Rhode Island Department of
Transportation

RIPDES Phase II Storm Water Management Program Plan

REVISED

APRIL 13, 2007

RIDOT PHASE II
Storm Water Management

Rhode Island Department of Transportation

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1

Introduction

In 2003, the Rhode Island Department of Transportation (RIDOT) contracted Vanasse Hangen Brustlin, Inc. (VHB) to assist them in the preparation of their Storm Water Management Program Plan (SWMPP) to achieve compliance with the Rhode Island Department of Environmental Management (RIDEM) *General Permit for Storm Water Discharge from Small Municipal Separate Storm Sewer Systems (MS4s) and from Industrial Activity at Eligible Facilities Operated by Regulated Small MS4s (RIRI4000, December 19, 2003)* [General Permit]. This RIPDES General Permit directs operators of small MS4s to develop plans and procedures to control potential storm water pollutants. The lead responsible groups for the SWMPP are the RIDOT Office of Environmental and Intermodal Planning and the Maintenance Office.

In 2006, the Rhode Island Department of Transportation (RIDOT) revised this Storm Water Management Program Plan (SWMPP) in accordance with the requirements under RIPDES. RIDOT has received, and incorporated where possible, RIDEM comments dated November 23, 2004 and December 16, 2005.

This revised document provides descriptions of the best management practices RIDOT has implemented within the first three years of the Permit, and the practices RIDOT proposes to implement in the remaining two years of the Permit period to address the Six Minimum Measures, and the measurements that will be used to determine successful implementation.

Mission

The mission of RIDOT is:

> *"To maintain and provide a safe, efficient, environmentally, aesthetically and culturally sensitive intermodal transportation network that offers a variety of convenient, cost-effective mobility opportunities for people and the movement of goods supporting economic development and improved quality of life."*

Goals

RIDOT seeks to implement its mission through policy and action, with particular emphasis on the following goals:

Promote mobility for people and goods through a balanced, multi-modal transportation system.
Direct investment and development to existing communities, urban concentrations, and designated economic growth areas.
Develop methods for assessing the fiscal impact and cost-benefit analysis of development for use by both state and local governments when considering infrastructure investments and land-use policies.
Encourage redevelopment and improve livability of existing communities and urban areas; and guide new employment to under-used commercial and industrial sites.
Attain sufficient state funding within a real Transportation Trust Fund.
Attain and then maintain an appropriate level of system preservation or service to our customers.
Look for and participate in opportunities for public/private cost sharing projects.
Deliver operating systems, services, programs, and projects in the most cost effective manner possible.
Make public participation and a customer service focus, integral parts of the development of RIDOT programs, projects, and services.
Make media awareness and public participation a focus that is integrated with RIDOT's programs, projects and services via the Communications, Community Affairs, and the Transportation Operations Center.
Provide employees with opportunities to enhance their level of preparedness and performance so they can do the best job possible in the duties they are assigned.

Regulatory requirement

Under the Phase II Environmental Protection Agency Storm Water regulations [40 CFR Parts 9, 122, 123, and 124: National Pollutant Discharge Elimination System (NPDES) -- Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule] published in the Federal Register on December 8, 1999, portions of the highway drainage system owned and operated by RIDOT meet the definition of a regulated Municipal Separate Storm Sewer Systems (MS4s). According to 40 CFR 122.26(b)(8), “municipal separate storm sewer” is defined as a conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains:

(i) "Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States;
(ii) Designed or used for collecting or conveying storm water;
(iii) Which is not a combined sewer; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Federal and State-operated small MS4s can include universities, prisons, hospitals, roads (i.e. departments of transportation), military bases (e.g. State Army National Guard), parks and office buildings/complexes.

In Rhode Island, the Rhode Island Department of Environmental Management (RIDEM) has been delegated the authority to regulate storm water discharges regulated under the NPDES Program. In accordance with the Rhode Island Pollutant Discharge Elimination System (RIPDES) Regulations (RIDEM 2003), operators of regulated small MS4s are required to:

Apply for RIPDES permit coverage by the "Effective Date" of the General Permit Rhode Island Pollutant Discharge Elimination System Storm Water Discharge from Small Municipal Separate Storm Sewer Systems and from Industrial Activity at Eligible Facilities Operated by Regulated Small MS4s;
Develop a Storm Water Management Program that includes the six minimum control measures. The plan outlining the Storm Water Management Program must identify existing program compliance and proposed programs which will address the RIPDES General Permit requirements;
Implement the Storm Water Management Program using appropriate storm water management controls, or "best management practices" (BMPs), over the five year term of the permit term;
Develop measurable goals for the program; and
Annually evaluate effectiveness of the program and submit progress reports.

The ultimate objective of each of these steps should be protecting water quality. A regulated small MS4 operator's Storm Water Management Program must be designed to:

Reduce the discharge of pollutants from its MS4 to the "maximum extent practicable" (MEP);
Protect water quality; and
Satisfy the appropriate water quality requirements of the Clean Water Act.

General Objectives of the SWMPP

In order to develop this SWMPP, RIDOT assembled a Storm Water Advisory Committee (Committee) consisting of representatives of each division within RIDOT. The Committee originally met to review the SWMPP requirements and discuss how best to address them. The Committee has also provided input and comments for revisions to the SWMPP, and has reviewed the final changes of the SWMPP.

Originally, the consensus among the Committee members was that much of the public is not aware of the problem of non-point source pollution or more specifically the function of storm drains or the unintentional effects their day-to-day activities may have on water quality. The Committee further concluded that the SWMPP should focus on educating RIDOT personnel on non-point source pollution, and improving the effectiveness of selected BMPs and the frequency of implementation.

The original SWMPP was based on the completed Total Maximum Daily Load (TMDL) studies in Rhode Island[1] and the 2002 303(d) list finalized in March 2003 for other rivers and water bodies in the State. Fecal coliform was determined to be a priority pollutant that was addressed by the SWMPP. RIDOT continues pigeon abatement measures for bridges and underpasses statewide, as well as site-specific measures to address bacteria, total suspended solids, and other storm water contaminants as part of an ongoing effort to improve water quality of its discharges to impaired waters. The Committee felt that education and outreach efforts focusing on how non-point source contaminants, including fecal coliform, can contribute to pollutant loading of waterways, and that improving public and personal awareness could bring incremental improvements in water quality without large investments in infrastructure. Since 2002, new TMDL studies[2] have been drafted, and/or have been finalized by EPA. In 2006, a new 303(d) list was drafted by DEM. RIDOT has examined both the new 303(d) list and the new approved TMDL studies, and still feels that education and outreach efforts are necessary, and will be addressed with the RIDOT/RIDEM/URI Agreement (Appendix C). Each new TMDL will also be examined in more detail in this revised SWMPP (Section 4.0).

Document Organization

The following document satisfies the requirements for developing a Storm Water Management Program Plan. The remaining sections of this document include:

Section 2.0: Program Management and Storm Water Advisory Committee - This section identifies the general information regarding RIDOT's storm water

1 Taunton River, Hunt River, Runnins River, Barrington River, Palmer River, Pettaquamscutt River, Saugatucket River,
2 Approved: Sakonnet River, Greenwich Bay, Chickasheen River, Coastal, Kickamuit River
Drafted: Woonasquatucket

management infrastructure including responsible parties, the team of RIDOT personnel who are responsible for implementing and coordinating the Storm Water Management Program, and a discussion of the team responsibilities.
Section 3.0: Minimum Control Measures - A discussion of the six minimum control measures required by RIDEM, and the RIDOT approach to addressing these measures.
Section 4.0: Additional Requirements - A discussion of the additional requirements included in the RIPDES MS4 permit including Endangered or Threatened Species Habitat, Essential Fish Habitat, National Register of Historic Properties, Discharges to Impaired Waterways, and Discharges with Established TMDLs.
Section 5.0: Evaluation and Assessment - A summary of evaluation mechanisms and reporting requirements.
Section 6.0: References - A list of publications cited in the body of this document.

Rhode Island Department of Transportation

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Storm Water Advisory Committee

Committee Organization

This section identifies RIDOT Storm Water Advisory Committee, responsible for implementing and coordinating the Storm Water Management Plan, and briefly describes the team's responsibilities.

RIDOT's Storm Water Advisory Committee has changed over the last 3 years, and now includes the following individuals:

Chairman
Mr. Edward Szymanski, P.E.
Associate Chief Engineer
Environmental and Intermodal Planning
Rhode Island Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-2023

Ms. Emilie Holland
Senior Environmental Scientist
Environmental and Intermodal Planning
Rhode Island Department of Transportation
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Ms. Allison LeBlanc
Environmental Scientist
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Mr. Stephen Kut
GIS Manager
Rhode Island Department of Transportation
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Providence, Rhode Island 02903
(401) 222-6935

Ms. Dana Alexander Nolfe
Chief, Public Relations
Rhode Island Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-1362

Mr. Frank Corrao, PE
Deputy Chief Engineer, Construction Management
Rhode Island Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-2468

Mr. Namvar Moghadam
Maintenance Administrator
Rhode Island Department of Transportation
360 Lincoln Avenue
Warwick, RI 02888-3030
(401) 222-2378

Responsibilities

The Storm Water Advisory Committee is responsible for:

Annual evaluation of the effectiveness of current BMPs. The annual report should include recommendations for revisions, deletions and/or additions to BMPs.

Annual evaluation of the continued applicability of the measurable goals for each of the six minimum control measures with input from RIDOT division(s) responsible for the measurable goal. Based on this evaluation, the annual report may include a recommendation for revising, adding, or deleting measurable goals from the SWMPP.

Preparation and submittal of annual reports to RIDEM. Annual reports must include a narrative and/or numerical summary of how RIDOT has met the measurable goals for each of the six minimum controls over the last year, and an evaluation of current BMPs and measurable goals.

Implementation and coordination of each of the measures described in the SWMPP will be the responsibility of the division(s) indicated in the SWMPP schedule.

3

Six Minimum Control Measures

The operator must develop, implement and enforce a program to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, protect water quality, and satisfy the water quality requirements of the Federal Clean Water Act and Rhode Island Water Quality Standards. The plan has been designed to meet the requirements of the six minimum control measures listed below:

1. Public Education and Outreach
2. Public Participation and Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Runoff Control
6. Good Housekeeping Measures for Municipal Operations

The requirements apply to the urbanized areas, as shown in Figure 1.

General Requirements

For each of the six minimum measures listed, RIDOT has identified BMPs to achieve compliance with the measure and has identified the division responsible for implementation. The general requirements for each minimum measure as listed in the regulations are included in the SWMPP as follows.

Identify the person(s) or department responsible or sharing responsibility for the implementation of the measure. Identify the minimum measure being addressed.
Identify all BMPs to be implemented for full compliance with the measure.
Identify measurable goals for each BMP. Identify time-lines and milestones for BMP implementation, including as appropriate months and years in which the operator will undertake required actions, interim milestones, and frequency of activities.
Identify all impaired water bodies within regulated areas (if applicable).
Identify TMDL requirements or other water quality determination provisions (if applicable).

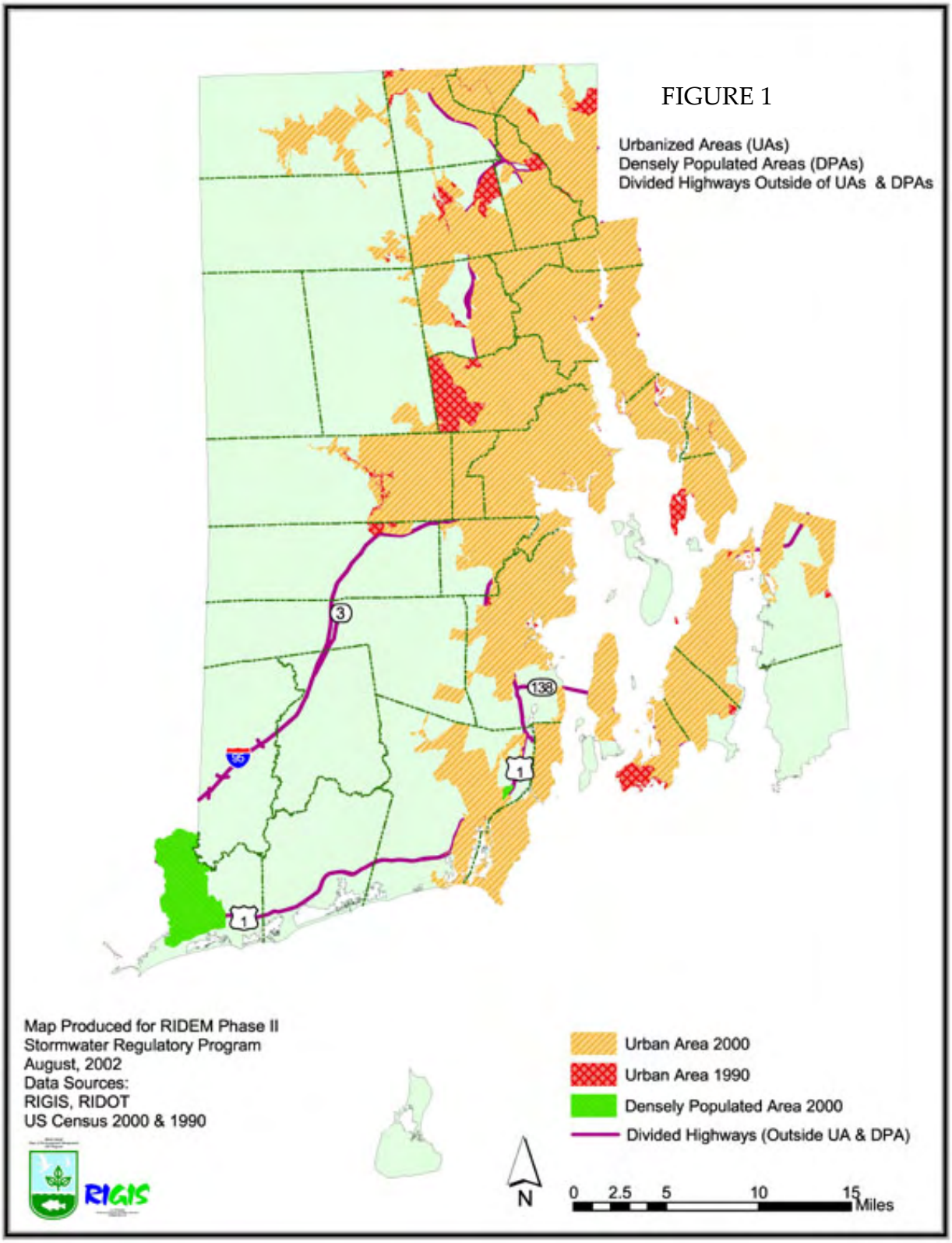
FIGURE 1
Urbanized Areas (UAs)
Densely Populated Areas (DPAs)
Divided Highways Outside of UAs & DPAs
3
138
95
1
1
Map Produced for RIDEM Phase II
Stormwater Regulatory Program
August, 2002
Data Sources:
RIGIS, RIDOT
US Census 2000 & 1990
RIGIS
Urban Area 2000
Urban Area 1990
Densely Populated Area 2000
Divided Highways (Outside UA & DPA)
N
0 2.5 5 10 15 Miles

Table 1 – Overview of Outfall Mapping

Basin	Sub-Basin	Completed[1]	Partial	To Be Done	Year	Urban[2]	TMDL[3]
Blackstone River	Blackstone River	X			2003	Y	N
	Branch River	X			2003	Y	N
	Chepactet River	X			2003	Y	N
	Clear River	X			2003	Y	N
Coastal Waters				X		Y	Y
Hunt River	Hunt River			X		Y	Y
Narragansett Bay	Annaquatucket River	X			2006	Y	N
	Greenwich Bay			X		Y	Y
	Kickamuit River	X			2006	Y	Y
	Maskerchugg River			X		Y	N
	Mount Hope Bay	X			2006	Y	N
	Narragansett Bay	X			2006	Y	N
	Pettaquamscutt River	X			2006	Y	Y
	Providence River			X		Y	N
	Sakonnet River			X		Y	Y
	Seekonk River			X		Y	N
Moshassuck River	Moshassuck River	X			2004	Y	N
Pawtuxet River	Barden Reservoir	X			2004	N	N
	Big River	X			2004	Y	N
	Flat River	X			2004	Y	N
	Moswansicut Reservoir	X			2004	Y	N
	Ponagansett Reservoir	X			2004	N	N
	Regulating Reservoir	X			2004	Y	N
	Scituate Reservoir	X			2004	Y	N
	Westconnaug Reservoir	X			2004	N	N
	North Branch Pawtuxet River	X			2005	Y	N
	South Branch Pawtuxet River	X			2005	Y	N
	Pawtuxet River		X			Y	N
	Pocassett River		X			Y	N
Pawcatuck River	Chickasheen River	X			2005	Y	Y
	Chipuxet River	X			2005	Y	N
	Queens River	X			2005	Y	N
	Pawcatuck River	X			2006	Y	N
	Wood River	X			2006	N	N
Saugatucket River	Saugatucket River	X			2002	Y	Y
	Point Judith Pond	X			2006	Y	N
Taunton River	Taunton River	X			2002	Y	Y
Ten Mile River	Ten Mile River			X		Y	N
Thames River (CT)	Five Mile	X			2006	N	N
	Mooseup River	X			2006	N	N
	Pachaug River	X			2006	N	N
Warren River	Barrington River			X		Y	Y
	Palmer River			X		Y	Y
	Runnings River			X		Y	Y
	Warren River			X		Y	N
Westport River	Adamsville Brook			X		Y	N
Woonasquatucket River	Woonasquatucket River	X			2004	Y	D

[1] Completed excluding roads mentioned in the final reports
[2] A portion or all of the sub-basin is urban or densely populated. Based on the US Census 2000.
[3] Total Maximum Daily Load (TMDL) Study is completed for portion of watershed by RIDEM

A map of known outfalls and receiving waterbodies, and a copy of RIDOT's data collection form, are included in Attachment A. RIDOT will identify the remaining outfalls in accordance with the mapping requirements under Minimum Measure 3.

■

Critical Habitat and Endangered Species

RIDOT has not identified discharges to critical habitats of listed or proposed to be listed endangered or threatened species. As outfalls are mapped, RIDOT will submit information in the subsequent Annual Reports on potential impacts to endangered or threatened species associated with outfall locations, if found.

■

Cooperation with Other Entities

Implementation of one or more of the minimum measures may be shared with another entity, or the entity may fully implement the measure if consistent with the permit requirements as stated in Section IV.A.1 of the General Permit.

RIDOT has signed an agreement with the University of Rhode Island Cooperative Extension for services to establish RIDOT compliance with obligations under the *Public Education and Outreach* and the *Public Involvement and Participation* minimum measures (Attachment B). RIDEM will provide technical assistance to RIDOT by reviewing URI's deliverables for technical accuracy and compliance with Storm Water Phase II to achieve approval. In undertaking this effort, RIDOT anticipates that a number of very valuable public education and outreach tools will be produced that will be applicable to the Storm Water Phase II needs of Rhode Island municipalities and that will be valuable to the general public as tools for managing storm water. Through this agreement, RIDOT will achieve full compliance with the *Public Education and Outreach* minimum measure and partial compliance with each of the other measures where public/employee education is required.

There are some areas under municipal control that are known or suspected to interconnect with RIDOT facilities. In these instances, there will be close coordination between RIDOT and the appropriate entity relative to BMP implementation.

■

Qualifying Local Programs

"A qualifying local program (QLP) is a State or local storm water management program that RIDEM has determined imposes the relevant requirements in Rule 31(e)(3)(ii) of the RIPDES Regulations. A QLP may be referenced by the operator to satisfy the requirements of Part IV.B of the General Permit. In order to reduce duplication of effort, municipalities may accept a permit from RIDEM Freshwater Wetlands and Water Quality Certification Programs, and the Coastal Resources

Management Council (CRMC) to meet the requirements for site plan and SWPPP reviews for Construction Site Storm Water Runoff Control and Post-Construction Storm Water Management in New Development and Redevelopment. Municipalities may also accept a permit from the RIDEM RIPDES Program in accordance to the limitations described in Part IV.B.4.b.5 of the General Permit for Construction Site Storm Water Runoff Control and Part IV.B.5.b.5. of the General Permit for Post-Construction Storm Water Management."

At this time RIDOT does not have the authority to develop a QLP, nor is RIDOT subject to the authority of any QLPs. RIDOT will continue to seek authorization from the RIDEM RIPDES Program, as applicable, pursuant to the General Permit for Storm Water Associated with Construction Activity.

Best Management Practice Decision Process

RIDOT developed their SWMPP in accordance with RIPDES Regulations and addressed each of the requirements of the General Permit. RIDOT developed appropriate BMPs through an extensive decision process.

RIDOT contracted Vanasse Hangen Brustlin, Inc. (VHB) in February 2003 to assist them in preparing the original SWMPP. The SWMPP was submitted to Rhode Island Department of Environmental Management in September 2004. RIDEM comments were received in November 2004 (re: Minimum Measures 1 and 2) and December 2005 (re: remaining Measures) and have been incorporated into this revision.

The Storm Water Advisory committee met with VHB to create the original SWMPP. An Environmental Scientist was hired in September 2005 to coordinate the Storm Water Management Program. The Committee and the relevant internal RIDOT Divisions are consulted in the decision-making processes.

BMPs to be implemented as part of Public Education and Outreach and Public Involvement (Measures 1 and 2) focus upon a partnership with the University of Rhode Island Cooperative Extension (URI-CE) to provide training and outreach to other municipalities struggling to meet Phase II requirements and internal education of RIDOT personnel concentrating on improvement of current RIDOT practices by improving designs and implementing maintenance projects.

The URI-CE contract was signed in February 2006 (Attachment B). Outreach and training programs started in the Fall of Year 3 and will continue through Year 5.

BMPs to be implemented for Measures 3-6 focus on mapping outfalls, surveying and sampling for illicit connections, creating an Illicit Discharge Detection and Elimination plan, controlling construction site runoff, and general pollution control.

Measure 1 - Public Education and Outreach

■

Permit Requirement

The operator must implement an ongoing public education program to distribute education material to the community over the term of the permit. The public education program must provide information concerning the impact of storm water discharges to water bodies. It must address steps and/or activities that the public can take to reduce the pollutants in storm water runoff.

■

Best Management Practices – Rationale Statement

RIDOT will focus educational efforts on municipal and state officials working on implementation of SWMPPs and RIDOT personnel. RIDOT, through an agreement with RIDEM, will fund URI-CE to provide outreach to municipal and state officials in the form of training opportunities as well as public educational information allowing the conveyance of a coordinated storm water message at both the state and local level. Internal education of RIDOT personnel will begin with basic education regarding storm water and progress to discussions of modifications to existing RIDOT practices to better control storm water and erosion. Internal Winter Training will continue to be offered to personnel, and storm water-related courses will continue to be incorporated into the schedule. The URI-CE storm water training and outreach will also be offered to RIDOT employees.

URI-CE will provide an annual report and assessment to RIDOT, which will be incorporated into the SWMPP Annual Report submitted to RIDEM each year. The URI-CE annual report will provide the measurable goals set and agreed upon by RIDOT, RIDEM, and URI-CE in the contract agreement, and the success towards each.

Success of Measure

The Office of Environmental Programs within the Environmental and Intermodal Planning will oversee the BMP reporting requirements and will be responsible for compiling and submitting the Annual Report. The Annual Report will include an evaluation of the BMPs implemented in the previous year and the success of the practice.

The success of the partnership with URI Cooperative Extension will be determined by the submittal of deliverables in a timely manner, post-survey of those attending training sessions and pre- and post- survey of target audiences for public outreach

efforts. The success of internal training will also be evaluated by pre- and post-surveys of those attending training.

Cost of Measure

RIDOT, RIDEM, and URI-CE have signed an agreement in the amount of $671,500 for public education, outreach, and training of municipal officials, the general public, and RIDOT personnel. This agreement will fully satisfy RIDOT responsibilities for Minimum Measure 1, and partially satisfy responsibilities for Minimum Measure 2. It is difficult to estimate the actual costs for maintaining each of the existing and proposed RIDOT measures, but they are anticipated to be in the RIDOT budget through the permit years. If it is deemed that additional funds are required beyond that which may reasonable be requested in annual budgets, additional evaluations for funding sources will need to be completed.

■

Best Management Practices – Implementation Plan

RIDOT will implement the following BMPs to achieve compliance with the requirements of **Measure 1**:

1A, 1B) Partner with URI Cooperative Extension to Provide Training to State and Municipal Officials and Coordinated Public Outreach Message (3 Year Program Agreement)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	State and Municipal Officials and Residents
Target Pollutant Sources:	Various
Description:	See full details in Attachment B.
Measurable Goals:	*Execute MOA in Year 3* *Goal: Receive deliverables on an agreed-upon timeline.*

1C) Storm Water Page on RIDOT Website

Responsible Party:	Public Information Department/Environmental and Intermodal Planning
Target Audience:	Residents and professionals
Target Pollutant Sources:	Hazardous waste, bacteria, and sand and sediment on roadways
Description:	The website will provide a description of the Phase II program, RIDOT's SWMPP, links to related sites, and a web based resource library.
Measurable Goals:	*Year 2: Create storm water website.* *Year 2-5: Update website regularly.* *Goal: 50 hits per year after initial launch*

1D) Public Storm Water Information in Internal Newsletters

Responsible Party:	Public Information Department/Environmental and Intermodal Planning
Target Audience:	State personnel
Target Pollutant Sources:	Any/all potential storm water pollutants
Description:	The RIDOT will develop a storm water related article and publish in the RIDOT and Department of Administration newsletters.
Measurable Goals:	*Year 3: Write and publish one storm water article in newsletter.* *Goal: Every RIDOT employee reached with information*

1E) Winter Training

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	RIDOT personnel
Target Pollutant Sources:	Any/all potential storm water pollutants
Description:	RIDOT personnel attend winter training sessions each year. Training includes erosion control and source reduction.
Measurable Goals:	*Year 2-5: Existing ongoing program.* *Goal: All pertinent employees trained each year*

1F) Storm Water Training

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	RIDOT personnel
Target Pollutant Sources:	Any/all potential storm water pollutants
Description:	RIDOT will incorporate storm water specific training into the annual training.
Measurable Goals:	*Year 2-5: Storm Water training provided.* *Goal: All pertinent employees trained each year*

Measure 2 - Public Participation/Involvement

■

Permit Requirement

All Public Participation/Involvement activities must comply with State and local public notice requirements.

■

Best Management Practices – Rationale Statement

The original SWMPP, this revised SWMPP, and all submitted Annual Reports are available to the general public on the RIDOT Storm Water website at **http://www.dot.state.ri.us/programs/enviro/index.html**. Questions and comments will be solicited throughout the permitting period via the website.

Before submission to RIDEM, revised SWMPPs and annual SWMPP reports will be available for public review and comment through a public notice. If more then 25 requests for a public hearing are received during the 30-day comment period, RIDOT will hold a public hearing. Otherwise, comments will be reviewed and responses prepared and documented. During the annual report public notice process, comments will also be accepted for suggested SWMPP amendments.

To further incorporate public involvement in the SWMPP process, the revised SWMPP will have/has gone before the Technical Committee to the State Planning Council for review. Comments and suggestions will be/have been incorporated as appropriate.

RIDOT's Public Participation and Involvement program will focus on residents and special interest groups state-wide. RIDOT Committee felt that opportunities for public participation and involvement in RIDOT programs would be difficult to implement due to the complexity of RIDOT projects, as well as diverting limited resources away from transportation improvement projects which are the primary goal of RIDOT. RIDOT has created a partnership the University of Rhode Island Cooperative Extension (URI-CE) to develop a public participation program (Appendix A). In addition, RIDOT has several established programs (Adopt-a-Spot/Adopt-a-Highway, Enhancement Program) that involve public participation, and several other programs that included public involvement during the development (Storm Drain Retrofit).

RIDOT initially utilized a stakeholder group to prioritize the Storm Drain Retrofit Demonstration Program outfall selection process. This stakeholder group included the Rhode Island Department of Environmental Management (RIDEM), Federal Environmental Protection Agency, Save the Bay, community representatives from Cranston, Warwick, and West Warwick as well as representatives from the Pawtuxet River Authority. It was mutually agreed that RIDOT would proceed with the design and construction of five outfalls on the Pawtuxet River as a first priority. RIDOT has continued to work with RIDEM to prioritize outfalls for retrofitting. This program has been added as a BMP to Minimum Measure 6: Pollution Prevention and Good House Keeping in this revised SWMPP.

In the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), Congress established the Enhancement Program. Funds set aside from the Surface Transportation Program (STP) would be committed to projects that would address the environmental impacts on local communities from transportation and highway construction. TEA-21 continued the Program, requiring that 10 percent of STP funds be set-aside and used exclusively for enhancement activities and projects that will increase mobility, protect the human and natural environment, and preserve and increase the livability of communities.

Enhancement projects typically consist of a partnership between RIDOT and another entity, and thus provide an opportunity for public involvement. This program provides flexible funding to public and private entities to improve, preserve, protect, and maintain transportation infrastructure. A Transportation Enhancement is a non-traditional transportation improvement with a link to the Intermodal transportation system. There are 12 categories under which projects may be considered for funding; the *Environmental Mitigation to Address Water Pollution due to Highway Runoff* is the category that will be monitored for the SWMPP requirements. The latest Transportation Improvement Program (TIP) funding may be viewed at http://www.planning.state.ri.us/transportation/.

Success of Measure

The measurable goals for each BMP were selected based on maximizing the use and effectiveness of RIDOT resources. In many cases, the Storm Water Committee felt that continuing existing programs was the best use of resources available, especially considering the funding and personnel allocations. The Committee felt that expanding the programs was important, however difficult.

The success of the partnership with URI Cooperative Extension will be determined by the submittal of deliverables in a timely manner, post-survey of those attending training sessions and pre- and post- survey of target audiences for public outreach efforts.

Assessing the success of the public participation programs poses a challenging issue. These programs are funded, but rely on the public to apply for inclusion into the program. RIDOT does not actively solicit applications. As such, RIDOT does not have control over the success of the programs. However, RIDOT will endeavor to provide information to other MS4 and RI municipalities regarding the programs in attempt to receive more applications. This will primarily be done on the new RIDOT Storm Water website **http://www.dot.state.ri.us/programs/enviro/index.html.**

The responsible party for monitoring and documenting each BMP is indicated below. Each entity will be responsible for tracking the success of each measure for inclusion in the Annual Report. Success will be determined on the basis of whether the measurable goal for each BMP was met.

Cost of Measure

At the present time it is difficult to estimate the actual costs for each of the proposed measures. For those practices that are currently part of the storm water management program for RIDOT, it will be included in the existing annual budget requests. For those measures that are new, it will first be required to evaluate the increased costs

for implementation and then evaluate if an existing departmental budget can handle the new procedures/tasks. If it is deemed that additional funds are required beyond that which may reasonably be requested in annual budgets, additional evaluations for funding sources will need to be completed.

■

Best Management Practices – Implementation Plan

RIDOT will implement the following BMPs to achieve compliance with the requirements of **Measure 2**:

2A) Adopt a Highway/Spot. Provide Bags, Litter Picks, and Signage

Responsible Party:	Maintenance Section
Target Audience:	The Public, commercial and industrial businesses, trade associations, environmental groups and educational organizations
Target Pollutant Sources:	Litter
Description:	Provide trash bags, litter picks and Signage
Measurable Goals:	*Year 2: Continue on-going program; Document the number of adopted areas/miles; number of organizations.* *Goal: Continuous improvement – more sponsors than previous year*

2B) Partner with URI Cooperative Extension to Develop Public Outreach Program

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	The Public, state and municipal officials, environmental groups and educational organizations
Target Pollutant Sources:	Various
Description:	Public outreach program developed jointly between URI-CE and other interested groups, and funded by RIDOT. Details provided in Attachment B.
Measurable Goals:	*Execute Memorandum Of Agreement in Year 3.* *Goal: Receive deliverables on an agreed-upon timeline.*

2C) Fund Clean-Up Efforts

Responsible Party:	Maintenance Section
Target Audience:	The Public, neighborhood associations, environmental groups and educational organizations
Target Pollutant Sources:	Litter, bulky/solid waste
Description:	Fund clean up efforts – prison cleanup crews; Woonasquatucket River clean up
Measurable Goals:	*Year 2: Continue to fund and manage existing program. Document tons of solid waste collected, number of groups completing cleanups through RIDOT.* *Goal: Continuous improvement – more efforts funded than previous year*

2D) RIDOT Internal Training -- DELETED – determined to be an inappropriate BMP for public involvement (accounted for elsewhere in SWMPP)

Responsible Party:	Environmental and Intermodal Planning/Maintenance Section
Target Audience:	RIDOT personnel
Target Pollutant Sources:	Any/all potential storm water pollutants
Description:	RIDOT personnel attend winter training sessions each year. Training includes erosion control and source reduction.
Measurable Goals:	*Year 2-5: Existing on-going program. Document the number of personnel attending training sessions.*

2E) Enhancement Program Projects

Responsible Party:	Design Office/Environmental and Intermodal Planning
Target Audience:	The Public, neighborhood associations and environmental groups
Target Pollutant Sources:	Sediment, hydrocarbons, airborne contaminants
Description:	Projects funded with enhancement, CMAQ or other sources, that address environmental quality (e.g. storm water retrofit, etc.).
Measurable Goals:	*Year 2: Continue on-going program. Document the number,$ of projects funded under this initiative.* *Goal: At least one Highway Mitigation project funded per funding cycle*

Measure 3 - Illicit Discharge Detection and Elimination

■

Permit Requirement

At a minimum, the operator must develop, implement and enforce a program to detect and eliminate illicit discharges or flows into the small MS4. The management program must include a storm sewer system map showing the location of all outfalls and the names of all waters that receive discharges from those outfalls. A strategy for mapping additional elements such as, location of catch basins, manholes, pipes within the system, must be completed for those portions of the system that are associated with the investigation and tracing of illicit discharges detected from the dry weather survey of outfalls, identification of physical interconnections with other regulated MS4s, municipal construction activity projects, and catch basin inspections.

The General Permit requires that to the extent allowable under State law, RIDOT must prohibit and enforce, through an ordinance or other regulatory mechanism available to the operator, un-authorized non storm water discharges into the system. RIDOT does not have the authority to establish such an ordinance.

The illicit discharge plan must contain procedures to identify and initially target priority areas, locate illicit discharges, locate the source of the discharge, remove illicit discharges, document actions, and evaluate impact on sewer system subsequent to the removal. RIDOT must inform public employees and users of the facility of hazards associated with illegal discharges and improper waste disposal.

■

Best Management Practices – Rationale Statement

RIDOT will use a combination of summer interns and hired vendors to identify, map and describe all remaining storm water outfalls. RIDOT is mapping its entire state-wide system, not just the portions in the urban and densely populated areas, as required by the General Permit. Mapping is being completed by watershed sub-basins.

The mapping effort began in 2002 by RIDOT summer interns. In addition to physically locating the outfalls, pertinent data regarding each outfall is recorded on a specially-designed field report form. Photo documentation is also collected. Construction design plans are reviewed and used as a basis for field locating outfalls. When plans are not available, outfalls are located by finding catch basins in the field and then following them to their discharge location. During the outfall identification and location process, the outfalls are surveyed for dry-weather discharges to potentially identify illicit connections to the RIDOT system. Dry weather flows are sampled for temperature, pH, conductivity, and bacterial contamination, as required by the General Permit. Based on the results of the dry weather flow surveys and sampling, it may be necessary to trace flows up the pipe to identify the connection point. As catch basins, manholes, and pipes are investigated, these additional elements will also be GPS located and documented. Various methods of tracing are available, including smoke or dye testing, or video. If an illicit connection is found, RIDOT will work with the responsible party and RIDEM to remove the connection. All actions will be documented in a specifically designed database, and will be reported in the Annual Reports submitted to RIDEM each year.

As of February 2007, RIDOT interns have identified, located, and documented outfalls within over half of Rhode Island sub-basins, with the exception of those outfalls located adjacent to limited access highways where it would be necessary to have a traffic detail accompany the interns. As RIDOT is mapping its entire system, as opposed to just the Permit-required areas, it is anticipated that it will take the entire 5-year permit period.

Based on the large area that needs to be covered, the Committee originally decided that RIDOT would need to hire a consultant vendor to complete the mapping. The primary mapping is being done by summer interns. For the limited-access roadways, RIDOT is in the process of developing a scope of work for a Request for Proposals to hire a vendor. The scope of work will include GPS location and documentation, inspection of outfalls for dry weather flows, and sampling of dry weather flows. This will be done in conjunction with the Asset Management Program that is being implemented in the Maintenance Division.

In order to organize and manage the data in a manner that will facilitate evaluation, and tracking of illicit discharges, the Committee determined that RIDOT would need to create a spatial database of the outfall information. RIDOT GIS personnel have created an ArcGIS drainage project where outfalls are just one data-layer within the project. The outfall records include all fields required by the General Permit, and other fields useful to RIDOT. Photo-documentation is/was collected at the time of mapping, and photographs are directly associated with each outfall record in the database. The data dictionary is included as Attachment A. Detention basins, storm water treatments units, catchbasins, and drainage swales are also in the process of being geographically referenced and added to this project. These data layers will also be imported into an Asset Management Software program being installed in the Maintenance Division (anticipated in Year 5). This software system will allow the Maintenance Division to better track and maintain RIDOT assets (light poles, guard-rails, drainage structures, etc.). The mapping of the RIDOT drainage structures is an integral part of detecting and eliminating illicit discharges.

Identification of existing connections to the RIDOT storm water system will be accomplished through a review of the RIDOT Physical Alteration Permit Application database. Applications are reviewed for direct drainage tie-ins to the State storm drain system. Past applications (since 2004) have been reviewed and those with direct connections have been inspected, GPS located and added to the state-wide drainage spatial database. RIDOT has modified the application process so that new applications requesting a direct tie-in require GPS coordinates to be provided by the applicant.

The General Permit requires that to the extent allowable under State law, RIDOT must prohibit and enforce, through an ordinance or other regulatory mechanism available to the operator, un-authorized non storm water discharges into the system. RIDOT does not have the authority to establish such an ordinance, and will rely on RIDEM for enforcement, should it be necessary. The University of Rhode Island Cooperative Extension will provide training and public information regarding the hazards associated with illegal discharges.

RIDOT developed an IDDE program during 2006 that will address requirements under Permit ID# IV.B.3.b.5. RIDOT has most procedures in place, though not documented or formalized in a Design Policy Memo (DPM), Work Breakdown Structure (WBS), or Standard Operating Procedure (SOP). The RIDOT IDDE

Program was developed using New England Interstate Water Pollution Control Commission's Illicit Discharge Detection and Elimination Manual – A Handbook for Municipalities (January 2003), the Center for Watershed Protection Illicit Discharge Detection and Elimination – A Guidance Manual for Program Development and Technical Assessments (October 2004), and RIDEM IDDE workshop materials (December 2004). The IDDE manual was modified to reflect RIDOT authority and procedures.

The IDDE program includes detailed methodology of the following:

- Receipt and consideration of complaints
- Locating priority areas for inspection
- Detecting and addressing non-storm water discharges
- Catch basin and manhole Inspections
- Tracing the source of an illicit discharge
- Removing the source of an illicit discharge
- Dry-weather surveys
- Recording/tracking actions taken to detect and address illicit discharges
- Program evaluation and assessment
- Coordinating w/ other physically interconnected MS4s re: illicit discharges
- Procedures for referrals to RIDEM
- Inform public of hazards associated w/ illegal discharges

The IDDE program is currently under internal review and awaiting approval. It is anticipated to be implemented in Permit Year 4. Attachment C.

In several instances, the timeline for RIDOT BMP implementation is extended beyond the Permit requirements. Because the RIDOT system is statewide and more extensive than any other MS4 permitted under the General Permit, RIDOT cannot, with the available manpower and funding, complete the required tasks in the allotted time. The modified schedule below provides a schedule that RIDOT can commit to.

Success of Measure

The measurable goals for each BMP were selected based on maximizing the use and effectiveness of RIDOT resources, while striving to meet the deadlines specified in the General Permit. Based in the size and complexity of the area to be covered by the mapping and illicit discharge detection program, the Committee felt that this Minimum Measure would be the most challenging to design and the most demanding to complete.

The responsible party for monitoring and documenting each BMP is indicated below. Each entity will be responsible for tracking the success of each measure for inclusion in the Annual report. Success will be determined on the basis of whether the measurable goal for each BMP was met. It is anticipated that during the preparation

of each annual report, the Committee will review the progress made on each BMP, and evaluate the success/failure of the method employed to meet the goal. It is likely the Committee may find that a different or revised approach may be necessary to meet the desired goal. Any changes to the proposed methods will be described in each annual report.

Cost of Measure

At the present time it is difficult to estimate the actual costs for each of the proposed measures. For those practices that are currently part of the storm water management program for RIDOT, it will be included in the existing annual budget requests. For those measures that are new, it will first be required to evaluate the increased costs for implementation and then evaluate if an existing departmental budget can handle the new procedures/tasks. If it is deemed that additional funds are required beyond that which may reasonably be requested in annual budgets, additional evaluations for funding sources will need to be completed.

■

Legal Authority

RIDOT does not have the legal authority to establish a law or ordinance banning dumping or discharging wastes. To the extent possible, RIDOT will discourage such discharges, however, it is assumed that illegal, illicit discharges will be referred to RIDEM for enforcement action. RIDOT has established a standard protocol, documented in the IDDE Plan, that will detail the procedure for such referrals.

■

Best Management Practices – Implementation Plan

RIDOT will implement the following BMPs to achieve compliance with the requirements of **Measure 3**:

3A) OUTFALL MAPPING

3Ai) Select Consultant/Vendor to Map Storm Water Outfalls (MODIFIED)

Responsible Party:	Environmental and Intermodal Planning and GIS Office
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will hire a vendor to map outfalls along divided- and limited-access highways in the NHS System; this scope of work will be a component of the Asset Management Software RFP.
Measurable Goals:	*Year 4: Create RFP and Hire consultant*

3Aii) Woonasquatucket River, Moshassuck River Mapping

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Complete mapping of outfalls within Woonasquatucket and Moshassuck River Watersheds.
Measurable Goals:	*Year 2: Complete mapping.*

3Aiii) Runnins River, Pawtuxet River (North Branch), Narragansett Bay (Upper)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Complete mapping of outfalls within Runnins River, Pawtuxet River – North Branch, and Narragansett Bay – Upper Bay Watersheds.
Measurable Goals:	*Year 3: Complete mapping.*

3Aiv) Pawtucket River (South Branch), Narragansett Bay (West Bay, Conanicut Island)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Complete mapping of outfalls within Pawtuxet River – South Branch, Narragansett Bay - West Bay and Conanicut Island Watersheds.
Measurable Goals:	*Year 4: Complete mapping.*

3Av) Narragansett Bay (East Bay, Aquidneck Island), Westport River

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Complete mapping of outfalls within Narragansett Bay – East Bay and Aquidneck Island, Westport River Watersheds.
Measurable Goals:	*Year 5: Complete mapping.*

3Avi) Pawcatuck River, Thames River, Coastal

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Complete mapping of outfalls within Pawcatuck River, Thames River, Coastal Watersheds.
Measurable Goals:	*Year 5: Complete mapping.*

3Avii) Saugatucket River, Stafford Pond and Blackstone River

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A

Description: Outfall location data collection completed.
Measurable Goals: *Completed.*

3Aviii) Hunt River – (ADDED)

Responsible Party: Environmental and Intermodal Planning
Target Audience: N/A
Target Pollutant Sources: N/A
Description: Outfall location data collection completed.
Measurable Goals: *Year 5: Complete mapping.*

3B) OUTFALL DATABASE

3B) Create Spatial Database for Structure Attributes, Maintenance and Asset Management (MODIFIED)

Responsible Party: GIS Office
Target Audience: N/A
Target Pollutant Sources: N/A
Description: GIS Office will create a spatial database for outfall attributes and will create a Drainage Project that will allow for additional drainage layers (catchbasins, detention basins, etc) to be included.
Measurable Goals: *Year 2: Develop database with applicable parameters.*

3Bi) Evaluate and Select Asset Management Software (MODIFIED)

Responsible Party: GIS Office
Target Audience: N/A
Target Pollutant Sources: N/A
Description: Chosen consultant will work with RIDOT GIS Office to select preferred software.
Measurable Goals: *Year 2-3: Select asset management software.*

3Bii) Purchase and Install Asset Management Software (MODIFIED)

Responsible Party: GIS Office
Target Audience: N/A
Target Pollutant Sources: N/A
Description: Install software recommended by chosen consultant.
Measurable Goals: *Year 4: Rollout software.*

3Biii) Select Area and Begin Pilot Project (Saugatucket River Watershed)

Responsible Party: GIS Office
Target Audience: N/A
Target Pollutant Sources: N/A
Description: Enter field data collected for the Saugatucket River Watershed outfall mapping into GIS software.
Measurable Goals: *Year 3: Enter field data previously collected.*

3Biv) Complete Implementation – All Other Watersheds

Responsible Party:	GIS Office
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Following pilot program, begin evaluating data collected in Year 3 mapping.
Measurable Goals:	*Year 3:Enter field data collected in subsequent years. Develop automated procedure for data entry.*

3C) Develop Procedure for Recording Additional Elements

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Develop a design policy memo (DPM) detailing the procedure for locating additional elements (catch basins, man holes, etc.), recording pertinent information about them and amending mapping to depict these features.
Measurable Goals:	*Year 3: Develop policy memo by end of Year 3.*

3D) ID EXISTING AND PLAN FOR FUTURE CONNECTIONS

3Di) Drainage Discharges to System Accounted for through PAP System Drainage

Responsible Party:	Design Office
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Drainage discharges to RIDOT system reviewed through the Physical Alteration Permit (PAP) process. Permitted drainage volumes are limited by an existing PAP regulations DPM that specifies no increases in drainage volumes discharging to the state system.
Measurable Goals:	*Year 2: Continue existing program.*

3Dii) Adopt/Evaluate Design Policy Memo for New Connections/Discharges

Responsible Party:	Design Office/ Environmental Office
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Draft new or revised policy for PAP policy/regulation regarding drainage connections to include geo-referencing to facilitate mapping of "additional elements".
Measurable Goals:	*Year 3: New or revised policy for PAP policy/regulations drafted by end of Year 3.*

3Diii) Identify Existing Connections/Discharges

Responsible Party:	Maintenance Division
Target Audience:	N/A
Target Pollutant Sources:	N/A

Description:	Identify existing connections/discharges into RIDOT system through a limited to review of PAP records for last three years and identification of significant contributors discharging to system.
Measurable Goals:	*Year 2: Review of PAP records and identify existing connections.*

3Div) Prohibiting Illicit Discharges – Develop IDDE Program (NEW MEASURABLE GOAL) Note: RIDOT is not required to establish a regulatory mechanism for this Minimum Measure

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Develop an IDDE program that include: procedures to eliminate illicit connections, plans to prevent future illicit connections, complaint procedures, catchbasin inspections, tracing and removing the source of illicit discharges
Measurable Goals:	*Year 3: Develop program and submit to DEM when complete for review*

3Dv) Prohibiting Illicit Discharges – Implement IDDE Program (NEW MEASURABLE GOAL) Note: RIDOT is not required to establish a regulatory mechanism for this Minimum Measure

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Implement DEM Approved IDDE program
Measurable Goals:	*Year 4: Implement program by end of year.*

3E) SURVEY OUTFALLS

3Ei) Survey Outfalls – Blackstone, Woonasquatucket and Moshassuck River Watersheds

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Survey outfalls to identify dry weather flows.
Measurable Goals:	*Year 3: Survey outfalls – Blackstone, Woonasquatucket and Moshassuck River Watersheds.*

3Eii) Survey Outfalls – Runnins River, Pawtuxet River (North Branch), Narragansett Bay (Upper Bay) Watersheds

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Survey outfalls to identify dry weather flows.
Measurable Goals:	*Year 4: Survey outfalls – Runnins River, Pawtuxet River (North Branch), Narragansett Bay (Upper Bay) Watersheds.*

3Eiii) Survey Outfalls – Pawtuxet River (South Branch), Narragansett Bay (West Bay), Conanicut Island Watersheds

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Survey outfalls to identify dry weather flows.
Measurable Goals:	*Year 5: Survey outfalls – Pawtuxet River (South Branch), Narragansett Bay (West Bay), Conanicut Island Watersheds.*

3Eiv) Survey Outfalls – Narragansett Bay (East Bay), Aquidneck Island and Westport River Watersheds

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Survey outfalls to identify dry weather flows.
Measurable Goals:	*Year 5: Survey outfalls – Narragansett Bay (East Bay), Aquidneck Island and Westport River Watersheds.*

3Ev) Survey Outfalls – Pawcatuck River, Thames River, Coastal Watersheds

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Survey outfalls to identify dry weather flows.
Measurable Goals:	*Year 5: Survey outfalls – Pawcatuck River, Thames River, Coastal Watersheds.*

3Evi) Survey Outfalls – Hunt River – (ADDED)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Survey outfalls to identify dry weather flows.
Measurable Goals:	*Year 5: Survey outfalls – Hunt River*

3F) SAMPLE OUTFALLS

3Fi) Sample Outfalls under Dry Weather Conditions

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will sample mapped outfalls at Saugatucket River and Stafford Pond that have dry weather flows.
Measurable Goals:	*Year 2: Sample outfalls.*

3Fii) Purchase Equipment to sample Storm Water Outfalls with Dry Weather Flows (MODIFIED)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will purchase equipment to analyze temperature, pH, and conductivity of dry weather flows, and sampling equipment to collect bacterial samples.
Measurable Goals:	*Year 3: Purchase equipment to sample storm water outfalls with dry weather flows.*

3Fiii) Sample Storm Water Outfalls with Dry Weather Flows – Saugatucket River and Stafford Pond Watersheds (MODIFIED)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will sample storm water outfalls identified with dry weather flows – Saugatucket River and Stafford Pond watersheds.
Measurable Goals:	*Year 4: Sample all storm water outfalls in these watersheds.*

3Fiv) Sample Storm Water Outfalls with Dry Weather Flows – Blackstone, Woonasquatucket and Moshassuck River Watersheds (MODIFIED)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will sample storm water outfalls identified with dry weather flows – Blackstone, Woonasquatucket and Moshassuck River watersheds.
Measurable Goals:	*Year 4: Sample storm water outfalls.*

3Fv) Sample Storm Water Outfalls with Dry Weather Flows – Runnins River, Pawtuxet River (North Branch) and Narragansett Bay (Upper Bay) Watersheds (MODIFIED)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will sample storm water outfalls identified with dry weather flows – Runnins River, Pawtuxet River (North Branch) and Narragansett Bay (Upper Bay) watersheds.
Measurable Goals:	*Year 4: Sample storm water outfalls.*

3Fvi) Sample Storm Water Outfalls with Dry Weather Flows – Pawtuxet River (South Branch), Narragansett Bay (West Bay) and Conanicut Island Watersheds (MODIFIED)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A

Description:	RIDOT will sample storm water outfalls identified with dry weather flows – Pawtuxet River (South Branch), Narragansett Bay (West Bay) and Conanicut Island watersheds.
Measurable Goals:	*Year 5: Sample storm water outfalls.*

3Fvii) Sample Storm Water Outfalls with Dry Weather Flows – Narragansett Bay (East Bay), Aquidneck Island and Westport River Watersheds (MODIFIED)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will sample storm water outfalls identified with dry weather flows – Narragansett Bay (East Bay), Aquidneck Island, and Westport River watersheds.
Measurable Goals:	*Year 5: Sample storm water outfalls.*

3Fviii) Sample Storm Water Outfalls with Dry Weather Flows – Pawcatuck River, Thames River, Coastal Watersheds (MODIFIED)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will sample storm water outfalls identified with dry weather flows – Pawcatuck River, Thames River, Coastal watersheds.
Measurable Goals:	*Year 5: Sample storm water outfalls.*

3Fix) Sample Storm Water Outfalls with Dry Weather Flows – Hunt River Watershed (NEW)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will sample storm water outfalls identified with dry weather flows – Hunt River watershed.
Measurable Goals:	*Year 5: Sample storm water outfalls.*

Measure 4 – Construction Site Runoff Control

■

Permit Requirement

According to the General Permit, the operator of the regulated small MS4 must develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one (1) acre. The operator must include disturbances less than one (1) acre if part of a larger common plan or if controlling such activities in a watershed is required by the Director. At a minimum, the program must be

consistent with the requirements of the RIDEM RIPDES General Permit for Storm Water Discharge Associated with Construction Activity.

