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## Narragansett Bay Watershed SCP Maidford River 2B (RI0007035R-02B) Middletown, Rhode Island

### Key Findings

This SCP Report is for Maidford River 2B (RI0007035R-02B) located within the Narragansett Bay watershed (**Figure 1-A**).

**Table 1-A: Subwatershed Summary**

Impairment(s)	Evaluation Methodology	RIDOT Reduction Target % (Acres)	Existing Treatment	Potential Treatment	Runoff Reduction	Remaining RIDOT Reduction Target	NonRIDOT Treatment Credit
<i>Fecal Coliform</i>	<i>IC Standard</i>	<i>17% (0.7 ac)</i>	<i>0.0 ac</i>	<i>1.6 ac</i>	<i>4.8 ac-ft</i>	<i>0.0 ac</i>	<i>58%</i>

### **Site Description**

#### Subwatershed Description

- The subwatershed is located in Middletown, RI.
- The subwatershed is 189 acres and 12% impervious (23 acres).
- The general land uses within the subwatershed are forest, wildlife refuge, agricultural, wetland, residential, and urban development.

#### RIDOT Discharging Area

- RIDOT maintained property is 7.2 total acres and 4.2 impervious acres.
- No "Other RIDOT roadways" exist in this subwatershed.
- The subwatershed area decreased from approximately 495 acres to 189 acres (-62% percent) due to changes identified during desktop review and site visits.
- There are no High Priority outfalls (Appendix 6).
- There are no Priority outfalls (Paragraph 20.b).
- There are no RIDOT MS4 discharge points for which RIDOT must provide a schedule for initiating IDDE inspections (Appendix 8).
- There are no MS4 outfalls for which RIDOT shall identify upgradient interconnections (Appendix 9).
- There are no TMDL Priority outfalls.
- There are 3 incoming MS4 interconnections and no private incoming interconnections.

- There are no outgoing interconnections.

#### Non-Discharge Areas

- RIDOT did not identify any non-discharge areas.

#### Sewered/Combined Sewer Areas

- A portion of the subwatershed has been identified as a sewered area.
- There are no areas that discharge to a combined sewer system.

### **Reduction Target Development**

- RIDOT's IC reduction target is 0.7 acres.
- Fecal Coliform is covered by TMDL: Rhode Island Statewide TMDL for Bacteria Impaired Waters – September 2011. The TMDL states that RIDOT should continue to implement its Stormwater Management Plan.

### **Existing Stormwater Controls**

- No STUs currently exist within the subwatershed.

### **Potential Enhanced Non-Structural Stormwater Controls**

- RIDOT did not identify any non-structural controls.

### **Potential Structural Stormwater Controls**

- RIDOT has identified that structural control measures are needed to reduce its effective IC to achieve the RIDOT IC reduction target.
- RIDOT identified 3 opportunities for potential STUs within the subwatershed (**Table 2-A**) with a total IC reduction credit of 1.6 acres.
- No TIP projects (as of November 2018) are scheduled for the next 5 years within the subwatershed.

**Table 2-A: STU Stormwater Controls Summary**

STU ID	Stormwater Control Type	Catchment Area (ac)	Impervious Cover (ac)	Treatment Depth (in) (Depth of Runoff Treated)	Runoff Reduction (ac-ft)	Equivalent IC Reduction Credit (ac)	Estimated Cost	Cost per IC Reduction Acre (\$/ac)	Retrofit Priority
SCP-MRB-001	Infiltration Swale	0.3	0.2	1.2	0.7	0.2	\$17,000	\$85,000	1
SCP-MRB-002	Infiltration Swale	0.2	0.2	1.1	0.6	0.2	\$14,900	\$93,100	1
SCP-MRB-003	Porous Pavement	2.7	1.9	0.3	3.5	1.3	\$78,500	\$61,300	2
							Percent RIDOT Reduction Reached 57%		
							Percent RIDOT Reduction Reached 242%		
Total		3.2	2.3		4.8	1.6	\$110,400		

