Rhode Island LINEAR Stormwater Manual

Draft Anticipated - Spring 2018

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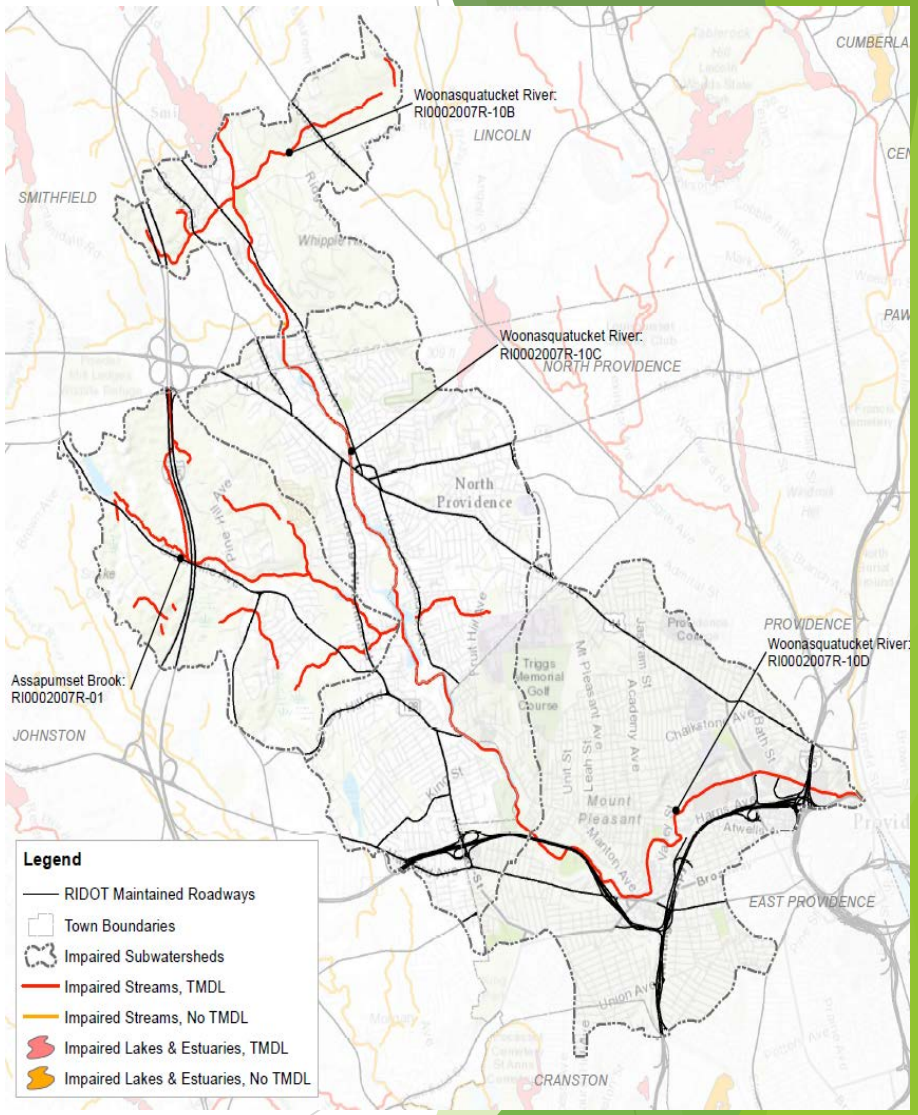
US DOJ Enforcement Action against RIDOT for Clean Water Act and NPDES Permit Violations

- In 2011, the US Environmental Protection Agency (EPA) audited the RIDOT
- In May 2014, the US Department of Justice (DOJ) notified RIDOT that EPA had requested that DOJ bring a federal court action against RIDOT for violations of conditions of the RIPDES General Permit.
- RIDOT, DOJ, and the EPA negotiated a Consent Decree that was filed in US District Court on October 15, 2015; RIDEM is not party to enforcement action but participated in settlement discussions.
- **CONSENT DECREE SUMMARY**
  - **Regulated MS4 system**
  - **Stormwater Control Plans (SCPs) to address impaired waters, including TMDLs**
  - **Implementation of Structural Stormwater Controls Prior to and as part of Stormwater Control Plans (SCPs) to address impaired waters, including TMDLs**
    ……..