Since RIDOT implements all construction projects within RIDOT property, this permit requirement does not appear to apply directly to RIDOT activities, with the exception of certain enhancement projects that are undertaken by others, but funded by RIDOT.

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Best Management Practices – Rationale Statement

Since RIDOT does not have the opportunity to regulate other entities performing construction projects within their property, the Committee decided to focus on improving construction site runoff control at RIDOT project sites. RIDOT construction policy is contained in the *Rhode Island Department of Transportation Standard Specifications for Road and Bridge Constructions* ("Blue Book"). These standard specifications provide all RIDOT employees and contractors guidance on construction activities, environmental inspections, and permitting requirements. However, discussions amongst the Committee identified failure of RIDOT or the contractors to perform regular inspection of construction site erosion and sedimentation controls, or inability of RIDOT to compel the contractor to maintain BMPs or respond to emergency situations due to the loosely written contracts and specifications. With that in mind, the Committee decided to focus attention to revising or creating standard specifications to require weekly or more frequent BMP inspections and stockpiling surplus BMPs at sites for emergencies.

An additional issue raised was the general lack of attention to preparing Storm Water Pollution Prevention Plans (SWPPPs) and facilitating compliance with SWPPPs due to confusion regarding responsibility and liability concerns. Proposed programs to address this breakdown include requesting the design engineer to prepare project specific site inspection checklists that would identify sensitive areas and specific permit requirements, continuing having an environmental specialist perform site inspections on a project specific basis as warranted, and holding storm water specific kick off meetings on certain projects as warranted to review the SWPPP, environmental permit conditions, inspection requirements and sensitive areas.

Finally, the Committee discussed a general disregard for or lack of enforcement of waste control requirements at construction sites. Methods discussed to address this concern included developing waste control training for RIDOT personnel and strengthening enforcement mechanisms to encourage the contractors to devote more attention to waste control.

Success of Measure

Measurable goals for each of the BMPs identified were selected based on the feasibility of implementing the program and available resources. In many cases, programs suggested by the Committee were abandoned because of impediments to adopting the program, or inability to adequately enforce the program.

Individual departments as identified below will be responsible for tracking the success of each measure. All actions taken will be recorded and reported in the Annual Report. For example, each field inspection will be recorded on a field inspection form and submitted to the Office of Environmental and Intermodal Planning. The number of field inspections will be reported annually. The report will include an evaluation of the effectiveness of the selected BMPs. Should it be determined that the proposed program did not achieve the desired goal, the proposed methods may be re-evaluated and revised.

Cost of Measure

At the present time it is difficult to estimate the actual costs for each of the proposed measures. Costs associated with storm water BMPs currently part of RIDOT storm water management program will be included in existing annual budget requests. New storm water management BMPs will be evaluated to determine if an existing departmental budget can handle the new procedures/tasks. If it is deemed that additional funds are required beyond that which may reasonably be requested in annual budgets, additional evaluations for funding sources will need to be completed.

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Best Management Practices – Implementation Plan

RIDOT will implement the following BMPs to achieve compliance with the requirements of **Measure 4**:

4A) Review and Revise RIDOT Standard Specifications ("Blue Book") if needed to Create More Controls During Construction (modified)

Responsible Party:	Design Office/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Draft an outline for a revised specification if needed to provide for more RIDOT control over contractor activities during construction.
Measurable Goals:	*Year 4: Develop outline for a revised specification if needed for use in Year 4.*

4B) Modify Standard Specification – inspection (modified)

Responsible Party:	Design Office/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Modify standard specification to require inspection of erosion and sedimentation controls at a minimum of once per week and during or immediately after each storm, or once per week during periods of dry weather or minor storms.
Measurable Goals:	*Year 4: Revised standard specification available for use.*

4C) Modify Standard Specification – on-site erosion and sediment control (modified)

Responsible Party:	Design Office/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Modify standard specification to require contractor to keep surplus erosion and sediment control materials on-site to facilitate maintenance or repair of damaged BMPs.
Measurable Goals:	*Year 4: Revised specification available for use.*

4D) Inspection Schedule (modified)

Responsible Party:	Design Office/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Mandate BMP inspection schedule to be at least once per week by Wednesday of each week. To be completed by the contractor per the specification.
Measurable Goals:	*Year 4: Revised specification available for use.*

4E) Revise WBS/DPM (modified)

Responsible Party:	Design Office/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Revise WBS/DPM to include project specific inspection checklist to be developed by the engineer during the design phase, identifying BMPs by station and sensitive areas to be inspected. Checklist to be used by designated RIDOT or contractor personnel.
Measurable Goals:	*Year 4: Revised WBS available for use.*

4F) Inspection Program on Project Specific Basis

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	On a project specific basis, RIDOT will perform weekly or monthly inspections of construction projects, as appropriate.
Measurable Goals:	*Year 2: Continue existing program.*

4G) Erosion and Sediment Control Inspection Techniques

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	RIDOT personnel
Target Pollutant Sources:	Sediment
Description:	Erosion and sediment control inspection techniques provided at RIDOT winter training.
Measurable Goals:	*Year 2: Continue existing program.*

4H) Standard Specification – Control Waste/disposal

Responsible Party:	Design Office
Target Audience:	Construction Contractor
Target Pollutant Sources:	Litter
Description:	Standard specification requires contractor to control waste at construction sites and dispose of properly.
Measurable Goals:	*Year 2: Continue existing program.*

4I) Modify RIDOT Policy – SWPPPs Included in Construction Documents (modified)

Responsible Party:	Design Office / Environmental and Intermodal Planning
Target Audience:	Consultants
Target Pollutant Sources:	Sediment, etc.
Description:	Modify RIDOT policy to require preparation of SWPPPs for all projects to be included in Construction Documents (PS&E) prepared by consultant during design phase. Contractor to sign NOI form and share liability.
Measurable Goals:	*Year 4:Revised WBS and DPM available for use*

4J) Develop a Contract Enforcement Mechanism (modified)

Responsible Party:	Construction Division/ Environmental and Intermodal Planning
Target Audience:	Construction Contractors
Target Pollutant Sources:	Sediment, litter
Description:	Develop a contract enforcement mechanism for RIDOT to enforce BMPs relative to inspection, waste control, etc. as described in SWPPP.
Measurable Goals:	*Year 2-5: Outline of enforcement procedure available in Year 4.*

4K) Develop or Contract for Waste Control Training (modified)

Responsible Party:	Construction Division/ Environmental and Intermodal Planning
Target Audience:	RIDOT Resident Engineers and Inspectors
Target Pollutant Sources:	Litter
Description:	Develop a training curriculum or contract with an education provider for waste control on job-site training.
Measurable Goals:	*Year 2-5:* Training curriculum available for use Year 4.

4L) Implement Training Program (modified)

Responsible Party:	Construction Division/ Environmental and Intermodal Planning
Target Audience:	RIDOT Resident Engineers and Inspectors
Target Pollutant Sources:	Litter
Description:	Implement program developed under 4K.
Measurable Goals:	*Year 3-5: Training curriculum available for use in Year 4.*

4M) Meetings with Contractor Prior to Construction

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	Contractors
Target Pollutant Sources:	Sediment, waste, etc.
Description:	Meetings with contractor prior to construction commencement to review environmental constraints and permit conditions. Pre-construction or field meetings.
Measurable Goals:	*Year 2: Procedure developed for conducting pre-construction environmental meetings.*

4N) Pilot Program Kick-Off Meetings on Three Projects

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	Construction contractors
Target Pollutant Sources:	Sediment, waste, etc.
Description:	Pre-construction environmental meetings held for three new projects.
Measurable Goals:	*Year 3: Conduct environmental kick-off meetings for new projects as appropriate.*

4O) Conduct Meetings at Project Kick-Off to 10 Projects

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	Construction contractors
Target Pollutant Sources:	Sediment, waste, etc.
Description:	Conduct meetings at project kick-off for 10 projects. Projects would be selected based on Water Quality applicability.
Measurable Goals:	*Year 4-5: Pre-construction environmental meetings held for 10 new projects each year.*

Measure 5 - Post-Construction Runoff Control

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Permit Requirement

According to the General Permit, the operator must develop, implement and enforce a program to address storm water runoff from new development and redevelopment

projects that disturb greater than or equal to one (1) acre, including projects less than one (1) acre that are part of a larger common plan of development or sale that discharge into the MS4. The program must ensure that controls are in place to prevent or minimize water quality impacts.

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Best Management Practices – Rationale Statement

Since RIDOT does not allow outside entities to construct projects on RIDOT property, the Storm Water Committee decided that this Minimum Measure should focus of RIDOT projects and maintenance practices. Currently, all new projects planned by RIDOT are designed in accordance with the State of Rhode Island Storm Water Design and Installations Manual (RIDEM 1993). This manual provides guidance on the design, construction and maintenance of storm water management systems. At a minimum, storm water management systems for all new projects are designed to realize the maximum sediment retention possible, or at a minimum, 80 percent total suspended solids removal. Certain treatments systems achieve greater water quality efficiency, including but not limited to extended detention wet ponds and infiltration. Typically, due to right of way constraints, RIDOT is limited to treatment options that occupy less space, such as Vortechs ™ or other similar systems that meet the minimum requirements. For rehabilitation and reconstruction projects, RIDOT strives to provide the maximum water quality treatment possible given the site constraints.

Since existing programs are already in place on the design side, the Committee felt that RIDOT should focus on improving maintenance of structural BMPs. Through discussions with the maintenance division staff, it was discovered that the maintenance division does not have access to complete or current information regarding the location and proper maintenance of structural BMPs. Therefore, it was decided that proposed programs should focus on improving the level of documentation and information available to the maintenance division staff such that their maintenance work is facilitated.

Success of Measure

Measurable goals for each of the BMPs identified were selected based on feasibility of implementing the program and available resources. In many cases, programs suggested by the Committee were abandoned because of impediments to adopting the program.

Individual departments as identified below will be responsible for tracking the success of each measure. All actions taken will be recorded and reported in the Annual Report. The report will include an evaluation of the effectiveness of the selected BMPs. Should it be determined that the proposed program did not achieve

the desired goal, the proposed methods may be re-evaluated and revised, or abandoned, as appropriate.

Cost of Measure

At the present time it is difficult to estimate the actual costs for each of the proposed measures. For those practices that are currently part of the storm water management program for RIDOT, they will be included in the existing annual budget requests. New storm water management BMPs will be evaluated to determine if an existing departmental budget can handle the new procedures/tasks. If it is deemed that additional funds are required beyond that which may reasonably be requested in annual budgets, additional evaluations for funding sources will need to be completed.

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Legal Authority

RIDOT does not have the legal authority to establish a law or ordinance for the permitting of storm water discharges. However, since outside entities are not entitled to perform construction projects on RIDOT property, this mechanism does not appear to be warranted.

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Best Management Practices – Implementation Plan

RIDOT will implement the following BMPs to achieve compliance with the requirements of **Measure 5**:

5A) RIDOT DPM – State Water Quality Standards

Responsible Party:	Design Office
Target Audience:	N/A
Target Pollutant Sources:	Sediment, hydrocarbons, metals, etc.
Description:	Current RIDOT DPM requires that all new construction meet the State Water Quality Standards for pollutant removal from storm water and redevelopment projects must incorporate retrofit actions to improve storm water quality to the maximum extent practicable.
Measurable Goals:	*Year 2: Continue existing program.*

5B) Snow Removal, Street Sweeping, Catch Basin Cleaning

Responsible Party:	Maintenance Division
Target Audience:	N/A
Target Pollutant Sources:	Sediment

Description:	Current maintenance practices include snow removal, street sweeping and catch basin cleaning. Work is completed on an as needed basis/as possible basis. Completion of work is dependent on available manpower.
Measurable Goals:	*Year 2: Continue existing program.*

5C) Location of Drainage Structures

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	RIDOT Maintenance Districts do not have information regarding the locations of all drainage structures. This limits the effectiveness of cleaning programs. Will be addressed in Measure 3C – location of "additional elements".
Measurable Goals:	*Year 3: Program in place.*

5D) Final Acceptance of Construction Work

Responsible Party:	Maintenance Division
Target Audience:	N/A
Target Pollutant Sources:	Sediment, etc.
Description:	Maintenance personnel to be present at final inspection of construction work. This will facilitate understanding of drainage systems, and improve knowledge of system components.
Measurable Goals:	*Year 3: Maintenance division personnel present at final inspection beginning third quarter of Year 3.*

5Ei) Expanded As-Built Plan Requirements

Responsible Party:	Construction Section
Target Audience:	Contractors, consultants
Target Pollutant Sources:	N/A
Description:	Implement aggressive as-built plan requirement. As-built plans would be prepared based on Resident Engineer's project diary and made available to RIDOT staff, including maintenance through current plan file management system available on internal network. As-built plans depict the project as actually constructed. This will facilitate location and mapping of "additional elements" and maintenance.
Measurable Goals:	*Year 3: Develop an as-built plan policy during Year 3.*

5Eii) Implement As-Built Plan

Responsible Party:	Construction Section
Target Audience:	Contractors, consultants
Target Pollutant Sources:	N/A
Description:	Implement new as-built plan policy.
Measurable Goals:	*Year 4: As feasible, implement new as-built plan policy during Year 4.*

5Eiii) As-Built Plan Policy Evaluation

Responsible Party:	Chief Engineer
Target Audience:	Contractors, consultants
Target Pollutant Sources:	N/A
Description:	Evaluate effectiveness of policy, revise or abandon.
Measurable Goals:	*Year 5: Evaluate effectiveness of policy during Year 5. Revise or abandon program as appropriate.*

Measure 6 - Pollution Prevention/Good Housekeeping

■

Permit Requirement

The operator must:

Identify all operations such as activities and facilities that have a point source or the potential for a point source discharge of storm water to an MS4 or waters of the State associated with activities or operations that have the potential to introduce pollutants to storm water runoff.
Develop and implement a program to prevent and reduce pollutant runoff and runoff volumes from facilities owned and operated by the MS4 operator, and from the MS4 and structural BMPs. The program must include an employee training component.
Develop and implement a program to prevent and reduce storm water pollution from operations and maintenance activities that have the potential to introduce pollutants to storm water runoff.
Develop inspection procedures and schedules for long-term operation and maintenance (O&M) of municipal facilities, municipal structural BMPs and the MS4.
Develop and implement an employee training program for good housekeeping, pollution prevention, and O&M of BMPs.
Implement a site-specific SWPPP developed for each facility that discharges storm water associated with industrial activity.

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Best Management Practices – Rationale Statement

Due to the size and complexity of RIDOT facilities, it was decided by the Committee that SWMPPs for Maintenance Facilities and Satellite Offices would be developed separately. These SWMPPs were prepared to provide guidance for the operators of those facilities on good housekeeping measures for operations, and have been submitted under separate cover.

The following section describes programs identified by the Storm Water Committee to address O&M measures to be implemented by RIDOT to address pollution prevention. Due to budget and manpower limitations, emphasis was placed on identifying existing programs that met the requirements of the General Permit. Where existing programs were found to fall short, the Committee reviewed various methods to improve pollution prevention while adhering to a realistic schedule and dedication of resources. Proposed programs will include source reduction initiatives such as more frequent sweeping and anti-icing management programs, education of RIDOT personnel, and location, inspection and maintenance of structural BMPs such as detention basins, swales and eroding road shoulders.

Recent changes to federal funding restrictions will allow for the use of federal funding sources for maintenance activities rather than construction projects alone. It is anticipated that this will allow for greater maintenance budgets which in turn may result in hiring additional personnel and purchasing more equipment. Due to these recent changes, there has been a shift in focus from construction to asset management, and RIDOT is currently investigating various systems for inventorying their infrastructure, recording maintenance requirements, and strategizing for future maintenance and funding.

Currently the RIDOT Maintenance Division keeps hard-copy records regarding work order requests for maintenance of RIDOT structures (road sweeping, catch basins, etc.) . The current record keeping practice is effective for dealing with complaints and work orders; however it is not useful for data collection and analysis. The investigation and development of an Asset Management Program began in Year 2. The Maintenance Division, along with the Contracts and Specifications Section, is currently developing a Scope of Work to advertise for an Asset Management consultant to assist in the development of a comprehensive inventory of RIDOTs assets and necessary tools to maintain the database. A consultant is anticipated to be selected by the end of Year 3 and the contract to be awarded in Year 4. This management program will enable RIDOT to better maintain, track, and report required data.

In 2006, the RIDOT GIS Office completed spatial analysis of Right-of-Way images on National Highway Institute roads (I-95, I-195, I-295, Rt. 10, Rt. 6, etc…) to geo-reference RIDOT catch-basins. Future work may include RIDOT ramps and other RIDOT-maintained roads. This is a significant step in both the Asset Management program and in the RIPDES permit requirements regarding annual catch-basin inspection, cleaning, and maintenance.

RIDOT initially utilized a stakeholder group to prioritize the Storm Drain Retrofit Demonstration Program outfall selection process. This stakeholder group included the Rhode Island Department of Environmental Management (RIDEM), Federal Environmental Protection Agency, Save the Bay, community representatives from Cranston, Warwick, and West Warwick as well as representatives from the Pawtuxet River Authority. It was mutually agreed that RIDOT would proceed with the design and construction of five outfalls on the Pawtuxet River as a first priority. RIDOT has continued to work with RIDEM to prioritize outfalls for retrofitting.

RIDOT is working to prioritize the remaining storm water outfalls that were identified in the Design Study Report through coordination meetings with the RIDEM Office of Water Resources. The ranking of outfalls is largely based on recommendations from federally approved Total Maximum Daily Load (TMDL) studies to ensure that the Storm Drain Retrofit Demonstration Project targets storm water outfalls where improvements are most needed. Currently, the Greenwich Bay drainage area is the next region to be targeted for storm water quality improvements.

As of July 2006, RIDOT has continued to advance storm water abatement components that are prioritized with the RIDEM and the federally approved TMDL studies. The following table depicts the outfalls and retrofits completed as of November 2006, and those to be constructed in 2007.

Table 2 – Storm Drain Retrofit BMPs

Outfall	Outfall Description	BMP	Status
Stafford Rd	18” outfall to Stafford Pond	Subsurface “swirl” type system	Constructed in 2001
Old Stafford Rd	12” outfall to Stafford Pond	Subsurface “swirl” type system	Constructed in 2001
P54	24” pipe on west side of I-95 at the Route 37 interchange	Wet pond	Constructed in 2002
P30	36” pipe in the northwest quadrant of Route 113 and I-95 interchange	Wet pond	Constructed in 2002
P75	48” pipe in the northeast quadrant of Route 113 and 295 interchange	Wet pond	Constructed in 2002
P61	60” pipe at Maple Street on the west side of I-95	Subsurface “swirl” type system	Constructed in 2003
P68A	10’ pipe at Wellington Ave	Subsurface filter system	Constructed in 2003
P68B	72” pipe at Doric Ave	Subsurface “swirl” type system	Constructed in 2003
Warren Ave	Twin 36” culverts north of I-195 overpass	Removal of Sediment, Installation of permanent erosion controls	Constructed in 2004
Highland Ave	36” outfall to Runnins River, south of Route 6 culvert	Subsurface “swirl” type system	Constructed in 2004
P113	Paved ditch within the median of 295	Grass swale with check dams	Under Construction Started in 2005
P38-2	12” and 18” pipes within the Airport connector cloverleaf	Removal of sediment at inlet and outlet pipes	Under Construction Started in 2005
P71	two 18” pipes at the intersection of I-95 and 295, (includes outfall P69)	Wet pond	Under Construction Started in 2005
P41	12” pipe west of I-95 and south of the Route 37 overpass	Wet pond	Under Construction Started in 2005
W6	Rt 6/Killingly Street Interchange	Three wet ponds; infiltration trench	Out to Bid Spring 07
S1	24” and 30” outfalls to the Seekonk River on Taft Street, South of I-95	Subsurface “swirl” type system	Designed; awaiting funding
W23	48” pipe on Providence Place, south side of the river near Providence Place Mall	Subsurface “swirl” type system	Designed; awaiting funding
W2	24” pipe on Promenade Street, north side of the river near Providence Place Mall	Subsurface “swirl” type system	Designed; awaiting funding

Success of Measure

Measurable goals for each of the BMPs identified were selected based of feasibility of implementing the program and available resources. In many cases, programs suggested by the Committee were abandoned because of impediments to adopting the program.

Individual departments as identified below will be responsible for tracking the success of each measure. All actions taken will be recorded and reported in the Annual Report. The report will include an evaluation of the effectiveness of the selected BMPs. Should it be determined that the proposed program did not achieve the desired goal, the proposed methods may be re-evaluated and revised, or abandoned, as appropriate.

Cost of Measure

At the present time it is difficult to estimate the actual costs for each of the proposed measures. For those practices that are currently part of the storm water management program for RIDOT, it will be included in the existing annual budget requests. New storm water management BMPs will be evaluated to determine if an existing departmental budget can handle the new procedures/tasks. If it is deemed that additional funds are required beyond that which may reasonably be requested in annual budgets, additional evaluations for funding sources will need to be completed.

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Best Management Practices – Implementation Plan

RIDOT will implement the following BMPs to achieve compliance with the requirements of **Measure 6**:

6A) Signage In Low Salt Area

Responsible Party:	Maintenance Division
Target Audience:	RIDOT & Town personnel, Public
Target Pollutant Sources:	Road salt
Description:	RIDOT currently provides signage in areas where surface waters are present nearby the roadway identifying these areas as "low salt" areas.
Measurable Goals:	*Year 2: Continue existing program.*

6B) De-icing Heavily Traveled Roadways and Interstates

Responsible Party:	Maintenance Division
Target Audience:	RIDOT Personnel
Target Pollutant Sources:	Sediment
Description:	RIDOT uses straight salt for de-icing on interstates and heavily traveled roadways. The use of salt only reduces sedimentation and clean up requirements of sand applications.
Measurable Goals:	*Year 2: Continue existing program.*

6Bi) Investigate Developing an ANTI-Icing Management Program (MODIFIED)

Responsible Party:	Maintenance Division
Target Audience:	RIDOT Personnel
Target Pollutant Sources:	Road salt
Description:	Investigate methods and equipment needed for a anti-icing management program by end of year 5.
Measurable Goals:	*Year 2-5: Investigate program development.*

6C) Winter Training

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	RIDOT Personnel
Target Pollutant Sources:	Any/all potential storm water pollutants
Description:	RIDOT personnel attend winter training sessions each year. Training includes erosion control and source reduction.
Measurable Goals:	*Year 2: Continue existing program.*

6D) Develop Storm Water Training Program

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	RIDOT Personnel
Target Pollutant Sources:	Any/all potential storm water pollutants
Description:	RIDOT will incorporate storm water specific training into the annual training.
Measurable Goals:	*Year 2: Storm Water training curriculum complete by end of Year 2.*

6E) Implement Storm Water Training

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	RIDOT Personnel
Target Pollutant Sources:	Any/all potential storm water pollutants
Description:	Implement storm water training.
Measurable Goals:	*Year 2: Storm Water training curriculum included in annual training*

6G) Cleaning of Water Quality Units (modified)

Responsible Party:	Maintenance Division
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Create RFP for maintenance contract for water quality units
Measurable Goals:	*Year 3: Decision made on future cleaning practices by end of second quarter of Year 3.*

6H) Implement Water Quality Unit Cleaning Program (modified)

Responsible Party:	Maintenance Division
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Water Quality unit cleaning program implemented, all units to be inspected once annually and cleaned in accordance with manufacturer's specifications, as appropriate.
Measurable Goals:	*Year 4: Water Quality unit cleaning program beginning in Year 4.*

6I) Standard Operating Procedures for Swales (modified)

Responsible Party:	Maintenance Division/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Roadside swales are difficult to clean due to rip rap, etc, and often lead to sediment plumes at the toe of slope that are difficult to access with equipment. Develop a standard operating procedure for maintenance of swales while minimizing disturbance to sensitive areas.
Measurable Goals:	*Year 4: Develop standard operating procedure*

6J) Implement Standard Operating Procedure (modified)

Responsible Party:	Maintenance Division/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Implement SOP for maintenance of swales.
Measurable Goals:	*Year 4: Standard operating practice in use*

6K) Catch Basins Cleaned – Northwest Division, Newport Division

Responsible Party:	Maintenance Division/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Northwest maintenance division - all catch basins cleaned within last three years. Newport maintenance division - all catch basins cleaned within last two years.
Measurable Goals:	*Year 2: Continue existing cleaning schedules.*

6L) Catch Basin Annual Cleaning - Statewide

Responsible Party:	Maintenance Division/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	600 catch basins will be cleaned annually state-wide as man power is available. Priority will be established based on results of cleaning records.
Measurable Goals:	*Year 2-5: 600 catch basins cleaned each year.*

6M) Inventory Existing Detention Basins

Responsible Party:	Maintenance Division/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Database of existing detention basin locations created.
Measurable Goals:	*Year 3: Database of detention basin locations by end of second quarter of Year 3.*

6N) Develop Inspection, Maintenance, Mowing Protocol

Responsible Party:	Maintenance Division/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Various
Description:	RIDOT will develop a detention basin inspection and maintenance protocol for ensuring proper function and maintenance of detention basins.
Measurable Goals:	*Year 3: Protocol available for use by second quarter of Year 3.*

6O) Implement Protocol

Responsible Party:	Maintenance Division/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Various
Description:	Begin inspecting and maintaining detention basins.
Measurable Goals:	*Years 3-5: Ten basins to be inspected annually beginning in the first quarter of Year 4 and cleaned as necessary.*

6P) Develop SOP for Maintaining Drainage Structures in Wetlands (modified)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	RIDOT Personnel
Target Pollutant Sources:	Sediment
Description:	Frequently drainage outfalls are located at or in wetlands, especially in the case of the older structures. Currently, RIDOT does not maintain these structures because of concerns about potential impacts to wetlands. RIDOT will develop a standard operating procedure for maintaining drainage structures in wetlands.
Measurable Goals:	*Year 4: SOP approved by RIDOT*

6Q) Negotiate Memorandum of Agreement with RIDEM (modified)

Responsible Party:	Maintenance/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Negotiate Memorandum of Agreement with RIDEM for maintaining drainage structures in wetlands.
Measurable Goals:	*Year 4: Begin negotiations during Year 4.*

6Ri) Develop Method for Tracking Inspection of Drainage Structures

Responsible Party:	Maintenance Division / GIS Office
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Currently, RIDOT Maintenance Division keeps records regarding work order requests for maintenance of the facilities. RIDOT will evaluate the current record keeping practices and investigate effectiveness, and potential for expanding the existing program to become more useful.
Measurable Goals:	*Year 2: Evaluate current record keeping practices during Year 2.*

6Rii) Conduct Needs Assessment

Responsible Party:	Maintenance Division / GIS Office
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Currently, the Maintenance Division does not have sufficient software resources to efficiently maintain cleaning and inspection records or model data to identify problem areas. Consultant hired under Minimum Measure 3Ai (Mapping Outfalls and Creation of Database) will conduct a needs assessment regarding asset management software during Year 3.
Measurable Goals:	*Year 3:Conduct needs assessment.*

6Riii) Evaluate Needs for Computer Hardware to Support Record Keeping and Inspection Effort

Responsible Party:	Maintenance Division / GIS Office
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Currently, the Maintenance Division does not have sufficient computer hardware resources.
Measurable Goals:	*Year 3: Requisition new equipment during Year 3.*

6Riv) Implement New Record Keeping Program

Responsible Party:	Maintenance Division / GIS Office
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	Implement new record keeping and inspection programs including software and hardware.
Measurable Goals:	*Year 4: Implement new program.*

6S) Develop a Procedure for Minimizing Erosion of Roadway Shoulders

Responsible Party:	Maintenance/Design
Target Audience:	N/A
Target Pollutant Sources:	N/A
Description:	RIDOT will develop a SOP to identify problem areas, investigate problem and incorporate repair into construction contracts.
Measurable Goals:	*Year 2: Develop program.*

6T) Sweeping Completed Statewide

Responsible Party:	Maintenance Division
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Currently, road sweeping is completed statewide on an annual basis. Work order program currently in use allows for response to complaints. The existing program will be expanded to track complaints and prioritize sweeping based on need.
Measurable Goals:	*Year 2-5: Continue existing program and expand as feasible to track complaints.*

6U) Investigate Feasibility of More Frequent Sweeping

Responsible Party:	Maintenance/ Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Sediment
Description:	Currently, RIDOT has insufficient resources to conduct roadway sweeping more than once per year. RIDOT will conduct a feasibility assessment to evaluate whether additional equipment or manpower can be allocated for more frequent roadway sweeping.
Measurable Goals:	*Year 3: Feasibility assessment completed in Year 3.*

6V) Storm Drain Retrofit Program (NEW MEASURABLE GOAL)

Responsible Party:	Environmental and Intermodal Planning
Target Audience:	N/A
Target Pollutant Sources:	Various
Description:	Storm drains are retrofitted to advance storm water abatement components
Measurable Goals:	*Year 1-5: Continue on-going program. Document the number of outfalls retrofitted under this initiative.* *Goal: Continuous coordination with RIDEM to retrofit most critical outfalls.*

Cooperation with Interconnected MS4s

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Permit Requirement

The operator must identify all physical interconnections with other MS4s within the first year of the program. If additional physical interconnections are identified in subsequent years they must be reported on an annual basis in accordance to Part IV.G of the General Permit. The operator must attempt to work cooperatively with other interconnected MS4s, whose discharge is determined to be a significant contributor of pollutants, to reduce the impact of the discharges.

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Best Management Practices

Rhode Island DOT will collaborate with all municipal MS4s because State roads and drainage systems run through each Rhode Island municipality. Physical interconnections with other MS4s occur where municipal storm and/or sewer systems connect with the RIDOT storm drain system. RIDOT will work with each MS4 as necessary as they locate and identify their systems.

RIDOT also has private entities interconnected into the drainage system. These interconnections are documented through the Physical Alteration Permit Application (PAPA) process. 2004 though 2006 PAPA interconnections were located and GPSed by the Office of Environmental and Intermodal Planning and the Design Office. Data were entered into a GIS database maintained by the GIS Office. Future PAPA interconnection locations will be documented through the Application process. Entities wishing to connect to the RIDOT drainage system are now required to provide geo-referenced locational data. This will be entered into the RIDOT drainage GIS database by the GIS Office.

Source Control

As mentioned above, RIDOT will investigate source control as a method of pollution prevention. Expanded funding may make it possible to employ more sweeping crews and procure additional maintenance equipment.

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Additional Requirements

The following additional requirements are addressed as part of this Plan.

Endangered Species Act

At this time, RIDOT has not identified any discharges to a critical habitat of a listed or proposed to be listed rare, threatened or endangered species. Upon completion of mapping of the remaining outfalls, or as impacts are identified during dry weather surveys or illicit discharge detection and elimination actions, RIDOT will determine if these newly identified illicit discharges or outfalls discharge to a critical habitat of a listed or proposed to be listed rare, threatened or endangered species. RIDOT will submit this new information to RIDEM in the Annual Report. If RIDEM determines that the newly identified discharge can not be authorized under the General Permit, RIDOT will submit an application for an individual RIPDES permit.

Screening for critical habitat of rare, threatened or endangered species is included in the early planning stages of all new RIDOT projects, therefore, all proposed new discharges or impacts will be avoided, minimized or mitigated to the maximum extent possible.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation And Management Act (PL 94-265, As Amended) provides for the designation and regulation of Essential Fish Habitat (EFH), in order to promote domestic, commercial and recreational fishing under sound conservation and management principles, and to promote the protection of EFH in the review of projects conducted under Federal permits, licenses, or other authorities that affect or have the potential to affect such habitat.

Screening for EFH is included in the early planning stages of all new RIDOT projects; therefore, all proposed new discharges or impacts to EFH will be avoided, minimized or mitigated to the maximum extent possible. RIDOT participates in quarterly coordination meetings with the National Marine Fisheries Services (NMFS)

to ensure that new projects are designed in compliance with NMFS guidance for EFH.

National Register of Historic Places Properties

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 4(f) of the National Environmental Policy Act, require that Federal agencies take into account the effects of federally funded projects on historic properties. The National Historic Preservation Act also requires that agencies afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on undertakings that have the potential to affect properties listed in, or determined eligible for listing in the National Register of Historic Places. Proposed actions must also include all possible planning to minimize harm to historic resources, including a thorough evaluation of all feasible and prudent alternatives to actions which affect inventoried historic resources.

Screening for Section 106 and 4(f) resources is conducted during the early planning stages of all RIDOT projects, therefore, all proposed new discharges having the potential to impact these resources will be avoided, minimized or mitigated to the maximum extent possible. RIDOT coordinates directly with the Rhode Island State Historic Preservation and Heritage Commission (RIHPHC) to ensure that projects are designed in compliance with Section 106 and 4(f) guidance. Mitigation is provided when impacts or negative affects can not be avoided. Such mitigation is defined in a Memorandum of Agreement between RIDOT and the RIHPHC on a project specific basis.

Discharges to Water Quality Impaired Waters

Discharges to impaired waters will be identified through the storm water outfall mapping to be completed under Minimum Measure 3. As outfalls are mapped in the GIS software, spatial analysis is used to determine if any of the outfalls discharge into the current RI 303(d) list of Impaired Waters. This attribute information is associated with the outfall, and will be provided to RIDEM in the annual reports.

RIDEM has designated RIDOT as a regulated small MS4, and has identified through TMDL studies RIDOT discharges that contribute to a violation of water quality standards or are significant contributors of pollutants to waters of the State. Therefore:

> The operator must determine the land areas contributing to the discharges identified in the approved TMDL or other water quality determination by RIDEM (subwatershed boundaries as determined from USGS topographic maps or other appropriate means).

- **The RIDOT drainage system is primarily comprised of RIDOT roadway and right-of-way runoff, and may be either a closed-drainage system or a roadway with bituminous ditches. As the RIDOT outfall system is mapped, it is determined, through spatial analysis in the mapping software program, the waterbodies that the outfall is discharging into. If the waterbody is a TMDL studied water, the contributing drainage system will be determined using USGS topographic contours, aerial photos, drainage plans, &/or field assessment, if the TMDL study does not specify which outfalls RIDOT should implement BMPs for.**

The operator must ensure that the SWMPP addresses all contributing areas and addresses the impacts identified by RIDEM.

- **This SWMPP addresses each TMDL study in the next section**

The operator must provide the following information regarding progress towards meeting the provisions that includes:

Identification of the discharge(s). Provide a tabular description of the discharges identified in the approved TMDL or other water quality determination by RIDEM that includes location (latitude/longitude), size and type of conveyance (e.g. 15" diameter concrete pipe), any existing discharge data (flow data and water quality monitoring data).

- **As each outfall is mapped with a GPS unit, both an electronic and hard copy data sheet are completed that include location (latitude/longitude and written description), size and type of conveyance, and the presence of dry weather discharge. Photographs are also taken upstream and downstream of the outfall. As each sub-basin is completed, the GPS data is compiled into ArcGIS, a mapping software program. The tabulated results are reported to RIDEM with each annual report, or upon request. As of January 2007, RIDOT has identified, mapped, and described over 3,000 outfalls.**

A description of the TMDL provisions or provisions of other water quality determination specific to the discharge.

- **This SWMPP addresses each TMDL study in the next section**

A description of any BMP(s) that have been implemented or will be implemented to address the provisions and pollutant(s) of concern identified by RIDEM. The BMPs must be tailored to address the pollutant(s) of concern and findings of the TMDL or other water quality determination by RIDEM. The operator shall assess the six minimum control measure BMPs and additional controls currently being implemented or that will be implemented in the SWMPP and describe the rationale for the selection of controls. The rationale must include the location of the discharge(s), receiving waters, water quality classifications, shellfish growing areas, and any other relevant information that the municipality may have (e.g. land use).

- **BMPs implemented or to be implemented for each TMDL is addressed in the next section**

If additional structural storm water controls or measures are necessary to meet the provisions of an approved TMDL or other water quality determination by RIDEM, the operator of the MS4 must also prepare and

submit a Scope of Work (SOW) document describing the process and rationale that will be used to select BMPs and measurable goals to ensure that the TMDL provisions or other provisions identified by RIDEM will be met.

- **At the time of this submission, it is not anticipated that additional measures are required above those required by the TMDL, or as addressed in the six Minimum Measures that will be implemented State-wide.**

The operator must provide measurable goals for the development and/or implementation of the six minimum measures and additional structural and non-structural BMPs that will be necessary to address provisions for the control of storm water in the provisions identified by RIDEM.

- **Section 3 of this SWMPP provides measurable goals for each of the six minimum measures.**

Development and implementation of any amendments made to the six minimum control measures within regulated areas and/or development and implementation of the six minimum control measures to contributing areas that were previously not regulated, must begin at the time of submittal of the NOI/SWMPP or revised SWMPP.

- **Section 3 of this SWMPP provides measurable goals for each of the six minimum measures, as amended.**

Development and implementation of storm water control measures from the MS4 that are additional to the six minimum control measures must be started upon receipt of written approval from RIDEM based on a review of the SOW and implementation schedule.

- **Not applicable to RIDOT at this time**

If the operator of an unregulated MS4 has not previously submitted a SWMPP, the operator of the MS4 must submit an NOI and SWMPP including amended BMPs, measurable goals, and the SOW if applicable, within one hundred and eighty (180) days of notification from RIDEM in accordance to the schedules of Part I.C.2 of the General Permit, and address the TMDL provisions or other provisions of a water quality determination identified by RIDEM as described in Part IV.D of the General Permit to obtain authorization for discharges previously not authorized. If the operator has previously submitted a SWMPP and has been authorized to discharge, the operator must submit only an amended SWMPP and the SOW, if applicable, to maintain authorization or to obtain authorization for discharges previously not authorized.

- **Not applicable to RIDOT**

Upon approval, the SOW document will be considered a part of the SWMPP and is subject to the Program Evaluation requirements of Part IV. E., the Record Keeping requirements of Part IV. F., the Reporting requirements of Part IV. G., and all other applicable requirements of the General Permit.

- **Not applicable to RIDOT at this time**

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Water Quality Impaired Waters within the RIDOT MS4

The current 303(d) List of Impaired Waters and the finalized TMDL studies are available on the RIDEM Office of Water Resources Website at: http://www.dem.state.ri.us/programs/benviron/water/quality/rest/index.htm

RIDOT continues to evaluate water quality improvement opportunities on a state-wide basis each time a project is undertaken by RIDOT. Emphasis is always placed on reducing pollutant loads for target contaminants where possible. Where reduction is not always possible within the scope of the RIDOT project, the goal is to improve the water quality to the Maximum Extent Possible.

Discharges with Established Total Maximum Daily Loads

Several TMDLs have been developed for waterbodies within the state that identify RIDOT as a responsible party. These TMDLs were listed in a letter provided by RIDEM dated February 23, 2004 from Mr. Eric Beck to RIDOT. Since the original submission of the RIDOT SWMPP, several other TMDL studies have been finalized and accepted by the US EPA. Each TMDL study is summarized below, and includes descriptions of any BMP(s) that have been implemented or will be implemented to address the provisions and pollutant(s) of concern identified by RIDEM, descriptions of the TMDL provisions or provisions of other water quality determination specific to the discharge.

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Scrabbletown Brook TMDL

Scrabbletown Brook is a second order stream located within the Towns of East Greenwich and North Kingstown. The watershed is approximately 1,653 acres in size and drains several wetland areas. Measured fecal coliform concentrations have been found to exceed the state's water quality standards. The pollutant of concern is pathogens as indicated by fecal coliform. RIDEM has identified Scrabbletown Brook as a Class A waterway and impaired by pathogens for a length of approximately 3.2 miles.

RIDEM has identified four major sources of fecal coliform bacteria in the Scrabbletown Brook watershed. These include storm water runoff from highways and residential/commercial areas, pigeons roosting under the Route 4 overpass, resident waterfowl upstream of Station SCe and SCh, and domestic pets and wildlife. According to RIDEM, the largest dry weather source of bacteria comes from the roosting pigeons under the Route 4 overpass. The largest wet weather source of bacteria to the watershed is storm water runoff. Although the 'pigeon source' is

considered significant by RIDEM during wet weather, storm water runoff has a greater cumulative impact in the watershed. RIDEM has provided recommendations for BMPs and responsible entities in the Scrabbletown Brook TMDL. The following section outlines those BMPs that RIDEM has recommended that RIDOT implement to reduce fecal coliform bacteria loads to the maximum extent practicable (MEP).

Stations SCe and SCh (Tributary to Scrabbletown Brook at Scrabbletown Road and Route 2, respectively)

Storm Water runoff from Scrabbletown Road and Routes 2 and 4 was identified as a wet weather source of pollution. RIDEM recommends that RIDOT implement one or more structural BMPs to reduce fecal coliform loads from Routes 2 and 4 to the MEP.

Station SC01 (Scrabbletown Brook at Stony Lane)

It is evident from RIDEM investigations that the pigeons roosting under the Route 4 overpass at Stony Lane negatively impact the water quality in this section of Scrabbletown Brook. Therefore, any efforts to reduce or eliminate the numbers of roosting pigeons would appear to be justified. This would have the effect of decreasing both dry and wet weather bacteria contributions to the stream. RIDEM recommends that RIDOT retrofit the overpass with a pigeon deterrent BMP.

The second source of fecal coliform bacteria identified at station SC01 is untreated storm water runoff from Stony Lane and Route 2. RIDEM recommends that RIDOT implement one or more structural BMPs to reduce fecal coliform loads from Route 2 to the MEP.

Watershed-Wide Storm Water Management Issues

According to the TMDL, urban storm water runoff from roads and residential/commercial land uses impacts water quality in several portions of the Scrabbletown Brook watershed. Therefore, it is important to address these issues on a watershed basis. RIDEM believes that the best way to accomplish this is by working with RIDOT and the Towns of East Greenwich and North Kingstown to highlight these concerns and support their storm water management planning, including the construction of BMPs where needed.

Road Runoff BMPs

RIDEM has highlighted possible locations in the Scrabbletown Brook watershed where storm water BMPs may be the most effectively applied by RIDOT to address road runoff. Scrabbletown Brook intersection with Routes 2 and 4 downstream of

station SC01 and the Scrabbletown Brook tributary intersection with Routes 2 and 4 downstream of station SCh.

Other BMPs recommended for the Scrabbletown Brook watershed include the implementation of the pigeon deterrent BMP which should result in a complete removal of roosting pigeons from the Route 4 overpass at Stony Lane, effectively eliminating this source of fecal coliform bacteria to Scrabbletown Brook.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water.

Should a project be designed within the TMDL area, RIDOT will work to the maximum extent practicable to implement RIDEM BMP recommendations, and coordinate with the interconnected MS4s.

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Fry Brook TMDL

Fry Brook is a third-order stream located entirely within the Town of East Greenwich, Rhode Island. The watershed is approximately 1,986 acres in size and drains several wetland areas. Fry Brook is located in the Hunt River watershed and has been determined to impact water quality in the Hunt River. As a result, the Fry Brook TMDL is an integral part of the overall Hunt River TMDL for fecal coliform. The pollutant of concern is pathogens, as indicted by fecal coliform. Measured fecal coliform concentrations have been found to exceed the state's water quality standards. As reported in the 2002 303(d) list, RIDEM has identified Fry Brook as a Class B waterway and impaired by pathogens for approximately 3.9 miles.

RIDEM has identified three major sources of fecal coliform bacteria in the Fry Brook watershed. These include: storm water runoff from Routes 2 and 4 and residential/commercial areas, a dairy farm, and resident waterfowl (geese) and other wildlife in the watershed. The largest dry weather source of bacteria comes from the dairy farm. The farm includes confined animal operations in which large quantities of manure are produced. Manure found in barnyards, pastures, feedlots, and uncontrolled manure storage areas is a significant source of bacteria to Fry Brook. In addition, cows are allowed access to all portions of Fry Brook on the dairy farm. Elevated levels of bacteria during dry weather are a direct result of this. The two largest wet weather sources of bacteria to the watershed are storm water runoff from roads and commercial areas, and the dairy farm. RIDEM has provided recommendations for BMPs and responsible entities in the Scrabbletown Brook

TMDL. The following section outlines those BMPs that RIDEM has recommended that RIDOT implement to reduce fecal coliform bacteria loads to the MEP.

Station FRY02 (Fry Brook approximately 600 yards south of Fry's Corner)

Storm Water runoff from both Route 2 and Middle Road (Fry Corner) was identified as a wet weather source of pollution. RIDEM recommends that RIDOT and the Town of East Greenwich delineate the catchment area draining to Fry Brook at Route 2 and Middle Road, especially those portions of the roadways that drain to the stream. RIDEM recommends one or more structural BMPs to attenuate storm water runoff from the Route 2 Middle Road intersection to the MEP. Structural BMPs for this area should be designed to promote the detention and infiltration of runoff.

Station FRY04 (Tributary of Fry Brook, known as North Stream, located off Route 2)

In addition to impacts from the dairy farm, storm water runoff from Route 2 was identified as a wet weather source of pollution. RIDEM recommends that RIDOT implement a structural BMP to reduce fecal coliform loads from Route 2 to the MEP. Structural BMPs for this area should be designed to promote the detention and infiltration of runoff.

Station FRY05 (Tributary of Fry Brook, known as South Stream, located off Route 2)

In addition to impacts from the dairy farm, storm water runoff from Route 2 was identified as a wet weather source of pollution. RIDEM recommends that RIDOT implement a structural BMP to reduce fecal coliform loads from Route 2 to the MEP. Structural BMPs for this area should be designed to promote the detention and infiltration of runoff.

