew normal analyses. Table 5-1 presents the 2000 census figures for the Town of Narragansett.

TABLE 5-1
TOWN OF NARRAGANSETT AND WASHINGTON COUNTY POPULATION
U.S. CENSUS 2000

	1980	1990	2000
Narragansett	12,088	14,985	16,361
Washington County	93,317	107,573	123,456
State	947,154	1,003,464	1,048,319

Source: R.I. Statewide Planning Program, Rhode Island Population Totals by County, City & Town and U.S. Census 2000

A comparison of the 2000 Census data to the previous population studies (Mount Vernon and 1992 Wastewater Management Facilities Plan) finds that the population has decreased when in fact this is not the trend. The Town continues to raise concerns with the latest population figures generated by the U.S. Census Bureau. The 2000 Census had been conducted during the off-season, when 22% of the housing units were not occupied. If the 2000 Census was to be used, the number of persons per housing unit would translate to 1.79 persons (16,361 persons ÷ 9,159 housing units). The same report, prepared by the Census Bureau, calculated an occupancy rate for the Town at 2.42 persons per dwelling unit. Based upon the 2.42 persons occupancy rate and the 9,159 housing units, the projected population should be 22,165.

For the purpose of forecasting the future wastewater needs, this report will use the occupancy rate of 2.42 persons per dwelling unit combined with the number of new and existing homes that will connect to sewers in the future. The Town has an informal policy that sewers will be provided for the entire Town, as capacity allows. Therefore, the future needs will be incrementally added to the new construction figures, provided by the Town, and a stage tie-in for existing ISDS systems. This will be established for the north and south end of Town.

The Town's data base provides a wastewater generation per residential housing unit for the north end and south end. The north end sewer system generates 215 gallons per housing unit per day, while the south end sewer system generates 260 gallons per housing unit per day. This data, along with the future number of housing units, provide insight to the future wastewater production.

The future service area in the North End Sewer System is based on the Town providing sewers for the entire north end. Figure 5-1 illustrates the future service areas in the North End Sewer System.

The future service area for the South End Sewer System is based on the Rhode Island Coastal Resources Management Council's Special Area Management (SAM) Plan in the Salt Pond Region, the 1992 Wastewater Management Facilities Plan, prepared by Travassos-Geremia & Associates., Inc., the 2000 ISDS Wastewater Management Plan, prepared by James J. Geremia & Associates, Inc., and the Town's approval of developments. The future service area in the south end is comprised of Harbour Island; Great Island; an area bound by Point Judith Road, Durkin Drive, Knowles Campground and Knowles Way; and an area east of Point Judith Road and north of Clarke Road (Alexander Drive Sewer Area), as shown in Figure 5-1.

For the purposes of this study, it is assumed that 100% of a future service area will be sewered at build-out. Table 5-2 indicates corresponding sewered populations will reach 24,543 in 2025.

TABLE 5-2
EXISTING AND FUTURE SEWERED POPULATION

NARRAGANSETT	2005	2010	2015	2020	2025
North End Sewer System Population	12,066	12,797	13,552	14,341	15,127
North End Housing Units	4,976	5,288	5,600	5,926	6,251
South End Sewer System Population	5,358	6,604	8,635	9,024	9,416
South End Housing Units	2,214	2,729	3,568	3,729	3,891
Total Population	**17,424**	**19,401**	**22,187**	**23,365**	**24,543**
Total Housing Units	**7,190**	**8,017**	**9,168**	**9,655**	**10,142**

Note: Population is based on 2.42 persons per housing unit.