Stormwater Control Plan (SCP)

- Stormwater Control Plan (SCP) for each Impaired Water Body Segment and associated Impaired Sub-Watershed
- For Impaired Water Body Segments with EPA-approved TMDLs,
  - for non-bacteria TMDLs; the required **pollutant load reductions** (PLA)
  - for Impaired Water Body Segments where RIDOT is required to meet the **Impervious Cover Standard** (IC Method)
  - define the RIDOT MS4 with GIS mapping
  - direct and indirect discharges
  - credit for existing BMPs/controls
  - a schedule for implementation of proposed structural stormwater controls in the Impaired Sub-Watershed, including interim design milestones and proposed construction start and completion dates.



Stormwater Control Plan (SCP)

- **Cost estimates** for all proposed structural stormwater controls and Enhanced Non-Structural BMPs.
- If the total pollutant load reduction and Equivalent Area credits do not meet the pollutant load reduction requirements and the treatment level requirement of the Impervious Cover Standard RIDOT shall explain why achieving those **requirements that are not achieved is not feasible** and why the proposed and existing structural controls and proposed Enhanced Non-Structural BMPs will **achieve the maximum pollutant reduction and maximum level of treatment to meet the Impervious Cover Standard that are feasible**.

Table 4-A-1: TMDL Method: Pollutant Reduction Target Summary

Applicable TMDLs:		Woonasquatucket River Fecal Coliform Bacteria and Dissolved Metals Total Maximum Daily Loads – April 2007		
Subwatershed Total Area:		3,458 acres		
Subwatershed Total IC Area (%):		2,327 acres (67%)		
RIDOT Contributing Total Area to Waterbody:		202 acres		
RIDOT Contributing Total IC Area to Waterbody:		138 acres		
Pollutants of Concern	Required Pollutant Load Reduction (%)	Pollutant Load Rate (lb/ac/yr)[1]	Current RIDOT Load (lb/yr)	Required Pollutant Load Reduction (lb/yr)[2]
Zinc	41%	1.23	170.1 lb/yr	69.7 lb/yr
Copper	35%	1.23	170.1 lb/yr	59.5 lb/yr
Lead	42%	1.23	170.1 lb/yr	72.1 lb/yr

Table 4-A-2: Impervious Cover Method: Pollutant Reduction Target Summary

Subwatershed Total Area:	14,320 acres
Subwatershed Total IC Area (%):	2,062 acres (14%)
Subwatershed Target IC (10%):	1,432 acres
% IC Reduction to Meet Target:	55.0%
RIDOT Contributing Total Area to Waterbody:	100.0 acres
RIDOT Contributing Total IC Area to Waterbody:	90.0 acres
RIDOT Required IC Reduction:	49.5 acres
Pollutants of Concern:	Pathogens, Fecal Coliform

Why a Linear Stormwater Manual

- Efficiency and Consistency through:
  - Combining multiple stormwater requirements that need to be explained in one manual (RIDEM, consent decree & TMDL)
  - Design approaches to address challenges in a linear environment
  - Permitting guidance as negotiated with RIDEM
    - i.e. How most RIDOT projects meet the redevelopment criteria
    - i.e. How RIDOT will move through the MEP process
  - Providing standardized report templates

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To Incorporate stormwater requirements into the RIDOT PROCESS

SCOPE	• How to include Stormwater from the beginning (e.g. LID)
DESIGN	• Provides specific design ideas for roadways
CONSTRUCT	• Specifies materials familiar to RIDOT
MAINTAIN	• While keeping maintainability as a priority