Station FRY03 (Fry Brook at downstream side of Route 4)

In addition to storm water impacts upstream at stations FRY02, FRY04 and FRY05, storm water runoff from Route 4, the parking lot of American Die Casting Corp., and On Semiconductor was identified as contributing to the elevated bacteria loads measured at station FRY03. Additionally a large, resident population of Canada geese is present in the FRY03 sub-watershed which RIDEM attributes as a contributing source of fecal coliform bacteria. BMP recommendations for stations FRY02, FRY04 and FRY05 were described above.

RIDEM recommends that RIDOT implement one or more structural BMPs to reduce fecal coliform loads from Route 4 to the MEP. Structural BMPs for this area should be designed to promote the detention and infiltration of runoff.

Watershed-Wide Storm Water Management Issues

Urban storm water runoff from roads and residential/commercial land uses impacts water quality in several portions of the Fry Brook watershed. Therefore, it is important to address these issues on a watershed basis. RIDEM believes that the best way to accomplish this is by working with RIDOT and the Town of East Greenwich to highlight these concerns and support their storm water management planning, including the construction of BMPs where needed.

Road Runoff BMPs

RIDEM has highlighted possible locations in the Fry Brook watershed where storm water BMPs may be the most effectively applied by RIDOT to address road runoff. Fry's Corner Route 2 downstream of station FRY02; west side of Route 4 near American Die Casting Corporation upstream of station FRY03; Route 2 downstream of station FRY04; and Route 2 downstream of station FRY05.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water.

Should a project be designed within the TMDL area, RIDOT will work to the maximum extent practicable to implement RIDEM BMP recommendations, and coordinate with the interconnected MS4s.

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Hunt River TMDL

The Hunt River Basin is centrally located in Rhode Island on the westerly side of Narragansett Bay. The watershed drains approximately 25 square miles (15,445 acres) and includes parts of seven Rhode Island communities: Exeter, North Kingstown, East Greenwich, West Greenwich, Coventry, West Warwick, and Warwick. The watershed includes Hunt River, Potowomut River, and four major tributaries. The major tributary sub-watersheds are Sandhill Brook (2,352 acres), Frenchtown Brook (4,487 acres), Scrabbletown Brook (1,653 acres), and Fry Brook (1,986 acres). TMDLs have been developed for Scrabbletown Brook and Fry Brook

and have been discussed previously. The Hunt River TMDL has been developed for fecal coliform, as measured fecal coliform concentrations in the river have been found to exceed the state water quality standards. Both dry and wet weather water quality data have been collected in the Hunt River watershed, revealing elevated fecal coliform concentrations at both instream and tributary stations.

As reported in the 2002 303(d) list, RIDEM has identified the Hunt River headwaters to Frenchtown Road (5.4 miles) as a Class A waterway and the Hunt River from Frenchtown Road to the Brown and Sharpe discharge point located approximately 0.55 miles downstream of Frenchtown Road as a Class B waterway (0.5 miles). Both the class A and B segments are listed as being impaired by pathogens. The majority of bacteria violations in the watershed were found to occur during wet weather conditions.

RIDEM has identified five major sources of fecal coliform bacteria in the Hunt River watershed. These include storm water runoff from highways and residential/commercial areas, a dairy farm, pigeons roosting under a Route 4 overpass, a horse farm, and resident waterfowl, domestic pets, and wildlife. The largest dry weather sources of bacteria are the dairy farm, pigeons roosting under a Route 4 overpass, and domestic pets, resident waterfowl, and other wildlife. The largest wet weather source of bacteria to the watershed is storm water runoff. Although other sources are significant during wet weather, RIDEM attributed storm water runoff as having a greater cumulative impact in the watershed. RIDEM has provided recommendations for BMPs and responsible entities in the Hunt River TMDL. The following section outlines those BMPs that RIDEM has recommended that RIDOT implement to reduce fecal coliform bacteria loads to the MEP.

Station HRe (Hunt River headwaters at Route 2)

Runoff draining from Route 2, South Road, and Tillinghast Road was observed by RIDEM representatives entering the stream channel unabated by pollution control measures. RIDEM recommends that RIDOT implement one or more structural BMPs to reduce wet weather fecal coliform loads from Route 2 to the MEP.

Station FB01 (Frenchtown Brook at Davisville Road)

Fecal coliform standards are not violated at this station during dry weather. Elevated bacteria concentrations during wet weather are thought to be primarily due to the large numbers of waterfowl found in the ponds draining to the brook, and to storm water runoff from Woodbridge Drive, Tillinghast Road, Frenchtown Road, and Route 2. RIDEM's recommendations address these two pollution sources. RIDEM recommends that RIDOT implement one or more structural BMPs to reduce wet weather fecal coliform loads from Route 2 to the MEP.

Station HR04 (Hunt River at Route 1)

Fecal coliform standards are not violated at this station during dry weather. Wet weather impairments in this section of the Hunt River are thought to be due to wet weather inputs from Fry Brook, as well as untreated storm water runoff from Route 1. The pollution reductions required for the Fry Brook watershed and the future BMPs discussed below should result in the achievement of water quality standards at station HR04.

Watershed-Wide Storm Water Management Issues

Urban storm water runoff from roads and residential/commercial land uses impacts water quality in several portions of the Hunt River watershed. Therefore, it is important to address these issues on a watershed basis. RIDEM believes that the best way to accomplish this is by working with RIDOT and the Towns of East Greenwich and North Kingstown since these are the towns where the impairments have been detected, to highlight their concerns and by supporting their storm water management planning, including the construction of BMPs where needed.

Road Runoff BMPs

RIDEM has highlighted possible locations in the Hunt River watershed where storm water BMPs may be the most effectively applied by RIDOT to address road runoff. Hunt River headwaters downstream of station HRe; Frenchtown Brook downstream of water quality stations FB01, FB01A, FB03, FBc; Pierce Brook (Separate TMDL planned) downstream of UB01; Sandhill Brook (Separate TMDL planned) downstream of water quality stations SB01, SB1, SB02, SB03; Hunt River mainstem downstream of water quality stations HR04, HR05.

RIDOT Actions

Work is underway by RIDOT to design a number of BMPs associated with improvements to Route 1 at the Frenchtown Road interchange. As part of the project, RIDOT has contracted with an engineering firm to design at least three storm water BMPs and two wetland restoration/creation areas. The wetland areas will be located on the north and south sides of the river near the Route 1 bridge and should provide flood control and habitat benefits. Since other wetland areas in the watershed have been shown to reduce fecal coliform concentrations, a reduction may be seen here as well.

The first storm water BMP is a series of detention basins that accepts runoff from the highway from the railroad bridge to the entrance to the shopping center – an area of 5.8 acres. Excess flows from the existing BMP in the adjacent Stop and Shop parking lot will be accepted as well. The second BMP drains about 19.0 acres from the

railroad bridge to Bruester Drive. Runoff is conveyed to a detention basin for treatment and then discharged to a wetland area, which contributes flow to Sandhill Brook. The third BMP treats an area of about 4.3 acres and consists of a level spreader designed to provide sheet flow to an adjacent wetland. All of the BMPs are designed to treat runoff from a 10-year storm event. For detention basins, the designs provide additional storage volume, and thus improved treatment, for all storm frequencies. RIDEM anticipates that these new BMPs and wetland areas will result in a net reduction in wet weather pollutant loads, including pathogens, to both the Hunt River and Sandhill Brook. This project is currently in the design phase.

The Route 403 Relocation project is in construction, and water quality basins have been installed as storm water BMPs. Twelve basins have been constructed to manage storm water runoff from Rt 403.

RIDOT will also continue to implement BMPs under the six Minimum Measures within the TMDL watershed.

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Pettaquamscutt (Narrow) River TMDL

The Pettaquamscutt (Narrow) River is just over 9.5 kilometers long and runs parallel to the West Passage of Narragansett Bay in the southern portion of its watershed. The river is a composite of a tidal inlet and back bay, an estuary, and two ponds. The watershed includes slightly more than 36 square kilometers within the Towns of North Kingstown, Narragansett and South Kingstown in southern Rhode Island. The pollutant of concern is fecal coliform, a parameter used by RIDEM as an indicator of pathogen contamination. Three perennial and seven intermittent streams discharge to Narrow River. The principal tributaries to the river are Gilbert Stuart Stream, which discharges to Upper Pond at the northern extremity of the river, and Mumford and Crooked brooks that discharge to Pettaquamscutt Cove, near the southern extremity. The remaining regions of the river receive a majority of baseline freshwater inflow as groundwater seepage from the coastal margin.

As reported on the 2002 303(d) list, RIDEM has identified the Narrow River from the headwaters at the end of Gilbert Stuart Stream to the mouth of the river including Pettaquamscutt Cove as a Class SA waterway; the Narrow River waters in the vicinity of the marina at Middle Bridge as a Class SA{b} waterway; Gilbert Stuart Stream as a Class A waterway; and Crooked Brook as a Class A waterway. Both the Class SA and A segments are listed as being impaired by pathogens. The {b} modifier indicates a partial use designation due to inputs from a concentration of vessels.

Narrow River's three largest tributaries, Mumford Brook, Gilbert Stuart Stream and Crooked Brook act as the principal pathways by which nonpoint loadings enter the Narrow River during periods of dry and wet weather. Gilbert Stuart Stream is the

primary fecal coliform source to Upper Pond while Mumford Brook and Crooked Brook are the principal sources to southern Pettaquamscutt Cove. Birds also contribute significant fecal coliform loadings to the river. They are present throughout the Narrow River watershed, however, the largest waterfowl populations are consistently seen in the heavily developed residential area between Bridgetown Bridge and Middlebridge Bridge, and within the Pettaquamscutt Cove National Wildlife Refuge located in the southern portion of Pettaquamscutt Cove in Narragansett. Predictably, water quality impacts that appear attributable to birds are most evident in these areas. Bird-related fecal coliform loadings to the middle section of the river are estimated through a mass balance approach explained in detail in Chapter 5 of the TMDL. Loadings to Pettaquamscutt Cove from wildlife and waterfowl are not estimated because accurate population counts are unavailable, other significant sources are present and tidal action increases the complexity of any calculations.

All dry weather sources continue to contribute during wet weather conditions to a larger or lesser degree. However, wet weather sources of fecal coliform to the Narrow River attributed by RIDEM are dominated by storm water runoff entering the river through tributary channels, storm sewer outfalls, and overland as sheet flow. Storm sewer outfalls discharging to Segments 2, 3 and 4 of the River have a dramatic effect on water quality during runoff events. Fecal matter from domestic animals, wildlife, waterfowl and failing septic systems is deposited on lawns, parking lots, docks, streets and along the shoreline. It accumulates during dry periods and is subsequently washed off and efficiently transported to receiving waters through storm drains during rain events

Pollutant Contributions to Gilbert Stuart Stream

Although wildlife and storm water runoff may contribute significant fecal coliform loadings to the stream, human activity appears to be the dominant source. Since monitoring began in 1992, fecal coliform concentrations in Gilbert Stuart Stream have consistently been elevated. A failing septic system at the Gilbert Stuart Museum, located at the headwaters of the stream, was replaced around 1997, however concentrations in the stream remained elevated. During the 1999 sampling effort, the primary source of fecal coliform contamination to Gilbert Stuart Stream was localized to the Gilbert Stuart Museum property. A privy in close proximity to Carr Pond was identified as the likely source. With the ready cooperation of the museum curators, John and Deborah Thompson, the use of the privy was eliminated and replaced with a portable toilet. Recent sampling indicates that the water quality in Gilbert Stuart Stream has improved markedly.

Pollutant Contributions to Mumford Brook

Fecal coliform concentrations in the brook are consistently the highest of any tributary in the watershed. Although wildlife and storm water runoff may

contribute significant fecal coliform loadings to the brook, human activity again appears to be the dominant source. The highest concentrations in Mumford Brook have consistently been measured in close proximity to East Narragansett Avenue in South Kingstown. The consistent nature and extremely high concentrations noted during the RIDEM study were concluded by RIDEM to be from an anthropogenic source. Homes in the immediate vicinity rely on standard on-site disposal systems for wastewater treatment. Soils in the area are comprised of thin mantles of "high risk" well-draining gravel fill and glacial outwash or poorly draining glacial till over bed rock. Based on the monitoring data and the previously described conditions, it appears that one or more septic systems in the area may be discharging inadequately treated effluent to the brook.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water.

The RIDEM TMDL study did not provide specific recommendations for RIDOT installation of structural or non-structural BMPs. Therefore, RIDOT will consider implementation of the six minimum measure BMPs in the study area as sufficient action for this TMDL.

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Palmer River TMDL

The Palmer River lies in northeastern Rhode Island and southeastern Massachusetts. The upper fresh water reach of the River lies in the Town of Rehoboth. Smaller portions of the River extend into Seekonk, Attleboro, Swansea, Norton, Taunton, and Dighton. Significant areas of the watershed drain to Shad Factory Pond and Warren Upper Reservoir, which are water supply reservoirs for the Bristol County (RI) Water Authority (BCWA). The BCWA provides drinking water to the communities of Bristol, Warren and Barrington in Rhode Island.

As reported in the 2002 303(d) list, the water quality classification of the Palmer River is SA. The Palmer River from the MA-RI border to the East Bay Bike Path trestle in Warren, approximately 2,500 feet north of the confluence with the Barrington River is impaired for low dissolved oxygen, nutrients, and pathogens. This TMDL addresses the Rhode Island portion of the Palmer River from the state boundary to the East Bay Bicycle Path Bridge. The reach of the River from the Bike Path Bridge to its confluence with the Barrington River is assigned a water quality designation of SB1 and is not included in this TMDL.

The impaired reach of the Palmer River was divided into three segments. These include the upper Palmer River located entirely in Massachusetts, lower Palmer River and Belcher Cove. Additionally, sources in the Warren and Barrington Rivers, seaward of the Palmer River were also evaluated, as this is a tidal system. A detailed description of individual sources is presented in the TMDL report. A brief summary of pollutant sources by stream segment is presented below.

Pollutant Contributions to Upper Palmer River

The predominant sources of fecal coliform are located in the tributaries to the upper Palmer River in Massachusetts. These fecal coliform sources are the predominant contributors to the high bacterial concentrations downstream in the main body of the Palmer River. The highest bacterial concentrations observed in the upper Palmer River watershed during wet weather were associated with runoff from adjacent cropland, pasture, and dairy farms. Fecal matter from domestic animals, wildlife, waterfowl and failing septic systems may also be washed off forested areas, lawns, golf courses, and roadways into the Palmer River during rain events. RIDEM considers station 6A, located in the upper portion of the main body of the Palmer River to represent Massachusetts' sources to the Rhode Island portion of the Palmer River in both dry and wet weather.

Pollutant Contributions to Lower Palmer River

The lower Palmer River is influenced by sources upstream in the Palmer River, which include the upper Palmer River and Belcher Cove. Other sources along the banks of the Palmer River, including the large wetlands bordering either side of the river, were determined to be negligible in dry weather. The RIDEM Shoreline Survey sampled all sources including pipes and streams located along the shoreline of the Palmer and Warren Rivers in Rhode Island. The survey found three dry weather sources that may also be potential wet weather contributors to the system. The areas along the river may serve as sources during wet weather due to wash off of fecal matter from domestic animals, wildlife, waterfowl and failing septic systems. RIDEM has concluded that there are no significant sources in this area of the river other than sources in the headwaters and natural background inputs.

Pollutant Contributions to Belcher Cove

Two streams flow into Belcher Cove and contribute to the fecal coliform concentrations. These two streams, Belcher Stream East and Belcher Stream West have higher weighted geometric mean fecal coliform concentrations than station 6A in the upper Palmer River. The flow rates from these small streams are much lower, whereas station 6A is in the main body of the river where downstream flow and the total contribution of bacteria is much higher. Belcher Stream West has high bacteria concentrations in dry and wet weather due several pet waste problems and urban

runoff from roadways and commercial properties. Belcher Stream East is problematic only in wet weather. The predominant source in this stream is a small cattle farm located upstream on the southern fork of the tributary. Other sources in this stream include wildlife, waterfowl, domestic animals and possible failing septic systems on the north fork of the stream.

RIDEM recommends that RIDOT install structural BMPs to reduce contribution of fecal coliform from roadways to Belcher Stream East at the crossings of Market Street, and with Belcher Stream West at the crossing with Child Street.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water.

Should a project be designed within the TMDL area, RIDOT will work to the maximum extent practicable to implement RIDEM BMP recommendations, and coordinate with the interconnected MS4s.

Stafford Pond TMDL

Stafford Pond is a 487-acre reservoir with a watershed of approximately 947 acres in Tiverton, Rhode Island, which serves as a drinking water supply for both Tiverton and Portsmouth, Rhode Island. Over the past several years, the pond has experienced frequent algal blooms, leading to taste and odor problems, which prompted the Stone Bridge Fire District (SBFD) to upgrade its water treatment practices. As reported in the 2002 303(d) list, the water quality classification of Stafford Pond is Class A and it is impaired for excess algal growth, low dissolved oxygen and nutrients.

The TMDL documents that the primary problem affecting Stafford Pond is an overabundance of algae caused by elevated levels of phosphorus. In addition, the study found violations of water quality criteria for both dissolved oxygen and total phosphorus. RIDEM has provided recommendations for BMPs and responsible entities in the Stafford Pond TMDL. Two 18-inch storm drains empty into the southeast corner of Stafford Pond near the public boat ramp. These outfalls are the only direct discharges of storm water runoff to the pond. The northern storm drain pipe (sampling station SP8) drains sections of Old Stafford Road. The southern pipe (sampling station SP9) drains sections of Route 81 and discharges to a small wetland area within 200 feet of the pond. Sub-basin 2, which contains these two storm drain

systems, delivers the second largest of the sub-basin loads, so it is an important source to control.

RIDOT Actions - COMPLETED

As part of the Storm Drain Retrofit Program, two subsurface Vortechnics filter systems were installed in the Fall of 2001 to treat storm water runoff for suspended solids.

RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed.

Crooked Brook TMDL

The Crooked Brook watershed is located in Narragansett, Rhode Island. Crooked Brook is the third largest tributary to Narrow River discharging to Pettaquamscutt Cove at the southern end of the Narrow River estuary. The pollutant of concern is fecal coliform, a parameter used by Rhode Island as an indicator of pathogen contamination. As reported in the 2002 303(d) list, the water quality classification of Crooked Brook is Class A.

The MS4s that discharge to Crooked Brook are owned and operated by the Town of Narragansett or by RIDOT. Because available land and funding for BMPs is limited and because only a limited number of technologies are effective at removing fecal coliform from run off, it will take some creativity to find viable solutions. RIDEM will assist the town in evaluating locations and designs for storm water control BMPs in an effort to mitigate wet weather bacteria loadings. It is difficult to quantify the improvements that may be attained by applying storm water BMPs with any real certainty. The TMDL calls for continued monitoring of Crooked Brook to ensure that water quality targets are met as remedial actions are implemented

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water.

The RIDEM TMDL study did not provide specific recommendations for RIDOT installation of structural or non-structural BMPs. Therefore, RIDOT will consider implementation of the six minimum measure BMPs in the study area as sufficient action for this TMDL.

Saugatucket River TMDL

The Saugatucket River Basin is south-centrally located in Rhode Island on the westerly side of Narragansett Bay. The watershed drains approximately 16.5 square miles (10,560 acres) and includes parts of four Rhode Island communities: Exeter, Narragansett, North Kingstown, and South Kingstown. The watershed includes the Saugatucket River and its major tributaries, Indian Run Brook, Rocky Brook, and Mitchell Brook.

As reported in the 2002 303(d) list, Indian Run Brook is impaired for Copper (Cu), Lead (Pb), Zinc (Zn), and pathogens. Mitchell Brook is impaired for pathogens, biodiversity impacts and iron (Fe). Rocky Brook is impaired for pathogens. The Saugatucket River is impaired for pathogens, biodiversity impacts and iron (Fe). As reported in the 2002 303(d) list, the water quality classification of Indian Run Brook, Mitchell Brook, Rocky Brook and the Saugatucket River are Class B waterways. The Saugatucket River from the Main Street Dam in Wakefield to the Route 1 overpass is a Class SB water and is impaired for pathogens.

The Saugatucket River TMDL has been developed for fecal coliform, which has been found to exceed the state's water quality standards. Both dry and wet weather water quality data have been collected in the Saugatucket River watershed, revealing elevated fecal coliform concentrations at both instream and tributary stations. Based on this data, Saugatucket River, Indian Run Brook, Rocky Brook, and Mitchell Brook were placed on the state's2003 303(d) List of Impaired Waterbodies.

RIDEM has identified the major sources of fecal coliform bacteria in the Saugatucket River watershed. These include storm water runoff from highways and residential/commercial areas, a cow farm, pigeons roosting under the Palisades Industries Complex and the Main Street bridge, resident waterfowl, domestic pets, and wildlife. The largest dry weather sources of bacteria are the cow farm, pigeons roosting under the Palisades and Main Street Bridge, resident waterfowl, and other wildlife. Cumulatively, the largest wet weather source of bacteria to the watershed is storm water runoff.

RIDEM has recommendations for BMPs and responsible entities in the Saugatucket River TMDL. The following sections outline those BMPs that RIDEM has recommended that RIDOT implement to reduce fecal coliform bacteria loads to the MEP.

Pollutant Contributions to Segment 3 (Rocky Brook headwaters to Curtis Corner Road)

A combination of structural and non-structural control measures are recommended by RIDEM for this reach. Non-structural control measures include more frequent street cleaning, storm drain maintenance, a pet-waste ordinance, and ISDS maintenance. Additionally, this TMDL calls for the Town of South Kingstown, RIDOT, and responsible property owners to reduce wet weather fecal coliform loads to the maximum extent technically feasible through the use of structural BMPs that promote the detention and/or infiltration of runoff from roadways and commercial properties within the catchment area and/or at the outfall located off Greenwood Drive. More specifically, RIDEM has suggested that there appears to be adequate space within the storm sewer right-of-way off Greenwood Drive (Station RB9) to construct an infiltration basin to detain and/or reduce the volume of water that reaches the stream as runoff.

Pollutant Contributions to Segment 1 (Rocky Brook Reservoir outlet to Rocky Brook mouth at Railroad St.)

A combination of structural and non-structural control measures are recommended for this segment. Non-structural control measures include more frequent street cleaning, storm drain maintenance, and a pet-waste ordinance. ISDS maintenance is not recommended since this segment of the watershed is sewered. Additionally, this TMDL calls for the Town of South Kingstown, RIDOT and responsible property owners to reduce wet weather fecal coliform loads to the maximum extent technically feasible through the use of structural BMPs that promote the detention and/or infiltration of runoff from roadways and commercial or industrial properties within the catchment areas and/or the outfalls at the following locations: the Kingstown Road storm water swale below Rocky Brook Reservoir (Station RB5U), Kingstown Road at Anton's Deli, and Railroad Street.

Pollutant Contributions to Segment 1 (Indian Run Brook at Indian Run Reservoir Outlet to Peace Dale Guild)

A combination of structural and non-structural control measures are recommended for this segment. Non-structural control measures include more frequent street cleaning, storm drain maintenance, a pet-waste ordinance, and ISDS maintenance. Additionally, this TMDLs calls for the Town of South Kingstown, RIDOT, and responsible property owners to reduce wet weather fecal coliform loads to the maximum extent technically feasible through the use of structural BMPs that promote the detention and/or infiltration of runoff from roads and commercial properties within the 102 acre catchment area and/or the outfall that drains the Dale Carlia Corner intersection and Old Tower Hill Road, and discharges to the box culvert located at the intersection of Route 108, School Street and Indian Run Road.

Pollutant Contributions to Segment 1 (Saugatucket River from Church Street Bridge to the Main Street Dam)

A combination of structural and non-structural control measures are recommended for this segment. Non-structural control measures include more frequent street cleaning, storm sewer maintenance, and a pet-waste ordinance. ISDS maintenance is not recommended since this segment of the watershed is sewered. Reductions in upstream fecal coliform concentrations associated with Indian Run Brook, Rocky Brook, and the Palisades Industrial Complex are expected to reduce concentrations in this segment. However, RIDEM also recommends that RIDOT retrofit the Main Street bridge with pigeon deterrents to discourage pigeons from roosting underneath the bridge over the river.

Storm Sewer Discharges

Storm water runoff is the largest wet weather source of bacteria to the Saugatucket River and its tributaries. Storm sewers magnify the problem by rapidly collecting, concentrating and directly routing polluted runoff to receiving waters. They supply the majority of the fecal coliform load to the river during wet weather. Consistent with the goals of this TMDL, outfalls are targeted for water quality best management practices to mitigate pollutant loadings to the maximum extent technically feasible.

According to the TMDL, "end-of-pipe" structural BMPs designed to treat current flows and pollutant loadings at the storm sewer outfalls would necessarily be rather expensive and/or require substantial land area. RIDEM suggests that a multi-faceted storm water management strategy be incorporated by the Town of South Kingstown and RIDOT that utilizes a combination of end-of-pipe structural BMPs, smaller-scale structural retention/infiltration BMPs located up-gradient within the catchment areas, and the implementation of nonstructural BMPs throughout the watershed.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water.

Should a project be designed within the TMDL area, RIDOT will work to the maximum extent practicable to implement RIDEM BMP recommendations, and coordinate with the interconnected MS4s.

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Runnins River TMDL

The Runnins River lies in a 10.2 square mile (6,545 acres) watershed within the Warren River Basin. The watershed contains portions of the City of East Providence in Rhode Island and the Towns of Rehoboth and Seekonk Massachusetts. At its mouth the Runnins River flows over the Mobil Dam to form the Barrington River, a tributary estuary to Narragansett Bay. The TMDL addresses the Class B water of the Runnins River from the County Street Bridge at the Rhode Island/Massachusetts border where the river enters the state, to the Mobil Dam. The Rhode Island portion of the Runnins River is designated as a Class B water in the RIDEM Water Quality Regulations.

The pollutant of concern is fecal coliform, used by Rhode Island as an indicator of pathogen contamination. RIDEM identified one significant dry weather source, elevated fecal coliform concentrations were attributed to pigeons roosting under the Route 195 Bridge overpass. RIDEM identified four significant wet weather sources below County Street, the Route 6 stream no. 2, the County Street Culvert, the Route 195 stream (pigeons under the Route 195 overpass), and Orange Juice Creek, which drains a large area of East Providence. RIDEM has additionally proposed a BMP for a fifth source in this reach, the Route 6 culvert, which routes storm water runoff to the river from Route 6 in East Providence.

RIDOT Actions – COMPLETED

As part of the Storm Drain Retrofit Program, BMPs were installed and implemented to reduce storm water impacts to the Runnins River at the following locations:

County Street Culvert

The County Street Culvert was identified as the second largest wet weather source of fecal coliform to the Runnins River. RIDOT removed sediment, cleaned and flushed drainage pipes, and installed erosion controls along a vegetated swale for twin culverts discharging to the Runnins River.

Route 195 Stream

Under a RIDOT contract, a pigeon deterrent BMP was designed and installed to prevent pigeons from nesting under the Route 195 Bridge. The Route 195 Stream was the sole identified dry weather source and the third largest wet weather contributor of fecal coliform to the Runnins River. This BMP may also reduce loadings at County Street because runoff from the bridge does flow to the County Street drain.

Route 6 Culvert

A subsurface Vortechnics filter system was installed in 2004 to treat storm water runoff for suspended solids.

RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed.

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Barrington River TMDL

The Barrington River watershed lies in northeastern Rhode Island and southeastern Massachusetts and includes the estuarine waters of the Barrington River and One-Hundred Acre Cove. The Barrington River TMDL addresses the Class SA waters of the Barrington River from the Mobil Dam to the Bike Path Bridge. The River violates the Class SA water quality standard for fecal coliform and the river has been closed to shell fishing since 1998. The entire river fails to meet water quality standards in wet weather. The Runnins River, due to its proximity to the Barrington River, its discharge volume, and its source strength constitutes the principal influence on fecal coliform conditions in the Barrington River. The Palmer River watershed is a source during wet weather.

The MS4s that discharge to the Barrington River are owned and operated by the Town of Barrington and RIDOT. RIDEM, CRMC, RIDOT and the Town of Barrington will work together to identify funding sources and to evaluate locations and designs for storm water control BMPs throughout the watershed.

RIDEM has recommendations for BMPs and responsible entities in the Barrington River TMDL. The following section outlines those BMPs that RIDEM has recommended that RIDOT implement to reduce fecal coliform bacteria loads to the MEP.

Woods Pond

RIDEM believes that the Town of Barrington and RIDOT should consider a structural BMP to pretreat storm water prior to discharge into Woods Pond. Woods Pond, located behind the Barrington Town Hall functions as a storm water treatment pond handling storm water runoff from Route 114 and Maple Avenue.

RIDEM Office of Water Resources prepared a TMDL for Fecal Coliform in August 2002 for the Barrington River. This report indicated that agricultural lands, and wildlife and waterfowl contribute to the elevated levels of fecal coliform in the river. The Runnins River discharges directly into the head of the Barrington River and is "the largest fecal coliform source to the Barrington River." The majority of the

Barrington River is located outside of East Providence in Massachusetts. BMPs proposed for the Runnins River will serve to reduce fecal coliform levels entering the Barrington River.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT has implemented BMPS in accordance wit h the Runnins River TMDL study, which will reduce fecal coliform loadings into the Barrington River.

RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water. Should a project be designed within the TMDL area, RIDOT will work to the maximum extent practicable to implement RIDEM BMP recommendations, and coordinate with the interconnected MS4s.

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Green Hill Pond, Ninigret Pond, Factory Pond Stream and Teal Pond Stream TMDL

The TMDL addresses fecal coliform impairments to Green Hill Pond, two of its tributaries, Factory Pond Stream and Teal Pond Stream, and a portion of Ninigret Pond, all located in the Towns of South Kingstown and Charlestown, Rhode Island. Green Hill and Ninigret Ponds are designated as Class SA waters. Factory and Teal Pond Streams discharge to Green Hill Pond, and are therefore designated as Class A waterbodies. A DNA based bacterial source tracking study, conducted September and October 2002, indicated that dry and wet weather sources of fecal coliform bacteria include direct deposition and storm water conveyance of feces from wildlife, waterfowl and pets. Septic systems were included in the bacterial source tracking. Septic systems were found to account for near 0% (Allen's Cove) to 30% (Unnamed Brook 2) of bacteria isolates found in surface waters.

The Phase II Program requires operators of municipal separate storm sewer systems (MS4s) in urbanized areas (UAs) or those areas with TMDLs to develop storm water management program plans (SWMPPs) and obtain a permit for those MS4s. Charlestown and South Kingstown will be asked to develop a SWMPP to address storm drains identified in the TMDL. Septic systems in both towns are in the process of being inspected. Other recommended BMPs to address elevated dry weather bacteria concentrations include pet waste management, waterfowl management, a public education campaign addressing proper disposal of pet waste, feeding waterfowl, and street sweeping periodically throughout the year especially during the critical summer season. Waterfowl such as mute swan and Canada geese should be discouraged from residing in the area by planting buffers along properties with

lawns to the water and by encouraging residents to not feed the birds. Population control of mute swans and Canada geese should be continued.

Point source storm water measures

Storm water runoff is the largest controllable source of fecal coliform to Green Hill Pond and its tributaries. Storm sewers magnify the problem by rapidly collecting, concentrating, and directly routing polluted runoff to receiving waters. The storm sewer outfalls and conveyances represent the only known point sources of fecal coliform to Green Hill Pond. A number of roadways in the watershed generate runoff that drains from roadway surfaces to the ponds and their tributaries. Three outfalls, DP02 in Allen's Cove in the Town of Charlestown, and DP03 and DP04 in the Town of South Kingstown, along Factory Pond Stream should receive priority for BMP implementation, as they drain the largest impervious area of any storm water conveyances in the watershed. Bacteria sources to Green Hill Pond are primarily non-point in nature, so RIDEM feels that significant reductions can be achieved through simple good housekeeping efforts of the 43 municipalities and local residents. Good housekeeping measures include minimizing fertilizer applications, periodic street sweeping, policing pet waste, and discouraging waterfowl from residing in specific areas.

Control of nonpoint source loadings

The bacterial source tracking study conducted during this TMDL found that wildlife and waterfowl accounted for 75% of the bacterial isolates in the water samples collected. The control of waterfowl and wildlife is therefore an important element of water quality restoration. Obvious measures to limit pollutant loadings from non-human sources include policing pet wastes, minimizing fertilizer applications, and minimizing impervious cover. Pet wastes should be disposed of in trash receptacles and away from the ponds, tributary streams and all storm water conveyances. In common or public areas such as beaches or boat ramps the installation and use of pet waste bags and trash receptacles is encouraged. Impervious surfaces in the watershed should be minimized to decrease the volume of runoff generated during storm events.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water.

The RIDEM TMDL study did not provide specific recommendations for RIDOT installation of structural or non-structural BMPs. Therefore, RIDOT will consider implementation of the six minimum measure BMPs in the study area as sufficient action for this TMDL.

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Chickasheen Brook, Barber Pond, and Yawgoo Pond TMDL

The Chickasheen Brook watershed is a relatively small subwatershed of the Pawcatuck River located in the Towns of Exeter and South Kingstown in Rhode Island. The entire Chickasheen Brook encompasses approximately 4,260 acres, however, the TMDL only addresses the upper portion of the watershed, which encompasses approximately 2116 acres (3.3 mi^2). All subsequent references and descriptions of the Chickasheen Watershed will refer only to this upper portion of the watershed.

Chickasheen Brook (waterbody ID number RI0008039), Yawgoo Pond (waterbody ID number RI0008039L-15-03) and Barber Pond (waterbody ID number RI0008039L-14) are located in the southern portion of the State of Rhode Island within the Towns of Exeter and South Kingstown. The surrounding watershed is not sewered and approximately 48 percent of the watershed is forested. Other land use consists of approximately 11 percent as low to medium density residential development (1/4- to 2-acre lots), 11 percent as agriculture, and a small amount (3 percent) as industrial/commercial use.

The impairments of Chickasheen Brook are caused by excessive phosphorus loadings entering the stream principally in the Arrow Swamp reach, and to a lesser degree, from the area of the watershed east of Route 2. The nature of and mechanisms causing these sources have not been verified. Similarly, the means of reducing these sources require further evaluation.

The TMDL recommends the installation of catch basins or another suitable BMP to treat runoff and stabilize soils in the area of the public boat launch adjacent to Route 2 near the Barber Pond outlet to prevent the overland conveyance of phosphorus in sheet flow entering Barber Pond and further sedimentation along that area of its shoreline.

Arrow Swamp

The persistent trend of increasing phosphorus concentration with distance along the brook indicates that phosphorus is entering the brook from distributed sources through Arrow Swamp. The source(s) are nonpoint in nature and enter the brook in areas where physical (e.g. dredging) or chemical alterations of the environment are

probably not appropriate. DEM recommends that a strategy be developed to control phosphorus and algae blooms in Yawgoo and Barber Ponds by a consultant with expertise and experience in addressing similar situations.

Sources upstream of Route 2

The headwaters of Chickasheen Brook in Maple Swamp contribute phosphorus to the lower brook and ponds. Although significantly lower than those downstream and west of Route 2, total phosphorus concentrations in Chickasheen Brook at Route 2 continue to remain elevated.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water.

The RIDEM TMDL study did not provide specific recommendations for RIDOT installation of structural or non-structural BMPs. Therefore, RIDOT will consider implementation of the six minimum measure BMPs in the study area as sufficient action for this TMDL.

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Greenwich Bay Waters TMDL

The TMDL plan addresses fecal coliform impairments to Greenwich Bay, Brush Neck Cove, Buttonwoods Cove, Warwick Cove, Hardig Brook, Tuscatucket Brook, two additional Coves, and seven tributaries within the Greenwich Bay watershed, located in the City of Warwick and the Towns of East Greenwich and West Warwick, Rhode Island.

With a few exceptions, bacteria impairments in the Greenwich Bay watershed arise directly following wet weather events. In dry weather, all stations in Greenwich Bay and the coves meet the geometric mean criterion, while five of the stations exceed the 90th percentile criterion for the shellfish use. Following rain events, only one station in Greenwich Bay meets both parts of the Class SA water quality standard. The Greenwich Bay coves exhibit the highest bacteria concentrations, with Apponaug Cove and Brush Neck Cove requiring the largest percent reductions for the entire bay.

Recommended implementation activities focus on storm water and wastewater management. Ongoing efforts to ensure adequate treatment of wastewater through the planned sewer extensions, and the proper operation and maintenance of septic systems should continue. Achieving water quality standards will also require that both the amount of storm water and the bacteria concentrations in that storm water reaching Greenwich Bay are reduced. To reduce runoff volumes and treat storm water, use of infiltration basins or similar structures is recommended. A targeted approach to construction of storm water retrofit BMPs at state and locally owned storm water outfalls is recommended.

Priority areas for BMP construction within the City of Warwick are Apponaug Cove and Brush Neck Cove, for the Town of East Greenwich, Greenwich Cove, and for the Town of West Warwick, the Hardig Brook headwaters. This TMDL also recommends pollution prevention efforts to discourage residents from feeding birds, encourage residents to pick up after their pets, and ensure that boats comply with the *No Discharge* requirements of Rhode Island marine waters.

Storm Water Priorities for Municipalities and DOT

Addressing bacteria sources throughout the watershed will take many years. Localized water quality improvements will be seen earlier if storm water retrofit activities are concentrated at the sub-watershed level. While the Storm Water Phase II minimum measures apply to the entire watershed, targeted retrofit activities should be phased in over time, focusing first in those sub-watersheds designated as high priorities. It is recommended that preliminary design studies should evaluate means of distributing treatment structures within the watershed in addition to end-of-pipe solutions at the water's edge. This concept is particularly important for areas along tributary streams, such as Hardig Brook where rain events increase the storm water flows and bacteria loads as a result of the large amount of impervious surfaces and there is a small amount of undeveloped land available for BMP construction. Areas prioritized for restoration are associated with recent shellfish closures, require the highest percent reductions in bacteria, and are described in the following sections.

DOT owns direct storm water discharges throughout the Greenwich Bay watershed. DOT must coordinate its efforts with the local municipalities in the priority areas of Brush Neck Cove, Apponaug Cove, and Greenwich Cove (Part IV.C of the General Permit). DOT should investigate areas for storm water treatment along Route 117. Suggestions for improvements to Hardig Brook include the mitigation of storm water from Route 117 and I-95 using the open areas of the interstate highway. DEM recommends that DOT work with Warwick to evaluate means of reducing storm water from Apponaug to lower Hardig Brook and Gorton Pond Tributary. DOT should conduct a BMP feasibility study to identify ways to mitigate storm water entering Lower Hardig Brook and Gorton Pond Tributary from Route 115, Route 117, and US-1. This area is also the site of a fish restoration study for Hardig Brook and Gorton Pond Tributary. One option being studied is the feasibility of returning Hardig Brook to its original streambed in this undeveloped area. Storm water planning should accommodate this possibility. Roadway reconstruction anywhere in the watershed should include infiltration or equivalent BMPs, wherever feasible.

Together with RIDEM, RIDOT has prioritized the Greenwich Bay Waters as a priority area for the Storm Drain Retrofit Program. RIDOT is in the process of choosing priority outfalls within the area for retrofits, and design for the projects will commence once the chosen outfalls are agreed upon with RIDEM.

The Apponaug Circulator Project to re-align the Rt 117 roadway through Apponaug Village in Warwick is currently in design. Storm water BMPs are being employed to the maximum extent practical and the design is being reviewed by the Natural Resources Unit to ensure RIDEM recommendations are explored.

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The Sakonnet River – Portsmouth Park and The Cove – Island Park TMDL

The goal for the Sakonnet River (Portsmouth Park) and The Cove – Island Park TMDL is to eliminate the discharge of bacterial contamination to the impaired portion of the Sakonnet River (Portsmouth Park) (the waters north of a line extending from the southwestern-most corner of the stone bridge in Tiverton to the eastern-most extension of Morningside Lane in Portsmouth) and the impaired portion of The Cove – Island Park (waters south of a line from the southern end of Hummock Point to the RIDEM range marker located at the eastern extremity of a point of land on the western shore of The Cove).

In Portsmouth Park, illegal direct discharges to the river and indirect discharge of contaminated groundwater inflows and illicit connections via storm drains to the river are thought to be the major pollution sources. Catch basins and storm drains in the vicinity of Narragansett, Lee, President and Aquidneck Avenues are all suspected of having illicit connections. Other storm drains containing contaminated flows include the drains from Morningside Lane, Child Street, Tallman Avenue, Aquidneck Avenue, Atlantic Avenue, and Park Avenue. Several small pipes located along the seawalls adjacent to Aquidneck Avenue and Atlantic Avenue are suspected of being illegal discharge pipes either from french drain systems transporting contaminated groundwater or direct overflow pipes from improperly functioning septic systems. The presence of Fluorescent Whitening Agents (FWAs), a constituent found detergents, in the storm drain pipes along Water Street contributing to the Morningside Lane outfall is also an indication of either illicit connections or failing septic systems.

In Island Park, the high-density residential and commercial development on sandy, rapidly drained soils is thought to be contributing untreated or inadequately treated wastewater via groundwater to The Cove, though illegal direct discharges have also been identified. Even using I/A systems, effective treatment of wastewater may be difficult to achieve due to the extremely small lot sizes, high groundwater table, excessively transmissive soils, or proximity to the shoreline. The discharge of

untreated or inadequately treated human waste into storm drains and subsequently into the State's water or via direct discharges or groundwater seeps is a violation of the state's water quality regulations and ISDS regulations. Responsibility for correction of these problems lies with both the property owners and the owners of the storm drains in question. Property owners are responsible for the proper treatment and disposal of wastewater. The owners of the storm drain systems in question, the Town of Portsmouth for the town-owned storm drains and RIDOT for any state-owned systems, also share responsibility for the elimination of these contaminated flows.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures within the TMDL watershed until prioritization is given to this TMDL water. RIDOT will focus IDDE inspection (Minimum Measure 3) activities in the recommended areas.

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Kickemuit Reservoir, Upper Kickemuit River, Kickemuit River TMDL

The study area includes the Kickemuit Reservoir (upper and lower reservoirs and is also known as the Warren Reservoir), the Kickemuit River (Massachusetts and Rhode Island portions), and its tributaries: the Upper Kickemuit River or Western Tributary, Heath Brook and two unnamed tributaries in Rhode Island. The Kickemuit Reservoir is located in the Town of Warren in eastern Rhode Island. The Kickemuit River watershed extends northeast from Rhode Island into portions of Swansea and Rehoboth, Massachusetts.

Implementation activities to restore Kickemuit River water quality focus on improved wastewater management, agricultural controls, and mitigation of storm water. Impairments to the Kickemuit River and Reservoir come from a combination of point and nonpoint sources during wet and dry weather. The sources included failing or substandard septic systems, agriculture, impervious surfaces, residential areas, waterfowl/wildlife and roadways. Pollutants are conveyed to the surface waters in storm runoff via storm drains, concentrated flow paths, and through sheet flows during and after rainstorms. Concentrations of all the pollutants were highest in the river after storms. Dry weather inflows containing significantly elevated fecal coliform concentrations are also conveyed to the upper river via storm drains. It can be concluded deductively that phosphorus, nitrogen, and fecal coliform loads are also conveyed to the river through groundwater flows and direct deposition. The sources would be agriculture and residential areas.

To realize water quality improvements in the Kickemuit River and the Kickemuit Reservoir, both the pollutant concentrations in storm water *and* the volume of storm

water discharged to the river and its tributaries must be reduced. Impervious areas in the watershed cause substantial increases in the amount of water and pollutants entering the Kickemuit River and Reservoir following rain events.

As the amount of impervious area in a watershed increases, the peak runoff rates and runoff volumes generated by a storm increase because developed lands have lost much or all of their natural capacity to delay, store, and infiltrate water. As a result, phosphorus, bacteria, and suspended material from livestock, domestic pets, and other animals quickly wash off during storm events and discharge into the adjacent waterbodies. As represented by 2000 monitoring data, some tributary streams were not flowing during dry weather, but had measurable flows during wet weather. Due to the substantially large phosphorus, bacteria, and suspended sediment load that needs to be reduced in order to meet water quality standards, as previously mentioned, both water quality and water quantity reductions must be addressed.

RIDEM recommends the use of BMPs that reduce both pollutant loads *and* volumes to the maximum extent feasible.

Stormwater Priorities for Municipalities and DOT

There are numerous point and non-point sources of storm water runoff to the river and reservoirs. EPA identified a total of 41 storm water outfalls or other direct conveyances within the watershed. Fifteen outfalls discharge directly to the lower Kickemuit Reservoir, including nine storm drainpipes ranging in size from 8″ to 16″ in diameter, four hand-dug channels constructed to divert runoff to the reservoir, and two points where overland flow is discharging from the adjacent roadway into the reservoir.

Roadways in the watershed, including Routes 6, 195, Serpentine Road, and the numerous local roads within the residential areas contribute phosphorus, bacteria and sediment loads to adjacent surface waters in storm runoff through direct conveyances that are regulated under the Phase II storm water program.

While the Storm Water Phase II minimum measures apply to the entire watershed, targeted retrofit activities should be phased in over time, focusing first on those discharges that discharge directly to the reservoirs. Design studies should evaluate means of distributing treatment structures within the watershed in addition to end-of-pipe solutions at the water's edge.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. As of this revised SWMPP, priority is being given to Greenwich Bay waters. RIDOT will continue to implement BMPs under the six Minimum Measures with projects within the TMDL watershed until prioritization is given to this TMDL water. Should a project be designed within the TMDL area, RIDOT will work to the maximum extent practicable to implement RIDEM BMP recommendations, and coordinate with the interconnected MS4s.

The Woonasquatucket River watershed, located entirely within the state of Rhode Island, covers nearly 52 mi^2 (135 km^2) and includes all or portions of the towns of Smithfield, North Smithfield, Glocester, Johnston, North Providence, and Providence. The river, classified as B, B1, and B1a, is a tributary to the Providence River, located in the Narragansett Bay watershed. In total, three segments of the Woonasquatucket River are currently on Group 1 of the state's 2006 303(d) list of impaired waters for fecal coliform bacteria and dissolved Cadmium (Cd), Copper (Cu), and Lead (Pb).

The largest and most persistent wet weather pollution sources include storm water runoff and CSO discharges. Fecal coliform bacteria concentrations in the mainstem increase markedly during rainfall events, particularly in the lower portion of the river within the CSO reach. Both fecal coliform and dissolved metals impairments occur during dry weather conditions and are likely the result of dry weather CSO discharges, other miscellaneous discharges, and contributions from waterfowl and wildlife. The Smithfield WWTF is a source of dissolved Cu and Zn. Additional sources of metals may include groundwater and sediments.

Recommended implementation activities focus on storm water and CSO management. Achieving water quality standards will require that both the volume of storm water and the bacteria and dissolved metals concentrations in the storm water reaching the Woonasquatucket are reduced. The City of Providence, the Towns of North Providence, Johnston and Smithfield, and the RIDOT operate Municipal Separate Storm Sewer Systems (MS4s) that discharge to the Woonasquatucket River and its tributaries. Storm water runoff from pervious and impervious surfaces in these areas contributes to the violation of water quality standards for fecal coliform and dissolved metals in the river and its tributaries.

A targeted approach to construction of storm water retrofit BMPs at state and locally owned storm water outfalls is recommended. Priority areas for BMP construction are the storm water outfalls located at Mancini Drive in Providence, outfalls located at the Route 44 bridge and Riverside Drive, both located in Johnston, the Woonasquatucket Avenue outfalls located in North Providence, and all RIDOT outfalls draining to the Woonasquatucket.

This TMDL also recommends pollution prevention efforts aimed at discouraging residents from feeding waterfowl, encouraging residents to pick up after pets and deposit litter in proper receptacles. This is a phased TMDL and, as such, additional monitoring is required to ensure that water quality objectives are met as remedial actions are accomplished. Monitoring by two organizations, the Woonasquatucket River Watershed Council (WRWC) and the Narragansett Bay Commission will be the principle method of obtaining the data necessary to track bacteriological water quality conditions in the watershed. Periodic dissolved metals sampling will be carried out at specific locations jointly by the Town of Smithfield and RIDEM, as specified in the permit.

Several key projects in the watershed are expected to reduce pollution in the Woonasquatucket River. These include the CSO Abatement Project overseen by the

Narragansett Bay Commission as well as NBC's Best Management Practices Plan for Field's Point and Bucklin Point Service Areas, and implementation of Phase II Storm water Project Plans by the Cities of Providence and North Providence, and the Towns of Johnston and Smithfield, and the RI Dept. of Transportation. Other activities focus on litter and waste management controls, and other good housekeeping measures. Both Metals Recycling L.L.C. and the Smithfield WWTF are permitted to discharge to the Woonasquatucket River.

RIDOT Actions

RIDOT is currently working with RIDEM to prioritize outfalls for the Storm Drain Retrofit Program. Of 20 priority outfalls identified, three discharge to the Woonasquatucket River: W6 (Mancini Drive outfall), W23 (48-inch outfall near Providence Place Mall), and W2 (24-inch outfall near Providence Place Mall). RIDEM has worked with RIDOT and its consultant to design storm water BMPs at each of these locations. An infiltration trench and 2 water quality detention ponds to capture and treat runoff from Route 6 are planned for the W6 catchment area. Whereas due to severe site constraints, only subsurface swirl type BMPs will be installed at W23 and W2.