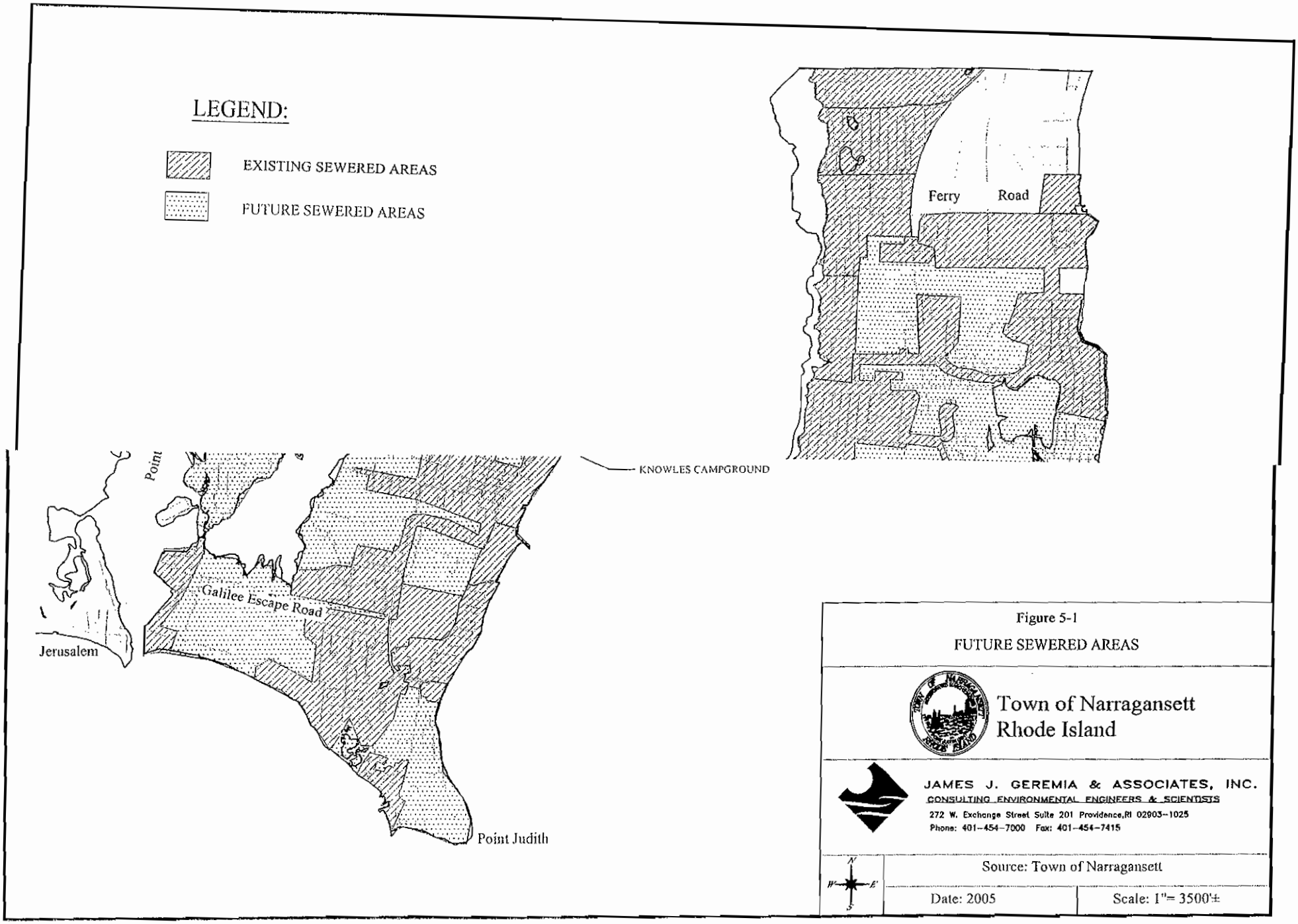

Figure 5-1

FUTURE SEWERED AREAS

Town of Narragansett
Rhode Island

JAMES J. GEREMIA & ASSOCIATES, INC.
CONSULTING ENVIRONMENTAL ENGINEERS & SCIENTISTS
272 W. Exchange Street Suite 201 Providence,RI 02903-1025
Phone: 401-454-7000 Fax: 401-454-7415

Source: Town of Narragansett

Date: 2005

Scale: 1"= 3500'±

5.2 FUTURE LAND USE

The 2005 Comprehensive Plan states that the buildout projections were prepared to assess the potential for future residential growth in Narragansett. This type of analysis evaluates the entire land area of the Town for its development potential under current zoning regulations. The estimates are based on land ownership and regulated zoning densities.

Estimates were developed by:

- Identifying land that is potentially developable in the future;
- Evaluating the environmental (or other) constraints that may limit development of that land (wetlands, watercourses, water bodies, slopes in excess of 25%, 100-year floodplain, or soils with a seasonally high water table within 18" of the surface that are not currently sewered, nor scheduled to be sewered within the next ten years); and
- Determining the amount of development allowed under the existing zoning regulations.

The land use survey found that 1,856 acres of land in Narragansett (21% of the community) are potentially developable in the future because they are vacant, not presently developed to their full potential, or might be converted to another use in the future.

The Town's consultant for Planning (Planimetric) has estimated the potential buildout projection to be an additional 600 to 1,800 units in the future. This range reflects, at the low end, the amount of "buidable" land area in conforming lots in the different zoning districts and, at the high end, the potential resulting from development of pre-existing lots. Since the buildout potential of any pre-existing lot is so dependent on site specific characteristics (physical, regulatory, and economic), it is difficult to be more specific. Clearly the variation in buildout potential is highest in areas with a large number of pre-existing lots.