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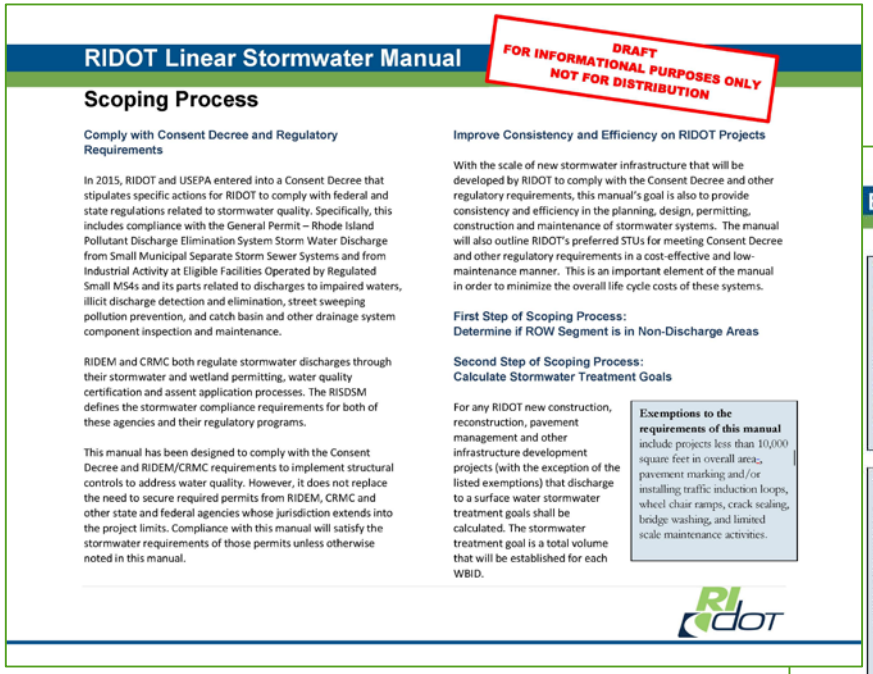
As of Feb 2018

- 3 Meetings with RIDEM, CRMC and EPA
- Manual is being drafted, draft will be complete in May



RIDOT Linear Stormwater Manual

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Scoping Process

Comply with Consent Decree and Regulatory Requirements

In 2015, RIDOT and USEPA entered into a Consent Decree that stipulates specific actions for RIDOT to comply with federal and state regulations related to stormwater quality. Specifically, this includes compliance with 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 and its parts related to discharges to impaired waters, illicit discharge detection and elimination, street sweeping pollution prevention, and catch basin and other drainage system component inspection and maintenance.

RIDEM and CRMC both regulate stormwater discharges through their stormwater and wetland permitting, water quality certification and assent application processes. The RISDSM defines the stormwater compliance requirements for both of these agencies and their regulatory programs.

This manual has been designed to comply with the Consent Decree and RIDEM/CRMC requirements to implement structural controls to address water quality. However, it does not replace the need to secure required permits from RIDEM, CRMC and other state and federal agencies whose jurisdiction extends into the project limits. Compliance with this manual will satisfy the stormwater requirements of those permits unless otherwise noted in this manual.