Construction of the W6 BMPs is planned for Summer 2007. Outfalls W23 and W2 have been designed and are awaiting further funding. They are anticipated to go out to bid in Fall 2007, and under construction Summer 2008.

As part of the Phase II requirements, RIDOT identified and mapped outfalls in the Woonasquatucket River watershed in 2004. Outfalls were inspected for dry weather flows, and sampling of dry weather flows will occur in 2007 (Year 4). Outfall data have submitted to RIDEM with the SWMPP Annual Reports, and are available upon request.

Table 3 – Summary of TMDLs, RIDOT Responsibilities, and RIDEM Recommended BMPs.

TMDL	Causes of Impairment	Locations specifically identified as RIDOT Responsibilities	RIDEM Recommended Abatement Measures
Scrabbletown Brook	Storm Water runoff/ Storm sewer outfalls	Routes 2 and 4 at Stony Lane	Implement one or more structural storm water BMPs to MEP
	Pigeons roosting under Route 4 overpass	Route 4 overpass at Stony Lane	Install Pigeon Deterrent retrofit to the overpass
Fry Brook	Overland storm water runoff	Route 2 at Middle Road and Route 4	Implement one or more structural storm water BMPs to MEP
Hunt River	Storm Water runoff/ Storm sewer outfalls	Route 2, South Road Tillinghast Road, Frenchtown Road and Route 1 at Frenchtown Road	Implement one or more structural storm water BMPs to MEP
	Pigeons roosting under Route 4 overpass	Route 4 overpass	Install Pigeon Deterrent retrofit to the overpass
Pettaquamscutt (Narrow) River	Storm sewer outfalls	Bridgetown Road	Implement one or more structural storm water BMPs to MEP
Palmer River	Storm Water runoff	Market Street at Belcher Stream East and Child Stream at Belcher Stream West	Implement one or more structural storm water BMPs to MEP
	Storm sewer outfalls		Implement one or more structural storm water BMPs to MEP
Stafford Pond	Storm Water outfalls	Route 81 and Old Stafford Road	COMPLETED – 2 Vortechnic units installed
Crooked Brook	Storm sewer outfalls	Kingstown Road, South Pier Road outfall	Implement one or more structural storm water BMPs to MEP
Saugatucket River	Storm sewer outfalls	Outfall located off Greenwood Drive, the Kingstown Road storm water swale below Rocky Brook Reservoir, Kingstown Road at Anton's Deli, and Railroad Street, intersection of Route 108, School Street and Indian Run Road	Implement one or more structural storm water BMPs to MEP
	Pigeons roosting under the Main Street Bridge	Main Street Bridge	Install Pigeon Deterrent retrofit to the bridge
Runnins River	Storm sewer outfalls	County Street Culvert	COMPLETED – BMPs installed
	Storm sewer outfalls	Route 6 culvert in East Providence	COMPLETED - Vortechnic unit installed
	Pigeons roosting under the Route 195 overpass	Route 195 overpass	COMPLETED - pigeon deterrent installed
Barrington River	Storm sewer outfalls	Woods Pond	Implement one or more structural storm water BMPs to MEP

TMDL	Causes of Impairment	Locations specifically identified as RIDOT Responsibilities	RIDEM Recommended Abatement Measures
Green Hill Pond, Ninigret Pond, Factory Pond Stream, Teal Pond Stream	Storm water runoff		Implement one or more structural storm water BMPs to MEP
Greenwich Bay	Storm sewer outfalls	Apponaug Cove, Brushneck Cove, Greenwich Cove, Hardig Brook Headwaters	Implement one or more structural storm water BMPs to MEP
Sakonnet River	Illicit Connections		Identify and eliminate illicit connections to storm drains servicing state roads
Chickasheen Brook	Nonpoint sources	Boat launch adjacent to Route 2	Implement one or more structural storm water BMPs to MEP
Kickemuit Reservoir	Storm water runoff	Route 6 Route 195	Implement one or more structural storm water BMPs to MEP
Woonasquatucket River	Storm water runoff Combined Sewer Overflows	Mancini Drive Routes 6, 10, 95, & 44	Implement one or more structural storm water BMPs to MEP, including storm drain retrofits

TMDL Action Summary

Though it appears questionable that RIDOT facilities may be contributing significant pollutant or storm water inputs to some of these waterbodies (e.g. Crooked Brook), RIDOT will endeavor to implement the requested BMPs. RIDOT has a state-wide pigeon abatement program in place that allows for retro-fitting bridges with netting or other structures to discourage pigeon roosting under bridges. New bridge structures such as the proposed new I-195 Providence River Bridge have been designed to eliminate the types of surfaces that pigeons typically roost on.

The previously mentioned state-wide Storm Water Retrofit Initiative is providing water quality improvement for runoff from existing RIDOT facilities. Sites are selected based on contaminants of concern, available right of way width, and anticipated BMP effectiveness. Several of these projects have been completed to date and are visible in the vicinity of the I-95/ Route 113 intersection.

Rhode Island Department of Transportation

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Evaluation and Assessment

Program Evaluation Requirements

The operator must annually evaluate the compliance of the SWMPP with the conditions of this permit. If the permittee is required to implement, requirements for the control of Storm Water identified in an approved TMDL, the operator must identify compliance with the approved scope of work and schedules. If the schedules are not being met, the operator must provide an explanation as well as an amended schedule. If any or all of the Storm Water control measures have been implemented, assess whether the Storm Water control measures are being met or if additional measures are necessary.

The operator annually must evaluate the appropriateness of the selected BMPs and efforts towards achieving the Measurable Goals. The SWMPP may be changed in accordance with the following provisions:

Changes adding (but not subtracting or replacing) components, controls or requirements to the SWMPP may be made at any time upon written notification to RIDEM.

Changes replacing an ineffective or infeasible six minimum control measure BMP, specifically identified in the SWMPP, with an alternative BMP may be requested at any time. Unless denied, changes proposed in accordance with the criteria below shall be deemed approved and may be implemented sixty (60) days from submittal of the request. If the request is denied, the Director shall send a written explanation of the denial. Changes replacing an ineffective or infeasible storm water control specifically identified in the SWMPP or in an approved Scope of Work document to meet the requirements of an approved TMDL, may be requested at any time, however, written approval from RIDEM must be received prior to implementing changes.

Modification requests, must include the following information:

-- Analysis of why the BMP is ineffective or not feasible (e.g., cost prohibitive).
-- Expectations on the effectiveness of the replacement BMP.
-- Analysis of how the replacement BMP is expected to achieve the goals of the BMP to be replaced.

Change requests or notifications must be in writing and signed in accordance with the signatory requirements of Part V. of this permit.

The Director may require changes to the SWMPP as needed to:

Meet the minimum requirements of Part IV of this permit.
Address impacts on receiving water quality caused or contributed by discharges from the MS4.
Include more stringent requirements necessary to comply with new Federal statutory or regulatory requirements.
Include such other conditions deemed necessary to comply with the goals and requirements of the CWA.
Include a revised scope of work and implementation schedule necessary to comply with the TMDL requirements.

Any changes requested by the Director shall be in writing and shall set forth the time schedule for the operator to develop the changes and amend the SWMPP and to offer the opportunity to propose alternative program changes to meet the objective of the requested modification.

Record Keeping

RIDOT is required to keep records of all activities performed in accordance with the Storm Water Management Plan, such as public education and participation programs, illicit discharge detection progress, construction and post construction programs, and pollution prevention programs. RIDOT must keep all records for a minimum of five years, submit copies of records to RIDEM if required, and make the records relating to this permit available to the public, including the SWMPP.

Reporting

RIDOT must submit a report to RIDEM each year containing the following information:

A self assessment review of compliance with the permit conditions.
Assessment of the appropriateness of the selected BMPs.
Assessment of the progress towards achieving the measurable goals.
Assessment of the progress towards meeting the requirements for the control of Storm Water identified in an approved TMDL.
Summary of results of any information that has been collected and analyzed. This includes any type of data.
Discussion of activities to be carried out during the next reporting cycle.
A discussion of any proposed changes in identified BMPs or measurable goals.
Date of annual notice and a copy of the public notice.
Summary of public comments received in the public comment period of the draft annual report and planned responses or changes to the program.
Planned municipal construction projects and opportunities to incorporate water quality BMPs, low impact development as well as activities to promote infiltration and recharge.

Newly identified physical interconnections with other small MS4s.
Coordination of activities planned with physically interconnected MS4s.
Summary of the extent of the MS4 system mapped, actions taken to detect and address illicit discharges including: the number of illicit discharges detected, illicit discharge violations issued, and violations that have been resolved.
Number and summary of all enforcement actions referred to RIDEM.
Summary of the number of site inspections conducted for erosion and sediment controls, inspections that have resulted in an enforcement action, and violations that have been resolved. Number and summary of all enforcement actions referred to RIDEM.
Summary of the number of site inspections conducted for proper installation of post construction structural BMPs, inspections that have resulted in an enforcement action, and violations that have been resolved. Number and summary of all enforcement actions referred to RIDEM.
Summary of the number of site inspections conducted for proper operation and maintenance of post construction structural BMPs, inspections that have resulted in an enforcement action, and violations that have been resolved.
Reference any reliance on another entity for achieving any measurable goal.

Reports to RIDEM must be submitted at the following address:

R.I. Department of Environmental Management
Office of Water Resources
RIPDES Program
235 Promenade Street
Providence, RI 02908

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References

New England Interstate Water Pollution Control Commission. 2003. Illicit Discharge Detection and Elimination Manual – A Handbook for Municipalities

RIDEM 1989. Soil Erosion and Sediment Control Handbook.

RIDEM 1993. Storm Water Design and Installations Manual.

RIDEM 1997. Water Quality Regulations.

RIDEM 1998. Total Maximum Daily Load for Total Phosphorus Loads to Stafford Pond, Final.

RIDEM 2001. Fecal Coliform TMDL Development For Fry Brook, Rhode Island, Final Report.

RIDEM 2001. Fecal Coliform TMDL Development for Hunt River, Rhode Island, Final Report.

RIDEM 2001. Fecal Coliform TMDL Development for Scrabbletown Brook, Rhode Island, Final Report.

RIDEM 2001. Fecal Coliform TMDL for the Pettaquamscutt (Narrow) River Watershed, Rhode Island.

RIDEM 2002. Fecal Coliform TMDL Development for Barrington River, Rhode Island.

RIDEM 2002. Fecal Coliform TMDL for Palmer River, Rhode Island.

RIDEM 2002. Fecal Coliform TMDL for the Runnins River, Rhode Island.

RIDEM 2003. Fecal Coliform TMDL for Crooked Brook, Rhode Island (Waterbody ID Number RI0010044R-03).

RIDEM 2003. Final Pathogen TMDL for Saugatucket River, Mitchell Brook, Rocky Brook and Indian Run Brook.

RIDEM 2003. General Permit Rhode Island Pollutant Discharge Elimination System Storm Water Discharge from Small Municipal Separate Storm Sewer Systems and from Industrial Activity at Eligible Facilities Operated by Regulated Small MS4s (RIR14000).

RIDEM 2003. Regulations For The Rhode Island Pollutant Discharge Elimination System.

RIDEM 2003. State Of Rhode Island 2002 303(D) List, List of Impaired Waters, Final.

RIDEM 2004. Illicit Discharge Detection and Elimination workshop. W. Alton Jones Campus.

The Center for Watershed Protection. 2004. Illicit Discharge Detection and Elimination – A Guidance Manual for Program Development and Technical Assessments

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Attachments

Attachment A: Outfall Mapping Information

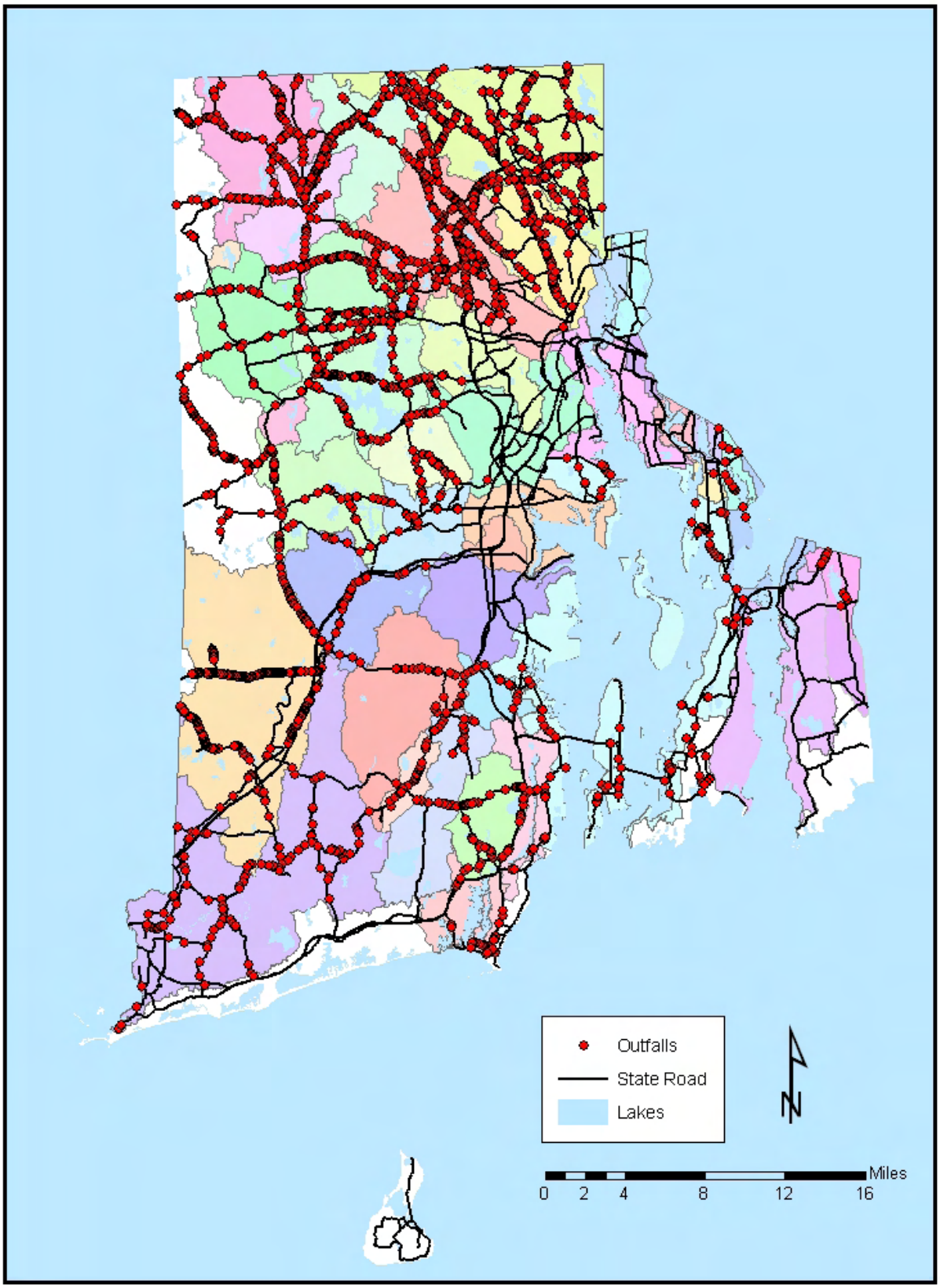
Attachment B: University of Rhode Island Cooperative Extension Partnership for Public Outreach and Participation

Attachment C: Illicit Discharge Detection and Elimination Program Plan

Attachment A – Outfall Mapping Information

RIDOT Mapped Outfalls
GPS Unit Data Dictionary
Outfall Inspection Data Sheet
Dry Weather Survey Data Sheet

RIDOT Mapped Outfalls To Date



GPS Unit Data Dictionary

"Outfall", Dictionary

```
"Outfall", point, "", 5, seconds, 1, Code
  "Outfall ID", text, 30, required, normal, Label1
  "Pipe ID", text, 30, normal, normal
  "State Road", text, 50, normal, normal
  "Water Type", menu, normal, normal, Label2
    "Tidal"
    "Fresh"
    "Unknow"
  "Outfall Discharge", menu, normal, normal
    "Stream/River"
    "Lake/Pond"
    "Wetland"
    "Non-Wetland"
    "Unknown"
  "Pipe Type", menu, normal, normal
    "Plastic"
    "Concrete"
    "Metal"
    "Stone"
    "Unknown"
  "Pipe Size", text, 30, normal, normal
  "Headwall", menu, normal, normal
    "Yes"
    "No"
    "Unknown"
  "Flared End", menu, normal, normal
    "Yes"
    "No"
    "Unknown"
  "Rip-Rap", menu, normal, normal
    "Yes"
    "No"
    "Unknown"
  "Bit Ditch", menu, normal, normal
    "Yes"
    "No"
    "Unknown"
  "Swale", menu, normal, normal
    "Vegetated"
    "Non-Vegetated"
    "None"
    "Unknown"
  "DWD", menu, normal, normal
    "YES"
    "NO"
  "From Plans", menu, normal, normal
    "YES"
    "NO"
  "Maintenance Concern", menu, normal, normal
    "YES"
    "NO"
  "Date", date, auto, mdy, manual, normal, normal
  "Water Body Name", text, 50, normal, normal
  "Water Body ID", text, 50, normal, normal
  "Contract Number", text, 30, normal, normal
"Catchbasin", point, "", 5, seconds, 1, Code
  "Outfall", text, 30, normal, normal, Label2
  "Inlets", menu, normal, normal
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    ">3"
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Label1
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  "Inlets", menu, normal, normal, Label1
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    "1"
    "2"
    "3"
    ">3"
    "unknown", default
  "Date", date, auto, mdy, manual, normal, normal,
Label2
"Ditch", point, "", 5, seconds, 1, Code
  "Type", menu, normal, normal, Label1
    "Bituminous", default
    "Concrete"
    "Other"
  "Date", date, auto, ymd, manual, normal, normal,
Label2
  "Comment", text, 50, normal, normal
"Point_generic", point, "", 5, seconds, 1, Code
  "Comment", text, 32, normal, normal, Label1
"Line_generic", line, "", 5, seconds, 1, Code
  "Comment", text, 32, normal, normal, Label1
"Area_generic", area, "", 5, seconds, 1, Code
  "Comment", text, 32, normal, normal, Label1
```

Rhode Island Department of Transportation

OUTFALL INSPECTION

Date: Time: Sub-Basin:

Last Rain Event: Investigators:

Note: If more than one pipe is located in a single area, complete a separate sheet for each one. (Use the same Outfall ID for each pipe at the location, but assign a different Pipe ID to each pipe.)

Outfall ID: _____ Pipe ID: _____

State Highway: _____

Sketch of outfall structures (if outfall has multiple pipes, indicate which one is reported on this sheet.) Indicate location of edge of pavement and nearest CB or MH. If possible, indicate # and direction of inlets into the CB or MH

Location Sketch

Plan View

Outfall Flows to:

	Fresh	Tidal
Stream/River		
Lake/Pond		
Wetland		
Non-Wetland		
Unknown		

Name: _____

303(d)?

Pipe size (dia): _____ inches Condition: _____ Material: _____

Headwall: Yes No Condition: _____ Material: _____

Flared End Section: Yes No Condition: _____

Rip-Rap: Yes No Condition: _____

Bituminous lined ditch: Yes No Condition: _____

Vegetated Swale: Yes No Condition: _____

Problems Noted:

Distance to edge of pavement: _____ ft N W S E

Nearest Intersection: _____ Distance: _____ N W S E

Nearest Utility Pole #: _____ Distance: _____ N W S E

Photo looking into pipe:

Photo looking downstream:

Add'l Photos

DRY WEATHER DISCHARGE (Yes / No / Unknown)

Notes:

Unknown b/c survey NOT done during dry weather conditions (72-hr after 0.10" rain event)

IF YES - COMPLETE DRY WEATHER FLOW SURVEY

Rhode Island Department of Transportation

ILLICIT DISCHARGES

DRY WEATHER FLOW SURVEY

Survey must be taken 72-hours AFTER a 0.10-inch rain event

I: General Information

Date:	Time:	**Outfall ID:**
Last Rain Event:	Investigators:	

II: Illicit Discharge Flow Measurements

Width of Water Surface (feet):			Notes:		
Approx Depth of Water (feet):					
Approx Flow Velocity (visual):	☐ drip	☐ trickle	☐ moderate	☐ substantial	

III: Visual Observations

Immediate Surrounding Land Use:
☐ Industrial ☐ Commercial ☐ Residential ☐ Municipal ☐ Open Space ☐ Highway ☐ Other

Odor
☐ None ☐ Sewage ☐ Rotten Eggs ☐ Oil/Gas ☐ Laundry ☐ Other

Color
☐ None ☐ Red ☐ Yellow ☐ Brown ☐ Green ☐ Orange ☐ Other

Floatables
☐ None ☐ Sewage/ Toilet Paper ☐ Oil Sheen ☐ Laundry/ Soap Suds ☐ Other

Staining
☐ None ☐ Black ☐ Brown ☐ Yellow ☐ White ☐ Orange ☐ Other

Clarity
☐ Clear ☐ Cloudy ☐ Opaque

Vegetation/Algae Growth
☐ None ☐ Normal ☐ Excessive ☐ Inhibited

Sedimentation
☐ No ☐ Yes

Scouring
☐ No ☐ Yes

Notes:

IV. Field Analysis

Water Temperature:	Is Outfall located in Urban/Densely Populated Area?	Yes	No
	Does Outfall flow to 303(d) Listed Water?	Yes	No
pH:	Are Water Temp/pH/Conductivity abnormal?	Yes	No
	IF ANY are 'YES', COLLECT LABORATORY SAMPLE		
Conductivity:	Fecal Coliform MPN:		

Attachment B– University of Rhode Island Cooperative Extension Partnership for Public Outreach and Participation

A G R E E M E N T

Between the

State of Rhode Island and Providence Plantations

Department of Transportation

and

The University of Rhode Island

and

The Rhode Island Department of Environmental Management

In the Amount of

Six Hundred Seventy-One Thousand Five Hundred Dollars ($671,500)

For a Period of Forty-two Months

For the Purpose of

Storm Water Phase II
Public Outreach, Education, Involvement and Participation

Contract Identification Code FAP # STP-SDRP(004)

This contract is funded in whole or in part with federal funds, 1270.39001102 (federal), 1270.38851019 (State)

Whereas, the State of Rhode Island Department of Transportation, hereinafter referred to as **DEPARTMENT** and the State of Rhode Island and Providence Plantations, hereinafter referred to as **STATE**, has applied for and received FHWA federal grant funds; and

Whereas,

The University of Rhode Island

hereinafter referred to as **CONTRACTOR** has agreed to undertake services described in **Appendix I**, herein, **Scope of Work** of this agreement; and

Whereas,

The Department of Environmental Management

hereinafter referred to as **DEM** has agreed to provide technical assistance as described in of this agreement; and

Whereas, the **STATE** has delegated contracting authority to the **DEPARTMENT** to enter into agreements with sponsors of projects to accomplish work to enhance transportation; and

Whereas, the **DEPARTMENT, DEM** and the **CONTRACTOR** under their respective authorities are cooperating to implement programs to enhance transportation as well as protect ground and surface water resources that are threatened by stormwater; and

Whereas, the **DEPARTMENT** and **DEM** have agreed that the successful completion of the services and activities further described in the **Scope of Work** will fulfill the **DEPARTMENT's** responsibilities under *Rhode Island Pollution Discharge Elimination System Regulations* Storm Water Phase II, hereinafter referred to as Storm Water Phase II, minimum measure for the *Public Outreach and Education*; and

Whereas, the **DEPARTMENT** and **DEM** have agreed that the successful completion of the services and activities further described in the **Scope of Work** will fulfill certain aspects of the **DEPARTMENT's** responsibilities under the Storm Water Phase II *Public Involvement and Participation* minimum measure; and

Whereas, the **DEPARTMENT** and **DEM** acknowledges further services and activities are required to fulfill the **DEPARTMENT's** Stormwater Management Plan responsibilities under Storm Water Phase II minimum measure *Public Involvement and Participation.*

Whereas, the **DEPARTMENT** desires to engage the **CONTRACTOR** to perform services and activities further described in **Appendix I**, herein, **Scope of Work**; and

Whereas, the **CONTRACTOR** is willing and qualified to provide the services, now, therefore, the **DEPARTMENT, DEM** and the **CONTRACTOR** hereto do mutually agree as follows:

Paragraph 1 - Governing Law and General Terms and Conditions

This agreement is deemed executed and delivered in the **STATE** of Rhode Island and Providence Plantations, and all questions arising out of or under this agreement shall be governed by the laws of the **STATE**.

The **STATE'S**, Purchasing Law (Chapter 37-2 of the Rhode Island General laws), Purchasing Rules and Regulations and General Terms and Conditions, which can be obtained at **www.purchasing.state.ri.us** shall apply as the governing terms and conditions of this agreement.

Paragraph 2 - Federal Funding Provisions

Funds made available to the **CONTRACTOR** under this agreement are or may be derived from federal funds made available to **DEPARTMENT**. The provisions of Paragraph 1 notwithstanding, the **CONTRACTOR** agrees to make claims for reimbursement under this agreement in accordance with federal policies governing allowable costs to be charged against federal grants. The **CONTRACTOR** agrees that no expenditures claimed for reimbursement under this agreement will be claimed for reimbursement under any other agreement, grant or contract that the **CONTRACTOR** may hold which provides funding from **STATE** or federal sources. The **CONTRACTOR** further agrees to be liable for audit exceptions that may arise from examination of expenditures:

a) claimed by the **CONTRACTOR** for reimbursement under this agreement; and/or
b) submitted by the **CONTRACTOR** in meeting any cost participation (i.e., match) requirements.

In executing this agreement, the **CONTRACTOR** is serving as grantee or independent **CONTRACTOR** under federal grant of contract between the federal government and **DEPARTMENT**. The master grant award or cooperative agreement made to **DEPARTMENT** by the federal government governing activities under this agreement is, therefore, made a part of this agreement. The **CONTRACTOR** specifically agrees to abide by all applicable federal requirements for grantee contractors, or independent contractors receiving federal funds including, but not limited to, those requirements set forth or referenced in the master grant or contract relating to this agreement.

Paragraph 3 - Disclosure and Certifications

The **CONTRACTOR** has executed **Appendix III--Contractor Certification Form.**

Paragraph 4 - Contract Period

The **CONTRACTOR** shall commence performance of this agreement on the ___day of October 2005 and shall complete performance no later than the ___day of March 2009 unless both parties mutually agree to extend the contract period or one or both parties terminate the agreement prior to that day in accordance with other provisions of this

agreement.

In accordance with Chapter 37-2-54 (3) of the Rhode Island General Laws "no purchase or contract shall be binding on the **STATE** or any agency thereof unless approved by the Department of Administration." Authorization for the **CONTRACTOR** to proceed with the contract shall be in the form of a Purchase Order issued by the Department of Administration or, in urgent circumstances, a Letter of Authorization to Proceed issued by the Purchasing Agent in anticipation of the issuance of a Purchase Order.

Paragraph 5 - Performance

The **CONTRACTOR** shall, in a manner to be determined satisfactory at the sole and exclusive discretion of the **DEPARTMENT** and **DEM** acting on behalf of the **STATE**, perform all obligations and duties as contained in **Appendix I - Scope of Work**, hereby incorporated by reference into this agreement.

The **DEPARTMENT** and **DEM** or their agents and if appropriate representative(s) of the federal government shall have the right at all times to inspect the work performed or being performed under this agreement as well as the places where such work is performed; and to that end, **DEPARTMENT** and **DEM** representative(s) shall be given reasonable access to all activities related to this agreement.

Paragraph 6 - Licenses and Permits

The **CONTRACTOR** certifies that he possesses all licenses and permits required by Federal and State law and regulation as they pertain to the requirements of this agreement as set forth herein. The **CONTRACTOR** shall maintain such required licenses and permits during the entire course of this Agreement and, should such licenses or permits lapse or be suspended, shall immediately inform the Contract Officer in writing of such circumstance. Failure to maintain proper licenses or comply with permit requirements is consider a material breach of this agreement and may result in termination without notice.

Paragraph 7 - Contract Officer

The **DEPARTMENT** shall appoint a Contract Officer to manage this contract as specified in **Appendix IV--Contract Management.** Such Contract Officer shall be the contact person for all matters regarding implementation of this agreement. The **DEPARTMENT** shall notify the **CONTRACTOR** in writing, immediately, should the Contract Officer be changed.

The **CONTRACTOR** and **DEM** agree to maintain close and continuing communication with the **DEPARTMENT** Contract Officer, throughout the performance of work and services undertaken under the terms of the agreement. The Contract Officer is responsible for assuring that all terms and conditions set forth in this agreement and that all performance criteria are met before approving any payments made by the **STATE** to the **CONTRACTOR.**

Paragraph 8 - Project Officers

The **CONTRACTOR** shall appoint a Project Officer, as specified in **Appendix IV--Contract Management.** Such Project Officer shall be the contact person for all matters regarding implementation of this agreement. The **CONTRACTOR** shall notify the **DEPARTMENT** in writing immediately should a problem arise regarding implementation of any part of this agreement or should a change be necessary. No Project Officer shall be appointed by the **CONTRACTOR** without the written consent of the **DEPARTMENT**.

DEM shall appoint a Project Officer, as specified in **Appendix IV--Contract Management**. Such Project Officer shall provide technical assistance to the **DEPARTMENT** by reviewing **CONTRACTOR** products for technical accuracy and compliance with Storm Water Phase II and notifying the Contract Officer of **DEM**'s findings. No payment shall be made by the **DEPARTMENT** prior to **DEM**'s review and approval; however, **DEM** shall not be responsible for contract administration beyond technical review of products and notification of the **DEPARTMENT** as described in this paragraph. The **DEM** shall notify the **DEPARTMENT** in writing immediately should a problem arise regarding implementation of any part of this agreement or should a change be necessary. No Project Officer shall be appointed by **DEM** without the written consent of the **DEPARTMENT**.

Paragraph 9 - Compensation

Total payment for services to be provided to the **CONTRACTOR** under this agreement shall not exceed Six Hundred Seventy-One Thousand Five Hundred Dollars ($671,500) subject to the availability of funds. The **CONTRACTOR** shall provide documentation and certification of matching expenses for the project in the amount of Zero Dollars ($0). Changes shall not be implemented without prior written authorization and shall be made in accordance with the provisions of **Paragraph 15 - Changes** of this agreement. There shall be no payment to **DEM**.

Total value of this agreement may be subject to availability of funds to the **STATE**. Whether funding availability is reduced because of executive or legislative actions or because of any fiscal limitations not presently anticipated, the **STATE**, at its sole discretion, may reduce the value of a contract or eliminate the value of the contract as a whole, or may reduce or eliminate any budget line item(s) to accommodate funding availability amendments. The **CONTRACTOR** and **DEM** shall be notified in writing of such amendments.

All payments shall be made in accordance with procedures established by the **STATE** Controller. Upon submission of an original signed invoice and documentation as required in accordance with provisions of **Appendix V--Payments and Reports Schedule**, **DEM** shall notify the **DEPARTMENT** of the findings of its Project Officer technical review as described in Paragraph 8 and the **DEPARTMENT** shall notify the Controller of the request for payment to the **CONTRACTOR**. The **CONTRACTOR** will complete and forward narrative and fiscal reports as per **Appendix V--Payments and Reports Schedule**.

Ten percent (10%) of the grant amount shall be withheld pending the completion and acceptance of tasks and products as described in **Appendix I--Scope of Work**. Failure to complete tasks or provide products in a timely manner may result in termination of this agreement.

Paragraph 10 - CONTRACTOR Liability for Reimbursement Denied to the STATE for Work Conducted Under this Agreement

It is understood and agreed that in the event that less than full federal funding or other funding is received by the **STATE** due to failure of the **CONTRACTOR** to comply with the terms of this agreement, the **CONTRACTOR** is liable to the **STATE** for an amount equal to the amount of the denied funding. The amount of the denied funding shall be payable upon demand to the **STATE** or the **DEPARTMENT** acting as an agent of the **STATE**.

Paragraph 11- Fiscal Assurances

The **CONTRACTOR** agrees to abide by **Appendix VI--Fiscal Assurances**. Failure to comply is considered a material breach of this agreement and may result in termination without notice.

Paragraph 12 - Accessibility and Retention of Records

The **CONTRACTOR** agrees to make accessible and to maintain all fiscal and activity records relating to this agreement to **STATE** and/or federal officials. This requirement is also intended to include any auditing, monitoring, and evaluation procedures, including on-site visits performed individually or jointly, by **STATE** or federal officials or their agents. Minutes of town council and board of directors meetings, fiscal records, and narrative records pertaining to activities performed will be retained for audit purposes for a period of at least three (3) years following the submission of the final expenditure report for this agreement or, if audit funding has not been received at the end of the three (3) years, the records shall be retained until resolution of the audit findings are made.

Paragraph 13 – Confidentiality of DEPARTMENT Records

The **CONTRACTOR** agrees to abide all federal and **STATE** laws and regulations governing the confidentiality of information to which the **CONTRACTOR** may have access pursuant to the terms of this agreement. In addition, the **CONTRACTOR** agrees to recognize basic rights to privacy and to the confidentiality of personal information. ("Confidential records" are the records as defined in Section 38-2-3(d) (1) - (1 - 19) of the General Laws, entitled "Access to Public Record.") Failure to abide by this paragraph will result in termination of contract.

Paragraph 14 - Termination of Agreement

This agreement may be terminated upon fifteen (15) days written notice (delivered by certified mail, return receipt requested) by **DEM**, the **DEPARTMENT** or the

CONTRACTOR. In the event of termination by any party, all property and finished or unfinished documents, data, studies, and reports prepared by the **CONTRACTOR** under this agreement, shall, at the option of **DEPARTMENT**, become **STATE** property. Notwithstanding the above, the **CONTRACTOR** shall not be relieved of liability to **DEPARTMENT** for damages sustained by **DEPARTMENT** by virtue of any breach of this agreement by the **CONTRACTOR**, and **DEPARTMENT** may withhold payment to the **CONTRACTOR** for the purpose of setoff until such time as the exact amount of damages due to **DEPARTMENT** from the **CONTRACTOR** is determined.

Notice of the effective date of termination will include the reports that must be completed. The above mentioned fifteen (15) day written notice notwithstanding, the **DEPARTMENT** expressly reserves the unilateral right to terminate, amend and/or reduce services and payments under this agreement, effective immediately upon notice to the **CONTRACTOR** and **DEM**, in the event that the funding underlying the participation of **DEPARTMENT** is limited or curtailed. Further, the **CONTRACTOR** agrees to hold **DEPARTMENT** and **DEM** harmless from any and all liability, which may arise under this agreement.

The **DEPARTMENT** may terminate this agreement without notice in the event of material breach of the agreement by **CONTRACTOR** or **DEM**.

Paragraph 15 - Changes

The **STATE** may permit changes in **Appendix I—Scope of Work**, time of performance, or approved budget of the **CONTRACTOR** to be performed hereunder. Such changes, which are mutually agreed upon by the **STATE** and the **CONTRACTOR**, must be in writing and shall be made a part of this agreement by numerically consecutive amendment and shall be issued by the **STATE** in the form of Change Orders. No amendment shall be valid until and unless approved by the Rhode Island Department of Administration in the form of Change Order to the Purchase Order established for this agreement.

Paragraph 16 - Assignability

The **CONTRACTOR** shall not subcontract or otherwise assign or novate any interest in this agreement without **DEPARTMENTAL** approval.

Paragraph 17 - Subcontracts

Any proposed subcontract under this agreement shall be submitted to the **DEPARTMENT** contract officer for approval prior to execution. To be valid, all subcontracts shall incorporate this grant agreement by reference and attachment Subcontracting shall transfer all provisions of this grant agreement to subcontractors pursuant to the scope of work they are to perform. Notwithstanding, the **CONTRACTOR** shall remain liable to the **STATE** for all aspects of this agreement. Failure to comply with the provisions of this article may result in denial of reimbursement for such nonapproved subcontractual services.

Paragraph 18 - Partnership

It is understood and agreed that nothing herein is intended or should be construed in any manner as creating or establishing the legal relation of partnership between the parties hereto, or as constituting the employees, agents, or representatives of the **CONTRACTOR** included in this agreement as employee, agents, or representatives of the **DEPARTMENT** or **DEM**.

Paragraph 19 - Pecuniary Interest

The **CONTRACTOR** covenants that it presently has no pecuniary interest and shall not acquire any such interest, direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under this Agreement. The **CONTRACTOR** further covenants that in the performance of this Agreement no person having any such interest shall be employed.

Paragraph 20 - Intellectual Property, Equipment, Capital and Other Assets

All equipment, property, management practices, finished or unfinished documents, computer software, data studies, and reports prepared or acquired by the **CONTRACTOR** under this agreement and for which reimbursement was claimed under this agreement shall, at the option of **DEPARTMENT**, become the property of **STATE**. The **CONTRACTOR** further understands and agrees to abide by federal regulations, requirements, and policies governing the disposition of equipment or property purchased with funds made available to the **CONTRACTOR** under this agreement or with funds identified by the **CONTRACTOR** as matching expenditures under this agreement. The **CONTRACTOR** agrees to maintain an equipment inventory list under this agreement and to identify related equipment properly for inspection.

The **CONTRACTOR** agrees to operate, maintain and repair any management practices installed or equipment purchased pursuant to this agreement, in accordance with state-of-the-art standards as approved by the **DEPARTMENT,** throughout their life. The **CONTRACTOR** agrees to provide the **DEPARTMENT** free and clear access to any such management practices and equipment for the purpose of inspection and monitoring.

Paragraph 21 - Copyrights and Publicity

The **DEPARTMENT, DEM** and the **CONTRACTOR** shall retain permanent right to receive use and distribute copies of all documents and materials (hardcopy and digital formats) developed under this agreement.

All printing, signage, advertising, publicity, or outreach materials distributed for the purpose of this grant will require prior review and approval by the **DEPARTMENT** and **DEM** and must recognize the **DEPARTMENT** and federal agencies as appropriate as a source of funding. Additionally, the **DEPARTMENT** and **DEM** logo shall be prominently displayed where textual acknowledgements are included on materials produced for the purposes of this agreement.

Paragraph 22 - Use of recycled paper for printing

All written correspondence, documents, reports and other printed materials for work pursuant to this agreement shall utilize nontoxic ink and recycled paper (minimum 20% post-consumer content) whenever practicable.

Paragraph 23 – Nonliability for personal injuries

As between the **DEPARTMENT**, **DEM** and **CONTRACTOR**, the **CONTRACTOR** shall be responsible for any liability to third parties resulting from negligent acts or omissions of the **CONTRACTOR**, its agents, employees, contractors or subcontractors, arising from or occurring in the course of the performance of the services under this Agreement.

Paragraph 24 - Nondiscrimination in Employment and Services

The **CONTRACTOR** agrees to comply with the requirements of Title VI of the Civil Rights Act Of 1964 (42 USC 200d et seq.); Section 504 of the Rehabilitation Act Of 1973, as amended (29 USC 794); Title IX of the Education Amendments of 1972 (20 USC 1681 et seq.); The United States Department of Health and Human Service Regulations found in 45 CFR, parts 80 and 84; and the United States Department of Education Implementing Regulations (34 CFR, parts 104 and 106); which prohibit discrimination on the basis of race, color, national origin, handicap, or sex, in acceptance for or provision of services, employment, or treatment in educational or other programs or activities.

The **CONTRACTOR** acknowledges receipt of **Appendix VII--Notice To Department Contractors Of Their Responsibilities Under Title VI Of The Civil Rights Act Of 1964** and **Appendix VIII--Notice To Department Contractors Of Their Responsibilities Under Section 504, Of The Rehabilitation Act Of 1973** incorporated herein by reference and made part of this agreement.

The **CONTRACTOR** agrees to comply with all other provisions applicable to law, including the Americans with Disabilities act of 1990; the Governor's Executive Order No. 93-1, which prohibits discrimination on the basis of race, sex, age, national origin, sexual orientation, or disability; and the Governor's Executive Order No. 95-11, relating to sexual harassment.

Failure to comply with the provisions of this paragraph may be the basis for cancellation of this agreement.

Paragraph 25 – Fair Share for Procurement, Construction and Subcontracting

The **CONTRACTOR** agrees to abide by **Appendix IX--Fair Share for Procurement, Construction and Subcontracting.**

Paragraph 26 - Drug-free Workplace Policy

The **CONTRACTOR** agrees to comply with the requirements of the Governor's Order No. 89-14 and The Federal Anti-Drug Abuse Act of 1988. As a condition of contracting with the **STATE**, the **CONTRACTOR** hereby agrees to abide by **Appendix X--Drug-Free Workplace Policy,** and in accordance therewith has executed **Appendix XI--Drug-Free Workplace Policy CONTRACTOR Certificate of Compliance.**

Furthermore, the **CONTRACTOR** agrees to submit to the **DEPARTMENT** any report of forms which may periodically be required to determine the **CONTRACTOR**'s compliance with this policy.

The **CONTRACTOR** acknowledges that a violation of the drug-free workplace policy may, at the **STATE**'s option, result in termination of this agreement.

Paragraph 27 - Pro-Children Act of 1994 (Act)

As a condition of contracting with the **STATE**, the **CONTRACTOR** hereby agrees to abide by **Appendix XIII - Certification Regarding Environmental Tobacco Smoke** and in accordance has executed **Appendix XIII - Certification Regarding Environmental Tobacco Smoke.**

Paragraph 28 - Contractor Certificate of Compliance Regarding Hotel and Motel Safety

As a condition of contracting with the **STATE**, the **CONTRACTOR** hereby agrees to abide by **Appendix XIV--Contractor Certificate of Compliance Regarding Hotel and Motel Safety.**

Paragraph 29 - Debarment, Suspension and Other Responsibility Matters

The **CONTRACTOR** agrees to abide by **Appendix XV - Certification Regarding Debarment, Suspension, and Other Responsibility Matters,** and in accordance has executed the required certification included in **Appendix XV--Certification Regarding Debarment, Suspension and Other Responsibility Matters--Primary Covered Transactions.**

Paragraph 30 - Lobbying

CONTRACTOR agrees to comply with all federal laws restricting and/or limiting lobbying activities of recipients of federal funds including but not limited to 31 U.S.C. Section 1352 and Section 503 of the Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act (Public Law 104-209).

Paragraph 31 - Campaign Contributions

Pursuant to Rhode Island General Law 17-27, all contractors must file campaign contribution affidavits when the cumulative annual value of all State contracts to a vendor exceeds $5000. Affidavits may be obtained at the Rhode Island Board of

Elections.

Paragraph 32 - Severability

If any provision of this agreement is held invalid, the remainder of this agreement shall not be affected thereby if such remainder would then continue to conform to the terms and requirements of applicable law.

Paragraph 33 – Dispute Arbitration

In the event of difference of disputes arising between the parties hereto as to the application or interpretation of any clause of this Agreement, or as to the rights or obligations of the parties hereunder, all such questions and issues shall be subject to existing departmental policies and procedures. In the event the issues is unable to be resolved, it shall be submitted to the determination and award of the Director of Transportation and the Director of Adminstration as arbitrators, to hear and determine the same and their decision shall be final and binding upon the parties to this Agreement. The expenses of the arbitration shall be shared equally by the parties to this Agreement.

Paragraph 34 - Appendices

Attached hereto and made part of this agreement are the following appendices:

Appendix I	Scope of Work
Appendix II	Budget Forms
Appendix III	Contractor Certification Form
Appendix IV	Contract Management
Appendix V	Payments and Reports Schedule
Appendix VI	Fiscal Assurances
Appendix VII	Notice to Department Contractors of Their Responsibilities Under Title VI of The Civil Rights Act of 1964
Appendix VIII	Notice to Department Contractors of Their Responsibilities Under Section 504 of the Rehabilitation Act of 1973
Appendix IX	Contractor Responsibilities Regarding Fair Share for Procurement, Construction and Subcontracting
Appendix X	Drug-Free Workplace Policy
Appendix XI	Drug-Free Workplace Policy Contractor Certificate of Compliance
Appendix XII	Drug-Free Workplace Policy Subcontractor Certificate of Compliance
Appendix XIII	Contractor Certificate of Compliance Regarding Environmental Tobacco Smoke
Appendix XIV	Contractor Certificate of Compliance Regarding Hotel and Motel Safety
Appendix XV	Certification Regarding Debarment, Suspension, And Other Responsibility Matters - Primary Covered Transactions

IN WITNESS THEREOF, the parties, through their duly authorized representatives have executed this Agreement on the _____ day of October 2005 A.D.

RI DEPARTMENT OF TRANSPORTATION
Recommended for Approval:

By: _____
Edmund T. Parker, Jr., PE
Chief Engineer

Approved as to form:

By: _____
John Affleck, Esq.
Chief Legal Council

Approved:

By: _____
Dorothy Pascale, CPA
Assistant Director

Approved:

By: _____
James R. Capaldi, PE
Director

UNIVERSITY OF RHODE ISLAND
Approved:

By: _____
Lynn Pasquarella
Vice Provost for Research

RI DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Approved:

By: _____
W. Michael Sullivan
Director

Appendix I

Scope Of Work

TITLE: Storm Water Phase II Public Outreach, Education, Involvement and Participation

PROBLEM/NEED:

Per the Storm Water Phase II regulations, Department of Transportation (DOT) is required to undertake a program of public education and outreach as well as public involvement. DOT believes that many aspects of these initiatives will be most efficiently developed and implemented via a contract for services. University of Rhode Island Cooperative Extension (URI) has successfully provided public outreach, education, involvement and participation on water quality issues (including storm water) to municipalities and the general public for many years and has developed a high degree of expertise in this arena.

PURPOSE:

The purpose of this project is to contract URI for services to establish DOT compliance with their obligations under Storm Water Phase II for *Public Outreach and Education* minimum measure. This project will also establish compliance with the following aspects of *Public Involvement and Participation* minimum measure that are related to public outreach and education of the Storm Water Phase II general permit:

- Identification of target audiences (Item IV.B.2.b.2(i)).
- Description of public involvement activities (Item IV.B.2.b.2(ii)).
- Evaluation of success (Item IV.B.2.b.4).

DEM will provide technical assistance to DOT by reviewing URI's deliverables for technical accuracy and compliance with Storm Water Phase II to achieve approval. After reviewing deliverables, DEM will forward their findings to DOT. No payment shall be made by DOT prior to DEM's review and approval; however, DEM shall be responsible for no contract administration beyond technical review of deliverables and notification to DOT of acceptability for payment.

In undertaking this effort, DOT anticipates that a number of very valuable public education and outreach tools will be produced that will be applicable to the Storm Water Phase II needs of Rhode Island municipalities and that will be valuable to the general public as tools for managing storm water.

GENERAL PROJECT PLAN:

DOT and DEM will contract with URI for the scope of services described below.

These initiatives, combined with other initiatives by DOT, will fully comply with the *Public Outreach and Education* and *Public Involvement* minimum measures of Storm Water Phase II.

A. Local Needs Assessment and Advisory Committee Development
The local needs assessment is intended to assist in determining the needs of municipalities in developing and implementing improved stormwater management (e.g., Phase II) programs. An advisory committee will be formed and use the assessment to guide work on other tasks. Lead participants will use the advisory as a sounding board for development of deliverables.

1. Conduct a needs assessment--This should include the following tasks:

- Review of available municipal storm water management plans (SWMPs)--SWMPs include valuable information on municipal needs for storm water management including training needs (e.g., good housekeeping). This task would involve reviewing all available plans to infer and determine common needs. (Assume 33 plans will be available.)
- Surveys of municipal stormwater management capacity--In recent years, surveys of municipal stormwater management capacity have been performed by several groups (e.g., Statewide Planning, Nonpoint Source, RIPDES, etc.). This survey will focus on training or technical assistance that communities will need for implementation of Phase II, implementation of municipal stormwater recommendations in TMDLs, other recommendations of municipal stormwater management plans and issues of particular municipal interest (e.g., flooding). The survey should also ask what municipal needs could potentially be filled by watershed organizations. The survey should focus on a small representative sample of municipalities (i.e., 5 - 10).

2. Advisory committee--As a follow-up an advisory committee will be formed to guide development of training and technical assistance. The committee should include but not be limited to: 3- 5 municipal representatives as well as representatives of DEM, DOT, Statewide Planning, Watershed Coordinating Council, Rivers Council, Conservation Districts, Audubon Society, Save The Bay, Conservation Law Foundation, Rhode Island Association of Conservation Commissions the URI Transportation Training Center, the Rhode Island League of Cities and Towns, and private sector representatives. URI will be responsible for administration of the advisory committee including, but not limited to, organizing mailing/email lists, calling and coordinating meeting dates, times and locations, developing agendas and facilitating meetings. . The Southern Rhode Island Conservation District (SRICD) will provide support including: providing meeting space, assisting in meeting facilitation, and developing meeting materials such as attendance sheets and minutes. The URI Coastal Institute will support coordination and information exchange among advisory committee members through the project website.