5.3 FUTURE INFILTRATION AND INFLOW

The existing infiltration/inflow values are incorporated for the North End and South End Sewer Collection Systems. For those areas currently not sewered in the South End, a per housing unit rate of 60 GPD was

used (2.42 persons per housing unit x 25 gallons per person per day). Table 5-3 illustrates the amount of I/I that will be generated.

TABLE 5-3
SUMMARY OF INFILTRATION/INFLOW COMPONENTS

	NORTH END SEWER SYSTEM	SOUTH END SEWER SYSTEM	TOTAL
Present (2004)			
Infiltration	0.400	0.087	0.487
Inflow	0.683	1.048	1.731
Future (2025)			
Infiltration/Inflow	0.077	0.100	0.170
TOTAL	**1.160**	**1.235**	**2.388**

5.4 FUTURE FLOWS AND WASTELOADS

5.4.1 FUTURE FLOWS

In order to compute the future wastewater flows, the following assumptions have been made based on a realistic, but conservative, approach:

- The 2000 Census was conducted during the off-season when 22% of the dwellings were not occupied. In accordance with the 2000 Census, the occupancy rate was 1.79 persons per dwelling (16,361 persons ÷ 9,159 housing units). The Census Bureau also calculated an owner-occupied occupancy rate of 2.42 persons per unit, which is based on the occupied housing units but did not agree to a new population. The total sewered dwelling units are based on Town records which are accurate. Therefore, flows will be based on the gallons per day per dwelling unit in lieu of population.

- Present residential per dwelling wastewater flow selected for the computation is equal to 215 gpd per dwelling unit for the North End Sewer System and 260 gpd per dwelling unit for the South End Sewer System, based on the sewer flows obtained from the Narragansett Engineering Department.

- Based upon the existing plumbing code which promotes water conservation measures, it would continue to result in a stabilization of water consumption.

- Future residential per housing unit wastewater flow will be based on 300 gpd for the North End Sewer System and the South End Sewer System.

- Future infiltration will be increased by 60 gpd (25 gpdp x 2.42 persons per housing unit) for the future dwellings in the North End and South End Sewer Systems.

- Future inflow will remain at the current level.

- Peak flow factor for future residential, industrial and commercial flows is based on flow records from the Narragansett Sewer Department and TR-16.

- Future industrial flow is based on Town Council Resolution No. 85-33 (adopted 26 June 1985) which established a future reserve capacity of 150,000 gallons per day for the Port of Galilee in the South End (an annual increase of 10,000 gallons per day for 15 years). In the North End, the existing Industrial Park is at build-out, therefore, there are no further flows in the North End.

- Assumed 25 percent of the existing ISDS systems will connect during each 5-year period, therefore by the year 2025 all of the ISDS systems will be connected.

- Assumed 25 percent of the total number of dwellings at the build-out scenario per Planimetric will connect during each 5-year period resulting in all of the dwellings to be connected by the year 2025.

The future sewered population and housing units are comprised of two elements: the first being those existing housing units that are on ISDS, the second reflects the potential available land for new residential units.

Tables 5-4 and 5-5 provide a breakdown of the future sewered connections.

TABLE 5-4
FUTURE DWELLING UNITS (SOUTH END)

	2010 INCREMENTAL			2015 INCREMENTAL				2020 INCREMENTAL				2025 INCREMENTAL			
Plat	ISDS	FUTURE LOTS	Total ISDS + Develop-able	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2010 + 2015	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2015 + 2020	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2020 + 2025
G	9	1	10	9	1	10	20	9	1	10	30	9	1	10	40
I-G	3		3	3		3	6	3		3	9	4		4	13
I-J Jerus															
J	7		7	7		7	14	7		7	21	7		7	28
K	1	1	2		1	1	3		1	1	4		1	1	5
L	1	8	9		8	8	17		8	8	25		11	11	36
M	24	2	26	24	2	26	52	24	2	26	78	22	4	26	104
N	2	2	4		2	2	6		2	2	8		3	3	11
R		1	1		1	1	2		1	1	3		1	1	4
R-1	17	3	20	17	3	20	40	17	3	20	60	16	3	19	79
R-2 G1				283	1	284	284		1	1	285		1	1	286
R-3 G1				89		89	89				89				89
R-4															
S		1	1		1	1	2		1	1	3		2	2	5
*S-1	112	6	118		6	6	124		6	6	130		7	7	137
T Balt	40	1	41		1	1	42		7	7	49				49
U	13	2	15	13	2	15	30	13	2	15	45	11	4	15	60
V	12	8	20	12	8	20	40	12	8	20	60	13	10	23	83
Harbor Y1				309		309	309				309				309
Y2	8	1	9	8	1	9	18	8	1	9	27	9	1	10	37
Briggs Y3	171	34	205		17	17	222		17	17	239		7	7	246
Y4	2	8	10	2	8	10	20	2	8	10	30	2	9	11	41
Total	422	79	501	776	63	839	1,340	95	69	164	1,504	93	65	158	1,662