Improve Consistency and Efficiency on RIDOT Projects

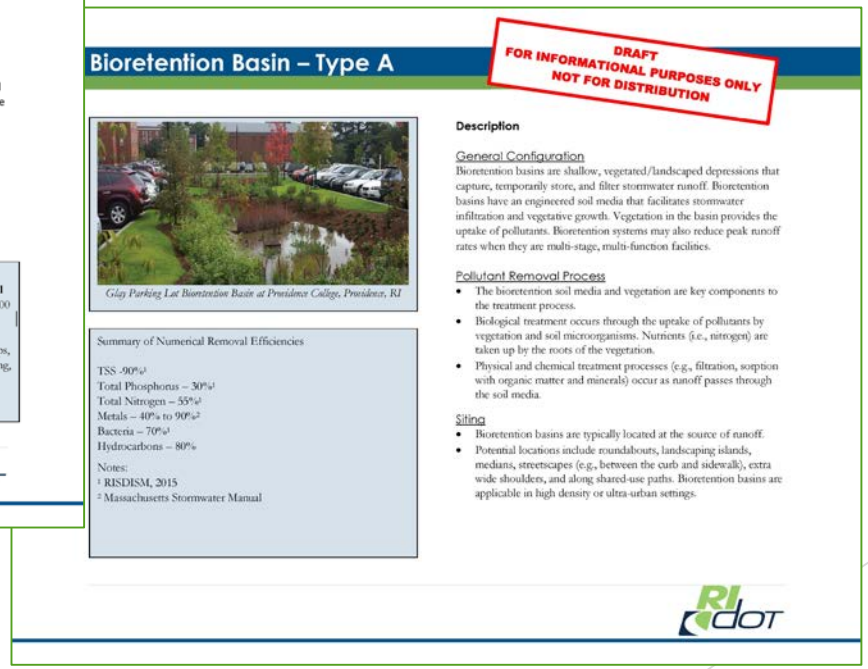
With the scale of new stormwater infrastructure that will be developed by RIDOT to comply with the Consent Decree and other regulatory requirements, this manual's goal is also to provide consistency and efficiency in the planning, design, permitting, construction and maintenance of stormwater systems. The manual will also outline RIDOT's preferred STUs for meeting Consent Decree and other regulatory requirements in a cost-effective and low-maintenance manner. This is an important element of the manual in order to minimize the overall life cycle costs of these systems.

First Step of Scoping Process:
Determine if ROW Segment is in Non-Discharge Areas

Second Step of Scoping Process:
Calculate Stormwater Treatment Goals

For any RIDOT new construction, reconstruction, pavement management and other infrastructure development projects (with the exception of the listed exemptions) that discharge to a surface water stormwater treatment goals shall be calculated. The stormwater treatment goal is a total volume that will be established for each WBID.

Exemptions to the requirements of this manual include projects less than 10,000 square feet in overall area, pavement marking and/or installing traffic induction loops, wheel chair ramps, crack sealing, bridge washing, and limited scale maintenance activities.



Bioretention Basin – Type A

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Gray Parking Lot Bioretention Basin at Providence College, Providence, RI

Summary of Numerical Removal Efficiencies

TSS -90%[1]
Total Phosphorus – 30%[1]
Total Nitrogen – 55%[1]
Metals – 40% to 90%[2]
Bacteria – 70%[1]
Hydrocarbons – 80%

Notes:
[1] RISDISM, 2015
[2] Massachusetts Stormwater Manual

Description

General Configuration

Bioretention basins are shallow, vegetated/landscaped depressions that capture, temporarily store, and filter stormwater runoff. Bioretention basins have an engineered soil media that facilitates stormwater infiltration and vegetative growth. Vegetation in the basin provides the uptake of pollutants. Bioretention systems may also reduce peak runoff rates when they are multi-stage, multi-function facilities.

Pollutant Removal Process

- The bioretention soil media and vegetation are key components to the treatment process.
- Biological treatment occurs through the uptake of pollutants by vegetation and soil microorganisms. Nutrients (i.e., nitrogen) are taken up by the roots of the vegetation.
- Physical and chemical treatment processes (e.g., filtration, sorption with organic matter and minerals) occur as runoff passes through the soil media.

Siting

- Bioretention basins are typically located at the source of runoff.
- Potential locations include roundabouts, landscaping islands, medians, streetscapes (e.g., between the curb and sidewalk), extra wide shoulders, and along shared-use paths. Bioretention basins are applicable in high density or ultra-urban settings.

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Treatment Goals

RIDOT Linear Stormwater Manual
Worksheet A - Treatment Goal(s)

Date: November 29, 2017 **Prepared By:** Fuss & O'Neill

Project: Example 3 of 11/30/2017 Presentation **General Project Location:** I-95 in Providence

Instructions: Fill in boxes that are not shaded gray.