   The advisory committee is expected to meet quarterly, on average, with communication maintained via web and email in the interim. In addition, URI will organize a work group

consisting of municipal representatives responsible for implementation of Phase II stormwater programs, as described in TASK C. Coordination of this group will be directed to making Phase II requirements and obligations known in cooperation with DEM, obtain local feedback on materials developed, and facilitate transfer and adoption of products developed. Coordination with this group will be maintained by mail, email and web, and meetings with local officials organized by regions of the state.

A. Local Needs Assessment and Advisory Committee Development

Tasks	Participants[1]	Deliverables	Grant Budget	Month [2]
1. Form and facilitate an advisory steering committee (see list of members above) with input from DEM and DOT	**URI, SRICD**	Steering committee membership, agendas, attendance sheets and minutes.	13,200	1 – 42
2. Conduct a needs assessment.	**URI (LP, LJ)** , DOT, DEM	Completed needs assessment.	5,000	3
			18,200	

[1] The participant that will lead the task is listed in bold type.
[2] Month numbers are based on the grant period. The first month begins on the date of the grant agreement approval. Month two begins on same number day of the following calendar month. Sub-Task Deliverables are to be submitted to **DEPARTMENT** within one month of completion.

B. State, Municipal and Private Sector Training Curriculum
This part of the project is intended to assist state, municipal officials and other interested parties in the implementation of stormwater management programs. Six currently identified areas of need are training related to 1. the revisions of the stormwater manual, 2. Phase II--public outreach, 3. Phase II--good housekeeping, 4. Phase II--illicit discharge detection and elimination, 5. development of stormwater-related ordinances and 6. budget planning for operating and capital expenditures. Additional needs may be identified during the local needs assessment. Training developed under this section of the scope of work is expected to include a module on each of the aforementioned topics. The training should be designed to assist communities and state agencies (e.g., DOT) meet the requirements of their Phase II permits. The training program should be coordinated with DOT's existing staff training programs.

This task will be led by URI with training objectives, workshop/ conference agendas, educational modules, and program evaluations conducted in cooperation with the advisory committee. Where noted, subcontractors will be responsible for development and delivery of specific training topics. RIDEM will assume the lead role in conducting training on the Stormwater manual and Illicit detection, with URI providing support. For other programs, URI responsibilities will include design, printing and distribution of workshop/conference brochures, meeting notices and publicity, coordination with trainers, organizing and printing handouts, meeting room arrangements, catering, and registration. Advisory group members will provide support by making mailing/ email lists available, expanding publicity, and assisting with meeting logistics. The SRICD will provide general support with meeting logistics and manage subcontracts with the LID center and stormwater manual trainers. Conference and workshop fees may be charged to offset basic expenses not included in the budget for this task, including travel and expenses for presenters, meals and room fees, conference organization fees and other expenses. A sliding fee scale and/or incentives will be offered to state, local and non-profit organizations.

Workshop publicity, registration and products developed will be made easily accessible via the project website, to be developed and maintained by the URI Coastal Institute. Where appropriate, the URI Coastal Institute will assist in coordinating educational and outreach efforts with statewide coastal management initiatives being undertaken under the umbrella of the Coastal Institute.

1. Stormwater Manual (assume biennial workshops over the permit term)--The first edition of the Stormwater Manual was written and published during the early 90s. Since its publication there have been many advances and the manual is now being revised. Once the revision is completed, training will be needed to ensure proper use of the manual by regulators and the regulated community (e.g., design professionals). RIDEM will assume the lead role in conducting this training, with support from URI Cooperative Extension in designing the agenda, support from the SRICD and URI in managing training subcontracts, and logistical support. Two primary areas of training need include:

   - Proper use of best management practices (e.g., low impact development (LID), better site design). Nonstructural methods have emerged as the state-of-the-art approach to

addressing water quality and hydrologic impacts of stormwater runoff among leading national and state stormwater managers, however, these methods have not been widely used in Rhode Island. Training in these approaches will be conducted by the Low Impact Development Center or comparable organization using a two-level approach. 1) One basic 2-day training program will be offered, customized to state-specific conditions and needs, focusing on understanding of LID concepts, selection of appropriate methods, and in-depth LID treatment system planning and design. 2) To accelerate adoption of these methods, additional training and technical support will be provided by the LID center to state regulators and private sector stormwater system designers. The type of assistance will be finalized with input from the advisory committee and may include one or more of the following services: a) final review and recommendations on the RI stormwater manual, focusing on nonstructural stormwater control standards and design methods; b) development of guidance in selecting watershed-based stormwater treatment standards using LID methods; c) development of educational materials to support application of the storm water manual; d) follow-up specialized training for State, municipal and private sector stormwater system designers in LID methods; e) design review assistance for state/municipal stormwater managers and regulators; and f) design review assistance for private sector stormwater system designers as an incentive for early adoption of LID methods or DEM/CRMC requirement to mitigate stormwater impacts to sensitive areas or impaired waterbodies.

- Revised methodologies for stormwater management and design, including updated treatment system designs and assessment methods such as Stoke's Law and Darcy's Law Training will be provided by design professionals familiar with the updated RI stormwater manual, with preference given to authors of the manual. This portion of the training will held biennially for municipal, state and private sector audiences, with additional training in alternate years targeting DOT and other state agency /municipal staff.

To support implementation of the stormwater manual, SRICD will develop and conduct training in use of TR55 to estimate stormwater runoff volume, rates and comparison of pre- and post-development hydrology as required for stormwater systems design using either conventional or Low Impact Development Methods. This training will be offered at least twice during the project period, in coordination with stormwater manual training and following the basic 2-day LID training. Materials developed by the LID center or other readily available sources may be used as the basis for this training. Project funds will be used to support adapting existing curriculum to Rhode Island soils, with workshop fees used to offset costs of providing training.

2. Public Outreach (assume biennial workshops over the permit term at month 20 and 44 of this grant agreement)--Phase II requires municipalities to develop public outreach regarding the impacts of stormwater on local waterbodies. Municipal officials need training regarding:

   - Scope of the stormwater problem and how it affects urban, suburban and rural areas differently.

- Methods of public outreach/education and effective delivery of outreach/education messages by municipalities to residents and others within the community. (Refer to task C for the specific outreach program.)

This element will focus on making materials and outreach methods developed under Task C readily available to municipalities. Outreach may be conducted through meetings with groups of communities with similar needs regionally rather than statewide workshops.

3. Good Housekeeping (assume biennial workshops over the permit term)--Phase II regulations require that municipalities perform certain types of maintenance on their municipal storm sewer systems, properties, and infrastructure. Three areas where training is needed include:

   - DPW site design, operation and maintenance (coordinated with EPA as appropriate).
   - Municipal storm sewer system design, operation and maintenance.
   - Grounds management. (The Greenshare Program at URI could be used and augmented as necessary for this purpose.)

   Outreach to municipalities, DOT, and other state agencies on these topics will be closely coordinated with development and delivery of educational materials under Task C 6. The SRICD will coordinate with EPA, DEM and DOT to organize and deliver training on these topics, with URI leading grounds management education. The focus of information delivery will be to enhance capacity of supervisors and field engineers using a 'train the trainer" approach to educate field staff responsible for routine roadway maintenance / and public facilities management.

4. Illicit Discharge Detection and Elimination (assume one workshop over the permit term, the first training should be offered by month 18 of this grant agreement)--Phase II regulations require owners of municipal storm sewer systems to identify and eliminate all illicitly discharging connections to their systems. A good program necessitates a general knowledge of the layout of the sewer system, proper policy for illicit discharge prohibition, moratorium and inspection, and development and implementation of inspection programs. RIDEM will assume the lead role in this training, in conjunction with USEPA. URI Cooperative Extension will provide support to coordinate and organize the program. The following have been identified as areas of training need:

   - Mapping storm sewer systems and recommend uniform mapping methodologies (e.g., RIGIS) and guidance.
   - Developing and implementing policy (e.g., ordinances) for control of illicit discharges.
   - Establishing an inspection program.
   - Illicit discharge detection and elimination (IDDE) techniques consistent with the New England Interstate Water Pollution Control Commission's IDDE manual.
   - Appropriate roles for various MS4 owners (e.g., DOT, municipal, DEM, etc.) to coordinate on solving interconnection issues efficiently.

5. Development and Amendment of Ordinances and Enforceable Policies (assume biennial workshops over the permit term, annotated ordinances should be developed by month 6 of the grant agreement and training should be offered by month 12 of the grant agreement)--Phase II requires the development of various enforceable policies (e.g., soil erosion, stormwater maintenance, pet waste, illicit discharge, etc.). Additionally, there are a number of ordinances that would be particularly helpful for communities (e.g., redevelopment standards, stormwater utility districts, etc.).

   This task will involve consideration of the need for annotated model ordinances and the compilation of examples of best available existing ordinances. The need for annotated model ordinances will be determined in conjunction with the advisory committee. Selected model ordinances will then be developed with input from the advisory committee.

   At a minimum, the following ordinances will be considered:

   - Soil erosion.
   - Stormwater maintenance.
   - Pet waste.
   - Illicit discharge.
   - Redevelopment standards.
   - Stormwater utility districts.

URI Cooperative Extension will lead this task, with the SRICD providing support in review and development of ordinances. In addition the SCRICD will assume primary responsibility for development of model ordinances and enforceable policies for soil erosion, stormwater maintenance and stormwater utility districts. SRICD will also coordinate with DEM and EPA to finalize and annotate illicit discharge detection ordinances.

6. Budget Planning (assume one workshop over the permit term)--Phase II and stormwater TMDLs will require communities to develop new operations and infrastructure, for which they may have limited experience in budgeting. This task will provide training to municipalities in how to develop operational and capital budgets and identify funding sources for stormwater management programs. The focus will be on creative strategies to fund stormwater programs using for example, permit application fees to cover costs of stormwater plan review and field inspection by independent contractors, stormwater system maintenance fees based on impervious area, and pollutant trading fees and credits to offset increased runoff impacts where all other measures have been taken to minimize impacts. This element will be closely coordinated with development of ordinances and enforceable policies.

7. Additional Training (assume annual workshops over the permit term)--The following programs related to Storm Water Phase II Public Education and Outreach as described in the DOT 5-Year SWMPP (3/25/03) will be developed. Training will be coordinated with

and designed to augment existing programs currently offered by RI DOT. To the extent possible, curriculum items 1-6 above will be designed to address DOT training needs and schedules to the extent possible. Materials developed in these preceding elements (such as "good housekeeping" information in element 3 above, and in Task C of this project will be made available to RIDOT field engineers and highway/ facilities maintenance staff using a "train the trainer" approach to reach all appropriate staff.

- DOT winter training program.
- Stormwater, erosion control and source reduction training.

Summary of training topics and schedule

Training topic	Annual	Biennial	One time
1. Stormwater manual		X	
2. Public outreach		X	
3. Good Housekeeping		X	
4. Illicit Discharges			X
5. Ordinances & Enforcement		X	
6. Budget Planning			X
7. Additional DOT training	X		

* Stormwater system design may be offered to DOT and other state/government staff in alternate years biennially.

All training materials, including presentations and accompanying educational materials will be made available through the project website. Availability of these materials will be publicized through established communication networks such as listserves, newsletters, professional publications and general interest news features.

B. State, Municipal and Private Sector Training Curriculum Development

Tasks	Participants*	Deliverables	Grant Budget	Month
1. Prepare a list of training needs based on this scope of work (7 needs listed in the narrative above) and the local needs assessment. Solicit review and comment from the advisory committee.	**URI (LJ, LP)**, Advisory Committee	List with consensus from the advisory committee.	3,000	4 (or February 2006 which ever is earlier)
2. Prepare outlines of training modules and solicit review and comment from the advisory committee.	**URI, (LJ, LP),** SRICD, Advisory Committee	Outlines of training modules. Comments from the advisory committee.	10,000	6
3. Draft training modules and solicit review and comment from the advisory committee.	**URI**, SRICD, Advisory Committee	Drafts of training modules. Comments from the advisory committee.	70,000	6 - 10
4. Finalize training modules and establish workshop schedules for each module with input from the advisory committee. Make updates to modules as needed with input from the advisory committee.	**URI**, SRICD, Advisory Committee	Schedule of workshops.	18,000	11, 23, 35
5. Hold workshops for each module.	**URI**, RIDEM, SRICD, LID Center, stormwater manual training consultant.	Workshops and workshop materials including: mailer to audience, agenda, handouts (e.g., training module) and other items as appropriate	100,600	12- 42
			201,600	

* Under Tasks B 1,2,3,4 and 5 RIDEM will be primarily responsible for development of training on the Stormwater Manual and Illicit Discharge Detection and Elimination, with URI coordinating and conducting the workshops.

C. Model Stormwater Education and Outreach Program

Over the years, agencies and organizations have authored a myriad of brochures related to stormwater management, nonpoint source pollution and related water quality issues. Although these public outreach materials each cover important issues, readers often have questions about the relative importance of recommendations and occasional divergence. This ambiguity has lead to confusion. As required by the Phase II stormwater regulations, communities are required to have a stormwater education and outreach program. What is needed is a model stormwater education program that is peer-reviewed and addresses different sources of stormwater contamination that are common in rural, suburban and urban communities. These model education and outreach materials should be prepared with a menu of options based on capacity to deliver the message and budget. All materials must be evaluated per literature or field-testing (see item C.7, pre-survey assessment and piloting) to determine their effectiveness. Additionally, many agency partners would benefit from the availability of a ready message in an easy-to-deliver format. This task will be led by URI Cooperative Extension. Dr. Marion Gold, director of the Cooperative Extension Education Center will lead development and implementation of a model stormwater education and outreach program focusing on development and delivery of consistent messages on the need for stormwater controls using a variety of media. The URI Nonpoint Education for Municipal Officials program, coordinated by Lorraine Joubert, will focus on application of source-specific materials for use by municipalities and state agencies in implementing customized stormwater education programs. The following seven tasks are to be undertaken:

1. Review current outreach materials used in Rhode Island for stormwater management (especially, FHWA, EPA, DOT and DEM materials). A minimum level of effort will be devoted to this task, taking advantage of materials collected by DEM. It is likely that additional materials will be identified and incorporated as the project progresses.
2. Review national literature for comparative purposes and identify other appropriate outreach materials, messages and delivery methods. Additional materials will be reviewed as new sources are identified.
3. Prepare a consistent message for state agencies, communities and watershed organizations) regarding why the public should be concerned about the impacts of stormwater on receiving waterbodies. Solicit review and comment from the advisory committee. In designing this outreach campaign, URI will work with consulting professionals to develop or adapt the most compelling messages for Rhode Island audiences.
4. Identify best available options for delivery of the messages and materials discussed in task 3 and 6. A variety of media will be used to test cost effectiveness of outreach methods considering methods appropriate for initial outreach and a sustainable level of outreach beyond the life of the project. Development of public information campaign will draw on the expertise of communication specialists within the University and other media services.
5. Deliver the consolidated state-agency message in task 3. (This will be an ongoing commitment over the life of the permit, i.e., 5-year term.)
6. Using the consistent message in task 3 as a starting point, develop source-specific contamination outreach messages and materials. While the consistent messages on

importance of runoff control developed in subtask D 3 are essential for raising general awareness of stormwater runoff as a pollution source, and reaching a large audience through popular media, materials developed in this subtask will be directed to specific audiences to promote change in behavior. As a starting point, URI will work with the advisory group to identify desired changes in behavior among residents/businesses in different types of watersheds/aquifer recharge areas based on priority pollution sources and impacts to receiving waters. All materials must be in easy-to-deliver formats for users at a variety of levels (e.g., watershed-association, municipal, etc.). Focus the messages on audiences (i.e., message recipients), sources and pollutants that are likely causing the greatest stormwater impacts as determined by the advisory committee. Sources of pollutants should be consistent with the general permit (Part IV.B.1.b.5). Pay special attention to industrial and residential contributors, sources and pollutants. Work with the advisory committee to determine appropriate formats. Products should be readily available to municipal users (e.g., web-based and downloadable formats). As part of this item, develop a model public education and outreach plan that can be easily tailored to the local needs and be incorporated into municipal SWMPPs. The outreach plan will identify specific opportunities to capture attention and provide information and/or incentives to change behavior given existing methods whereby residents and landowners receive information from municipalities and keep informed on local issues in general.

To ensure local participation in development of this model outreach program, this element will be coordinated with municipal representatives responsible for implementation of Phase II stormwater programs. URI will organize and coordinate a municipal work group with support from DEM, SRICD and other members of the advisory committee. This will provide a direct communication link with communities to make Phase II requirements and obligations known, obtain local feedback on materials developed, and facilitate transfer and adoption of products developed. Coordination with this group will be maintained by mail, email and web, and meetings with local officials organized by regions of the state. This element will be closely linked to development and delivery of public outreach education under Task B 2 as well as local educational outreach necessary to generate public awareness of the need for stormwater controls that may be subject to local ordinances and enforceable policies under Task B 5.

7. Run a pre-survey for each type of audience and stormwater contamination source, followed up by post-survey after the outreach is conducted to see how effective the program was. Determine what outreach materials/methods are the most cost effective to reach the target audience and effect some change in awareness or behavior. This may be a function of the particular stormwater issue to be addressed. Make adjustments before going ahead with full program. The pre and post survey work will only be needed where the literature or the advisory

committee is not able to verify the effectiveness of a given outreach message or technique. This assessment may be conducted using a variety of methods, to include for example, focus groups, interviews and/or survey. Professional services will be retained to evaluate effectiveness of outreach messages in changing attitudes and behaviors through pre- and post- evaluations of outreach messages and training programs piloted on a small scale before wide-scale delivery.

C Coordinated Stormwater Message for Use in Public Outreach

Tasks	Participants	Deliverables	Grant Budget	Month
1. Review and collect current outreach materials used in Rhode Island for stormwater management (especially, FHWA, EPA, DOT and DEM materials).	**URI (LP, LJ)**	Library of stormwater outreach materials and literature.	1,200	1
2. Review national literature for comparative purposes and identify other appropriate outreach materials, messages and delivery methods.	**URI (LP, LJ)**	Appropriate materials added to the library. Compendium of recommended delivery methods.	1,200	1
3. Prepare a consistent message for state agencies, communities and watershed organizations regarding why the public should be concerned about the impacts of stormwater on receiving waterbodies. Solicit review and comment from the advisory committee.	**URI (LP, LJ, MG)** , SRICD, Advisory Committee	Message in easy-to-deliver formats for partners at a variety of levels.	15,100	3
4. Identify best available options for delivery of the messages and materials discussed in task 3 and 6.	**URI (LP, LJ, MG)** , Advisory Committee	List of options for delivery of the messages.	5,000	4 (or February 2006 which ever is earlier)
5. Deliver the consolidated state-agency message in task 3. Continue delivery of consolidated message.	**URI (MG)**, Advisory Committee	Delivery of the consolidated state-agency message.	216,800	10 - 42

6. Using the consistent message in task 3 as a starting point, develop source-specific contamination outreach messages and materials.	**URI**, SRICD, Advisory Committee	Source-specific contamination outreach messages and materials	160,000	18
7. Run a pre-survey followed up by post-survey after the outreach is conducted to see how effective the program was. Make adjustments to the outreach program as needed.	**URI** (MG, LP) Advisory Committee	Results of the survey. Final outreach program and message for DEM and DOT.	16800	9
			$ 416,100	

D Implementation Schedule, Evaluation and Assessment

Phase II requires realistic schedule for implementation of all strategies and elements, which should focus on a forty-two month timeframe. Phase II also requires reporting that includes the following elements:

- Status of compliance with permit conditions, including an assessment of the appropriateness of the selected BMPs and progress toward achieving the selected measurable goals.
- Results of any information collected and analyzed.
- Summary of the storm water activities planned for the next reporting cycle.
- Change in any identified best management practices or measurable goals.
- Notice of relying on another governmental entity to satisfy some of the permit obligations.

This part of the project will focus on development of an appropriate implementation schedule as well as evaluation and assessment of all work performed for it. As with other parts of the project the advisory committee will be utilized as a sounding board for the work. As a starting point, URI will work with DEM and DOT to identify specific measures of compliance by which muncipal progress in meeting permit conditions will be evaluated. To ensure consistency throughout the project and among various activities and project partners, URI will be responsible for this task. Assessment reports submitted under Subtask D 3 will include summary results of project effectiveness based on assessments conducted in Task C under the direction of Dr. Marion Gold.

D. Implementation Schedule, Evaluation and Assessment

Tasks	Participants	Deliverables	Grant Budget	Month
1. Develop an implementation schedule each permit year for each set of tasks in the scope of work and solicit review and comment from the advisory committee.	**URI (LJ, MG)**, Advisory Committee	Draft implementation schedule with comments from the advisory committee.	5000	3, 15, 27, 39
2. Incorporate comments from the advisory committee and present to DOT and DEM for final approval.	**URI (LJ, LP)**	DEM/DOT approved implementation schedule.	3000	4, 16, 28, 40
3. Draft annual evaluation and assessment reports for this scope of work each permit year and solicit review and comment from the advisory committee.	**URI (LP, MG)**, Advisory Committee	Draft annual evaluation and assessment reports. Comments from the advisory committee.	20,000	Jan 10 each annum, starting in 2007.
4. Incorporate comments from the advisory committee and present report to DOT and DEM for final approval.	**URI (LJ, LP)**, Advisory Committee	DEM/DOT approved report.	3000	Feb 10, each annum, starting in 2007.
5. With assistance of advisory committee, adjust implementation schedule as needed based on annual evaluation. Provide any recommended changes to DOT/DEM for final approval	**URI (LP, LJ)**, Advisory Committee	Adjusted implementation schedule with DEM/DOT approval.	4600	Mar 10, each annum, starting in 2007.
			35,600	

DELIVERABLES

Task A:

- Steering committee membership, agendas, attendance sheets and minutes.
- Completed needs assessment.

Task B:

- List with consensus from the advisory committee.
- Outlines of training modules. Comments from the advisory committee.
- Drafts of training modules. Comments from the advisory committee.
- Schedule of workshops.
- Workshops and workshop materials including: mailer to audience, agenda, handouts (e.g., training module) and other items as appropriate

Task C:

- Library of stormwater outreach materials and literature.
- Appropriate materials added to the library. Compendium of recommended delivery methods.
- Message in easy-to-deliver formats for partners at a variety of levels.
- List of options for delivery of the messages.
- Delivery of the consolidated state-agency message.
- Source-specific contamination outreach messages and materials
- Results of the survey. Final outreach program and message for DEM and DOT.

Task D:

- Draft implementation schedule with comments from the advisory committee.
- DEM/DOT approved implementation schedule.
- Draft annual evaluation and assessment reports. Comments from the advisory committee.
- DEM/DOT approved report.
- Adjusted implementation schedule with DEM/DOT approval.

PROJECT MANAGER:

Name: Lorraine Joubert

Address: University of Rhode Island Cooperative Extension
Natural Resources Science
Coastal Institute in Kingston
1 Greenhouse Road
Kingston, RI 02881

Phone: 401-874-2138
Fax: 401-874-4561
Email: ljoubert@uri.edu

ESTIMATED TOTAL COST, STATE AND MATCH AMOUNTS:

TOTAL: $671,500

Southern Rhode Island Conservation District
60 Quaker Lane, Suite 46 • Warwick, RI 02886-0114 • Phone (401) 822-8832 • Fax (401) 828-0433

October 17, 2005

To: Lorraine Joubert, RA IV, University of Rhode Island
From: Alicia J. Lehrer, Southern Rhode Island Conservation District

Alicia J. Lehrer

Re: Intent to Collaborate on Upcoming Project

The Southern Rhode Island Conservation District is pleased to collaborate with the University of Rhode Island on the project entitled:

Storm Water Phase II Public Outreach, Education, Involvement and Participation

The Southern Rhode Island Conservation District (SRICD) is a partner in this project, providing a role in the following areas:

Under Task A, the SRICD is responsible for providing support to the advisory committee. The SRICD will be responsible for providing meeting space, assisting in meeting facilitation, developing attendance sheets and taking minutes.

Under Task B, the SRICD is responsible for several areas of training, including:

- General support with meeting logistics and managing training subcontracts.
- Develop and conduct training in use of TR 55 to estimate storm water runoff volumes, rate and to compare pre- and post- development hydrology as required for "low impact" development methods.
- Coordinate with EPA, DEM and DOT to organize and deliver training on "good housekeeping" practices for local/state maintenance staff responsible for routine roadway maintenance and public facilities. Training will focus on capacity development through "train the trainer" programs.
- Review local ordinances, develop annotated model ordinances and enforceable policies for selected topics.

Under Task C, SRICD will provide support to the municipal work group in the development of a model outreach program.

Southern Rhode Island Conservation District Budget

Project period: 10/1/05 to 4/30/09

	Yr 1	Yr 2	Yr 3	Yr 4 (6 mos)	Total
Southern RI Conservation District	$16,400	$10,350	$5,000	$1,000	$32,750
Low Impact Dev. Center Training (subcontract)	8,000	8,000			16,000
RIDEM Stormwater Manual Training (subcontract)	4,000	4,800	2,000	2,000	12,800
Total SRICD	28,400	23,150	7,000	3,000	$61,550

Please see URI proposed budget and notes for estimated expenses

Appendix II

BUDGET DETAIL

Project Name:

Estimated Personnel Expenses

Name	Title	Salary	% of Time	Salary Costs	Fringe	Total
Totals						**$0**

Budget Estimate

	Total Costs	Grant Requested	Nonfederal Match		
			State	Contractor	Other
Estimated Personnel Expenses (from above)					
Indirect Cost					
Contractual					
Supplies					
Equipment					
Travel					
Construction					
Other--Bid advertisement					
Total					

Storm Water Phase II Public Outreach, Education, Involvement and Participation

URI Cooperative Extension October 2005

BUDGET	Year 1	Year 2	Year 3	Year 4 (6 months)	TOTAL REQUEST
	10/1/05-9/30/06	10/1/06-9/30/07	10/1/07-9/30/08	10/1/08-3/31/09	
A. Personnel					
L. Joubert, Res Assoc.IV	17,006	31,193	36,917	25,810	110,926
M. Gold, Dir. CE ed ctr.	10,069	10,421	10,786	6,793	38,069
M Esten Res Assoc. II	9,034	9,350	9,677	3,962	32,022
L. Philo Res. Associate II	12,189	22,358	26,159	17,939	78,646
Students	3,000	3,000	2,000	1,000	9,000
					0
TOTAL PERSONNEL	**51,298**	**76,322**	**85,539**	**55,505**	**268,664**
B. Fringe Benefits					
LJ	4,337	7,954	9,414	6,582	28,286
MG	2,547	2,637	2,729	1,718	9,631
ME	4,517	4,675	4,838	1,981	16,011
LP	6,948	12,744	14,911	10,226	44,828
TOTAL BENEFITS	**18,349**	**28,010**	**31,892**	**20,506**	**98,757**
TOTAL PERSONNEL AND BENEFITS	**69,646**	**104,332**	**117,431**	**76,011**	**367,420**
D. Travel					
In state	600	700	700	600	2,600
Out of state	1,000	1,000	1,000	500	3,500
TOTAL TRAVEL	**1,600**	**1,700**	**1,700**	**1,100**	**6,100**
E. Supplies					
Computer Projector	1,000				1,000
Educational displays and related outreach materials	1,600				1,600
Office and workshop supplies, publications and eduational materials	300	400	400	300	1,400
Software and computer /printer supplies	1,100	1,100	1,100	800	4,100
Mailing and Postage	200	1,400	1,400	780	3,780
Printing and copying	500	2,000	3,000	3,000	8,500
TOTAL SUPPLIES	**4,700**	**4,900**	**5,900**	**4,880**	**20,380**
F. Contractual					
1. Southern RI Consv District	16,400	10,350	5,000	1,000	32,750
Low Impact Development Center-Training and Technical support	8,000	8,000			16,000
RIDEM Stormwater Manual training	4,000	4,800	2,000	2,000	12,800
Subtotal SRICD	28,400	23,150	7,000	3,000	61,550
2. Professional services to edit, design and layout of conference brochures, publications and other outreach materials	2,000	2500	2000	2000	8,500
3. Outreach design and media services	2,080	13,000	20,000	20,000	55,080
4. Survey design, assessment and evaluation		1,680	3,500	3,500	8,680
TOTAL CONTRACTUAL	**32,480**	**40,330**	**32,500**	**28,500**	**133,810**
G. Other					
URI Coastal Institute Computer / Web services and workshop/conference support	3,000	5,000	5,000	3,800	16,800
TOTAL OTHER COSTS	**3,000**	**5,000**	**5,000**	**3,800**	**16,800**
TOTAL DIRECT COSTS	**111,426**	**156,262**	**162,531**	**114,291**	**544,510**
INDIRECT 25%	27,007	33,278	38,883	27,823	126,990
TOTAL REQUESTED FROM AGENCY, BY TASK	**138,433**	**189,539**	**201,414**	**142,114**	**671,500**

Budget Notes:

Students - Based on undergraduates, average of 16 weeks each fall and spring semester, 8 hours/week, @ $8.00/hr, approx. $2000. FICA is not charged during the academic year.

Materials and supplies - includes office supplies, folders, labels, and other resources used in educational programs.

Travel - Estimate based on average of 4 meetings/workshops per month for all URI staff, approximately 40 mi round trip each @ 0.405 /mi. Out of state travel funds to be used for staff participation at regional and national conferences for training and to present project results. May also be used for travel expenses of invited speakers participating in RI training programs.

Printing and copying - includes copying and printing mateirals for workshops, supporting handouts, and for printing updated/ new fact sheets.

PERSONNEL

L.Joubert is Director of URI Nonpoint Education for Municipal Officials and will serve as project manager and lead outreach to municipal officials at avg. of .5 FTE . L. Joubert waives health benefits and fringe estimates are reduced accordingly.

Lisa Philo, a Research Associate II will assist in the literature search, development of outreach products with consistent messages, and assessment and evaluation of outreach materials, at an average of .55 FTE.

Marie Esten will be hired as a Research Associate II, at an average .23 FTE, to assist in development of educational materials focusing on implementation of the DEM stormwater manual and DOT staff training. Educational materials for local officials will incorporate GIS
products to demonstrate need for stormwater controls and GIS-based tools such as URI's 'MANAGE" model to evaluate and manage stormwater impacts from new development. Ms. Esten wil lalso assist in project coordination.

Dr. Marion Gold, Director of the Cooperative Extension education center, will lead development and implementaton of a model stormwater education and outreach program under Task C at an avg. of .15 FTE. Through the NBC "Plant Pro" television program, Dr. Gold currently reaches 150,000 households, focusing on environmentally sustainable landscape and garden care practices. Development of the public information campaign will draw on the expertise of communication specialists within the University. In addition, Dr.Gold will assist in developing a consistent message for state and municipal staff responsible for grounds management using "GreenShare" educational materials. Training in sustainable landscape care practices will be conducted as part of annual training for municipalities in "good housekeeping" practices. M. Gold waives health benefits and fringe estimates are reduced accordingly.

Dr. Arthur Gold, Hydrology professor in the Natural Resources Science Department and Director of the URI Cooperative Extension Water Quality Program, will serve as project science advisor and will assist in review of training materials, focusing on technical accuracy.

CONTRACTUAL

Subcontract: The Southern Rhode Island Conservation District

The Southern Rhode Island Conservation District (SRICD) is a key partner in this project, taking a lead role in the following areas:

Under Task A, the SRICD will provide support for stakeholder involvement by assisting in coordinating the advisory committee.

Under Task B, the SRICD is responsible for several areas of training, including: General support in organizing and developing training programs, in conjuction with the URI Coastal Institute.

Develop and conduct training in use of TR 55 to estimate the rate and volume of stormwater runoff volumes, and to compare pre- and post- development hydrology as required for "low impact" development methods and use of the RIDEM stormwater manual.
The SRICD will manage subcontracts with the LID Center and RIDEM Stormwater manual trainers in coordination with URI, and without overhead charge by SRICD.
Good housekeeping training – SRICD will coordinate with DEM, EPA and URI to organize biennial training on management of DPW facilities and municipal storm sewers.
Assist in developing consistent messages on these topics and erosion and sediment control for state/local supervisors and field staff.
Model ordinances and enforceable procedures - develop model ordinances for stormwater system maintenance, utililty districts and
erosion and sediment control focusing on improved field inspection and enforcement.

Task C- Provide general support in development of consistent messages and delivery strategies for stormwater control.

Contractors:
Low Impact Development Center: Two day training $8,000; additional technical support and training in low impact stormwater runoff planning and control $8,000, to include development of LID educational materials, guidance in selecting watershed based stormwater treatment standards, and recommended revisions to the RI stormwater manual as needed. Note: other nonprofit organizations with similar expertise may be selected depending on cost and availability)

RIDEM stormwater manual training - development of training modules in planning and design of stormwater treatment systems, including new methodologies for design and sizing (Stokes, Darcy's law). Consultants will be selected based on familiarity with the manual, including preference given to authors of the manual.

Edit, design and layout of publications and other outreach materials. Includes publications presenting a consistent message using a variety of media, as well as workshop brochures and training materials. Focus is on development of materials that can be easily adapted for use by state and local agencies and others.

Outreach design and media services. In implementing an public education campaign, Dr. Marion Gold will work with consulting professionals as necessary to disseminate information exploring a variety of media while focusing on cost effective methods that are sustainable beyond the life of the project.

Survey design, assessment and evaluation. Professional services will focus on evaluating effectiveness of outreach messages and training programs through pre- and post- evaluations. A variety of methods, such as surveys, interviews and focus groups may be used.

OTHER
URI Coastal Institute is responsible for all web services and support in organizing conferences and other educational programs.

INDIRECT
URI overhead is 25%, SRICD is 31%. URI indirect costs are only charged on the first $25,000 of the subcontract to the SRICD

ADDENDIX III

State of Rhode Island and Providence Plantations Contract Offer

CONTRACTOR CERTIFICATION FORM

Contract Identification:	RIDOT Contract ID#
Description	Storm Water Phase II Public Outreach Program
Contractor Name:	University of Rhode Island
Federal Tax ID	#056000522
Address Line 1:	Natural Resources Science Coastal Institute in Kingston 1 Greenhouse Road
Address Line 2:	Kingston, RI 02881
Telephone:	401-874-2138
Fax:	401-874-4561
email:	ljoubert@uri.edu
Contact Person:	Lorraine Joubert
Title of Contact:	Research Associate
RI Foreign Corp #	

NOTICE TO CONTRACTORS

This Certification Form shall be considered an integral part of each offer made by a contractor to enter into an agreement with the State of Rhode Island and Providence Plantations. As such, submittal of this Certification Form, signed by a duly authorized representative of the offer or attesting to the accuracy of the information provided and the offer extended, is a mandatory part of any contract award.

ALL CONTRACTS ARE SUBJECT TO THE FOLLOWING PROVISIONS AND PROCEDURES

Contractors are expected to read and comply with all requirements.

Failure to do so may be grounds for disqualification of the contract referenced above contained herein.

This contract is issued in accordance with the specific requirements described herein, and the State's Purchasing Laws and Regulations and other applicable State Laws. The Regulations, Terms and Conditions and basic information on How To Do Business with the State of Rhode Island are posted on the Rhode Island Vendor Information Program (RIVIP) Website (http://www.purchasing.state.ri.us).

Offers may not be withdrawn, except with the express permission of the State Purchasing Agent. All pricing will be considered to be firm and fixed unless otherwise indicated. After a contract award has been made, failure to meet all requirements may result in a determination of default.

Contractors are advised that this agreement will be considered without exception to be Public Records pursuant to Title 38 Chapter 2 of the Rhode Island General Laws, and will be released for inspection immediately upon request once an award has been made.

Provisions of State labor laws concerning payment of prevailing wage rates shall apply for contracts involving public works construction, alteration, or building repair work. Prevailing wage rates are posted in the information section of the RIVIP.

State Equal Employment Opportunity Compliance certificate and agreement procedures will apply to all awards for supplies or services valued at $10,000 and more. Minority Business Enterprise policies and procedures, including subcontracting opportunities as described in Title 37 Chapter 14.1, of the Rhode Island General Laws, also apply.

In accordance with Title 7 Chapter 1.1-99 of the Rhode Island General Laws, Foreign corporations (a corporation established other than in Rhode Island) shall have the right to transact business in the State.

ALL CONTRACT AWARDS ARE SUBJECT TO THE FOLLOWING DISCLOSURES & CERTIFICATIONS

Contractors must respond to every disclosure statement a person authorized to enter into contracts

Must sign the offer and attest to the accuracy of all statements.

Indicate Yes (Y) or No (N):

N 1. Has your firm (or any principal) been subject to any of the following findings by the Federal Government, the State Of Rhode Island or any other jurisdiction? Suspension, Debarment, Indictment, Criminal Conviction. CIRCLE APPROPRIATE ITEM(S).

N 2. Has your firm (or any principal) been fined more than $5000 for a single violation by the Rhode Island Department of Environmental Management for violation of the Rhode Island Fresh Water Wetlands Act (RIGL 2-1-18 to 2-1-24)?

Y 3. I/we certify that I/we will immediately disclose, in writing, to the Chief Purchasing Officer any potential conflict of interest which may occur during the course of the engagement authorized pursuant to this contract.

Y 4. I/we acknowledge that, in accordance with Chapter 37-2-54(3) of the Rhode Island General Laws "no purchase or contract shall be binding on the State or any agency thereof unless approved by the Department of Administration or made under general regulations which the Chief Purchasing Officer may prescribe."

Y 5. I/we certify that the above Contractor information is correct and complete.

Y 6. I/we certify that I or my firm possesses all licenses required by Federal and State law and regulation as they pertain to the requirements of the solicitation and after made herein and shall maintain such required license(s) during the entire course of the contract resulting from the offer contained herein and should my/our license lapse or be suspended, I/we shall immediately inform the Rhode Island State Purchasing Agent in writing of such circumstance.

Y 7. I/we certify that I/we will maintain required insurance during the entire course of the contract resulting from the offer contained herein and, should my/our insurance lapse or be suspended, I/we shall immediately inform the Rhode Island State Purchasing Agent in writing of such circumstance.

Y 8. I/we certify that I/we understand that falsification of any information herein or failure to notify the Rhode Island State Purchasing Agent as certified herein may be grounds for suspension, debarment and/or prosecution for perjury.

Y 9. I/we acknowledge that the provisions and procedures set forth in this form apply to this contract.

Y 10. I/we acknowledge that I/we understand the State's Purchasing Regulations and General Terms and Conditions available at the Rhode Island Divisional Purchases Website (http://www.purchasing.state.ri.us) apply as the governing conditions for any contract or purchase order I may receive from the State of Rhode Island, including the offer contained herein.

IF YOU HAVE ANSWERED "YES" TO QUESTIONS #1 - 2 OR IF YOU ARE UNABLE TO CERTIFY YES TO ITEMS #3 - 10 OF THE FOREGOING, PROVIDE DETAILS/EXPLANATION BELOW AND/OR IN AN ATTACHED STATEMENT. INCOMPLETE CERTIFICATION FORMS SHALL BE GROUNDS FOR DISQUALIFICATION OF OFFER.

Signature below certifies (1) that the above statements and information are accurate, (2) that vendor understands and has complied with the requirements set forth herein and (3) that, where appropriate, a product is guaranteed to be free of Year 2000 date change problems and meets the Rhode Island Year 2000 Product Warranty set forth on the RIVIP Website (www.purchasing.state.ri.us).

Lynn Pasquerella Date OCT 20 2005

Contractor's Signature (Person authorized to enter into contracts; signature must be in ink)

LYNN PASQUERELLA

VICE PROVOST FOR RESEARCH

Print Name and Title of Company official signing offer

Date Printed: 10/18/05

Appendix IV
Contract Management

In accordance with Paragraph 8, the **DEPARTMENT** appoints the representatives indicated below as the Contract Officers:

Primary

Name: Edward Szymanski, Associate Chief Engineer

Address: Rhode Island Department of Transportation
Two Capitol Hill
Providence, Rhode Island 02903

Phone: (401) 222-5826 ext. 4253

Fax: (401)

Email: eszymanski@dot.state.ri.us

Secondary

Name:

Address:

Phone:

Fax:

Email:

In accordance with Paragraph 9, the **CONTRACTOR** appoints the representatives indicated below as the Project Officers:

Primary

Name: Lorraine Joubert
Coordinator, RI Nonpoint Education for Municipal Officials

Address: University of Rhode Island Cooperative Extension
Natural Resources Science
Coastal Institute in Kingston
1 Greenhouse Road
Kingston, RI 02881

Phone: 401-874-2138

Fax: 401-874-4561

Email: ljoubert@uri.edu

Secondary
Name:

Address:

Phone:

Fax:

Email:

In accordance with Paragraph 9, the **DEM** appoints the representatives indicated below as the Project Officers:

Primary

Name:	Eric Beck, Supervising Sanitary Engineer
Address:	Rhode Island Department of Environmental Management Office of Water Resources 235 Promenade St. Providence, RI 02908
Phone:	(401) 222-4700 Ext. 7202
Fax:	(401) 222-3564
Email:	ebeck@dem.ri.gov

Appendix V
Payments and Reports Schedule

The **CONTRACTOR** agrees to provide (a) three single-sided, single-spaced copies of the final, **DEPARTMENT**-approved report for reproduction purposes and (b) a digital version of the final document as well as any other documents, maps, images, outreach materials, or other publications resulting from **Appendix I-- Scope of Work**.

Multiple payments under this agreement will be made in the form of reimbursement upon submission of SubTask deliverables. See Task Tables for Reimbursement Amount (Budget) and Deliverable Date (Month) (Start Month is October 2005). Payment is subject to DEM technical review for accuracy and compliance.

Appropriate documentation of billable expenses shall include payroll summary sheets, which identify the employee, the period (e.g., dates) worked and the expense incurred for that work. Non-personnel expenses shall be documented by canceled check whenever practicable and may be required at the option of the **DEPARTMENT**. Documentation shall be consistent with requirements of OMB-A21 and OMB-A110.

Documentation of matching expenses in the amount of zero dollars ($0) shall be presented with the request for reimbursement in order to receive payment. Failure to document match at the required rate may result in refusal, reduction or withholding of the requested payment.

Narrative, fiscal reports and other deliverables shall be sent to Contract Management Officer:

Edward Szymanski, Associate Chief Engineer
Rhode Island Department of Transportation
Two Capitol Hill
Providence, Rhode Island 02903

And the **DEM** Project Officer:

Eric Beck, Supervising Sanitary Engineer
Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade St.
Providence, RI 02908

The **DEM** Project Officer shall review all narrative reports for technical accuracy and to ensure compliance with the requirements of the **DEPARTMENT**'s obligations pursuant to Storm Water Phase II Public Outreach and Education and aspects of Public Involvement and Participation management measures as discussed in **Appendix I--Scope of Work**. Once this review is complete the **DEM** Project Officer shall forward **DEM**'s findings to the Contract Officer. It shall be the obligation and purview of the Contract Officer to make final payment approval.

All reports are due in accordance with the **Appendix I--Scope of Work**. Failure to provide acceptable program and fiscal reports within the prescribed time frame may result in a delay of payment or the withholding of funds to the **CONTRACTOR**.

Appendix VI
Fiscal Assurances

The **CONTRACTOR** agrees to segregate all receipts and disbursements pertaining to this agreement from recipients and disbursements from all other sources, whether by separate accounts or by utilizing a fiscal code system.

The **CONTRACTOR** assures a system of adequate internal control will be implemented to ensure a separation of duties in all cash transactions.

The **CONTRACTOR** assures the existence of an audit trail, which includes: cancelled checks, voucher authorization, invoices, receiving reports, and time and distribution reports.

The **CONTRACTOR** assures a separate subsidiary ledger of equipment and property will be maintained.

The **CONTRACTOR** agrees any unexpended funds from this agreement are to be returned to the **DEPARTMENT** at the end of the time of performance unless the **DEPARTMENT** gives written consent for their retention.

The **CONTRACTOR** assures insurance coverage is in effect in the following categories: bonding, vehicles, fire and theft, and liability.

The following federal requirements shall apply as indicated:

OMB circular a-21	cost principles for educational institutions
OMB circular a-87	cost principles applicable to grants and contracts with state and local governments
OMB circular a-102	uniform administrative requirements for grants-to-aid state and local governments
OMB circular a-110	uniform administrative requirements for grants and agreements with institutions of higher education, hospitals, and other nonprofit organizations
OMB circular a-122	cost principles for nonprofit organizations
OMB circular a-21 and a-122	prohibition against using federal or matching funds for lobbying or political activities

If the **CONTRACTOR** expends federal awards during the **CONTRACTOR**'s particular fiscal year of $300,000 or more, then OMB circular a-133, Audits of **STATE**, Local Governments and Nonprofit Organizations shall also apply.

This agreement may be funded in whole or in part with federal funds. If so, the cfda reference number is 66-419.

Appendix VII
Notice to Departmental Contractors Regarding Responsibilities Under Title VI Of The Civil Rights Act Of 1964

Public and private agencies, organizations, institutions, and persons that receive federal financial assistance through the **STATE** are subject to the provisions of Title VI of the Civil Rights Act of 1964 and the implementing regulations of The United States that require that no person shall be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in its programs and activities on the Founds of race, color, or national origin. It is the responsibility of each service **CONTRACTOR** to acquaint itself with all of the provisions of the Title VI regulations. A copy of the regulations is available upon request at http://www.maec.org/laws/title6.html.

Appendix VIII
Notice to Departmental Contractors Regarding Responsibilities Under Section 504 of the Rehabilitation Act Of 1973

Public and private agencies, organizations, institutions, and persons that receive federal financial assistance through the **STATE** are subject to the provisions of 504 of the Rehabilitation Act of 1973 and the implementing regulations of the which prohibits discrimination against handicapped persons in or other social services or benefits.

It is the responsibility of each service **CONTRACTOR** to acquaint itself with all of the provisions of the Section 504 regulations. A copy of the regulations is available upon request at http://www.dol.gov/oasam/regs/statutes/sec504.htm .

Appendix IX
Contractor Responsibilities Regarding
Fair Share for Procurement, Construction and Subcontracting

The **CONTRACTOR** agrees to comply with EPA's Program for Utilization of Small, Minority and Women's Business Enterprises in procurement under assistance agreements in accordance with the following, as appropriate.

a. The recipient must ensure to the fullest extent possible that at least 10 percent of Federal funds for prime contracts or subcontracts for supplies, construction, equipment or services are made available to organizations owned or controlled by socially and economically disadvantaged individuals, women, and historically black colleges and universities.

The recipient agrees to include in its bid documents an MBE "Fair Share" percentage (7%) and a WBE "Fair Share" percentage (3%) which total at least 10 percent and to require all of its prime **CONTRACTOR**s to include in their bid documents for subcontracts an MBE "Fair Share" percentage (7%) and a WBE "Fair Share" percentage (3%) which total at least 10 percent.

To evaluate compliance with the "Fair Share" policy, the recipient also agrees to comply with the six affirmative steps stated in 40 CFR 30.44(b), 31.36(e) or 35.6580(a), as appropriate.

The recipient agrees to submit EPA Form 5700-52A "MBE/WBE Utilization Under Federal Grants, Cooperative Agreements, and Interagency Agreements", to the Contract Office by October 15th of each year. Negative reports are also required.

b. Minority business enterprises shall be included in all procurements and construction projects and shall be awarded a minimum of ten percent (10%) of the dollar value of the entire procurement or project in accordance with Minority Business Enterprise (RIGL 37-14.1) and the "Regulations Governing Participation by Minority Business Enterprises in **STATE** Funded and Directed Public Construction Projects, Construction Contracts and Procurement Contracts for Goods and Services," as amended.

Appendix X
Drug-Free Workplace Policy

Drug use and abuse are subjects of immediate concern in our society. These problems are extremely complex and ones for which there are no easy solutions. From a safety perspective, the users of drugs may impair the well-being of all employees, the public at large, and result in damage to property. Therefore, it is the policy of the **STATE** that the unlawful manufacture, possession, or use of a controlled substance is prohibited in the workplace. Any employee (s) violating this policy will be subject to discipline up to and including termination. An employee may also be discharged or otherwise disciplined for a conviction involving illicit drug behavior, regardless of whether the employee (s) conduct was detected within employment hours or whether his/her actions were connected in any way with his or her employment. The specifics of this policy are as follows:

Any unauthorized employee who gives or in any way transfers a controlled substance to another person or sells or manufactures a controlled substance while on duty, regardless of whether the employee is on or off the premises of the employer will be subject to discipline up to and including termination.

The term "controlled substance" means any drugs listed in 21 USC, section 812 and other federal regulations. Generally, all illegal drugs and substances are included, such as marijuana, heroin, morphine, cocaine, codeine or opium additives, LSD, DMT, STP, amphetamines, methamphetamines, and barbiturates.

Each employee is required by law to inform the agency within five (5) days after he/she is convicted for violation of any federal or **STATE** criminal drug statute. A conviction means a finding of guilt (including a plea of *nolo contendere*) or the imposition of a sentence by a judge or jury in any federal or **STATE** court.