* Includes Knowles Campground (110 units)

TABLE 5-5
FUTURE DWELLING UNITS (NORTH END)

	2010 INCREMENTAL			2015 INCREMENTAL				2020 INCREMENTAL				2025 INCREMENTAL			
Plat	ISDS	FUTURE LOTS	Total ISDS + Develop-able	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2010 + 2015	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2015 + 2020	ISDS	FUTURE LOTS	Total ISDS + Develop-able	TOTAL 2020 + 2025
A	10	1	11	10		10	21	10		10	31	9		9	40
B	1	2	3		2	2	5		2	2	7		3	3	10
B-2	2	4	6	2	4	6	12	2	4	6	18	1	4	5	23
C	1	3	4		3	3	7		3	3	10		2	2	12
D		2	2		2	2	4		2	2	6		3	3	9
E	2	7	9	2	7	9	18	2	7	9	27	1	9	10	37
F	6	3	9	6	3	9	18	6	3	9	27	5	6	11	38
H	5	1	6	5	1	6	12	5	1	6	18	3	3	6	24
N-A	3	3	6	3	3	6	12	3	3	6	18	1	2	3	21
N-B															
N-C															
N-D	3	1	4	3	1	4	8	3	1	4	12	1		1	13
N-E	5	1	6	5	1	6	12	5	1	6	18	7	2	9	27
N-F		5	5		5	5	10		5	5	15		4	4	19
N-G	1		1	1		1	2	1		1	3	1		1	4
N-H	38	2	40	38	2	40	80	38	2	40	120	38	2	40	160
N-I	7	2	9	7	2	9	18	7	2	9	27	7	1	8	35
N-J	13	4	17	13	4	17	34	13	4	17	51	12	4	16	67
N-K		2	2		2	2	4		2	2	6		2	2	8
N-L	1	1	2	1	1	2	4	1	1	2	6	2		2	8
N-M	3	7	10	3	7	10	20	3	7	10	30	4	6	10	40
N-N	2	9	11	2	9	11	22	2	9	11	33	3	8	11	44
N-O	1	1	2	1	1	2	4	1	1	2	6	2		2	8
N-P									1	1	1		1	1	2
N-Q	7	5	12	7	5	12	24	7	5	12	36	5	4	9	45
N-R	16	2	18	16	2	18	36	16	2	18	54	16	1	17	71
N-S	55	2	57	55	2	57	114	55	2	57	171	53	1	54	225
O	2	2	4	2	2	4	8	2	2	4	12	4	3	7	19
P	3	2	5	3	2	5	10	3	2	5	15	3	4	7	22
Q	1	9	10	1	9	10	20	1	9	10	30	1	9	10	40
W	18	4	22	18	4	22	44	18	4	22	66	16	7	23	89
Y	15	2	17	15	3	18	35	15	2	17	52	16	2	18	70
X															
Z	1	2	3	1	2	3	6	1	2	3	9	2	2	4	13
Z-1	2		2	2		2	4	2	12	14	18	3	13	16	34
Total	224	91	315	222	91	313	628	222	103	325	953	216	108	324	1,277

Utilizing previously presented housing unit projections by Planimetric, flows, infiltration/inflow rates and industrial/commercial flows, Tables 5-6 and 5-7 were calculated. Table 5-6 displays the anticipated future wastewater flows from the North End Sewer System and Table 5-7 displays the anticipated future wastewater flows through 2025 for the South End Sewer System.

5.4.2 FORECAST OF FUTURE WASTELOADS

The future waste load contributions for the years 2010, 2015, 2020 and 2025 were based upon the assumptions that per capital wasteloads of suspended solids and BOD_5 are essentially equal to the nationwide average per capita loadings of these constituents. These averages as reported in various sources are 0.17 pounds of BOD_5 per person per day, or 0.41 pounds per housing unit per day (0.17 lbs/day x 2.4 persons/housing unit) and 0.2 pounds of Suspended Solids per capita per day, or 0.48 pounds per housing unit per day (0.20 lbs./day x 2.4 persons/housing unit).

The loadings attributed to the industrial users, based upon the current data, are well below domestic concentrations. This condition is a result of the on-site treatment that exists at each of the industrial locations.

For the purpose of forecasting the future loading, the actual permitted loadings will be used to establish the industrial component of the Town's loading. Table 5-8 provides a composite of the average future wasteloads and concentrations for the Scarborough WWTF.