Step 1: Input receiving waterbody information.	A	Enter Waterbody ID or RIVER ID from GIS Map Server.	WBID-A	WBID-B	WBID-C	
	B	Enter waterbody name from GIS Map Server.	Sample Lake	Example River	Case Pond	
	C	Is the waterbody impaired for any stormwater impairment(s) per the RIDEM List of Impaired Waters?	Yes	No	Yes	
	D	If the waterbody is impaired, list the stormwater impairment(s)/pollutant(s) of concern. *Note: enter N/A if Question "C" is "No."*	TP	N/A	TSS	
	E	Is there an approved SCP for the waterbody per the RIDOT List of Approved SCPs? *Note: enter N/A if Question "C" is "No."*	Yes	N/A	No	
						Project Total
Step 2: Input pre- and post-construction impervious conditions for the project site.	F	Total Pre-Construction[A] Impervious Area to the Waterbody (ft^2)	115,000	115,000	115,000	**345,000**
	G	Total Disturbed[B] Existing Impervious Area in the Waterbody (ft^2)	15,000	22,500	7,500	**45,000**
	H	Total Post-Construction[A] Impervious Area to the Waterbody (ft^2)	115,000	107,500	122,500	**345,000**
Step 3: Treatment goal results.	I	Post-Construction[A] Net Increase in Impervious Surface Area Subject to 100% WQV (ft^2)	0	-7,500	7,500	**0**
	J	Post-Construction[A] Impervious Surface Area Subject to 50% WQV (ft^2)	15,000	22,500	7,500	**45,000**
	E	WQV Treatment Goal (ft^2)	7500	3750	11250	**22,500**

[A] *Independent of phasing.*
[B] *Does not include impervious surface area disturbed during pavement marking, installing traffic induction loops, installing wheelchair ramps, crack sealing, bridge washing, and limited scale maintenance activities. Impervious surface converted to pervious surface is considered disturbed.*

Version: November 29, 2017

MEP Flowchart

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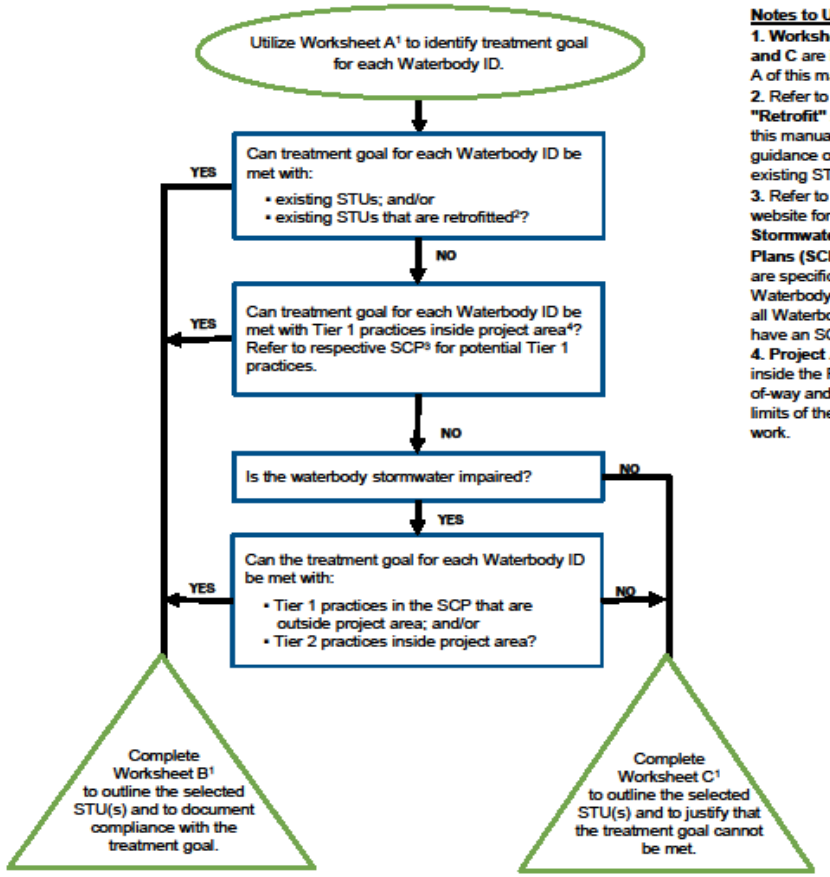
Flow Chart



Notes to User

1. Worksheets A, B and C are in Appendix A of this manual.

2. Refer to the **"Retrofit"** section of this manual for guidance on retrofitting existing STUs.

3. Refer to the RIDOT website for **Stormwater Control Plans (SCPs)**. SCPs are specific to a Waterbody ID, but not all Waterbody IDs will have an SCP.