The employer (**CONTRACTOR** or subcontractor) will be responsible for reporting conviction(s) to the appropriate federal granting source within ten (10) days after receiving notice from the employee or otherwise receives actual notice of such conviction(s). All convictions must be reported in writing to the Office of Personnel Administration (OPA) time frame.

If an employee is convicted of violating any criminal drug statue while on duty, he/she will be subject to discipline up to and including termination. Conviction (s) while off duty may result in discipline or discharge.

The **STATE** encourages any employee with a substance problem to seek assistance from the Rhode Island Employee Assistance Program (RIEAP).

The law requires all employees to abide by this policy.

Appendix XI

Drug-Free Workplace Policy Contractor Certificate of Compliance

I, LYNN PASQUERELLA VICE PROVOST FOR RESEARCH, **CONTRACTOR** doing business with the **STATE**, hereby acknowledge that I have received a copy of the **STATE** policy regarding the maintenance of a drug-free workplace. I have been informed that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance (to include but not limited to such drugs as marijuana, heroin, cocaine, pep, and crack, and may also include legal drugs which may be prescribed by a licensed physician if they are abused), is prohibited on **STATE** premises or while conducting **STATE** business. I acknowledge that my employees must report for work in a fit condition to perform their duties.

As a condition for contracting with the **STATE**, as a result of the federal omnibus drug act, I will require my employees to abide by the **STATE**'s policy. Further, I recognize that any violation of this policy may result in termination of the contract.

Lynn Pasquerella — OCT 20 2005

CONTRACTOR's Authorized Agent/Signature — **Date**

Appendix XII
Drug-Free Workplace Policy
Subcontractor Compliance

LYNN PASQUERELLA
VICE PROVOST FOR RESEARCH

I, _____, a **CONTRACTOR** doing business with the **STATE**, hereby certify that all approved subcontractors performing services under the terms of this agreement will have executed written contracts with this agency, and all contracts will be maintained on file and produced upon request. All contracts must contain language identical to the provisions of this agreement as follows:

Lynn Pasquerella — OCT 20 2005

CONTRACTOR's Authorized Agent/Signature — **Date**

Appendix XIII
Contractor Certificate of Compliance
Regarding Environmental Tobacco Smoke

Public Law 103-227, Part C - Environmental Tobacco Smoke, Also Known As The Pro-Children Act of 1994 (**act**), requires that smoking not be permitted in any portion of any indoor facility owned or leased or contracted for by an entity and used routinely or regularly for the provision of health, day care, education or library services to children under the age of 18, if the services are funded by federal programs either directly or through state or local governments, by federal grant, contract, loan, or loan guarantee. The law does not apply to children's services provided in private residences, facilities funded solely by Medicare or Medicaid funds, and portions of facilities used for inpatient drug or alcohol treatment. Failure to comply with the provisions of the law may result in the imposition of a civil monetary penalty of up to $1000 per day and/or the imposition of an administrative compliance order on the responsible entity.

Signature below certifies that **CONTRACTOR** will comply with the requirements of the **act**.

Lynn Pasquerella — OCT 20 2005

CONTRACTOR's Authorized Agent/Signature — **Date**

Appendix XIV
Contractor Certificate of Compliance
Regarding Hotel and Motel Safety

CONTRACTOR certifies that all requisitions for conference, meeting, convention, or training space funding in whole or in part with federal funds complies with the Hotel and Motel Fire Safety Act of 1990.

If a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the federal government, the **DEPARTMENT** may terminate this transaction' for cause of default.

Lynn Pasquerella — OCT 20 2005

CONTRACTOR's Authorized Agent/Signature — **Date**

Appendix XV
Certification Regarding Debarment, Suspension, And Other Responsibility Matters - Primary Covered Transactions

CONTRACTOR certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal **DEPARTMENT** or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction or contract under public transaction; violation of federal or state antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

c. Are not presently indicted or otherwise criminally or civilly charged by a governmental entity (federal, state or local) with commission of any offenses enumerated in Item b of this certification; and

d. Have not within a three-year period preceding this application/proposal had one or more public transactions (federal, state or local) terminated for cause or default.

Where the prospective primary participant is unable to certify to any of the statement in this certification, such prospective participant shall attach an explanation to this proposal.

Lynn Pasquerella — OCT 20 2005

CONTRACTOR's Authorized Agent/Signature — **Date**

Attachment C – RIDOT Illicit Discharge Detection and Elimination Program Plan (DRAFT)

RIDOT PHASE II

Storm Water Management

ILLICIT DISCHARGE DETECTION AND ELIMINATION

Rhode Island Department of Transportation's Illicit Discharge Detection and Elimination Plan

An illicit discharge is the unauthorized flow of non-storm water pollutants into the State-maintained drainage system via overland flow, direct connection, or direct dumping into a catch basin.

The Rhode Island Department of Environmental Management has been delegated authority to implement the US Environmental Protection Agency (EPA) NPDES program. In February 2002 and February 2003 the RIPDES regulations were amended to include EPA Phase II requirements. Phase II requires storm water discharges to waters of the state from industrial facilities owned or operated by small municipalities and from small municipal separate storm sewer systems (MS4s), located within urbanized areas or designated by the permitting authority, to obtain a RIPDES storm water permit. RIDOT is regulated as a MS4 under the RIPDES program, and is required to comply with permitting regulations.

The permit conditions include the preparation of a Storm Water Management Program Plan (SWMPP) that requires the development of six minimum control measures and incorporation of TMDL requirements, that when properly implemented will reduce pollutants to the maximum extent practicable. Minimum Measure 3 requires an Illicit Discharge Detection and Elimination Plan to be developed and must contain procedures to identify and initially target priority areas, locate illicit discharges, locate the source of the discharge, remove illicit discharges, document actions, and evaluate impact on the system subsequent to the removal. Included in this Plan are all associated Standard Operating Procedures required to effectively locate and eliminate illicit discharges.

DRAFT

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PRIORITY AREAS FOR LOCATING ILLICIT DISCHARGES

RIDOT is mapping the entire State-maintained drainage outfall system, not just within the urban and densely populated areas as required by the General Permit. As such, the entire system will be investigated for illicit discharges via the dry-weather surveys conducted during the initial outfall inventory.

The RIDEM Office of Water Resources maintains the 303(d) list of impaired waters and has finalized Total Maximum Daily Load (TMDL) studies of specific waters. The TMDL studies will also provide specific areas to investigate for illicit connections. TMDL plans identify impaired water bodies and provide quality goals and the necessary pollutant reductions to achieve these goals. The TMDL plans also identify the responsible sources. Storm water runoff from RIDOT-maintained roadways has been identified in several TMDL studies as a source of pollutants to impaired waterbodies. Where indicated in a TMDL study, RIDOT will focus IDDE actions in the appropriate area.

Priority will also be given to complaints received from the Public or any State Agency. Complaints will be investigated and cataloged in the RIPDES database. All actions will also be documented in the database.

LOCATING ILLICIT DISCHARGES

Illicit connections and discharges will be identified through identification of RIDOT-maintained outfalls, dry weather surveys of outfalls, design or construction projects, routine maintenance, or through the receipt of a complaint (either public or State Agency (DEM, DOH)).

RIDOT continues to identify, locate, and inspect all known outfalls. During outfall mapping, dry-weather surveys are conducted (must be 72-hours after a 0.10-inch rain event). If flow is observed from an outfall, dry weather monitoring is conducted (see following DRY WEATER SURVEYS AND SAMPLING section).

During Design and Construction projects, and any Maintenance activity, the RIDOT system will also be investigated for illicit discharges. When manholes, catch basins, or other drainage structures are opened for inspection or maintenance, the structure will also be inspected for illicit connections. A new Design Policy Memo will be created and RIDOT employee training will be provided.

Complaints regarding illicit discharges or dumping will be forwarded to the Natural Resources Unit, and will be investigated within 10 business days.

DEVELOP OUTFALL MAP

GIS is used to spatially identify the location of outfalls along RIDOT-maintained roads. Maps are produced that provide the outfall identification number, geo-referenced coordinates, and outfall information collected in the field. RIDOT is mapping the entire State system, not just the system located in urban or densely populated areas, as required by the General Permit. RIDOT chose to complete the inventory by drainage basins on a sub-basin level. The Natural Resources Unit, supported by the MIS Office, has been inventorying outfalls through plan research and field data collection. Divided highways and limited access roads pose significant traffic control issues during the summer months. Most of these roads have not been mapped. A mapping vendor may be hired to map outfalls along these limited-access roads. All outfalls of the RIDOT system are anticipated to be mapped by the end of the 5-year General Permit.

Detailed instructions may be found in the 2006 Summer Intern Report (Appendix A). The following is a general overview of the methodology used to collect and process outfall data.

Outfall Mapping – Standard Operating Procedure

Obtain Data Location Through Plan Research

An in-house desktop assessment of drainage outfall locations is the first step in the development of a State-wide outfall map. Using ArcGIS, a Geographical Information Systems (GIS) software package, sub-basin level maps are created with state-maintained roads, other major roads, major lakes and streams, town lines, and outfalls from previous years. Second, construction plans are researched to determine where outfalls are located. Both past and current construction plan sets are used to help locate outfalls.

Useful plans are not always available. For areas where useful plans are not available, field locating is required.

Field Locating Outfalls

Outfalls may be located in the field by considering the following:

1. Outfalls are often found at the lowest point on a road.
2. Outfalls often drain into rivers, lakes, wetlands or ditches.
3. Some roads have arrows painted on the road that point to outfalls.
4. Search the road for catch basins. If there are no catch basins, most likely there are not outfalls (except for bituminous swales).
5. Shine a flashlight to see into the catch basins to determine which direction the pipes leave the catch basin.
6. If a road has catch basins, but does not seem to have outfalls, check streets that run perpendicular (side streets) especially if they are close to lakes, rivers or the ocean. Specifically, search on streets that have access to the water. Another way to find side street outfalls is to follow the man hole covers down the side streets. Follow the man hole covers to the low point or until they end, then look for an outfall there.
7. In areas with dense vegetation, scan the area for large sand deposits. Outfalls off roads that are sanded in the winter may have large deposits of sand.

Obtaining Field Data

The Trimble GeoXT Global Positioning System (GPS) unit is used to map outfall locations. A Data Dictionary was developed to record data about each outfall and loaded onto the GPS unit. In addition, a handwritten datasheet is filled out on-site in

order to give a more detailed location and description. A dry weather discharge survey is also conducted at the time of GPS data collection. When dry weather discharge is noted from the outfall, a dry weather survey and sampling must be conducted.

Digital photographs are taken for each outfall: one looking at the outfall opening and one looking downstream from the outfall. In the case of bituminous swales one downstream picture was taken. When outfalls with dry weather discharge are found, pictures of the surrounding area are taken to assist in locating the outfall in the future. When possible, a picture including a mailbox or house that shows the address is also taken.

Post Processing Of Data

A spatial database has been created for the outfall locations. As mapping data is collected, the Natural Resources Unit, with the assistance of the GIS Office, is responsible for updating the database. Data is downloaded from the GPS unit using PathFinder software. GPS Correction Files, required to correct inaccuracies inherent in the GPS data, are downloaded from the RIDOT base station and used to correct the GPS data in the PathFinder software. Corrected files are exported into Shapefiles that can be edited and used in ArcMap to create the state-wide outfall map.

Additional Elements

RIDOT will be mapping additional structures for an Asset Management Program within the Maintenance Division. This program will be implemented in Permit Years 4 and 5. Until then, a Statewide Drainage Network is being developed using ArcGIS and SQL by the MIS Office that will include outfall data, catch basins, storm water treatment units (swirl units, drainage ponds, swales, etc.), and drainage interconnections. As with outfalls, RIDOT is mapping its entire system, not just the portions required under the General Permit. Additional mapping necessitated by any illicit discharge detection/elimination actions will be included in the Drainage Network database and the Asset Management Program.

DRY WEATHER SURVEYS AND SAMPLING

Dry weather discharge may be an indication of an illicit connection to the State drainage system. Dry Weather Surveys must be conducted 72-hours after a 0.10-inch rain event. If flow is observed from an outfall, a dry weather discharge monitoring sheet must be filled out (Appendix B). To date, dry weather surveys have been conducted during the outfall inventory work.

Dry weather discharges will be sampled for temperature, pH, conductivity, and bacteria, as required by the General Permit.

DRY WEATHER DISCHARGE SURVEY – STANDARD OPERATING PROCEDURE

Dry weather flow is a potential indicator of an illicit connection. If flow is observed in dry weather conditions (considered 72 hours after a 0.10-inch rain event), then it is considered a dry weather discharge.

During outfall location and identification, the outfalls are surveyed for discharge. Prior to going out in the field, www.wunderground.com is consulted for rainfall information to determine if 72-hours have passed since the last rainfall event over 0.10-inches in the area of inspection.

DETERMINE DRY WEATHER CONDITIONS:

1. Go to www.wunderground.com
2. Enter City, State or Zip Code into Search Box
3. Scroll down to the HISTORY & ALMANAC detail box
4. Click Monthly Calendar View (KPVD)
   This will provide a monthly view of daily weather conditions for the inspection area, including actual total precipitation for the day. If more information is required (i.e. time of precipitation), click on the specific day for detailed information.
5. Dry weather conditions exist if it has been 72-hours since a 0.10-inch precipitation event.

DRY WEATHER FLOW SURVEY

The dry weather flow survey sheet must be completed for each dry weather flow observed (Appendix B).

General Information
Include the Outfall ID, Date and Time of the observation, and whether the survey was done conducted during Low or High Groundwater Table. Also note the last 0.10-inch rain event, investigators, and sub-basin.

Illicit Discharge Flow Measurements
Approximate flow measurements (width, depth and velocity) of the discharge.

Visual Observations
Record the following visual observations.

Immediate Surrounding Land Use – Industrial, Commercial, Residential, Municipal, Open Space, Highway, Other (identify or determine through desktop assessment)

Odor – None, Sewage, Rotten Eggs, Oil/Gas, Laundry, Other (identify)

Color – None, Red, Yellow, Brown, Green, Orange, Other (identify)

Floatable – None, Sewage/toilet paper, Oil sheen, Soap suds, Other (identify)

Staining – None, Black, Brown, Yellow, White, Other (identify)

Clarity – Clear, Cloudy, Opaque

Vegetation/Algae Growth – None, Normal, Excessive, Inhibited

Sedimentation – Yes, No

Scouring – Yes, No

Outfalls identified as having dry weather discharge will be sampled for temperature, pH, conductivity, and bacteria, as required by the General Permit. If the outfall flows into a TMDL water, then additional analysis may be conducted based on TMDL requirements. If abnormal readings are observed, then additional analysis (surfactants, fluoride, ammonia/potassium) may also be conducted (see IDDE Flowchart).

DRY WEATHER DISCHARGE SAMPLING POLICY

FOR SURVEYS / SAMPLING CONDUCTED BETWEEN JANUARY 1 AND APRIL 30

- For Dry Weather Discharges INSIDE urbanized or densely populated areas
  - For every discharge RIDOT, will sample for pH, temperature, conductivity and bacteria. Temperature, pH, and conductivity will be tested in the field with a portable meter. Water samples will be brought to the DOH laboratory (following all applicable sampling and transporting procedures) and will undergo the SM1 – MPN Sanitary Microbiology Test, dilutions 10 thru $10^{(-2)}$ for Fecal Coliform. If field conditions imply possible illicit connections, the 10 through $10^{(-5)}$ dilution series may be used.
- For Dry Weather Discharges OUTSIDE urbanized or densely populated areas
  - For every discharge RIDOT will sample for pH, temperature, conductivity.
  - Bacterial samples will not be collected UNLESS:
    - The discharge has abnormal pH, temperature, and conductivity readings (flow temperature higher than outdoor temp; extreme pH of 3 or 12; conductivity > 2000 µS/cm). Temperature, pH, and conductivity will be tested in the field with a portable meter.
    - There are visual observations to indicate illicit connections (toilet paper, grease, foul odor…)
    - The discharge flows to a 2006 listed 303(d) water with PATHOGENS as a cause for the impairment.

FOR SURVEYS / SAMPLING CONDUCTED BETWEEN JULY 1 AND OCTOBER 31

- For Dry Weather Discharges INSIDE and OUTSIDE urbanized or densely populated areas that have been previously tested in January-April

    - For every discharge, RIDOT will sample for pH, temperature, conductivity.
    - Bacterial samples will NOT be collected UNLESS one of the following conditions exist:
        - The Jan-Apr bacterial sample yielded elevated levels of fecal coliform
        - The discharge has abnormal pH, temperature, and conductivity readings (flow temperature higher than outdoor temp; extreme pH of 3 or 12; conductivity > 2000 µS/cm).
        - There are visual observations to indicate illicit connections (toilet paper, grease, foul odor…)
        - The discharge flows to a 2006 listed 303(d) water with PATHOGENS as a cause for the impairment.

- For NEW Dry Weather Discharges (RIDOT has not completed outfall mapping)

    - RIDOT will conduct Dry Weather Surveys for all newly identified outfalls
    - For every dry weather discharge located INSIDE urban or densely populated areas, RIDOT will sample for pH, temperature, conductivity and bacteria.
    - For every dry weather discharge located OUTSIDE urban or densely populated areas, RIDOT will sample for pH, temperature, conductivity. Bacterial samples will NOT be collected UNLESS one of the following conditions exist:
        - The discharge has abnormal pH, temperature, and conductivity readings (flow temperature higher than outdoor temp; extreme pH of 3 or 12; conductivity > 2000 µS/cm). Temperature, pH, and conductivity will be tested in the field with a portable meter.
        - There are visual observations to indicate illicit connections (toilet paper, grease, foul odor…)
        - The discharge flows to flows to a 2006 listed 303(d) water with PATHOGENS as a cause for the impairment.

DRY WEATHER DISCHARGE CONDUCTIVITY/PH/TEMPERATURE SAMPLING

An Oakton waterproof hand-held pH/Conductivity/Temperature meter is used to sample the dry weather discharge for pH, conductivity, and temperature in situ. A separate sample must be taken for the bacterial analysis.

Using a calibrated meter (calibration instructions are not provided – see instructions included with the Oakton Meter), proceed to location of dry weather discharge.

1. Remove protective cap of the pH electrode.
2. Rinse the probe with DI water. If the pH electrode has dehydrated, soak it for 30 minutes in tap water.
3. Switch on the meter. The MEAS annunciator appears on the top center of the LCD. The ATC indicator appears in the lower right hand corner to indicate Automatic Temperature Compensation.
4. Dip the probe into the discharging flow. Make sure the probe is immersed beyond the electrode band. If flow is not deep enough to fully immerse probe, use a clean sample container to collect sample. Sir the sample gently with the probe to create a homogenous sample. Allow time for the readings to stabilize. When the readings are stable, the READY annunciator appears.
5. To toggle between pH and conductivity readings, press the MODE key. Press HOLD to freeze values of pH or conductivity for delayed observation readings.
6. Document pH, conductivity, and temperature readings on Dry Weather Discharge Survey Sheet (Appendix B).

DRY WEATHER DISCHARGE BACTERIAL SAMPLING

1. The Department of Health (DOH) laboratory at 3 Orms St. Providence, RI will provide autoclaved sample bottles. Contact the lab at 222-5588 the morning of sampling to ensure they are prepared to accept samples.
2. Label sample bottles prior to sampling. Use permanent marker or waterproof pen for labeling. See Example Sample Label for information to include the on label.
3. Samples will be collected at the dry weather discharging outfall using the sample bottles provided by the laboratories. In cases where laboratory sample bottles are too large to be fully submersed in the stream, a smaller pre-cleaned bottle will be used to transfer the sample into the larger container.
4. Place sealed sample bottle in sampling stick. When you are ready to take the sample, take the cap off the sample bottle. Hold the cap in your other hand. Do not touch the inside of the bottle or cap. Do not put the cap on the ground.
5. Avoid contaminating the samples by not allowing the sample water to come in contact with anything before it is placed in the bottle. If standing in stream, stand downstream of sampling location. Be careful not to bring the rim or cap of the sample bottle into contact with anything. Samples should be taken with a sample stick to avoid causing upstream disturbance prior to and during sampling.
6. Sample bottles will be filled with sample until the sample reaches between an inch to an inch-and-a-half of the top of the sample bottle.
7. Once sample is taken, sample bottles will be capped and placed in a cooler with ice to maintain a temperature of 4°C.
8. Fecal coliform samples will be delivered to the DOH laboratory within 6 hours of collection.
9. A Sample Submission Form/Chain of Custody Form must be filled out for EVERY sample and submitted to the DOH lab with the sample (see Example Submission Form). Maintain a copy of the filled-out form for RIDOT records.
10. For QA/QC purposes, duplicate fecal coliform samples will be randomly collected at 10% of the sampling stations. All bacteria samples (including field duplicate samples) shall be taken using the above field procedures.
11. A record of the sample locations and sample date and time shall be recorded in a field notebook and made part of the permanent project record. In addition a description of the current weather (i.e. cloud cover, temperature, wind speed, weather conditions) should also be noted. The full name of the samplers should also be recorded in the field notebook.
12. Document analysis results on Dry Weather Discharge Survey Sheet.

CATCH BASIN AND MANHOLE INSPECTIONS

During Design and Construction projects, and any Maintenance activity, the RIDOT system will also be investigated for illicit discharges. When manholes, catch basins, or other drainage structures are opened for inspection or maintenance, the structure will also be inspected for illicit connections. A new Design Policy Memo will be created and RIDOT employee training will be provided.

Catch basins and manholes will also be inspected in the course of an illicit discharge connection investigation. Catch basins located on National Highway Roadways (Routes 295, 195, 95, 10, 6 etc.) have been inventoried for the Asset Management program, but each catch basin will not be inspected due to the size and complexity of the RIDOT system. If an illicit connection is found, the surrounding catch basins and manholes will be inspected to determine the source of the discharge, and the extent of the affected area. Information gathered will be entered into the Drainage Network database and the Asset Management program.

RECEIPT AND CONSIDERATION OF COMPLAINTS

A complaint form (Appendix B) and database have been developed to deal with the receipt of complaints regarding suspected illicit discharges. A webpage has also been added to the RIDOT Storm Water Management Page, accessible from the RIDOT Programs Page (http://www.dot.state.ri.us/programs/).

Once a complaint is received, an inspection will take place within 10 business days. An inspection form will be filled out and appropriate actions will be taken to address the concern. The party registering the complaint will be notified to the findings, and any follow-up actions, if requested.

Complaints will be received via phone, email, verbally, or the RIDOT website, and will be directed to the Natural Resources Unit. Once received, the NRU will document the complaint, conduct the investigation, and forward the matter to the appropriate department, if necessary. The initial complaint will be logged in the RIPDES database. All follow-up actions will also be logged. Information will be provided to RIDEM in the RIPDES Phase II Annual Reports, or upon request.

TRACING THE SOURCE OF AN ILLICIT DISCHARGE

Sources of illicit discharges can be potentially identified by analyzing flows for specific components. Dry weather discharge will be surveyed for visual parameters and sampled for temperature, pH, conductivity, and bacteria, as required by the General Permit. If abnormal readings are observed, then additional analysis (surfactants, fluoride, ammonia/potassium) may also be conducted to aid in the identification of the source. If the initial survey indicates that no flow is present but there are other indicators of an illicit discharge (evidence of toilet paper, grease, excessive plant growth, foul odor), the tracing of the source will also be conducted.

The source may be determined from the dry weather flow survey information and the sampling results. The dry weather survey requires the identification of specific parameters that may identify a likely source. This information, along with a field survey of the surrounding area, may provide the source of the discharge, and may negate the need of more intensive and expensive testing.

FIELD SURVEY

General Information

Outfall ID, Date and Time of the observation, last 0.10-inch rain event, investigators, and sub-basin.

Illicit Discharge Flow Measurements

Approximate flow measurements (width, depth and velocity) of the discharge.

The flow velocity (drip, trickle, moderate, substantial) may be used to prioritize which illicit discharges are traced and eliminated first.

Visual Observations

Immediate Surrounding Land Use, Odor, Color, Floatables, Staining, Clarity, Vegetation/Algae Growth, Sedimentation, and Scouring

The visual observations may help to identify the composition and source of the illicit discharge.

Land Use

The following activities/sites in the listed land uses tend to be of most concern:

Commerical: Dumping/spills, vehicle-related activities, parking lots/landscape maintenance

Municipal: Landfills, airports, sanitary waste water treatment facilities, highways

Industrial: Outdoor material storage, process/rinse water usage, loading/unloading of dry bulk/liquids
Residential: Septic systems, car washing, swimming pool discharges, fertilizer use

Odor
Common sources for the following odors are:
Sewage: Sanitary wastewater treatment facilities
Rotten Eggs: Decaying organic wastes from industries such as meat packers, dairies and canneries produce a strong sulfur smell
Oil/gas: Industry associated with vehicle maintenance or petroleum product storage; gas stations
Laundry: Laundromat, dry cleaning, household laundry

Color
Common sources for the following colors are:
Red: Meat packers
Yellow: Textile facilities and chemical plants
Brown: Meat packers, paper mills, metal works, fertilizers, petroleum refining
Green: Chemical plants, textile facilities
Gray: Dairies

Floatables
Common sources for the following floatables are:
Sewage/toilet paper: Sanitary wastewater
Oil sheen: Petroleum refiner or storage facilities, vehicle service facilities
Soap suds: Laundry discharge

Staining
Common sources for the following stains are:
Black: Leather tanneries
Brown: Iron rich waters
White: Nitrogen rich fertilizer wastes

Clarity
Common sources for the following characteristics are:
Cloudy: Cement and stone working plants, sanitary wastewater, fertilizer facilties, automotive dealers
Opaque: Food processors, lumber mills, metal operations

Vegetation/Algae Growth
Common sources for the following vegetative characteristics are:
Normal: If vegetation beyond the outfall is similar to the conditions near the outfall, then harmful pollutants may/may not be present

Excessive: Excessive vegetation may result from an abundance of decaying organic matter from food product facilities and fertilizer runoff

Inhibited: Indicative of high storm water flows. Chemical dyes and inorganic pigments from beverage facilities, textile facilities, metal product facilities, printing plants, drug manufacturing, petroleum facilities and automotive dealerships

Sedimentation

Construction site erosion, sand/gravel pits, winter road applications are possible source of sedimentation.

Scouring

Occurs from high-velocity storm water runoff.

FIELD ANALYSIS

The dry weather sample analysis may also provide information of the source of the discharge. Flows must be sampled for pH, conductivity, temperature, and bacteria (total coliform).

Temperature

There is no specific temperature range that will indicate the source of the discharge; however, if the discharge is much warmer than the current outdoor temperature it may be indicative of sanitary wastewater or industrial cooling water.

pH

Uncontaminated discharges and sanitary wastewater will yield a pH around 7. Using pH as a industrial chemical source indicator will prove useful if extremes (around 3 or 12) are detected. Industries that commonly release low pH dry weather discharges composed of sulfuric, hydrochloric or nitric acids include textile mills, pharmaceutical manufacturers, metal finishers, as well as companies producing fertilizers and pesticides. Industrial wastes containing high pH composed of cyanide, sodium sulfide and sodium hydroxide are discharged from soap manufacturers, textile mills, metal plating industries, steel mills and producers of rubber or plastic.

Conductivity

Conductivity is used as an indicator of dissolved solids and can be used to distinguish between rainwater and wastewater. Rainwater will yield a conductivity of less than 1000 μS/cm and wastewater much higher. Flows from industrial sources will result in measurements greater than 2000 μS/cm.

If the source is still undetermined, it will be traced via field inspection of catch basins, manholes, and drainage pipes. The location of the illicit discharge will be mapped, along with all contributory areas that could be the potential source. Construction plans, aerial mapping, utility plans, etc. will be reviewed to determine the affected watershed area(s). RIDEM ISDS complaints and the RIDOT Physical Alteration Permit Application (PAPA) records will also be reviewed.

An illicit connection can be connected directly into the State system at a manhole or between manholes, making visual observations difficult. For suspected illegal connections dye tests, smoke tests, or televising the storm line may be utilized to confirm the source of an illicit connection. Such work would be performed by professional contractors. Abutting neighbors, RIDEM, and local Police and Fire Departments will be notified before and after any test. If the investigation does not identify the illicit source, the outfall will be monitored on an intermittent basis.

Investigation actions (including follow-up steps taken) will be documented on reporting sheets, and entered the RIPDES database. As the inspections are conducted, the "additional elements" (manholes, catch basins) will be GPSed and entered into the Drainage Network database. Detailed investigation actions will be kept in the RIPDES database (IDDE Module).

REMOVING THE SOURCE OF AN ILLICIT DISCHARGE

Following any investigation\analysis of data that is collected, RIDOT will send a certified letter with findings, required action, timetable, etc. to the responsible party(ies). RIDOT will work with the responsible party to remove the connection. RIDOT does not have legal enforcement authority, so RIDOT will rely on RIDEM for appropriate enforcement actions, if necessary. However, emergency disconnections may be made if the illicit discharge threatens public safety and health, or the operation of RIDOT's system is impaired.

DOCUMENTING ACTIONS

An Illicit Discharge Investigation Form (Appendix B) will be completed and scanned into an Adobe PDF file to be included within the RIPDES database. All actions will be documented, and files will be maintained by the Natural Resources Unit when an illicit discharge is found. Information will be made available to DEM upon request, or if enforcement is required. Actions will be reported in the RIPDES Annual report each year.

EVALUATION AND ASSESSMENT

All actions (beginning with the incident report, through the "final" action taken) will be recorded in the RIPDES database. All illicit discharge final investigation reports will include an assessment section that will report on any potential long-term impact on the receiving "system" (sewers, drains, bodies of water, etc.).

RIDOT will conclude an investigation successful if the illicit source is removed. Sampling of downstream flow in the DOT storm drain prior to and after the source removal may also be conducted to determine the success.

PUBLIC EDUCATION AND OUTREACH

RIDOT has contracted with the University of Rhode Island Cooperative Extension (URI CE) to provide a State-wide Public Outreach, Education, Involvement and Participation Project. URI CE will develop a consistent message for state agencies, communities, and watershed organizations regarding why the public should be concerned about the impacts of storm water on receiving water bodies and design an outreach campaign to develop or adapt the most compelling messages for Rhode Island audiences. They will also develop source-specific contamination outreach messages and materials. Materials developed in this subtask will be directed to specific audiences to promote change in behavior. URI will develop these materials primarily for use and distribution by municipalities, in implementing customized storm water education programs. State agencies and local watershed organizations are also expected to make use of educational materials developed.

COORDINATING W/ OTHER PHYSICALLY INTERCONNECTED MS4S RE: ILLICIT DISCHARGES

Once an illicit discharge is found, any interconnected MS4 will be notified of the connection and RIDOT actions. The Storm water coordinators list is posted on the RIDEM Website. The MS4 Coordinator will receive a phone call and all applicable information will be forwarded. Coordination efforts will be documented by the Natural Resources Unit.

RESPONSIBLE INDIVIDUALS

Storm Water Advisory Committee:

Chairman
Mr. Edward Szymanski, P.E.
Associate Chief Engineer
Environmental and Intermodal Planning
RI Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-2023

Ms. Emilie Holland
Senior Environmental Scientist
Natural Resources Unit
RI Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-2023

Ms. Allison LeBlanc
Environmental Scientist
Natural Resources Unit
RI Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-2023

Mr. Stephen Kut
GIS Manager
RI Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-6935

Ms. Dana Alexander Nolfe
Chief, Public Relations
RI Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-1362

Mr. Namvar Moghadam
Maintenance Administrator
RI Department of Transportation
360 Lincoln Avenue
Warwick, RI 02888-3030
(401) 222-2378

Mr. Frank Corrao, PE
Deputy Chief Engineer, Construction Management
RI Department of Transportation
2 Capitol Hill
Providence, Rhode Island 02903
(401) 222-2468

ADDRESSING NON-STORM WATER DISCHARGES

LEGAL AUTHORITY

The General Permit requires that to the extent allowable under State law, the MS4 must prohibit and enforce, through an ordinance or other regulatory mechanism available to the operator, un-authorized non-storm water discharges into the system.

RIDOT is not a regulatory agency, and therefore does not have authority to establish or enforce ordinances. However, RIDOT does have standard policies concerning connections to the State drainage system.

RIDOT policy states that it shall be unlawful for any person, firm or corporation to make any connection into a State road drainage system, or to drain or pump water onto the traveled surface of a State Highway without first obtaining written permission from the Director of the State Department of Transportation. In addition, any entity wanting to connect to the RIDOT drainage system is required to apply for a Physical Application Permit.

The applicant is responsible to show no increase to either peak flow or total volume of run off from existing conditions entering the State Drainage System in a 10-year storm, unless in the case of total volume the applicant can demonstrate unconditionally that there will be no impact to the receiving water body(ies). In addition, if a connection to the State Drainage System is proposed, the applicant will be required to address water quality impacts through incorporation of special drainage structures such as vortechs, stormceptors, swirl chambers, sediment ponds, created wetlands (Structural Storm water Treatment) deep sump catch basins and though use of Best Management Practices (BMPs). Design and construction of all storm water mitigation shall be in accordance with the State of Rhode Island “Storm water Design and Installation Standards Manual” by the Department of Environmental Management (RIDEM) and the RI Coastal Resources Management Council (RICRMC). Geo-referenced coordinates are also required to be provided for commercial applicants wishing to directly tie-in to the RIDOT system.

If an illicit connection is found, RIDOT will attempt to work with the responsible party to remove the connection. However, if legal action is required, RIDOT will refer the issue to RIDEM for legal enforcement.

ALLOWABLE NON-STORM WATER DISCHARGES

The General Permit allows for the following activities, provided they are not a significant source of pollutants to the MS4: discharges which result from the washdown of vehicles at retail dealers selling new and used automobiles where no detergents are used and individual residential car washing; external building washdown where no detergents are used; the use of water to control dust; fire fighting activities; fire hydrant flushings; natural springs; uncontaminated groundwater; dechlorinated pool discharges; air conditioning condensate; lawn watering; potable water sources including waterline flushings; irrigation drainage; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled materials have been removed) and where detergents are not used; discharges from foundation or footing drains where flows are not contaminated with process materials such as solvents, or contaminated by contact with soils where spills or leaks of toxic or hazardous materials have occurred; uncontaminated utility vault dewatering; dechlorinated water line testing water; hydrostatic test water that does not contain any treatment chemicals and is not contaminated with process chemicals.

If any of these discharges are found to enter into the RIDOT drainage system, RIDOT may conduct testing to determine if it is a significant source of pollutants. If found to be a contributing factor, RIDOT will attempt to work with the responsible party to improve or remove the discharge. However, if legal action is required, RIDOT will refer the issue to RIDEM for legal enforcement.

REFERRAL TO RIDEM

RIDOT does not have the enforcement authority to establish an ordinance to prohibit illicit discharges to the MS4. RIDOT has created a RIPDES database that will document all actions associated with illicit discharges found through field inspection or complaint. RIDOT will attempt to work with the responsible party to remove illicit connections. However, should legal action be necessary, RIDOT will provide the RIDEM Office of Water Resources all available information and will work with RIDEM to remove the source.

IDDE FLOWCHART

Inspection Type:
- Design/Construction
- Maintenance
- Dry Weather Survey
- Shoreline Survey
- Request by RIDEM/RIDOH
- Complaint

Dry weather surveys must be conducted no less than 72 hours after the last rain fall of 0.10 inches or more.
Other evidence may be foul odor, visual ID of toilet paper, oil, etc.

Temp, pH, Conductivity tested in field

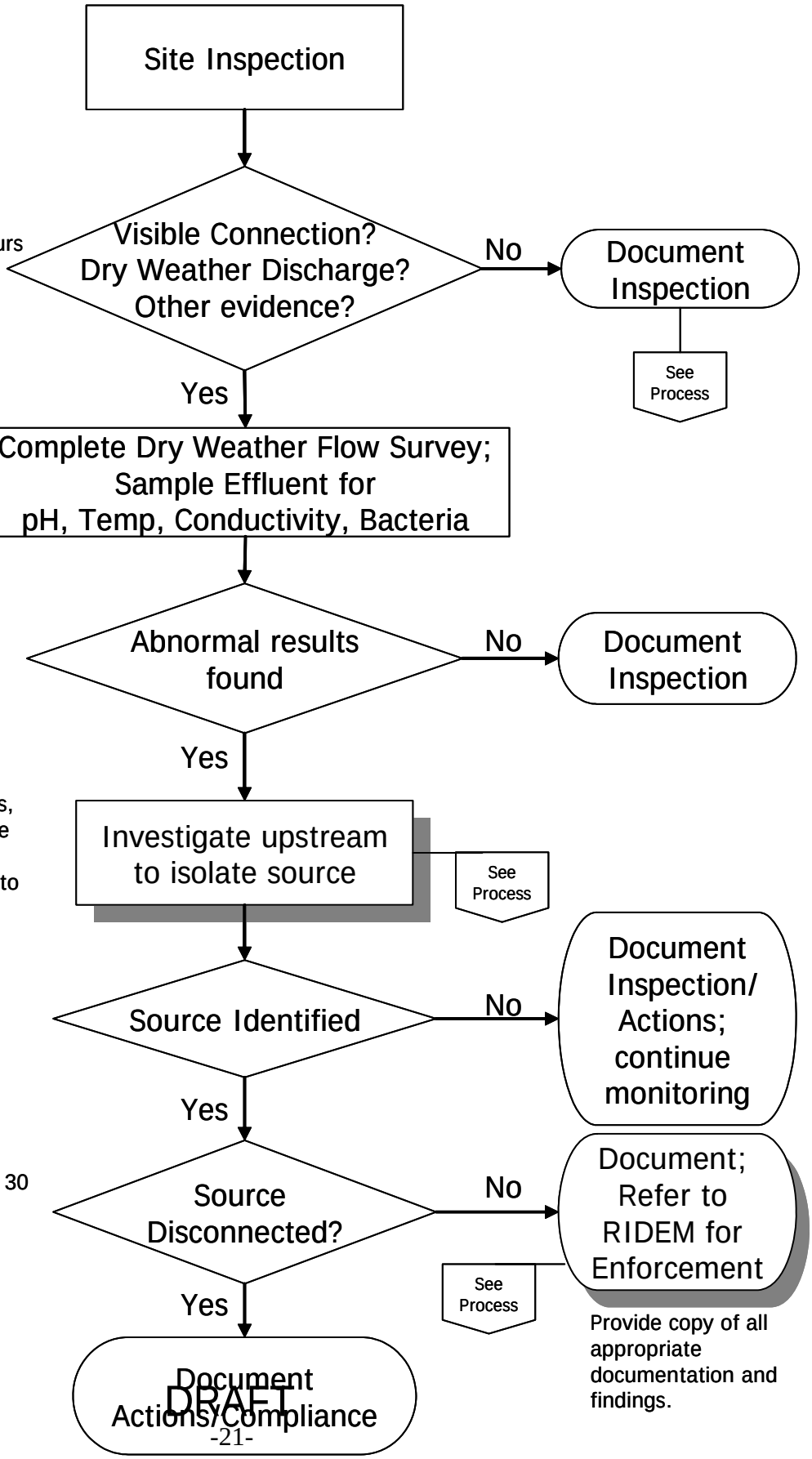
Water sample collected for bacterial analysis (total coliform); analyzed at DOH lab

pH ? 7
temp ? outdoor temp
conductivity > 1000 µS/cm

Additional analysis (surfactants, fluoride, ammonia) and/or dye testing, smoke testing, or TV investigation may be used to determine source.

Responsible Party will be contacted via Letter; will have 30 Days to respond.

Party and DOT will coordinate bringing connection into compliance.



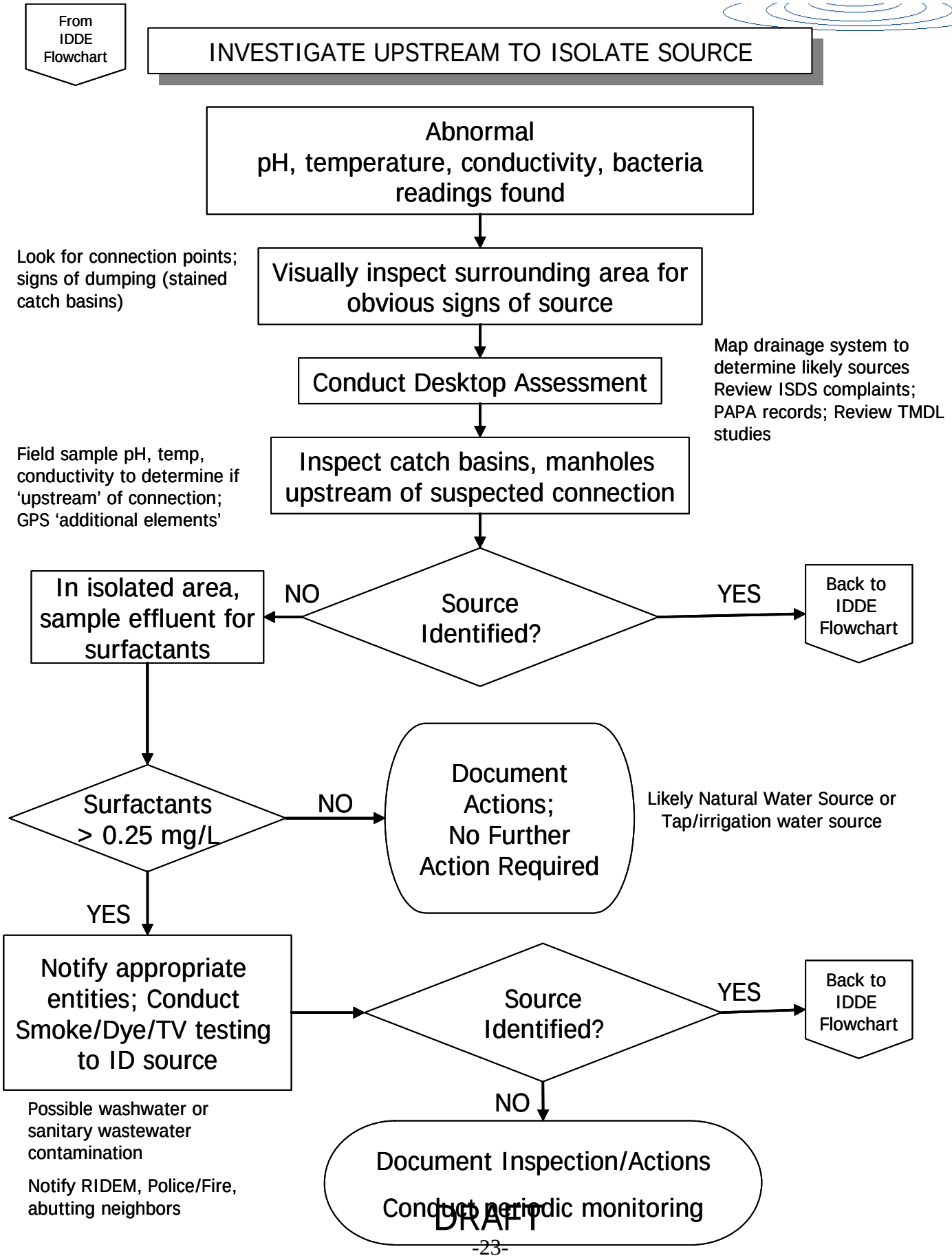
Provide copy of all appropriate documentation and findings.

DRAFT

From
IDDE
Flowchart

Document Actions

Insert instruction for
entering data into the
RIDOT RIPDES DATABASE


From IDDE Flowchart
INVESTIGATE UPSTREAM TO ISOLATE SOURCE
Abnormal pH, temperature, conductivity, bacteria readings found
Look for connection points; signs of dumping (stained catch basins)
Visually inspect surrounding area for obvious signs of source
Conduct Desktop Assessment
Map drainage system to determine likely sources Review ISDS complaints; PAPA records; Review TMDL studies
Field sample pH, temp, conductivity to determine if 'upstream' of connection; GPS 'additional elements'
Inspect catch basins, manholes upstream of suspected connection
Source Identified?
NO
YES
Back to IDDE Flowchart
In isolated area, sample effluent for surfactants
Surfactants > 0.25 mg/L
NO
Document Actions; No Further Action Required
Likely Natural Water Source or Tap/irrigation water source
YES
Notify appropriate entities; Conduct Smoke/Dye/TV testing to ID source
Source Identified?
YES
Back to IDDE Flowchart
NO
Possible washwater or sanitary wastewater contamination
Notify RIDEM, Police/Fire, abutting neighbors
Document Inspection/Actions
Conduct periodic monitoring

DRAFT

From
IDDE
Flowchart

Refer to RIDEM for Enforcement

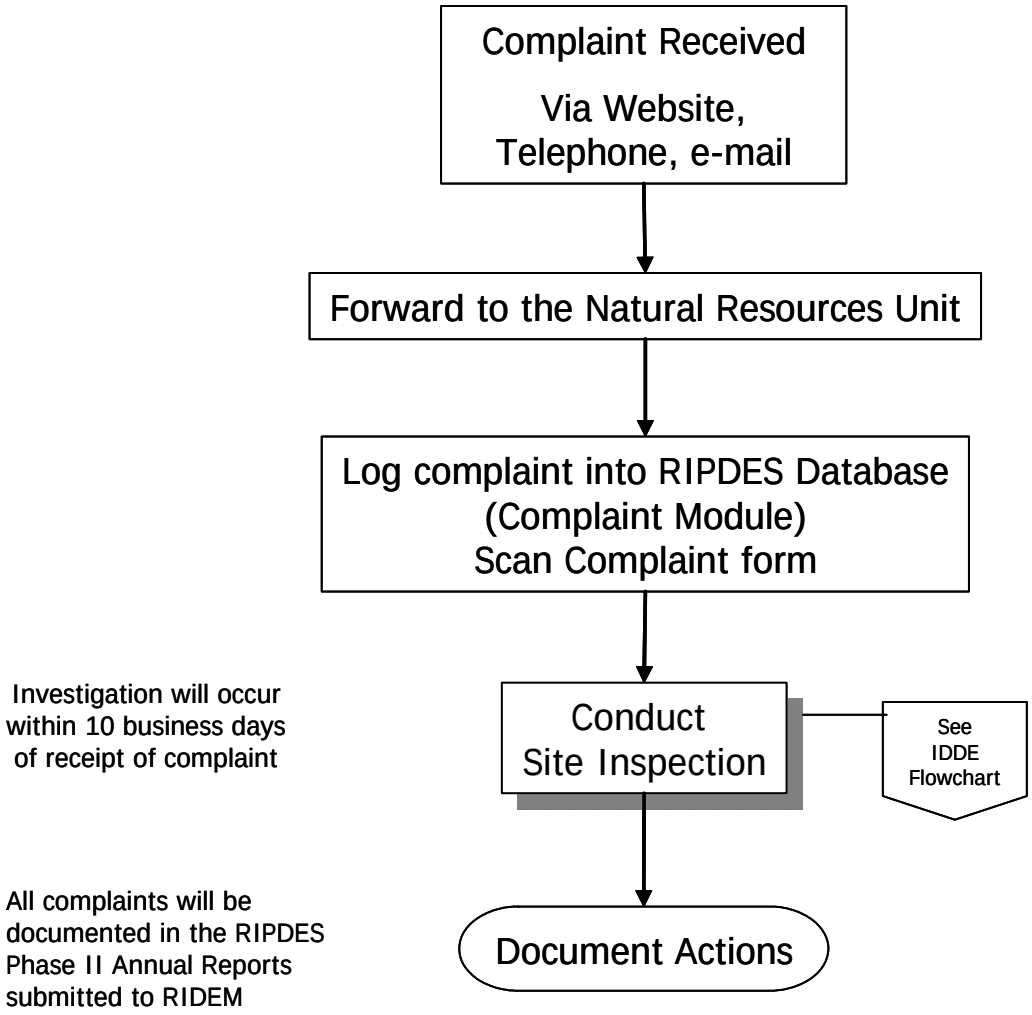
Compile Documentation:
sample analyses, correspondence, action log

Forward to:

David Chopy
Office of Compliance and Inspection
235 Promenade Street
Providence, RI 02908

Erik Beck, PE
Office of Water Resources
RIPDES Program
235 Promenade Street
Providence, RI 02908

Document Actions


Complaint Received
Via Website, Telephone, e-mail
Forward to the Natural Resources Unit
Log complaint into RIPDES Database (Complaint Module) Scan Complaint form
Investigation will occur within 10 business days of receipt of complaint
Conduct Site Inspection
See IDDE Flowchart
All complaints will be documented in the RIPDES Phase II Annual Reports submitted to RIDEM
Document Actions

APPENDICES

Appendix A: 2006 Summer Intern Storm Water Outfall Report
Appendix B: Data Sheets

APPENDIX A
RHODE ISLAND DEPARTMENT OF TRANSPORTATION
2006 SUMMER INTERN STORM WATER OUTFALL REPORT

October 17, 2006

DRAFT

Background

The Rhode Island Department of Transportation (RIDOT) is required under the mandate of the Environmental Protection Agency's (EPA) National Pollution Discharge Elimination System (NPDES) program Phase II requirement to "provide a storm water program that designates and controls sources of storm water discharges" CWA Section 402(p)(6). One portion of this mandate requires the inventory of all the outfalls on Rhode Island state roads. RIDOT decided to do this inventory on a drainage basin level. Rhode Island has thirteen basins and forty-six sub-basins in addition to coastal drainage. The basins were prioritized based on the Urban Area Map created from the 2000 US Census data. They were further prioritized based on RIDEM 2002 (303d) List of Impaired Waters, and waters with existing or planned Total Maximum Daily Loads (TMDLs).