Table 5-9 provides a breakdown of the future organic loading attributed to the North End Sewers. The North End Sewers are not monitored separately at the South Kingstown facility, therefore, for the purpose of future loadings, it was assumed that a standard loading of 250 mg/l for BOD and TSS were used for the initial concentration. The future loadings were based on 0.41 pounds per housing unit per day for BOD and 0.48 pounds per housing unit per day for TSS.

5.4.3 FUTURE SEPTAGE VOLUME AND LOADS

The future quantities of septage were computed based on the projected future non-sewered populations and the rate of per capita septage generation. For calculating future septage quantities, a conservative value of 150

TABLE 5-6
ANTICIPATED FUTURE FLOWS BY CONTRIBUTOR TO THE SOUTH KINGSTOWN REGIONAL WWTF
(NORTH END SEWER SYSTEM)

	FY 2005		2010		2015		2020		2025	
	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly
	(MGD)		(MGD)		(MGD)		(MGD)		(MGD)	
North End Sewer System										
Residential/Commercial	0.920	2.300	1.015	2.536	1.108	2.771	1.206	3.015	1.303	3.258
Industrial	0.020	0.050	0.020	0.050	0.020	0.050	0.020	0.050	0.020	0.050
Infiltration	0.400	0.400	0.419	0.419	0.438	0.438	0.457	0.457	0.477	0.476
Inflow	0.000	0.683	0.000	0.683	0.000	0.683	0.000	0.683	0.000	0.683
TOTALS	**1.340**	**3.433**	**1.454**	**3.688**	**1.566**	**3.942**	**1.683**	**4.205**	**1.800**	**4.467**

TABLE 5-7
ANTICIPATED FUTURE FLOWS BY CONTRIBUTOR TO THE SCARBOROUGH WASTEWATER TREATMENT FACILITY
(SOUTH END SEWER SYSTEM)

	FY 2005		2010		2015		2020		2025	
	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly	Average Daily	Peak Hourly
	(MGD)		(MGD)		(MGD)		(MGD)		(MGD)	
South End Sewer System										
Residential/Commercial	0.587	1.345	0.737	1.843	0.989	2.472	1.038	2.595	1.085	2.713
Industrial	0.036	0.090	0.086	0.215	0.136	0.340	0.186	0.465	0.186	0.465
Infiltration	0.087	0.087	0.117	0.117	0.167	0.167	0.177	0.177	0.187	0.187
Inflow	0.000	1.048	0.000	1.048	0.000	1.048	0.000	1.048	0.000	1.048
TOTALS	**0.710**	**2.570**	**0.940**	**3.223**	**1.292**	**4.027**	**1.401**	**4.285**	**1.458**	**4.413**

TABLE 5-8
AVERAGE FUTURE WASTELOADS AND CONCENTRATIONS
SOUTH END SEWER SYSTEM (SCARBOROUGH WWTF)

		2005	2010	2015	2020	2025
Residential/C (lbs./day)	BOD_5	752	957	1,301	1,368	1,433
	TSS	780	1,021	1,424	1,503	1,573
Industrial [1, 2] (lbs./day)	BOD_5	17	627	627	627	627
	TSS	9	147	177	147	147
TOTAL (lbs./day)	BOD_5	769	1,584	1,928	1,995	2,060
	TSS	789	1,178	1,581	1,660	1,736
TOTAL ADF (MGD)		0.71	0.94	1.292	1.401	1.458
Average Concentration (mg/l)	BOD_5	138	202	170	171	169
	TSS	153	150	147	142	143

[1] Base line concentration for BOD and TSS are actual IPT permit limits.
[2] Industrial loading based upon permit limits.

TABLE 5-9
AVERAGE FUTURE WASTELOADS AND CONCENTRATIONS
NORTH END SEWER SYSTEM (SOUTH KINGSTOWN REGIONAL WWTF)

		2005	2010	2015	2020	2025
TOTAL (lbs./day)	BOD_5	2,544	2,673	2,801	2,934	3,067
	TSS	2,544	2,695	2,845	3,001	3,157

gallons per capita, per year, was used. The future quantities derived in this section of the report were computed using residential units and population projections.

The loading associated with the future septage increases were calculated based on the average characteristics of domestic septage recommended for design purposes in EPA publications. These characteristics are listed in Table 5-10.