4. Project Area is inside the RIDOT right-of-way and within the limits of the proposed work.

RI DOT

Version: November 20, 2017

STU Selection & MEP Technical Justification

STU Selection & MEP Technical Justification

Version 11/27/2017

Project Name:

Discharge Point:

Step 1: Is the Water Quality Treatment Standard entirely managed with one or more of the following Tier 1 practices?

Infiltration (Surface Type A, Trench Type C)
Curb Inlet Planter (Type A)
Bioretention
Tree Filter (Type A)
QPA
Bioswale
Sand Filter

◉ Yes ○ No

Stop. No further justification needed.

1. These practices do not require specific justification due to feasibility limitations

Step 2: Assess the practicability of using Tier 1 Practices

Complete the matrix below in its entirety for each drainage area.

Tier 1 Practices are available to meet the Water Quality Treatment Standard. If using one of these practices, stop here. If additional site constraints exist other than those listed here, proceed to Step 3.		Infiltration (Surface Type A, Trench Type C)	Curb Inlet Planter (Type A)	Bioretention	Tree Filter (Type A)	QPA	Bioswale	Sand Filter
STU Available for Water Quality Treatment?		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basis of Practicability	**Response**	**Practice Availability Based on Restrictions**						
Do underlying soils have an infiltration rate of less than 0.17 inches per hour, as confirmed by field geotechnical tests or are classified as Hydrologic Soil Group D according to the NRCS Soil survey?	○ Yes ◉ No	Available	Available	Available	n/a	n/a	Available	Available
Will runoff to the practice include discharge from a LUHPPL?	○ Yes ◉ No	Available	Available	Available	Available	Available	Available	Available
Is the STU site a brownfield or contaminated where infiltration is either restricted or would increase the threat of pollution migration, as confirmed in writing by RIDEM's Office of Waste Management?	○ Yes ◉ No	Available	Available	Available	Available	Available	Available	Available
Is there above ground space within the RIDOT right-of-way for a surface STU (with or without supplemental subsurface storage)?	◉ Yes ○ No	Available	Available	Available	Available	n/a	n/a	Available
Is the slope of the QPA greater than 5%, QPA width less than the contributing impervious area width, the seasonal high water table less than 18 inches below ground surface, or within HSG D?	○ Yes ◉ No	n/a	n/a	n/a	n/a	Available	n/a	n/a
Are natural slopes where an infiltration trench or basin could be sited greater than 15%?	○ Yes ◉ No	Available	n/a	Available	n/a	n/a	Available	Available
Bottom of filter will be below seasonal high water table or bedrock?	○ Yes ◉ No	Available	Available	Available	Available	n/a	Available	Available
Top of filter will be less than three feet above seasonal high water table or bedrock?	○ Yes ◉ No	Available	Available	Available	Available	n/a	Available	Available
Seasonal high water table or bedrock less than 3 feet from the bottom of the practice?	○ Yes ◉ No	Available	Available	Available	Available	n/a	Available	Available
Will the practice or its subsurface drains be located within 50 feet down-gradient or 25 feet up-gradient or side-gradient of an OWTS leaching facility?	○ Yes ◉ No	Available	Available	Available	Available	Available	Available	Available
Will the practice be located within 200 feet of a surface drinking water supply?	○ Yes ◉ No	Available	Available	Available	Available	Available	Available	Available

Issues to still work out – Defining Feasible and MEP

- Design Standards for Best Practices for ROW
  - Volume and pollutant reductions
- Design Standards for Retrofits
- Designing for Maintenance
- Treatment Goals for Redevelopment vs. New Development vs. TMDL Goals for the waterbody
- Costs for planning purposes
- Developing Baseline and Accounting
  - Pollutant removal curves for structural practices
  - Credits for enhanced non-structural controls
  - Credits for non-MS4 retrofits

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