RIDOT began the process of inventorying outfalls in the summer of 2002 with the Saugatucket River sub-basin in the Saugatucket River basin and the Taunton River basin. In 2003, the Blackstone River, Branch River, Chepactet River, and Clear River sub-basins of the Blackstone River basin were completed. The Moshassuck River and Woonaquatucket River basins in addition to the Barden Reservoir, Big River, Flat River, Moswansicut Reservoir, Ponagansett Reservoir, Regulating Reservoir, Scituate Reservoir, and Westconnaug Reservoir sub-basins within the Pawtuxet River basin were completed in the summer of 2004. In 2005 the North Branch Pawtuxet River and South Branch Pawtuxet River sub-basins of the Pawtuxet River basin were completed. Also in 2005 the Chickasheen River, Chipuxet River, and Queens River sub-basins of the Pawcatuck River basin were completed. The Pawcatuck River sub-basin of the Pawcatuck River basin was partially completed in 2005.

In 2006, the remainder of the Pawcatuck River sub-basin and the Wood River sub-basin of the Pawcatuck River basin were completed. The Point Judith Pond sub-basin of the Saugatucket River basin was also completed. The Thames River basin, including the Five Mile River, Moosup River, and Pachaug River sub-basins, was completed. A portion of the Narragansett Bay basin was completed including the following sub-basins: the Annaquatucket River, Mount Hope Bay, Narragansett Bay, Pettaquamscutt River and Kickamuit River. Finally, the coastal drainage on Aquidneck Island was completed. Appendix 1 provides a summary of

the status of the outfall mapping project, in addition to a map of the completed sub-basins. It should be noted that in the "completed" sub-basins the limited access roads were not completed.

Equipment

Camera: Sony FD-Mavica MVC-FD200 Digital Still Camera.
Digital Photographs were taken for visual backup of the data.

GPS unit: Trimble GeoExplorer XT[1]
A Windows-based GIS data collection and data maintenance system. This is a handheld unit with an internal antenna and battery. There is an optional external antenna for easier use in a vehicle. The location of the catch basins, outfalls, manholes, and bituminous lined ditches were recorded in a data dictionary using these GPS

Items to Bring Into the Field

Orange vest & hat
GPS Unit
Plans
Project Map
RI Map Book
Coastal Resources Management Council (CRMC) Redbook
TMDL – if available
100' Measuring tape
Digital camera & extra disks
Flashlight
Crowbar
Clipboard & blank forms

Courtesy of: M. Emilie Holland
Rhode Island Department of Transportation
2002

Software

Falcon/DMS V6 DocMan	Used to locate plan sets and drainage and utility information
RIDOT Plan GIS	Rhode Island Department of Transportation online catalog of all state road contracts. http://ridotplanap/plangis/index.asp
Microsoft Photo Editor	Used for viewing and editing photos in JPEG format.
ArcGIS 9.1	Used to convert and export GIS information as a shapefile.
ArcMap 9.1	Used to merge shapefiles together, edit shape file data, create photo hotlinks, and make maps.
GPS Pathfinder Office 3.0	Used to create the data dictionary as well as to import data directly from the GPS unit in (.ssf format). This program also allows for files to be corrected (.cor format) with the assistance of the downloaded base station files, edited, and then exported as a shapefile (.shp), which can be opened in ArcMap or ArcGIS programs.

Data Location

Using ArcMap, maps were created on a sub-basin level. Each map included Rhode Island sub-basins, state roads, other major roads, major lakes and streams, town lines, and outfalls from previous years. An example can be found in Appendix 2.

Next, plan sets were acquired using Falcon DMS V6 DocMan, an archive of plan sets from past construction contracts. Falcon DMS V6 DocMan is a program which allows you to search through a database of contracts based on an input into the query fields. The plans can be viewed on the screen or printed. To search in Falcon DMS V6 DocMan:

1. Make sure Viewer, DB Tabs and Doc List are selected on the toolbar (Figure 1).

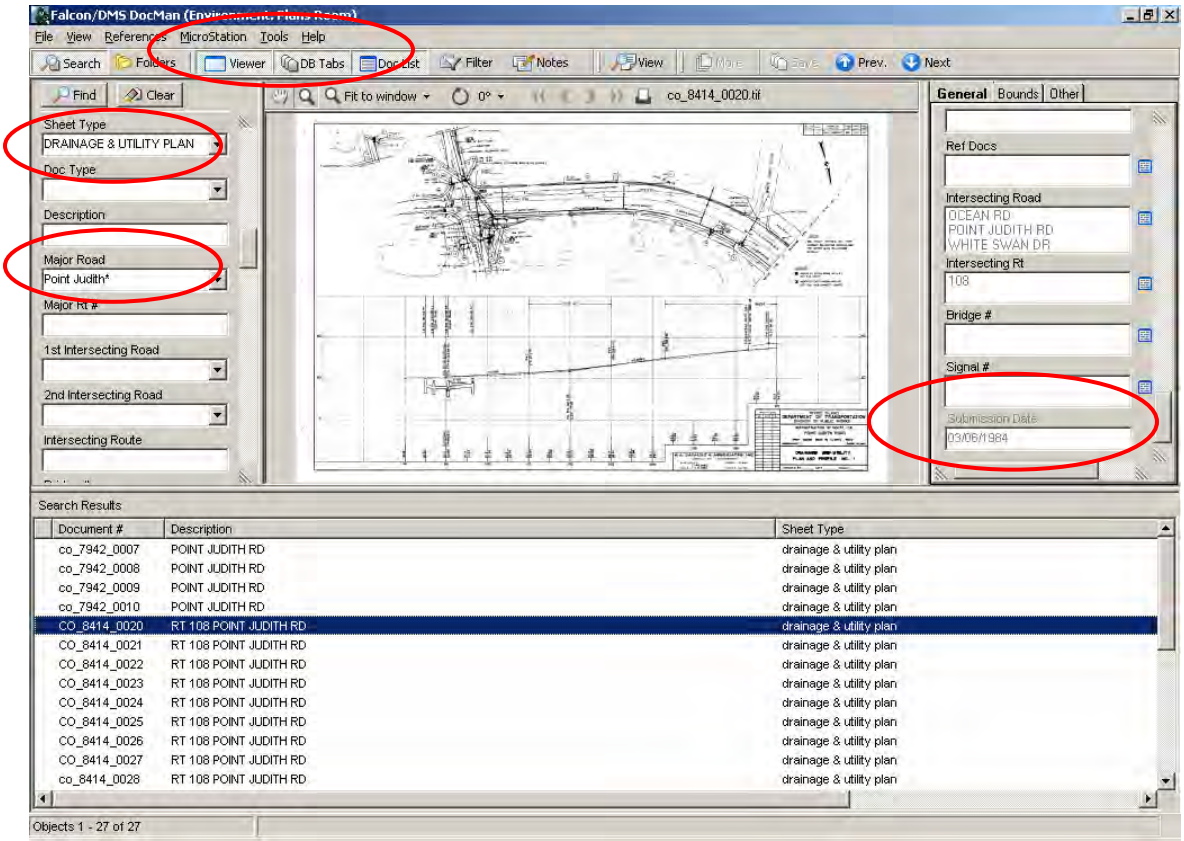


Figure 1. Falcon DMS V6 DocMan

2. Enter the state road name followed by a "*" in the Major Road field (Ex. Main*). Leave off abbreviations such as, ST, RD, AVE, BLVD, etc. The "*" symbol after a word allows the program to search for any words beginning with those letters. This allows the program to do a more thorough search of the database. In addition to the Major Road

field other useful fields are 1st Town Name and Sheet Type (drainage and utility, drainage agreements, and drainage details are the most useful sheet types). Any combination of these three field help to narrow down the search (Figure 1).

3. When a list of plans is generated, review each set of plans to determine if they are useful in locating outfalls. First, determine the submission date (Figure 1). The database contains plans dating back to the 1920s. In most cases these plans are not useful because the drainage has been changed. Next, scan through the plans to see if they contain drainage structures
4. Useful plans can be printed using landscape format. We found the most useful and convenient size to be 11" x 17". This size was large enough to read the details but small enough to carry out into the field.
5. Before going out into the field, review the plans and highlight any drainage structures. In addition, note the intersection and telephone poles near the drainage structures which many help in locating the structures in the field.

Either the drainage and utility plan or the general plans are useful in locating outfalls. The drainage and utility plans shows the location of outfalls, catchbasins, and other drainage structures. Sometimes, in the absence of drainage and utility plans, the general plans contain the drainage structures. The general legend found with each set of plans in addition to the cover sheet are useful tools to read the plans. The cover sheet includes a map of the entire project area. Other useful information on the cover page includes: the location area, submission date, contract number and index of the drawing/plans. The general legend shows symbols and number/letter abbreviations used on the plan. The most common outfall abbreviations are shown in Table 1. Table 2 is a list of plans used this summer.

Abbreviation	Description
2.1	Concrete Headwall
2.6	Precast Concrete Flared End Sections (dia)
2.11	Rip-Rap at Headwall
2.12	Rock filled Rip-Rap at Flared End Section

Table 1. Most common outfall abbreviations

State Road	Plan #	Plan Sheet Numbers	Sub-Basin
Galilee Escape Rd From Great Island Rd to Old Point Judith Rd	8423	General Plans 1-3	Point Judith Pond
Sand Hill Cove Rd	9307	Drainage and Utility Plan 1-14	Point Judith Pond
Galilee Connector	6703	Sheet 8 -11	Point Judith Pond
Point Judith Rd (108) From Ocean Rd to Clarke Rd	8414	Drainage and Utility Plan 1 - 12	Point Judith Pond
Point Judith Rd at South Pier Rd and Woodruff Ave	7942	Drainage and Utility Plan 1-4	Point Judith Pond
Kingston Rd/ Narragansett Ave (1A) From Dillion Rotary to Caswell St	8463	General Plan 1-4	Pettaquamscutt River
Boston Neck Rd 315' South of Castle rd to Beach St	8308	General and Drainage Plan	Pettaquamscutt River and Narragansett Bay
Boston Neck Rd From Old Boston Neck Rd to North Kingston Town Line	8621	General Plan 1-9	Pettaquamscutt River and Narragansett Bay
Hamilton Ave and N. Main Rd	9321	General Plans 1 - 7	Narragansett Bay
Southwest Ave/Beavertail Rd	9735	Drainage and Utility Plan 1 - 6	Narragansett Bay
Gooding Ave	9001	Drainage and Utility Plan 1 - 12	Narragansett Bay
Warwick Ave	8206	Drainage and Utility Plan 1 -4	Narragansett Bay

Table 2. Useful plans. Table includes the name of the road, plan number, plan sheet number and sub-basin.

Another option for locating plans is RIDOT Plan GIS, the RIODT online catalog of all state road contracts. This site can be used in combination to the Falcon DMS V6 DocMan program to maximize results. To search:

1. Access the http://ridotplanap/plangis/index.asp.
2. Select either a **Street Name** or Town Name search.
3. Enter the street name or town name to view a map.
4. Select **Find Document** on the left side of the screen.
5. Select **Contract Number** from the drop down list. Then click on **Go**
6. Enter the **Contract Number** and the Sheet Type and select **Go**.

Useful plans are not always available. As stated before, Falcon DMS V6 DocMan has plans dating back to the 1920s. These plans are not useful because the drainage has been altered or because the landmarks on the plans have changed. Table 3 has few examples of plans that were not useful and the reason they were not useful. For areas where useful plans are not available other mean of finding outfalls are needed. The following is a list of tips used to find these catch basins:

1. Outfalls are often found at the lowest point on a road.
2. Outfalls often drain into rivers, lakes, wetlands or ditches.
3. Some roads have arrows painted on the road that point to outfalls.
4. Search the road for catchbasins. If there are no catchbasins, most likely there are not outfalls either (except for bituminous ditches).
5. Shine a flashlight into the catchbasins to determine which direction the pipes leave the catchbasin.
6. If a road has catchbasins but does not seem to have outfalls, check streets that run perpendicular (side streets) especially if they are close to lakes, rivers or the ocean. Specifically, search on streets that have access to the water. Another way to find side street outfalls is to follow the manhole covers down the side streets. Follow the man hole covers until they end then look for an outfall there.
7. In areas with dense vegetation, scan the area for large sand deposits. Outfalls off of road that are sanded in the winter usually have large deposits of sand.

State Road	Plan #	Problem	Sub-basin
Bridgetown Rd	3405	Plans are from the 1930s and the exact locations of the drainage systems on the plans were not easily applied in the field, due to a lack of reference sites on the plans.	Pettaquamscutt River
Roger Williams Way/Quonset Rd	9145	Road has been redesigned to accommodate Rt 403.	Narragansett Bay
Boston Neck Rd	4001	Plans are from the 1930s and the exact locations of the drainage systems on the plans were not easily applied in the field, due to a lack of reference sites on the plans.	Pettaquamscutt River and Narragansett Bay

Table 3. Examples of plans not used and the reason why they were not useful.

Data Obtained

The Trimble GeoXT, the Global Positioning System (GPS) unit was used to map outfalls locations. In addition, the Data Dictionary was developed to record data about each outfall. A detailed data dictionary print out showing all features entered for outfalls in found in Appendix 3. In addition, a handwritten datasheet was filled out in order to give a more detailed location and description (Appendix 4). **Note**: A few fields were added to the Outfall Inspection field data sheet this year. Specifically, the date, investigators, sub-basin, time, last rain event and dry weather discharge information was added. In addition, a dry weather discharge data sheet was added to the back of the Outfall Inspection field data sheet. Since ocean/bay is not an option in the data dictionary under the discharge field lake/pond was selected and it was noted on the data sheet that it was actually an ocean/bay.

A digital photograph was taken for each outfall. In most cases, two pictures were taken: one looking up the pipe and one looking downstream from the outfall. In the case of bituminous ditches one picture, downstream, was taken. When outfalls with dry weather discharge were found, pictures of the surrounding area were taken to assist in locating the outfall in the future. When possible, a picture including a mailbox or house which showed the address was also taken.

Data Post Processing

Downloading points from the GPS unit:

1. Connect the USB from the GPS cradle to the computer. Plug in the GPS cradle into a wall outlet.
2. Click GPS unit into the cradle.
3. If the GPS unit is turned on, the unit should automatically detect the device and a **New Partnership** dialogue box should open (Figure 2).
4. Click on **Guest Partnership** radio button, then **Next** (Figure 2). You are now connected to the GPS unit.

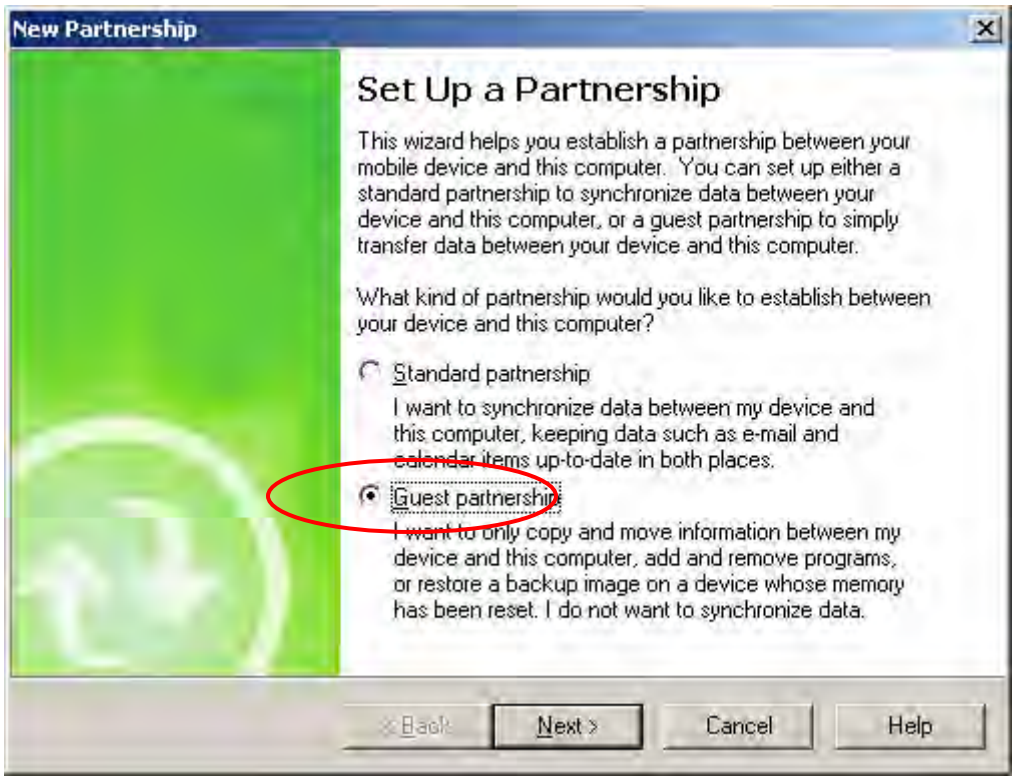


Figure 2. New Partnership window

5. Open GPS Pathfinder Office 3.00
6. A **Select Project** screen will pop-up. Select the **Project Name** from the drop down box (Figure 3). In our case our project name was, **Default**. Be sure to set-up a **Default Folder** to store the data. Due to an issue accessing the network in the beginning of the summer we set our folder as C:\Pfdata\Outfalls2006. It is suggested that the default

folder be on the network, instead of the C-drive to enable access throughout the network. Once your default folder is selected, click **OK**.

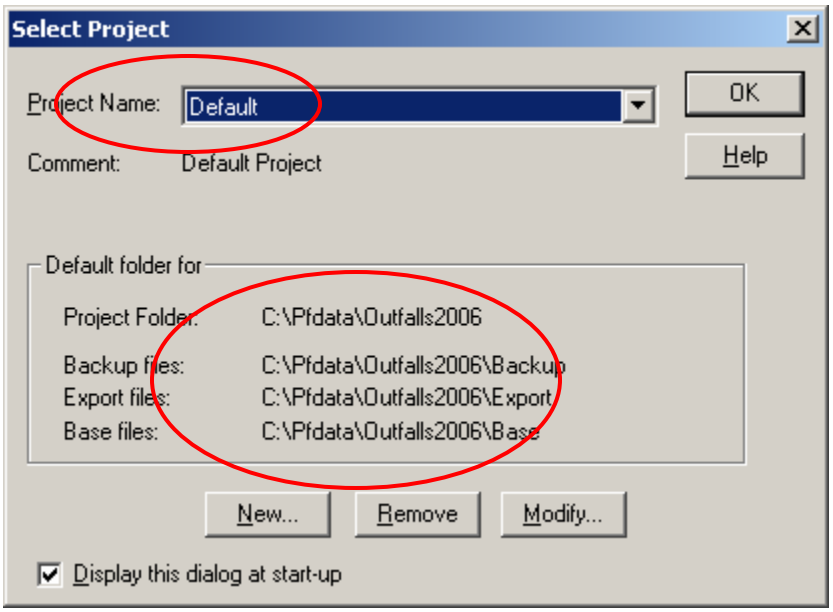


Figure 3. Select Project window.

7. Under **Utilities** on the task bar select **Data Transfer** and the data transfer window will open. The window should say **Connected to GIS Datalogger on Windows CE** (Figure 4) in right hand corner. **Troubleshooting**: If the window does not say connected look for GIS Datalogger on Windows CE in the pull down box labeled Device. Then click the icon with the green check mark. If this does not work try exiting the program and remove the GPS unit from the cradle and starting over. If GPS Pathfinder Office 3.00 is opened before the GPS unit is recognized by the computer Pathfinder Office 3.00 will not be able to find the device.

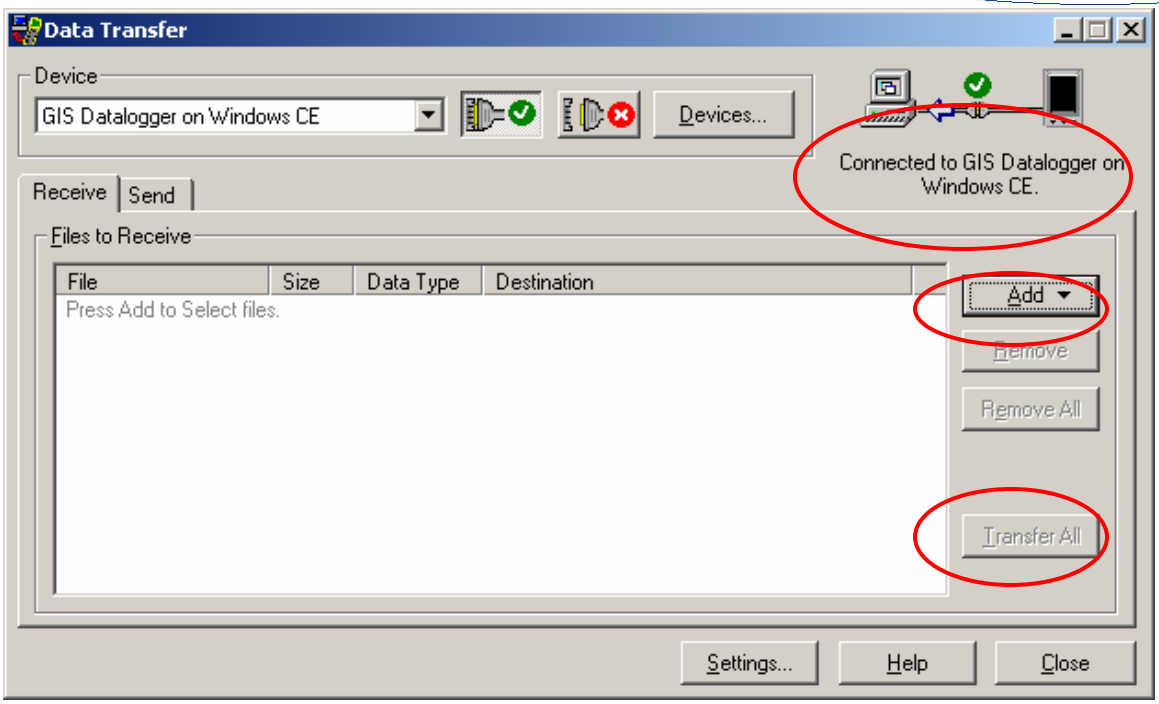


Figure 4. Data Transfer window

8. Click on the **Add** icon (Figure 4) and select **Data File**. Choose the file to be transferred from the list provided then click **Open**. Note: The data files that have not been transferred are highlighted until they are transferred (Figure 5).

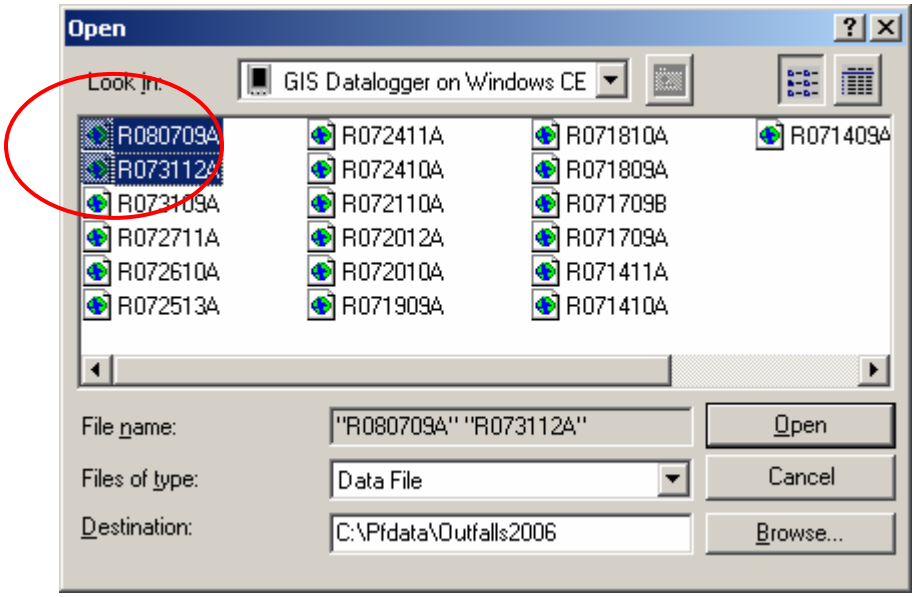


Figure 5. Open window within the Data Transfer window.

9. Select **Transfer All** on the **Data Tranfer** window (Figure 4). A window will pop-up telling you if the data was successfully transferred (Figure 6). In addition, this box will tell you the location where the data file was saved. **Close** this window.

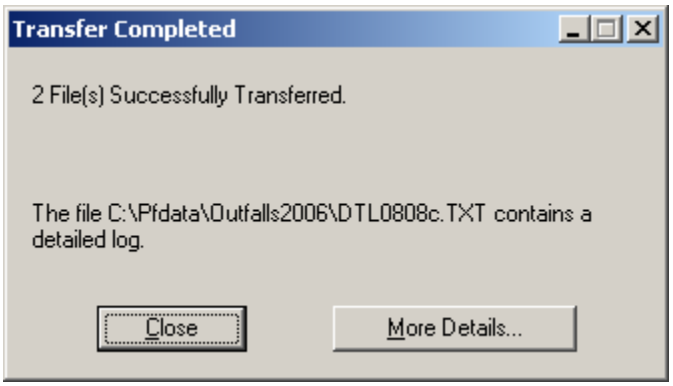


Figure 6. Transfer Completed window

10. In the Data Transfer window click on **the icon with the red circle with an "X"** to disconnect the GPS unit. **Close** the Data Transfer window.

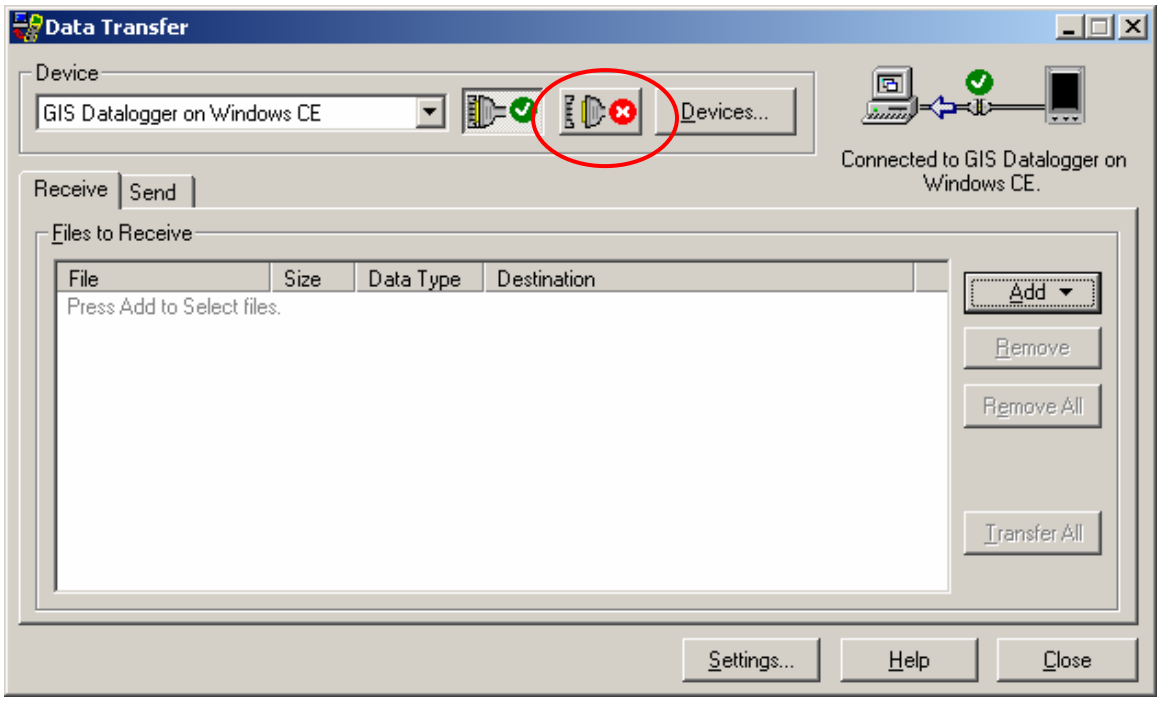


Figure 7. Disconnecting from the GPS unit

Downloading correction files from the internet:

A base station is located on the roof of the Rhode Island Department of Transportation building in Providence. Corrections need to be downloaded to ensure the most accuracy for the GPS points.

1. Under **Utilities** on the taskbar select **Differential Correction**. The differential correction window will open. In the **Rover Files** box click **Browse** (Figure 8).

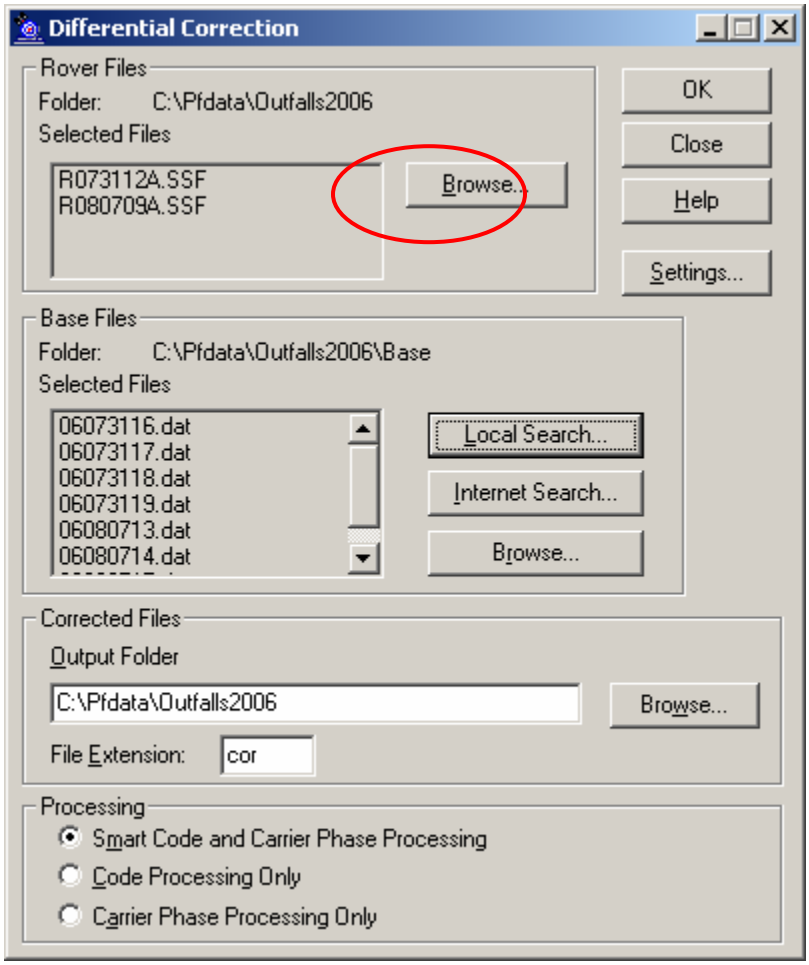


Figure 8. Differential Correction window

2. In the new window highlight, but <u>do not</u> double click the file to be corrected (Figure 9). Notice the **start and end time** on the bottom left hand side of the **Select Rover Files** window (Figure 9). **Cancel** this window.

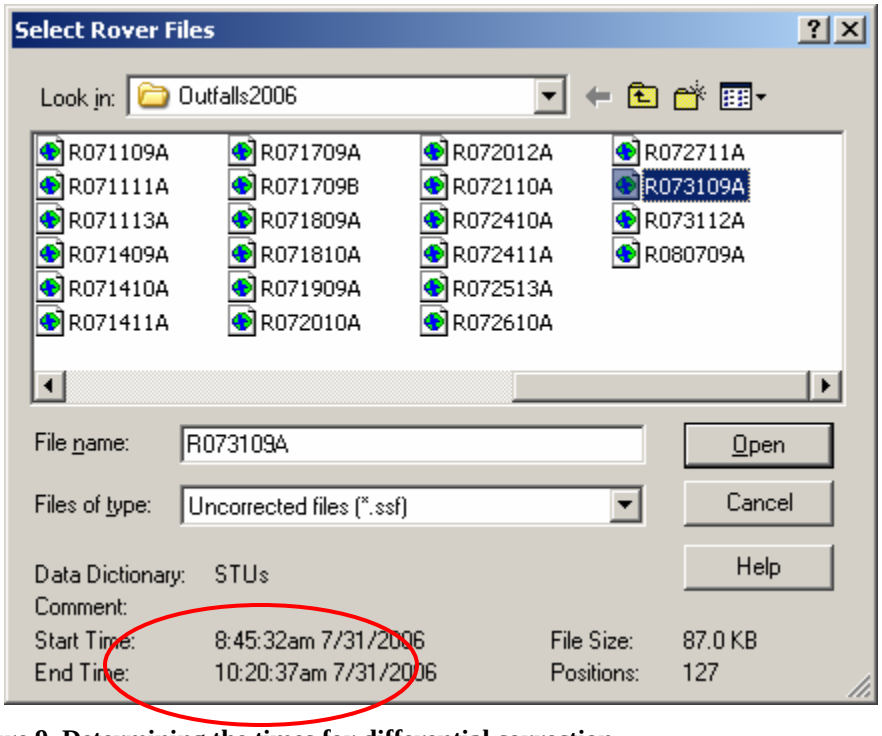


Figure 9. Determining the times for differential correction

3. Open the internet and access http://www.dot.state.ri.us/projects/survey/, the RIDOT's survey/GPS webpage.
4. Click on **Trimble (*.dat) Files** link and locate the correction files. **Note**: Data is posted in GMT (Greenwich Mean Time) therefore times should be converted to GMT. During Eastern daylight savings, Rhode Island is 4 hours behind, so 4 hours must be added to times. During the other months, there is a 5 hour difference, so 5 hours must be added to times. For example, at 9:00 AM during Eastern daylight savings the time will be converted to 1:00 PM GMT.
5. Download a .zip file for each time corrected to GMT. Our files were downloaded to C:\Pfdata\Outfalls2006\Base\
6. In the Base Files box of the **Differential Correction** window click on the **Local Search icon**. The **Local Search for Base Files** window will open (Figure 10). Click on **Search** (Figure 11). A confirmation that the base files match the Rover files will pop-up (Figure 12). If it says 100% coverage, then press **OK**. If not, go back and download missing base files and repeat step 6. Once 100% coverage for all rover files is achieved select **OK**. Then click **OK** in the Reference Position window (Figure 13). Make sure to define

the **Output Folder**. Our Output Folder is C:\Pfdata\Outfalls2006\Base (Figure 14). Once again click **OK**, in the Differential Correction window (Figure 14).

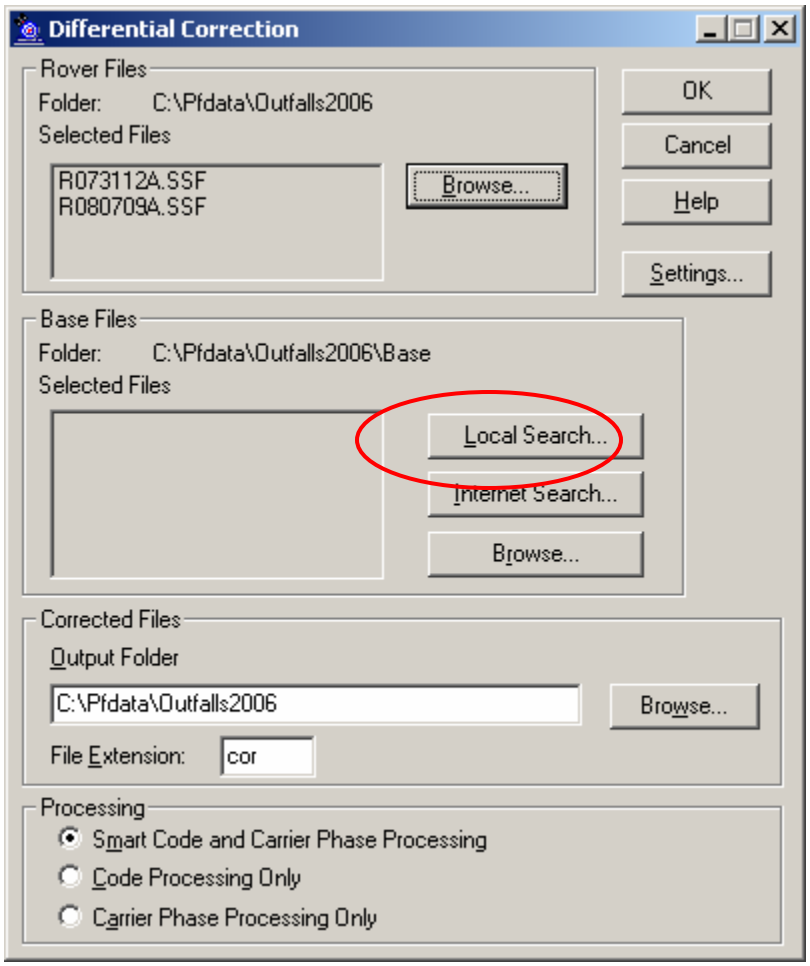


Figure 10. Local Search for correction files within the Differential Correction window

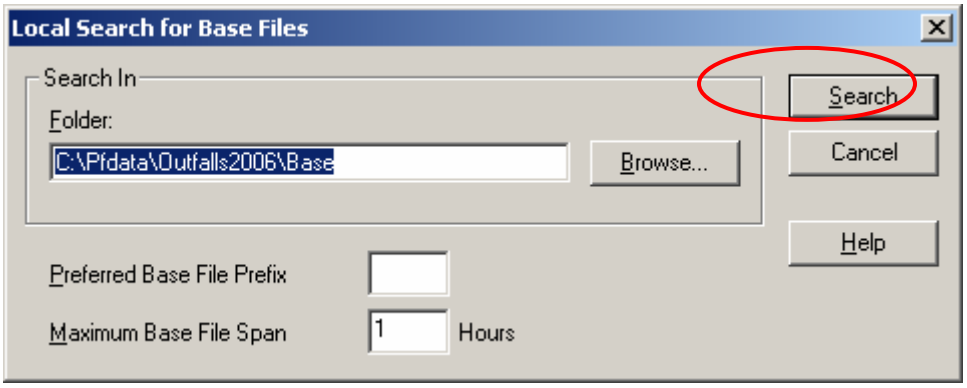


Figure 11. Search for local base files

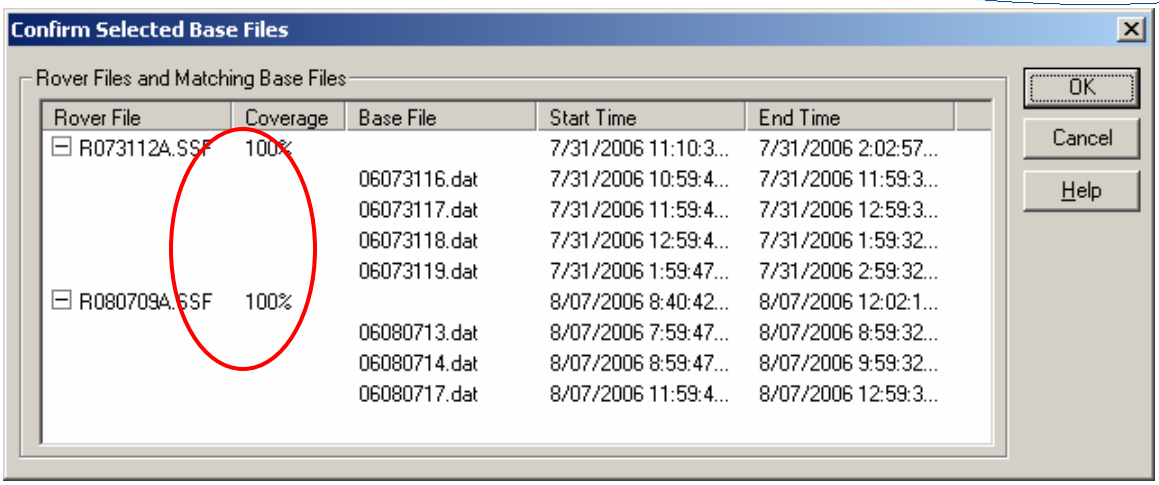


Figure 12. Local base file search confirmation

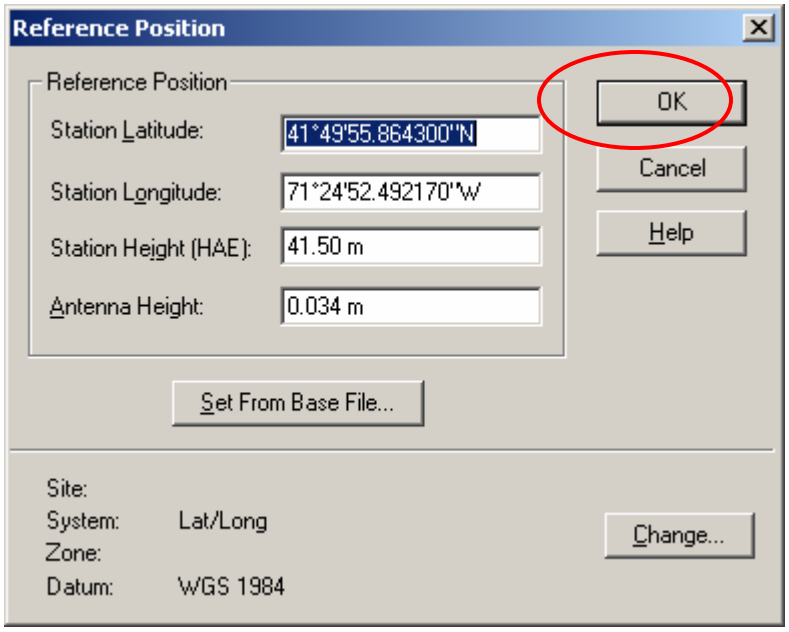


Figure 13. Reference Position window

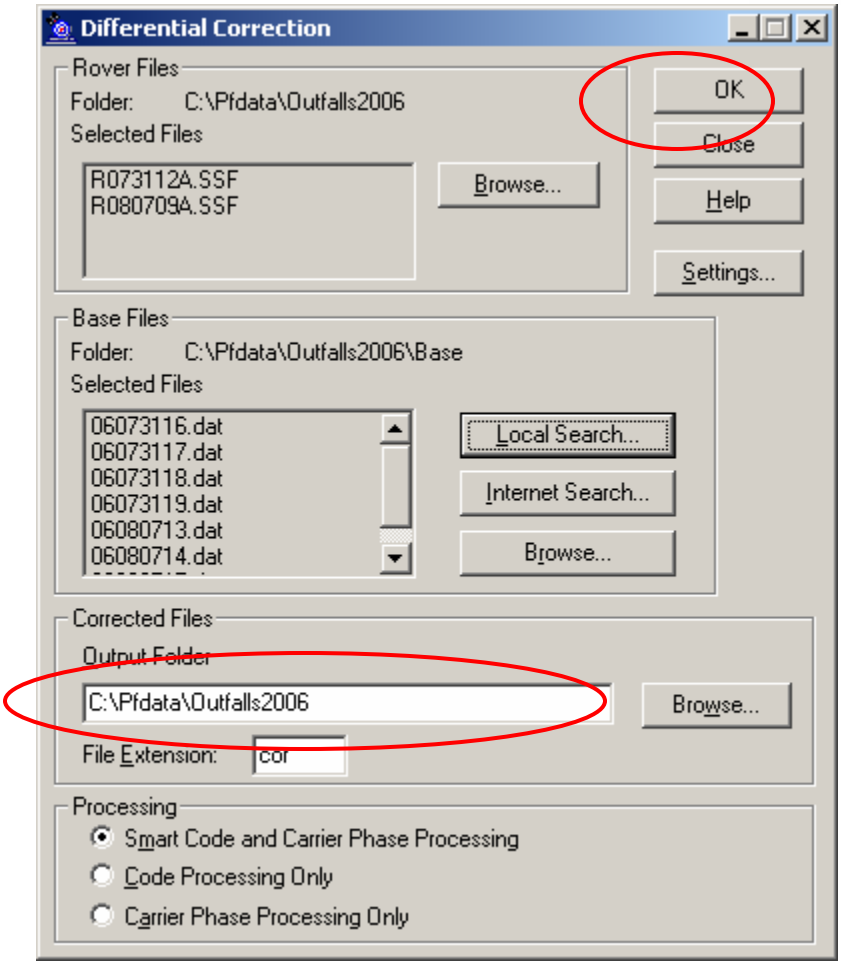


Figure 14. Differential Correction window

Export Corrected Files Into Shapefiles:

The corrected files now need to be converted into a shapefile so they can be edited and used in ArcMap9.1.

1. In GPS Pathfinder Office 3.0 select **Utilities** on the taskbar then select **Export**. Browse and select the corrected files that need to be exported (Figure 15). The Export Setup should be **New ERSI Shapefile**. Choose the correct **output folder**. Our output folder is C:\Pfdata\Outfalls2006\Export.

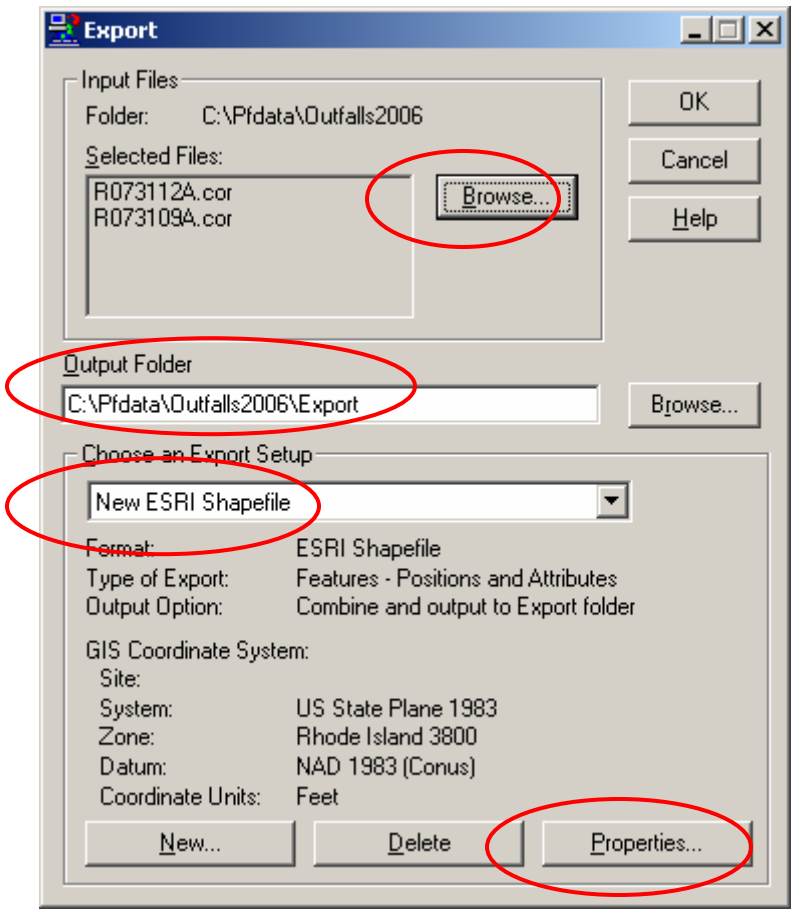


Figure 15. Export window

2. Select **Properties** in the Export window (Figure 15). Select the **Coordinate System** tab (Figure 16). Click on the **Use Export Coordinate System** radio button, and then select the **Change** icon

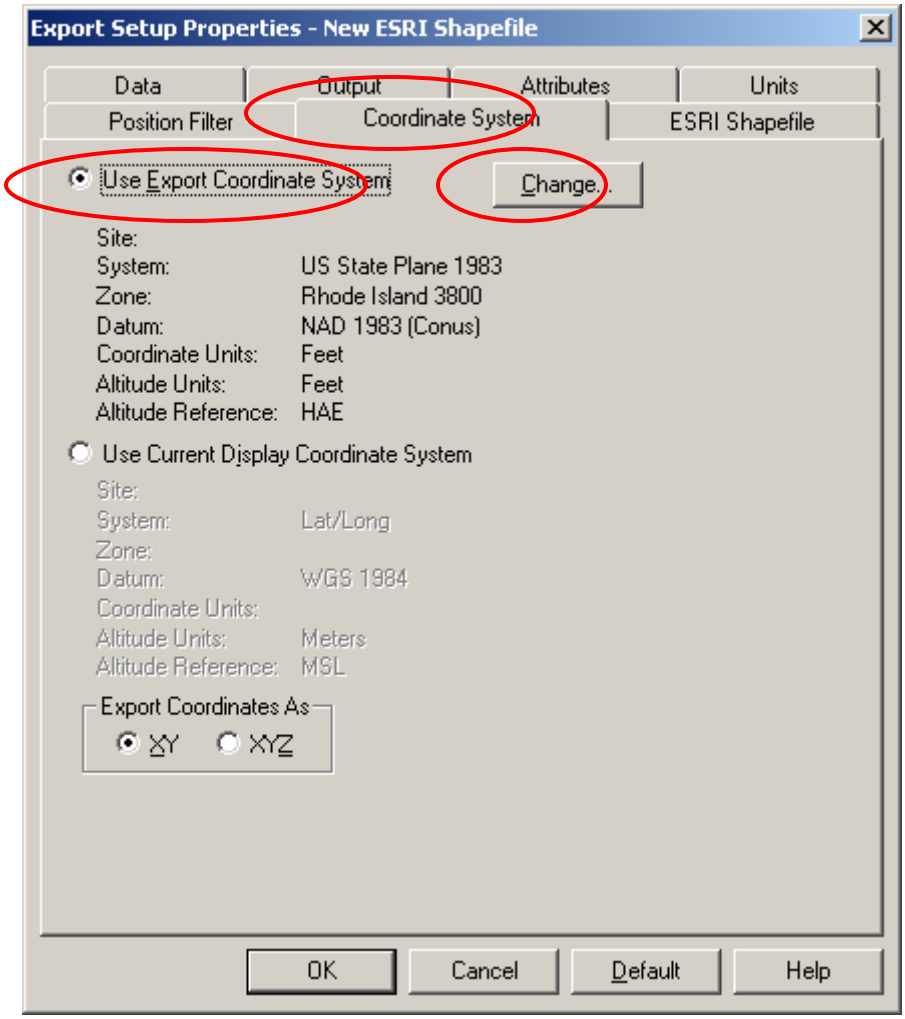


Figure 16. Export Setup Properties window

3. In the **System** pull down menu select **US State Plan Feet 1983** (Figure 17). In the **Zone** pull down menu select **Rhode Island 3800**. In the **Coordinate Units** pull down menu select **Feet**. Then select **OK**.