TABLE 5-10
PHYSICAL AND CHEMICAL CHARACTERISTICS OF SEPTAGE

PARAMETER	SUGGESTED[1] DESIGN VALUE	PARAMETER	SUGGESTED DESIGN VALUE
TS	40,000 mg/l	Iron	205 mg/l
TVS	25,000 mg/l	Zinc	49 mg/l
TSS	15,000 mg/l	Aluminum	48 mg/l
VSS	10,000 mg/l	Lead	8.4 mg/l
BOD5	7,000 mg/l	Copper	6.4 mg/l
COD	15,000 mg/l	Manganese	5.02 mg/l
TKN	700 mg/l	Chromium	1.07 mg/l
NH3-N	150 mg/l	Nickel	0.90 mg/l
TOTAL P	250 mg/l	Cadmium	0.71 mg/l
ALKALINITY	1,000 mg/l	Mercury	0.28 mg/l
GREASE	8,000 mg/l	Arsenic	0.16 mg/l
pH	6.0	Selenium	0.076 mg/l

[1] Handbook for Septage Treatment and Disposal, EPA, October 1984.
[2] Process Design Manual, Sludge Treatment and Disposal EPA, September 1979.

The summary of the non-sewered population projections and future septage volumes is presented in Table 5-11. The septage waste generated throughout the Town will be processed by the South Kingstown Regional Wastewater Treatment Facility.

5.5 FUTURE ADEQUACY OF THE INTERCEPTOR SYSTEM AND PUMP STATIONS

Current capacities of the interceptor segments are presented in Chapter 4.2.2. This information is used in this section for comparison with forecasted wastewater flows in the year 2025. Tables 5-12 and 5-13 present the

TABLE 5-11
PROJECTED FUTURE SEPTAGE QUANTITIES

TOWN	2004 Non-Sewered Septage			2010 Non-Sewered Septage			2015 Non-Sewered Septage			2020 Non-Sewered Septage			2025 Non-Sewered Septage		
	Popul.[1]	Total Mgal/yr	Total Pumped Mgal/yr[2]	Popul.	Total Mgal/yr	Total Pumped Mgal/yr[2]	Popul.	Total Mgal/yr	Total Pumped Mgal/yr[2]	Popul.	Total Mgal/yr	Total Pumped Mgal/yr[2]	Popul.	Total Mgal/yr	Total Pumped Mgal/yr[2]
Narragansett	5,956	3.113	0.778	4,462	2.305	0.576	2,047	1.058	0.265	1,285	0.664	0.166	532	0.275	0.069

[1] Based upon the current Ordinance, one quarter of the Town is required to pump their septic systems annually.
[2] Gallons are based on 25% of the septic systems at a capacity of 1,250 gallons.

lowest capacities in each interceptor segment and the forecasted wastewater flows. From this comparison, it is evident that the interceptors are adequate.

Table 5-12 summarizes the capacity of each station and the forecasted wastewater flows.

TABLE 5-12
FUTURE ADEQUACY ANALYSIS - NORTH END SEWER SYSTEM

Interceptor	Minimum Capacity (MGD)	Peak Discharge (MGD)	Comments
Bonnet Shores			
Segment 1	2.43	0.092	Adequate
Segment 2	2.43	0.259	Adequate
Segment 3	3.72	1.237	Adequate
North Interceptor			
Segment 1	4.58	1.237	Adequate
Segment 2	7.00	1.810	Adequate
Segment 3	7.00	1.958	Adequate
Segment 4	7.50	2.229	Adequate
Industrial Park P.S.	0.288	0.060	Adequate
Wolfe Road P.S.	0.432	0.261	Adequate
Bonnet Shores P.S.	2.102	1.237	Adequate
Mettatuxet P.S.	0.288	0.124	Adequate
Sprague P.S.	4.205	2.229	Adequate
Lakewood Drive P.S.	0.288	0.203	Adequate
Mumford Road P.S.	0.950	0.492	Adequate
Congdon Street P.S.	0.324	0.510	**Inadequate**
Ouida Street P.S.	4.310	4.558	**Inadequate**
Circuit Drive P.S.	0.06	0.040	Adequate
Baneberry Trail P.S.	0.06	0.040	Adequate
Wilson Drive P.S.	1.584	0.573	Adequate
Winterberry Road P.S.	0.259	0.166	Adequate

TABLE 5-13 FUTURE ADEQUACY ANALYSIS - SOUTH END SEWER SYSTEM			
Interceptor	**Minimum Capacity (MGD)**	**Peak Discharge (MGD)**	**Comments**
Point Judith Interceptor	1.30	0.655	Adequate
Point Judith Road	2.67	2.560	Adequate
Stanton Avenue P.S.	0.360	0.987	**Inadequate**
Galilee P.S.	1.584	1.377	Adequate
Burnside Avenue P.S.	1.728	1.535	Adequate
Point Judith P.S.	0.468	0.387	Adequate
Briggs Farm P.S.	0.576	0.516	Adequate

ADEQUACY OF PUMP STATIONS

North End Sewer System

There are fourteen pump stations in the North End Sewer System:

Industrial Park Pump Station
Wolfe Road Pump Station
Bonnet Shores Pump Station
Mettatuxet Pump Station
Sprague Pump Station
Lakewood Drive Pump Station
Mumford Road Pump Station
Congdon Street Pump Station
Ouida Street Pump Station
Circuit Drive Pump Station
Baneberry Trail Pump Station
Wilson Drive Pump Station
Winterberry Pump Station
Salt Pond/Seaport Village Pump Station (privately owned/publicly managed)

Industrial Park Pump Station

The Industrial Park Pump Station receives flows from South Ferry Road Industrial Park, which is totally developed. The future peak daily flow to the Industrial Park Pump Station is 0.060 GPD (42 GPM). The capacity of the station is 288,000 GPD (200 GPM) and appears to be adequate for the year 2025.

Wolfe Road Pump Station

The projected future peak flow at this station is estimated at 260,600 GPD (181 GPM). The station is equipped with two pumps, each rated at 432,000 GPD (300 GPM), and, therefore, the station is adequate for future flows.

Bonnet Shores Pump Station

The Bonnet Shores Pump Station will be receiving flows from the Industrial Park, URI Bay Campus and Bonnet Shores. The capacity of the station is 2,102,000 GPD (1,460 GPM) and the future peak daily flow will be 1,237,000 GPD (859 GPM). The pump station is adequate for the future flows.

Mettatuxet Pump Station

The future peak daily flow to the Mettatuxet Pump Station will be 123,800 GPD (86 GPM). The capacity of the station, determined in Chapter 4, is 288,000 GPD (200 GPM) and appears to be adequate. The station will be receiving flows from the Mettatuxet section of Town, consisting of residential properties.

Sprague Pump Station

In 1992, the Sprague Pump Station began to receive flows from the Middlebridge area within the Town of South Kingstown.

The future peak daily flow to the station will be approximately 2,229,300 GPD (1,548 GPM). The capacity of the Sprague Pump Station is 4,205,000 GPD (2,920 GPM). Therefore, the station is adequate for future flows in the year 2025. In the future, flow pacing should be considered to alleviate the flow problems at Ouida Street.

Lakewood Drive Pump Station

The Lakewood Drive Pump Station is rated at 288,000 GPD (200 GPM). The future peak flow will be 202,600 GPD (141 GPM). The pump station is adequate for future flows.

Mumford Road Pump Station

The Mumford Road Pump Station receives sewage flows from the Lakewood Drive Pump Station and adjacent areas, consisting of mostly residential flows. The future daily flow to the station is 491,900 GPD (342 GPM). The capacity of the station, determined in Chapter 4, is 950,000 GPD (660 GPM) and is adequate for future flows.

Congdon Street Pump Station

The present and future sewage flows consist mainly of 8-inch gravity residential flows. The capacity of the Congdon Street Pump Station is 324,000 GPD (225 GPM). The future required capacity for the station is 510,000 GPD (354 GPM) and is 155% greater than the existing capacity. Therefore, the Congdon Street Pump Station is inadequate for future flows. It is recommended that the existing pumps be replaced with a new pumps to meet the future demands of the station, and a new force main.

Ouida Street Pump Station

The Ouida Street Pump Station receives all the sewage flows generated by the North End Sewer System (including the Pier Area) and the Middlebridge area of South Kingstown. The major components of the future estimated flow to the Ouida Street Pump Station are presented in Table 5-14.

TABLE 5-14
FUTURE FLOW TO THE OUIDA STREET PUMP STATION

SOURCE	AVERAGE FLOW (MGD)	PEAK FLOW (MGD)
Residential/Commercial	1.303	3.258
Industrial	0.020	0.050
Infiltration	0.476	0.476
Inflow	0.000	0.683
Middlebridge [1]	0.031	0.090
TOTAL	**1.830**	**4.557**

[1] Middlebridge: Wastewater flow processed by Narragansett and allocated to South Kingstown.

The future required capacity for the Ouida Street Pump Station is 4,557 MGD (3,165 GPM), which is greater than the existing capacity of 4,320,000 GPD (3,000 GPM). The pumps and controls are inadequate. There are several other aspects of the existing installation which must be considered. In addition to inadequate pumping capacity, the alarms which are transmitted are the high wet level and high water pump room; the remaining 10 alarm signals are not transmitted to the Police Station, and the flow matcher should be changed to variable frequency drives. It is recommended that the pumps and related appurtenances (check and plug

valves) be replaced, and the flow meter. SCADA controls should be set up to communicate with the Regional Plant.

Circuit Drive Pump Station

The Circuit Drive Pump Station receives residential flows. The capacity of the pump station is 60,000 GPD (42 GPM). The future required capacity for the station is 40,000 GPD (28 GPM). Therefore, the station is adequate for future flows.