## Site Description

### Subwatershed Description

Maidford River 2B (RI0007035R-2B) is located within the Narragansett Bay Subwatershed (**Figure 1-A**). The subwatershed is located in the southern region of the Town of Middletown, southeast of North Easton Pond (RI0007035L-03) subwatershed, south of Paradise Brook and Gardiner Pond. The headwaters of Maidford River 2A (RI0007035R-2A) begin with two forks, east of State Highway 138(RIDIOT owned), near Meadow Lane, flows south, and eventually is culverted underneath Hanging Rock Road (RIDOT owned). Here Maidford River 2A (RI0007035R-2A) is terminated and Maidford River 2B (RI0007035R-02B) begins. Maidford 2B continues east to the southern berm of Gardiner Pond, through Sachuest Marsh, and discharges to Sakonnet River at Third Beach. The Maidford River is a source of water for both Nelson and Gardiner Ponds and is a tributary to the Newport Water system. The Rhode Island Department of Environmental Management (RIDEM) water quality classification for the Maidford River 2B is Class AA. Designated use goals associated with the Maidford River include public drinking water supply, primary and secondary contact recreation, fish and wildlife habitat, and fish consumption. According to RIDEM’s Clean Water Act (CWA) Integrated List of Waterbodies – Appendix A 2016 Index of Waterbodies and Category Listing,<sup>1</sup> the impairment affecting this waterbody segment is fecal coliform.

This waterbody segment underwent a TMDL for fecal coliform bacteria in June 2011 which describes potential sources of bacteria impairments and identifies measures needed to restore water quality. These potential bacteria sources include agricultural activities, wildlife and domestic animal waste, stormwater runoff from developed areas, and illicit discharges.

RIDOT maintained property in the subwatershed is 7.2 acres; 4.2 acres of which is impervious. **ArcGIS online Figure 1/2** shows the subwatershed with the impaired waterbody segments, the Rhode Island Department of Transportation (RIDOT) maintained roadways, the RIDOT maintained property

<sup>1</sup> RIDEM, March 2018, 2016 Integrated Water Quality Monitoring and Assessment List – Appendix A 2016 Index of Waterbodies and Category Listing. Available at: <http://dem.ri.gov/programs/benviron/water/quality/surfwg/pdfs/iwr16.pdf>

(catchment area) that is discharging to the waterbody, and the outfalls that are discharging to the waterbody. According to 2011 land use data obtained from the Rhode Island Geographic Information System (RIGIS),<sup>2</sup> land use for the subwatershed and areas surrounding the Maidford River is agricultural, developed uses, forest, wetlands, and wildlife refuge areas.

### **RIDOT Discharging Area Description**

**ArcGIS online Figure 3** shows RIDOT maintained roadways and catchment areas, outfalls, catch basins, interconnections, and RIDEM-listed impaired water bodies located within the subwatershed, as discussed below.

#### Subwatershed Boundary Delineation

The RIDEM-provided subwatershed boundary was reviewed through desktop analysis and site visits. As a result of this review, the subwatershed area decreased from approximately 495 acres to 189 acres (-62% percent). A subwatershed boundary modification memo was sent to RIDEM on December 31, 2018.

A revised subwatershed was delineated using automated ArcSWAT tools and 1-meter LiDAR elevation data. While the new delineation generally concurred with the HUC14 delineation, it did include minor variations around the subwatershed perimeter resulting from the use of higher-resolution data for the delineation. Beyond the minor variations due to topographic data, one specific modification was made to the Maidford River 2B subwatershed boundary:

1. The previous Maidford 2B delineation included approximately 250 acres of Sachuest Point and along Indian Ave that drain to the Sakonnet River and Atlantic Ocean, rather than the Maidford River.

#### Other RIDOT Roadways

Preliminary evaluation of this subwatershed determined RIDOT roads are properly identified and no "Other RIDOT roadways" exist in this subwatershed.

#### RIDOT Roadways

RIDOT maintained roadways in the subwatershed include: Hanging Rock Road and Sachuest Point Road. RIDOT maintains 7.2 acres of property (impervious and pervious) within the subwatershed, all of which are directly or indirectly discharging to Maidford River with 4.2 acres impervious cover. The RIDOT direct and indirect discharging areas include the following:

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<sup>2</sup> Rhode Island Department of Environmental Management, Rhode Island Department of Administration, Statewide Planning Program, Photo Science, Inc. [www.rigis.org](http://www.rigis.org)

**Table 3-A: Direct and Indirect Discharging Areas**

RIDOT Roadway	Roadway Type	ROW Description	Adjacent Land Use	Drainage System
Hanging Rock Road	two lane roadway with vegetation on both sides	right-of-way (ROW) width ranging from 40- to 50- feet	wildlife refuge and open space	sheet flow to Maidford river
Sachuest Point Road	two lane roadway with vegetation on both sides	right-of-way (ROW) width ranging from 40- to 50- feet	wildlife refuge and open space	sheet flow to Maidford River