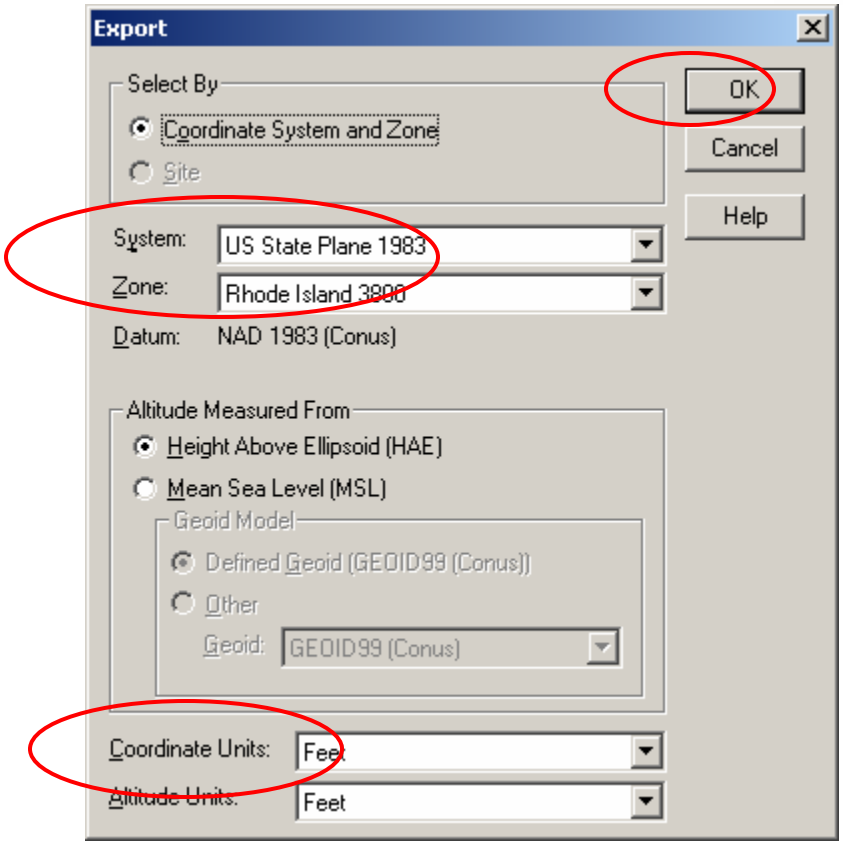
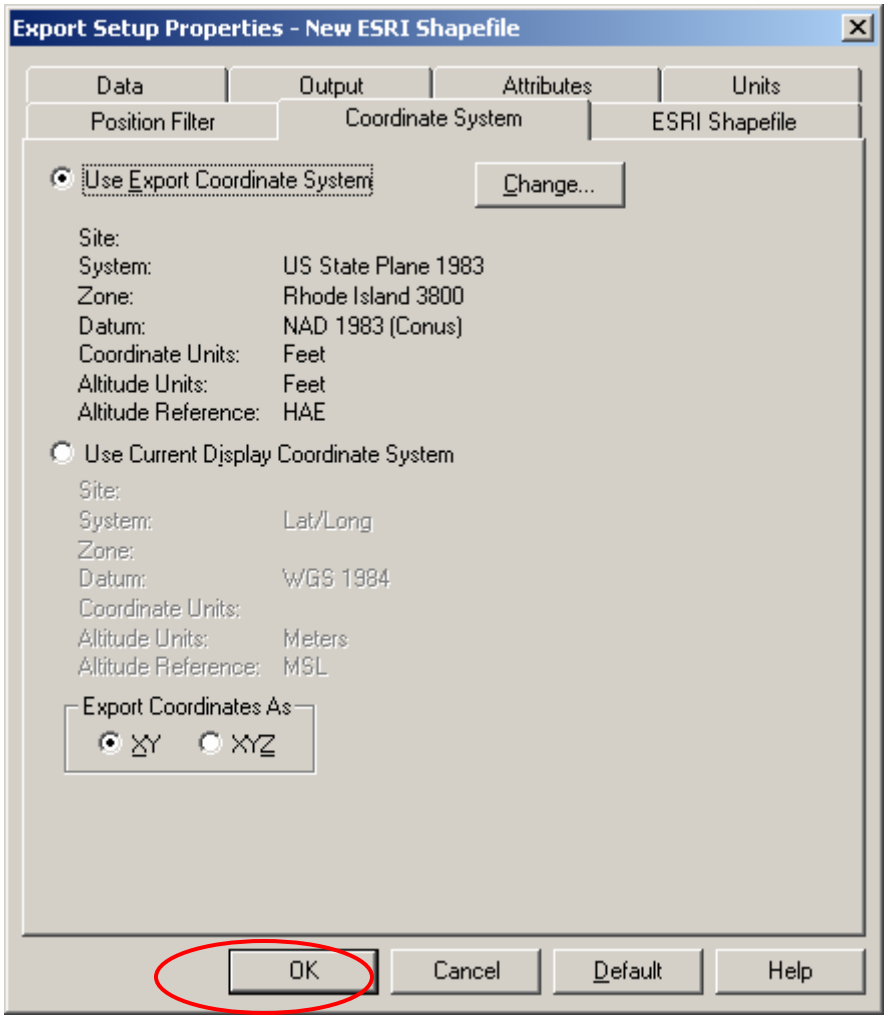


Figure 17. Export coordinate system window

4. Select **OK** in the **Export Setup Properties** window (Figure 18).
5. Select **OK** on the **Export** window. If you successfully complete the export, an **Export Completed** window will pop-up. Close this window. Go into Windows Explorer to the folder the shapefile was exported to. Re-name the .dbf, .shp, and .shx files with an original name. We named out based on the day the shapefile was exported (Ex. Outfalls8_8_2006.dbf, Outfalls8_8_2006.shp and Outfalls8_8_2006.shx). Note: If you do not rename the shapefile the next time a corrected file is exported to a shapefile it will over-write the last file and the previous export data will be lost.



Results

Nine-hundred and sixty-nine (969) outfalls were mapped in the summer of 2006. In the beginning of the summer we were not working off the most recent outfall shapefile. Because of this we re-mapped 85 outfalls done in previous years (Appendix 5), leaving the total number of newly mapped outfalls at 884. This summer 465 outfalls were mapped in the Pawcatuck River basin, 173 in the Pawtuxet River basin, 249 in the Narragansett Bay basin and 82 in the Thames River basin.

Based on calculations done with ArcMap 9.1 the Pawcatuck River basin covers 157,170 acres (246 mi^2), the Saugatucket River basin covers 17,540 acres (28 mi^2), the Narragansett Bay basin covers 124,711 acres (195 mi^2), and the Thames River basin in covers 941,371 acres

(1,471 mi^2). Table 5 is a break down of the area of the basins and sub-basins worked on in the summer of 2006.

		Basin Area		Sub-Basin Area	
		mi^2	acres	mi^2	acres
Basin	**Sub-Basin**				
Saugatucket River	Saugatucket River			17	10,933
	Point Judith Pond	28	17,540	11	7,010
Pawcatuck River	Chickasheen River			7	4,264
	Chipuxet River			26	16,509
	Queens River			37	23,446
	Pawcatuck River			97	62,072
	Wood River	246	157,170	79	50,879
Narragansett Bay	Annaquatucket River			7	4,643
	Mount Hope Bay			7	4,500
	Narragansett Bay			83	52,832
	Pettaquamscutt River			13	8,291
	Kickamuit River			4	2,362
	Sakonnet River			36	22,918
	Maskerchugg River			6	3,820
	Providence River			18	11,576
	Greenwich River			15	9,731
	Seekonk River	195	124,711	6	4,037
Thames River	Five Mile River			76	48,877
	Mooseup River			89	57,017
	Pachaug River	1,471	941,371	63	40,326

Table 4. Area of the basins and sub-basins

Two-hundred and thirty-two (232) miles of state road were mapped for outfalls in the summer of 2006. The Point Judith Pond sub-basin has 18 mi of state road, 12 mi were completed and 6 mi are left to be completed. The Pawcatuck River sub-basin has 52 mi of state roads, 45 mi have been completed and 7 mi are left to be done. The Wood River sub-basin has 53 mi of state roads; 42 mi have been completed leaving 11 mi left to be completed. The Annaquatucket River sub-basin has 7 mi of state road, 4 mi have been completed and 3 mi still need to be done. The Mount Hope Bay sub-basin has 10 mi of state roads, 7 mi have been completed and 3 mi remain to be completed. The Narragansett Bay sub-basin has 80 mi of state roads, this summer 67 mi were completed and 13 mi remain to be completed. The Pettaquamscutt River sub-basin has 13 mi of state road, 7 mi have been completed and 6 mi still need to be completed. The Kickamuit has 5 mi of state road, which were all completed. The Five Mile River, Moosup, and Pachaug River sub-basins have 10 mi, 21 mi and 1 mi of state

road respectively, which were all mapped. Coastal drainage on Aquidneck Island has 11 mi of state road, which were all mapped this summer. Table 6 is an overview of the length of state roads mapped this summer. See the section of traffic control for a list and description of roads not completed.

Basin	Sub-Basin	Length Completed (mi)	Length To Be Done (mi)	Total Length (mi)
Saugatucket River	Point Judith Pond	12	6	18
Pawcatuck River	Pawcatuck River	45	7	52
	Wood River	42	11	53
Narragansett Bay	Annaquatucket River	4	3	7
	Mount Hope Bay	7	3	10
	Narragansett Bay	67	13	80
	Pettaquamscutt River	7	6	13
	Kickamuit River	5	0	5
Thames River	Five Mile River	10	0	10
	Mooseup River	21	0	21
	Pachaug River	1	0	1
Coastal Drainage	Coastal Drainage (Aquidneck Island)	11	0	11
Total		232		

Table 5. Total lengths of state roads within sub-basins completed in the summer of 2006

Discussion

Due to the lack of accurate plan sets, outfalls were located by observing road elevations. This was productive and hundreds of outfalls were found, but without plans many assumptions were made about connecting catch basins. It was difficult to understand the complex drainage system of many high-density urban roads without plans.

It was assumed that the catch basins at higher elevations flowed into nearby catch basins at lower elevations, and at the lowest point an outfall would often be found. If there was not an obvious point of outfall near the catch basin, then bridges, guardrails, or bodies of water as likely places for outfalls would be sought out. Houses and buildings did not appear to be logical locations for outfalls. Yet, when plans were present, a number of outfalls were found in, under, and adjacent to homeowner's property.

Another assumption made was that most outfalls were not likely to be more than one hundred to two hundred feet away from the last catch basin. These assumptions were made based on typical engineering design practices, the history of the outfalls in the town, or from previous plans.

Outfall Attributes

It was difficult at times to differentiate between stream culvert outfalls and storm drain outfalls. Sometimes storm drain outfalls were connected to the stream culverts underground or along the streams in areas that were not easily visible. When it was difficult to determine the drainage system layout by visual inspection, the stream culvert was marked as the storm drain outfall. It was noted on the data sheets if a stream culvert was present.

Another outfall attribute was the presence of Dry Weather Discharge (DWD). DWD occurs when water is flowing from an outfall, despite a lack of a recent rain event. As per the Environmental Protection Agency (EPA), dry weather is defined as a period of at least 72 hours in which there was no precipitation or snowmelt. This summer was very wet and there was not period of time during which rain did not occur within 72 hours. The option was added to the field data sheet where DWD is unknown. This was marked if there was discharge from the outfall and it rained within the past 72 hours. These outfalls with unknown DWD can be visited in the future, after a period of 72 hours without rain, to determine if discharge was from precipitation or illicit discharge. Unknown is not an option in the DWD field in the data dictionary. It is suggested that this option be entered to allow for easy identification of DWD in the future.

Outfalls considered to be a maintenance concern are another characteristic that were observed and recorded in the field and the data dictionary. Pipes that are buried, broken, submerged, or filled with sand or trash are examples of a maintenance concern. Maintenance concern is another attribute in the data dictionary. Any additional details are recorded on the outfall inspection sheets.

Traffic Control and Limited Access

The most difficult points to search for storm drain outfalls were along the divided state highways and highly urbanized areas. RIDOT Ford F-150 trucks with roof lights were taken out into the field when working on these roads. Redirecting traffic or closing lanes was not done. If there was a portion of the road in which traffic control was needed then work was not done in that area. In most cases travel in the breakdown lanes was very productive. However, there are several sections of road that were not completed due to traffic issues and time constraints. Table 7 is a list of roads not completed.

In addition to the roads not completed due to traffic control there were a few roads that were either not completed due to access issues or outfalls were not found but are suspected to be in the area. Table 8 contains a list of these roads.

Roads Not Completed			
Basin	**Sub-Basin**	**Road**	**Reason**
Saugatucket River	Point Judith Pond	Rt 1 (including all on- and off-ramps)	Traffic control
Thames	Five Mile River	None	
	Mooseup River		
	Thames River		
Pawcatuck	Pawcatuck River	I-95 (including all on- and off- amps)	Traffic control
		Westerly By-Pass (78) from Post Rd to Connecticut boarder (including all on- and off-ramps)	Traffic control
	Wood River	I-95 (including all on- and off-ramps)	Traffic control
Narragansett Bay	Annaquatucket River	Rt 4 (including all on- and off-ramps)	Traffic control
	Pettaquamscutt River	Tower Hill Rd (Rt 1)	Traffic control
		Rt 138 (including on-ramps and off-ramps at intersections with Rt 1 and Rt 1A)	Traffic control
	Narragansett Bay	Devil's Foot Rd (Rt 403)	Under construction
		Rt 138 from 1A to Admiral Kalbfus Rd (including Jamestown Bridge and Newport Bridge, on-ramps and off-ramps at intersections with Helm St, Beacon St, North Main Rd, Eldred Ave, Conanicus Ave and East Shore Rd in Jamestown and JT Connell Hwy and Admiral Kalbfus Rd in Newport)	Traffic control
		Airport connector (Jewish War Veterans Memorial Hwy) from I-95 exit 13 into T.F.Green Airport, including roads surrounding the airport terminals.	Traffic control and security at the airport
		Rt 24 (including on-ramps and off-ramps at intersections with Turnpike Ave and West Main Rd)	Traffic control
	Mount Hope Bay	Mount Hope Bridge	Traffic control
		Rt 24 (including the Sakonet River Bridge and the on-ramps and off ramps at the intersections with Boyd's Ln, Anthony Rd, Hummocks Ave and Main Rd)	Traffic control
	Kickamuit River	None	

Table 6. Roads not completed due to lack of traffic control

Troubled Roads			
Basin	**Sub-Basin**	**Road**	**Reason**
Narragansett Bay	Narragansett Bay	Quonset Rd	Plans did not match road
		Devil's Foot	Under construction
		Nyatt Rd	Possible outfalls at the end of Nyatt Point Ct and Elm Ln. Sewer manhole covers continue from Nyatt Rd. onto Nyatt Point Ct and Elm Ln but both have private property at the end of the road.
		Gate 17	Possible outfalls on north and south sides of Northgate Rd, but fenced in US Naval Station land.
	Mount Hope Bay	Main Rd (Tiverton)	There were numerous catchbasins but we were unable to find an outfall.
	Pettaquamscutt River	Bridgetown Rd	There were numerous catchbasins and many outfalls that appeared to the plugged. We were unable to find a working outfall.
Pawcatuck River	Pawcatuck River	Watch Hill	There were numerous catchbasins but we were unable to find an outfall.

Table 7. Roads with suspected outfalls but were not mapped.

Suggestions for Future Work

- Create fields in the data dictionary to identify:
  - Stream culverts
  - Ocean/Bay in the Outfall Discharge field
  - Unknown in the DWD field
- Contact regional maintenance facilities before starting a new watershed. They may already have the outfalls mapped.
- Part of Greenwich River sub-basin has been mapped by Crossman Engineering. The outfalls have not been mapped using GPS but there is a map of outfalls. This data may be helpful in locating the outfalls.
- Use a flashlight to look into catchbasins and manholes to determine which direction pipes leave the catchbasins and manholes.

Conclusion

In the summer of 2006, a two person team mapped 884 outfalls in the Pawcatuck River, Saugatucket River, Thames River and Narragansett Bay basin. In addition, 85 outfalls were re-mapped (See Results sections for more details). Approximately 362 person hours were used to collect field data within these 4 basins and the re-mapped sites. 88 hours were used in the

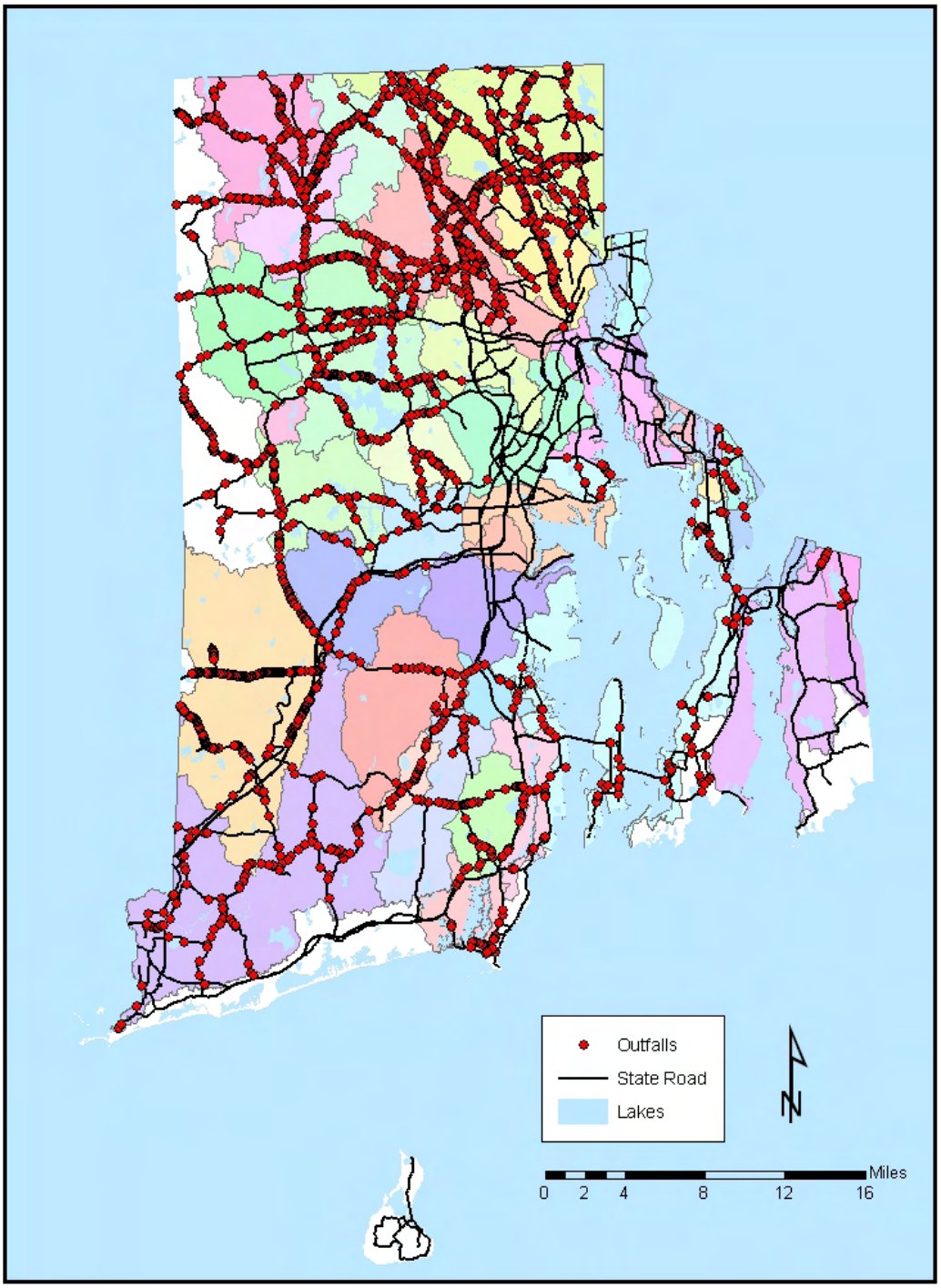
Pawcatuck River basin, 20 hours were used in the Saugatucket River basin, 12 hours were used in the Thames River basin, and 152 hours were used in the Narragansett Bay basin. The remaining 88 were used to re-map the 85 outfalls.

A total of 232 miles of road were mapped in the summer of 2006. Within the Pawcatuck River basin 45 miles were mapped within the Pawcatuck River sub-basin and 42 miles were mapped within the Wood River sub-basin. In the portion of Thames River basin in Rhode Island 10 miles were mapped in the Five Mile River sub-basin, 21 miles were mapped in the Moosup River sub-basin and 1 mile was mapped in the Pachaug River basin. In the Point Judith Pond sub-basin of the Saugatucket River basin 12 miles were mapped. Within the Narragansett Bay basin, 4 miles were mapped in the Annaquatucket River sub-basin, 7 miles were mapped in the Mount Hope Bay sub-basin, 67 miles were mapped in the Narragansett Bay sub-basin, 7 miles were mapped in the Pettaquamscutt River sub-basin and 5 miles were mapped in the Kickamuit River sub-basin.

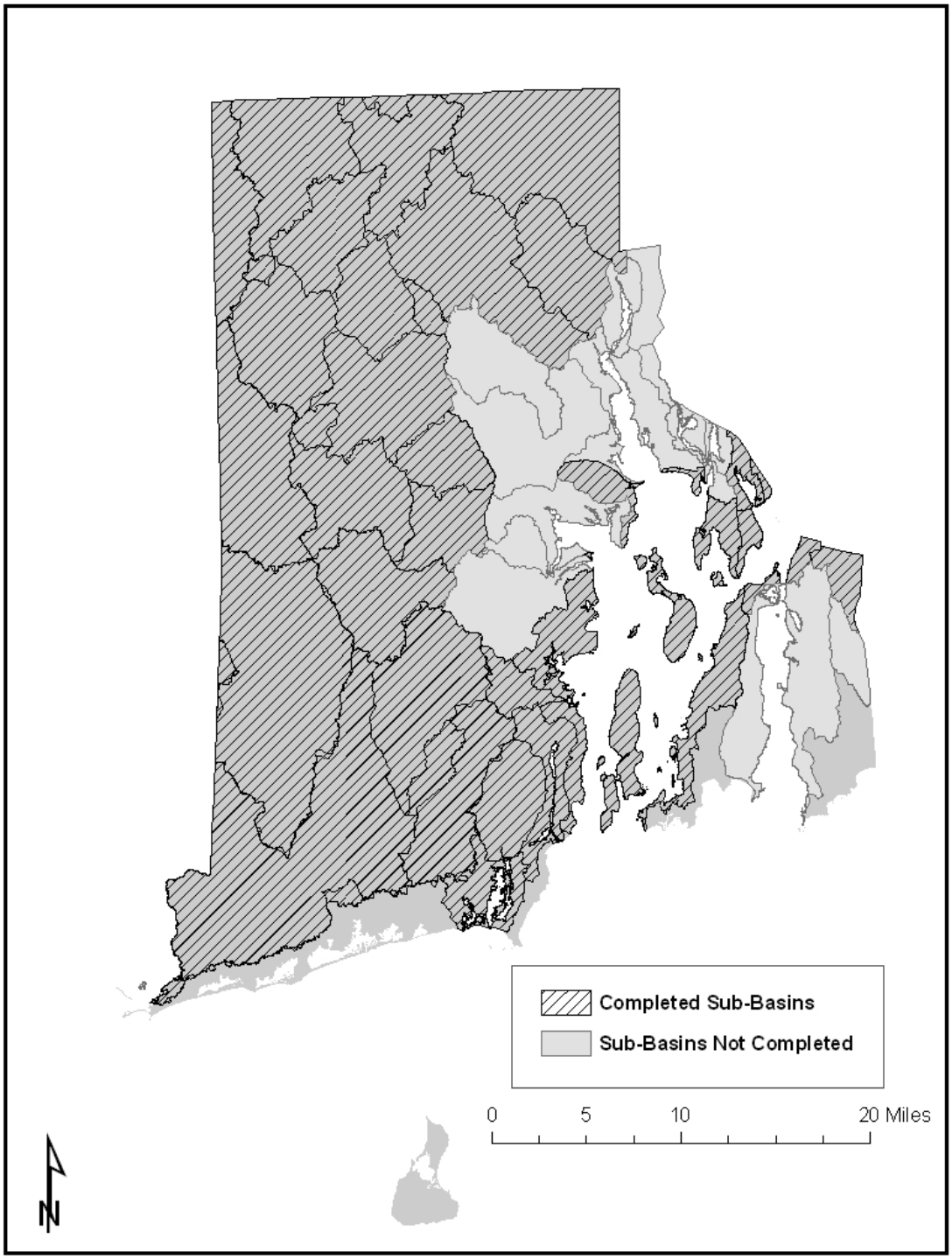
Appendix 1 –Overview of Outfall Mapping Through the Summer of 2006 and Map of Outfalls Through August 2006

Basin	Sub-Basin	Completed[1]	Partial	To Be Done	Year	Urban[2]	TMDL[3]
Blackstone River	Blackstone River	X			2003	Y	N
	Branch River	X			2003	Y	N
	Chepactet River	X			2003	Y	N
	Clear River	X			2003	Y	N
Coastal Waters				X		Y	Y
Hunt River	Hunt River			X		Y	Y
Narragansett Bay	Annaquatucket River	X			2006	Y	N
	Greenwich Bay			X		Y	Y
	Kickamuit River	X			2006	Y	Y
	Maskerchugg River			X		Y	N
	Mount Hope Bay	X			2006	Y	N
	Narragansett Bay	X			2006	Y	N
	Pettaquamscutt River	X			2006	Y	Y
	Providence River			X		Y	N
	Sakonnet River			X		Y	Y
	Seekonk River			X		Y	N
Moshassuck River	Moshassuck River	X			2004	Y	N
Pawtuxet River	Barden Reservoir	X			2004	N	N
	Big River	X			2004	Y	N
	Flat River	X			2004	Y	N
	Moswansicut Reservoir	X			2004	Y	N
	Ponagansett Reservoir	X			2004	N	N
	Regulating Reservoir	X			2004	Y	N
	Scituate Reservoir	X			2004	Y	N
	Westconnaug Reservoir	X			2004	N	N
	North Branch Pawtuxet River	X			2005	Y	N
	South Branch Pawtuxet River	X			2005	Y	N
	Pawtuxet River		X			Y	N
	Pocassett River		X			Y	N
Pawcatuck River	Chickasheen River	X			2005	Y	Y
	Chipuxet River	X			2005	Y	N
	Queens River	X			2005	Y	N
	Pawcatuck River	X			2006	Y	N
	Wood River	X			2006	N	N
Saugatucket River	Saugatucket River	X			2002	Y	Y
	Point Judith Pond	X			2006	Y	N
Taunton River	Taunton River	X			2002	Y	Y
Ten Mile River	Ten Mile River			X		Y	N
Thames River (CT)	Five Mile	X			2006	N	N
	Mooseup River	X			2006	N	N
	Pachaug River	X			2006	N	N
Warren River	Barrington River			X		Y	Y
	Palmer River			X		Y	Y
	Runnings River			X		Y	Y
	Warren River			X		Y	N
Westport River	Adamsville Brook			X		Y	N
Woonasquatucket River	Woonasquatucket River	X			2004	Y	D

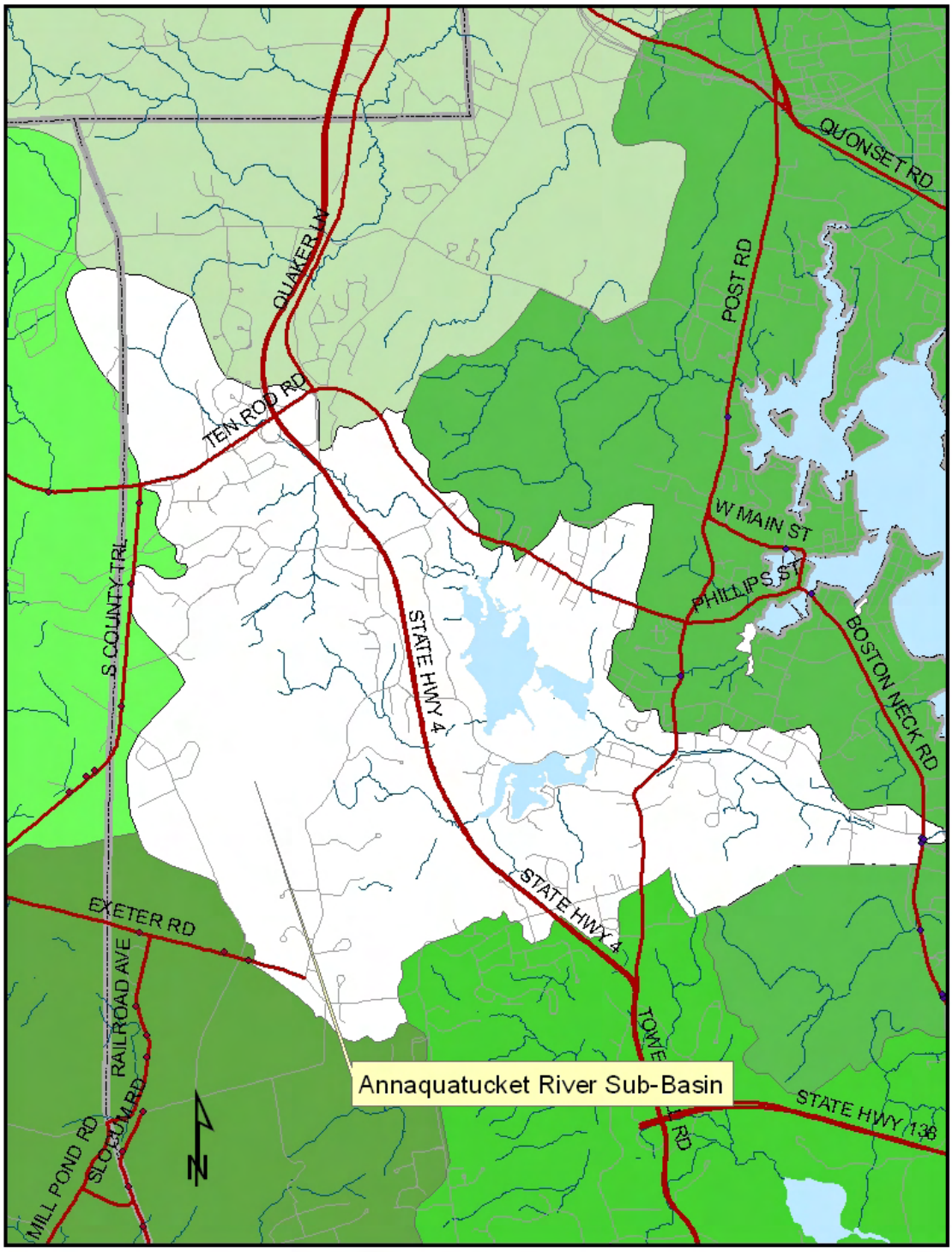
[1] Completed excluding roads mentioned in the final reports
[2] A portion or all of the sub-basin is urban or densely populated. Based on the US Census 2000.
[3] Total Maximum Daily Load (TMDL) Study is completed for portion of watershed by RIDEM



Outfalls completed though August of 2006.


Completed Sub-Basins
Sub-Basins Not Completed
0
5
10
20 Miles
N

Appendix 2 – Example of a Project Map



Appendix 3 – Data Dictionary

"Outfall", Dictionary
"Outfall", point, "", 5, seconds, 1, Code
  "Outfall ID", text, 30, required, normal, Label1
  "Pipe ID", text, 30, normal, normal
  "State Road", text, 50, normal, normal
  "Water Type", menu, normal, normal, Label2
    "Tidal"
    "Fresh"
    "Unknow"
  "Outfall Discharge", menu, normal, normal
    "Stream/River"
    "Lake/Pond"
    "Wetland"
    "Non-Wetland"
    "Unknown"
  "Pipe Type", menu, normal, normal
    "Plastic"
    "Concrete"
    "Metal"
    "Stone"
    "Unknown"
  "Pipe Size", text, 30, normal, normal
  "Headwall", menu, normal, normal
    "Yes"
    "No"
    "Unknown"
  "Flared End", menu, normal, normal
    "Yes"
    "No"
    "Unknown"
  "Rip-Rap", menu, normal, normal
    "Yes"
    "No"
    "Unknown"
  "Bit Ditch", menu, normal, normal
    "Yes"
    "No"
    "Unknown"
  "Swale", menu, normal, normal
    "Vegetated"
    "Non-Vegetated"
    "None"
    "Unknown"
  "DWD", menu, normal, normal
    "YES"
    "NO"
  "From Plans", menu, normal, normal
    "YES"
    "NO"
  "Maintenance Concern", menu, normal, normal
    "YES"
    "NO"
  "Date", date, auto, mdy, manual, normal, normal
  "Water Body Name", text, 50, normal, normal
  "Water Body ID", text, 50, normal, normal
  "Contract Number", text, 30, normal, normal
"Catchbasin", point, "", 5, seconds, 1, Code
  "Outfall", text, 30, normal, normal, Label2
  "Inlets", menu, normal, normal
    "0"
    "1"
    "2"
    "3"
    ">3"
    "unknown"
  "Date", date, auto, mdy, manual, normal, normal, Label1
"Manhole", point, "", 5, seconds, 1, Code
  "Outfall", text, 30, normal, normal
  "Inlets", menu, normal, normal, Label1
    "0"
    "1"
    "2"
    "3"
    ">3"
    "unknown", default
  "Date", date, auto, mdy, manual, normal, normal, Label2
"Ditch", point, "", 5, seconds, 1, Code
  "Type", menu, normal, normal, Label1
    "Bituminous", default
    "Concrete"
    "Other"
  "Date", date, auto, ymd, manual, normal, normal, Label2
  "Comment", text, 50, normal, normal
"Point_generic", point, "", 5, seconds, 1, Code
  "Comment", text, 32, normal, normal, Label1
"Line_generic", line, "", 5, seconds, 1, Code
  "Comment", text, 32, normal, normal, Label1
"Area_generic", area, "", 5, seconds, 1, Code
  "Comment", text, 32, normal, normal, Label1

Appendix 4 – Field Data Sheet and Dry Weather Discharge Data Sheet

OUTFALL INSPECTION

Date: Time: Sub-Basin:

Last Rain Event: Investigators:

Note: If more than one pipe is located in a single area, complete a separate sheet for each one. (Use the same Outfall ID for each pipe at the location, but assign a different Pipe ID to each pipe.)

Outfall ID:_____ Pipe ID: _____

State Highway:_____

Sketch of outfall structures (if outfall has multiple pipes, indicate which one is reported on this sheet.) Indicate location of edge of pavement and nearest CB or MH. If possible, indicate # and direction of inlets into the CB or MH

Location Sketch

Plan View

Outfall Flows to:

	Fresh	Tidal
Stream/River		
Lake/Pond		
Wetland		
Non-Wetland		
Unknown		

Name:_____

Pipe size (dia):_____ inches Material:_____ Condition:_____

Headwall (Y/N):_____ Material:_____ Condition:_____

Flared End Section (Y/N): _____ Condition:_____

Rip-Rap (Y/N):_____ Condition:_____

Bituminous lined ditch (Y/N):_____ Condition:_____

Vegetated Swale (Y/N): _____ Condition:_____

Problems Noted:

Distance to edge of pavement:_____ft N W S E

Nearest Intersection: _____ Distance: _____ N W S E

Nearest UP#: _____ N W S E

Photo looking into pipe:

Photo looking downstream:

Add'l Photos

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DRY WEATHER DISCHARGE (Yes / No / Unknown)

Notes:

Unknown b/c survey NOT done during dry weather conditions (72-hr after 0.10" rain event)

IF YES - COMPLETE DRY WEATHER FLOW SURVEY

ILLICIT DISCHARGES

DRY WEATHER FLOW SURVEY

Survey must be taken 72-hours AFTER a 0.10-inch rain event

I: General Information

Date: Time: **Outfall ID:**

Last Rain Event: Investigators:

II: Illicit Discharge Flow Measurements

Width of Water Surface (feet):

Approx Depth of Water (feet):

Approx Flow Velocity (visual): ☐ drip trickle moderate substantial

Notes:

III: Visual Observations

Immediate Surrounding Land Use:
☐ Industrial ☐ Commercial ☐ Residential ☐ Municipal ☐ Open Space ☐ Highway ☐ Other

Odor
☐ None ☐ Sewage ☐ Rotten Eggs ☐ Oil/Gas ☐ Laundry ☐ Other

Color
☐ None ☐ Red ☐ Yellow ☐ Brown ☐ Green ☐ Orange ☐ Other

Floatables
☐ None ☐ Sewage/ Toilet Paper ☐ Oil Sheen ☐ Laundry/ Soap Suds ☐ Other

Staining
☐ None ☐ Black ☐ Brown ☐ Yellow ☐ White ☐ Orange ☐ Other

Clarity
☐ Clear ☐ Cloudy ☐ Opaque

Vegetation/Algae Growth
☐ None ☐ Normal ☐ Excessive ☐ Inhibited

Sedimentation
☐ No ☐ Yes

Scouring
☐ No ☐ Yes

Notes:

IV. Field Analysis

Water Temperature:

pH:

Conductivity:

Was a laboratory sample collected? Yes No

Bacteria:

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Appendix 5 – Duplicate Outfalls

Summer 2002 through 2005	Summer 2006		Summer 2002 through 2005	Summer 2006		Summer 2002 through 2005	Summer 2006
Moswansicut			**Scituate**			**Flat**	
PAWT033	PAWT526		PAWT172	PAWT678		PAWT230	PAWT565
PAWT032	PAWT525		PAWT171	PAWT679		PAWT231	PAWT563
PAWT031	PAWT524		PAWT190	PAWT582		PAWT232	PAWT560
PAWT072	PAWT523		PAWT187	PAWT581		PAWT237	PAWT561
PAWT063	PAWT512		PAWT183	PAWT672		PAWT238	PAWT562
PAWT062	PAWT510		PAWT184	PAWT671		PAWT239	PAWT564
PAWT060	PAWT509		PAWT185	PAWT670		PAWT234	PAWT559
PAWT059	PAWT508		PAWT200	PAWT666		PAWT236	PAWT558
PAWT146	PAWT519		PAWT201	PAWT665		PAWT235	PAWT557
PAWT149	PAWT515		PAWT202	PAWT663		PAWT289	PAWT556
			PAWT203	PAWT662			
Regulating			PAWT204	PAWT651		**Westconnaug**	
PAWT191	PAWT582		PAWT206	PAWT650		PAWT220	PAWT676
PAWT195	PAWT587		PAWT207	PAWT648			
PAWT153	PAWT568		PAWT208	PAWT646			
PAWT193	PAWT585		PAWT213	PAWT640			
PAWT194	PAWT586		PAWT214	PAWT638			
PAWT035	PAWT532		PAWT215	PAWT637			
PAWT102	PAWT533		PAWT216	PAWT635			
PAWT036	PAWT534		PAWT217	PAWT631			
PAWt100	PAWT536		PAWT218	PAWT630			
PAWT101	PAWT537		PAWT219	PAWT629			
PAWT098	PAWT540		PAWT262	PAWT626			
PAWT037	PAWT538		PAWT261	PAWT625			
PAWT099	PAWT539		PAWT260	PAWT623			
PAWT097	PAWT541		PAWT259	PAWT621			
PAWT038	PAWT542		PAWT264	PAWT620			
PAWT096	PAWT543		PAWT265	PAWT621			
PAWT095	PAWT545		PAWT266	PAWT618			
PAWT039	PAWT546		PAWT267	PAWT616			
PAWT040	PAWT547		PAWT258	PAWT613			
			PAWT268	PAWT614			
Big			PAWT272	PAWT607			
PAWT422	PAWC420		PAWT283	PAWT606			
			PAWT282	PAWT608			
Wood			PAWT275	PAWT604			
PAWT421	PAWC419		PAWT276	PAWT605			
			PAWT281	PAWT603			
Chipuxet			PAWT277	PAWT602			
PAWC031	NARR022		PAWT278	PAWT601			
PAWC018	PAWC316		PAWT280	PAWT600			
			PAWT198	PAWT675			

APPENDIX B – DATA SHEETS

OUTFALL INSPECTION

Date: Time: Sub-Basin:

Last Rain Event: Investigators:

Note: If more than one pipe is located in a single area, complete a separate sheet for each one. (Use the same Outfall ID for each pipe at the location, but assign a different Pipe ID to each pipe.)

Outfall ID:_____ Pipe ID: _____

State Highway:_____

Sketch of outfall structures (if outfall has multiple pipes, indicate which one is reported on this sheet.) Indicate location of edge of pavement and nearest CB or MH. If possible, indicate # and direction of inlets into the CB or MH

Location Sketch

Plan View

Outfall Flows to:

	Fresh	Tidal
Stream/River		
Lake/Pond		
Wetland		
Non-Wetland		
Unknown		

Name:_____

Pipe size (dia):_____ inches Material:_____ Condition:_____

Headwall (Y/N):_____ Material:_____ Condition:_____

Flared End Section (Y/N): _____ Condition:_____

Rip-Rap (Y/N):_____ Condition:_____

Bituminous lined ditch (Y/N):_____ Condition:_____

Vegetated Swale (Y/N): _____ Condition:_____

Problems Noted:

Distance to edge of pavement:_____ft N W S E

Nearest Intersection: _____ Distance: _____ N W S E

Nearest UP#: _____ N W S E

Photo looking into pipe:

Photo looking downstream:

Add'l Photos

DRY WEATHER DISCHARGE
(Yes / No / Unknown)

Notes:

Unknown b/c survey NOT done during dry weather conditions (72-hr after 0.10" rain event)

IF YES - COMPLETE DRY WEATHER FLOW SURVEY

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ILLICIT DISCHARGES

DRY WEATHER FLOW SURVEY

Survey must be taken 72-hours AFTER a 0.10-inch rain event

I: General Information

Date:	Time:	**Outfall ID:**
Last Rain Event:	Investigators:	

II: Illicit Discharge Flow Measurements

Width of Water Surface (feet):		Notes:		
Approx Depth of Water (feet):				
Approx Flow Velocity (visual):	☐ drip	trickle	moderate	substantial

III: Visual Observations

Immediate Surrounding Land Use:						
☐ Industrial	☐ Commercial	☐ Residential	☐ Municipal	☐ Open Space	☐ Highway	☐ Other
Odor						
☐ None	☐ Sewage	☐ Rotten Eggs	☐ Oil/Gas	☐ Laundry	☐ Other	
Color						
☐ None	☐ Red	☐ Yellow	☐ Brown	☐ Green	☐ Orange	☐ Other
Floatables						
☐ None	☐ Sewage/ Toilet Paper	☐ Oil Sheen	☐ Laundry/ Soap Suds	☐ Other		
Staining						
☐ None	☐ Black	☐ Brown	☐ Yellow	☐ White	☐ Orange	☐ Other
Clarity				Notes:		
☐ Clear	☐ Cloudy	☐ Opaque				
Vegetation/Algae Growth						
☐ None	☐ Normal	☐ Excessive	☐ Inhibited			
Sedimentation						
☐ No	☐ Yes					
Scouring						
☐ No	☐ Yes					

IV. Field Analysis

Water Temperature:	Was a laboratory sample collected?	Yes	No
pH:	Bacteria:		
Conductivity:			

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EXAMPLE FORM

KEED FOR TRANSPORT

Sample Submission Form/Chain of Custody
Rhode Island Department of Health Laboratories
50 Orms Street, Providence, RI 02904

Sample Submission Number: PROVIDED BY DOH

Legal Sample ( )

Client: DWQ

A. Client ID#: Run #:
B. Client Name: RIDOT

Mail Report To: RIDOT - ALLISON LEBLANC
Street: 2 CAPITOL HILL RM 318
City: PROVIDENCE RI 02903
Report To (Agency/Person):

Collected By: INITIALS Collected Date: DATE Time: TIME Matrix: Water X Other

Source#: C. Facility ID#: D. E. Sample Point ID#: OUTFALL ID

Collection Point (sub-level): STORM DRAIN OUTFALL

Collection Point Address: LOCATION OF SAMPLE
Name Street City

Class: Origin#: pH: (adj pH): CL Residual:

Inorganics Lab	DUP	Metals	DUP	Organics Lab	DUP	Sanitary Microbiology
Grouped Tests		WL30 Mercury (245.1)		PE4-CARB (531.1)		SM2 – MF Total Coliform
WLA – O+		WL65 Lead & Copper(200.8)		PE12-Pest/PCB (608)		SM3 – SPC
WLB – Sanitary Chem.				PE14-EBD/DBCP (504)		SM34 – Colilert
WLC – Group II-DEM		Metals for New Systems		PE16-Pest/PCB (508)		SM36 – Pres./Abs.
WLD – User Fee		WL69 Full Set (200.8)		PE21-HERB (515.3)		X SM1 – MPN
WLM – C or P Systems		WL75 Antimony		PE22-Pest/PCB+ (508)		# of Tubes 3 Dil. 10
WLN – Routine Metals		WL76 Arsenic		PE		Fecal Coliform X
WLO – R Systems		WL77 Beriun				SM37 Enterolert
						SM38 A1 Fecal Coliform

EXAMPLE BOTTLE LABEL

R.I. Department of Health Laboratory ( ) Legal
DEM-SM (1:10^2) (indicate dilution ordered)
Sample # 01-02 + Date/Time DATE/TIME
System I.D. OUTFALL ID
Collection Point LOCATION
Collector INITIALS Program RIDOT DOT
Preservative added NONE (X) By Lab Sterilized on:

Must Be Completed For Legal Sample: Test Code	Container Number	Container Type	Preservative Added By Lab	Preservative Added By Collector	Special Instructions

Chain of Custody

Relinquished By	Date	Time	Received By	Date	Time	Comments
INITIALS	DATE	TIME				
			provided by DOH			

SAMPLE SUBMISSION FORM (rev. 10/01/2000)

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ILLICIT DISCHARGES
REPORTING FORM

REPORTING INFORMATION

DATE: _____ TIME: _____

CALLER/REPORTING PERSON:

NAME: _____ PHONE: _____

BUSINESS: _____

ADDRESS: _____

BRIEF SUMMARY:

_____

_____

_____

_____

_____

NAME OF PERSON TAKING CALL/COMPLAINT: _____

ILLICIT DISCHARGE IDENTIFICATION

WHEN WAS THE DISCHARGE SEEN: DATE: _____ TIME: _____

LOCATION: (highway and mile marker; nearest cross street; landmarks; directions)

_____

_____

_____

_____

DISCHARGE:

1 IS THE MATERIAL IN THE STORM DRAIN? YES / NO
2 IS THE MATERIAL JUST ON THE HIGHWAY? YES / NO

3 IS THE SUBSTANCE A KNOWN HAZARDOUS MATERIAL? YES / NO
4 IS THE SUBSTANCE A KNOWN NON-HAZARDOUS MATERIAL? YES / NO
5 IS THE SUBSTANCE UNKNOWN AND CANNOT BE IDENTIFIED? YES / NO

DESCRIPTION OF SUBSTANCE:

_____

_____

_____

_____

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