Baneberry Trail Pump Station

The Baneberry Trail Pump Station serves Baneberry Trail, Woodsia Road and Columbia Road. The future daily flow is 40,000 GPD (28 GPM). The capacity of the station is 60,000 GPD (42 GPM). Therefore, the station is adequate for future flows.

Wilson Drive Pump Station

The Wilson Drive Pump Station is rated at 1,584 MGD (1,100 GPM). The future peak flow will be .573 MGD (398 GPM). The pump station is adequate for future flows.

Winterberry Pump Station

The present and future sewage flows consist mainly of residential flows. The capacity of the Winterberry Road Pump Station is 259,000 GPD (180 GPM). The future flows will be 166,000 GPD (115 GPM). Therefore, the station is adequate for future flows.

Salt Pond/Seaport Village Pump Station

Despite the recorded by-laws to fully fund the operation and maintenance cost, the Association has refused to participate in those costs. That has left the Town with two options:

1. Let the station operate itself until it failed (or the electricity and gas for the standby generator) were shut off for non-payment, or

2. The Town would have to assume these responsibilities.

Acting in the interest of public health and safety, the Town has adopted the latter approach, although at a minimal level only. This station is now eleven (11) years old, and is at a point where certain preventative maintenance procedures should be undertaken.

In 2003, the Engineering Department identified capital improvements that would be necessary to bring this station into compliance with Town standards. These improvements will not increase the capacity of the station. Should these improvements be implemented in full, this station could be added to the Town's infrastructure inventory, and operated and maintained accordingly. This decision will have long-term budgetary impacts, in that the Town will essentially be committing to adding another pump station to the overall total. Funding was appropriated in the FY 2003-04 Wastewater Capital budget ($65,750) for these improvements; however, the implementation of same has been held pending further information from the developer relative to Phase II of this project.

South End Sewer System

There are five pump stations in the South End Sewer System:

Stanton Avenue Pump Station
Galilee Pump Station
Burnside Avenue Pump Station
Point Judith Pump Station
Briggs Farm Pump Station

Stanton Avenue Pump Station

The Stanton Avenue Pump Station serves a residential area, including Breakwater Village. The projected future peak flow at this station is 987,000 GPD (685 GPM). The station is equipped with two pumps, each

rated at 360,000 GPD (250 GPM). The Stanton Avenue Pump Station is inadequate for present and future flows. It is recommended that the pumps be upgraded to meet the present and future demands.

Galilee Pump Station

The Galilee Pump Station receives flows from restaurants, hotels and a number of fish/seafood processing operations. In the future, the station will serve Great Island, consisting of one-family residences and seasonal and beach properties. The capacity of the station is 1,584,000 GPD (1,100 GPM), and the future sewage flow is 1,376,900 GPD (956 GPM). The station is adequate for future flows in the year 2025. Controls need to be upgraded since VFDs no longer work.

Burnside Avenue Pump Station

The future service areas that the Burnside Avenue Pump Station will service are Harbour Island and Baltimore Avenue area. The future peak daily flow is 1,535,100 GPD (1,066 GPM). The capacity of the pump station is 1,728,000 GPD (1,200 GPM). The Burnside Avenue Pump Station is adequate for future flows.

Point Judith Pump Station

The Point Judith Pump Station serves a residential area, including a few restaurants. The projected future peak flow at this station is 386,600 GPD (268 GPM). The station is equipped with two pumps, each rated at 468,000 GPD (325 GPM). The station is adequate for future flows.

Briggs Farm Pump Station

The Briggs Farm Pump Station serves the Briggs Farm area and, in the future, the station will process flows from Harbour Island. The future daily peak flow is 515,800 GPD (360 GPM). The capacity of the pump station is 576,000 GPD (400 GPM). Therefore, the station is adequate to handle future flows.

5.6 WASTEWATER MANAGEMENT DISTRICT

In December 2002, the Town revised and amended their Ordinance to establish a Wastewater Management District (WWMD) to ensure that Individual Sewage Disposal Systems (ISDS) are properly operated, regularly inspected, and routinely maintained to prevent malfunctioning systems and to serve, where appropriate, as an alternative to municipal sewer systems. While this program will provide the framework for the efficient inspection, repair and maintenance systems in the Town, it is still ultimately the homeowner's responsibility to ensure that their system is well-maintained and properly functioning.

The Ordinance (Appendix D) encompasses the entire Town of Narragansett. This Ordinance is applicable to every owner of premises that have an ISDS located within the WWMD. Through the WWMD Rules and Regulations, the Town has the ability to enforce the proper maintenance of all existing and future ISDS's within the Town.