Outfall Catchment Delineation

RIDOT catchment areas by discharge location within the subwatershed are summarized in **Appendix A-A**. Catchments in the Maidford River 2B subwatershed were delineated based on a desktop review of RIDOT drainage data, 1-meter resolution LiDAR data, Google Earth tools, and 3-inch resolution aerial imagery. The RIDOT right-of-way (ROW) boundary was determined based on parcel boundaries retrieved from the Town of Middletown website. Non-RIDOT catchments were delineated only for those RIDOT catchments with a proposed STU. Non-RIDOT catchments in this subwatershed are limited due to the presence of a heavy vegetation and conservation areas along both sides of most of the RIDOT ROW. In general, runoff is conveyed to the outfalls north of the RIDOT ROW of the northern subwatershed via roadside swales. Outfalls and swales were confirmed by a field visit that took place in October 2018. The field visit confirmed general questions regarding roadway crowns and superelevation, drainage patterns and infrastructure, location of utilities, and identification of other potential constraints.

Illicit Discharge Detection and Elimination Priority Outfalls

There are 11 mapped RIDOT outfalls within the Maidford 2B subwatershed. There are no High Priority outfalls (as defined in Appendix 6) or Priority outfalls (as defined by paragraph 20.b) located in the subwatershed. There are also no RIDOT MS4 discharge points for which RIDOT must provide a schedule for initiating IDDE inspections (per Appendix 8). There are no MS4 outfalls for which RIDOT shall identify upgradient interconnections (per Appendix 9).

TMDL Priority Outfalls

There are no TMDL priority outfalls located in the subwatershed.

Interconnections

Interconnections are shown on **ArcGIS online Figure 3**. RIDOT utilized available Town of Middletown drainage data, RIDOT drainage data, and reviewed local topography and surface drainage patterns to identify possible interconnections.

MS4: RIDOT identified 3 locations where municipal separate storm sewer systems (MS4s) tie into the RIDOT drainage system (incoming interconnections) and no locations where RIDOT drainage ties into a municipal drainage system adjacent to their property (outgoing interconnections). Three Town of Middletown catch basins within Second Beach parking lot on Hanging Rock Road flow north underneath the RIDOT ROW and into 3 separate RIDOT mapped outfalls (Structure IDs 900218,

900217, 900216). The combined estimate of the non-RIDOT catchment areas for these three interconnections is 8.6 acres, which is primarily impervious area from within the Second Beach parking lot.

Private: The desktop review, drainage system mapping, and field visits identified no potential private interconnections.

RIDOT reviewed its RIDOT Physical Alterations Permit Application (PAPA) database. This database lists permits requested by adjacent properties to tie into the RIDOT storm drainage system and includes an analysis of the applicant's contribution to the RIDOT storm drainage system. No additional interconnections were identified as part of that review. RIDOT will review future PAPA permit requests for compliance with its TAC 0071 – PAPA Guidance – Public and Private Tie-Ins to the State's Drainage System and its RIPDES permit and to ensure that only stormwater flows are being introduced to their system.

### **Non-Discharge Areas**

RIDOT did not identify any non-discharge areas in the subwatershed.

### **Sewered/Combined Sewer Areas**

A portion of the subwatershed has been identified as a sewered area. Based on mapping from RIDEM, about half of the RIDOT ROW includes areas that are sewered by the Town of Middletown as shown in **ArcGIS online Figure 3**.

There are no areas in the subwatershed that discharge to a combined sewer system.

### **Flow and Water Quality Monitoring Data**

As part of this SCP, RIDOT reviewed the following sources for existing flow and water quality monitoring data:

- Rhode Island Statewide TMDL for Bacteria Impaired Waters Maidford River (RI0007035R-2A)
- University of Rhode Island (URI) Watershed Watch
- Groundwater Elevation Data

#### Rhode Island Statewide TMDL for Bacteria Impaired Waters Maidford River Watershed Summary<sup>3</sup>

As a part of this TMDL, samples were taken from seven sampling locations (MDF-SW5, MDF-SW6, OCI-9, OCI-10, OCI-11, OCI-12, and WW) and analyzed for the indicator bacteria, enterococci. The geometric mean of sample results taken from these seven stations exceeded the applicable water quality criteria for enterococci. These samples were taken in both dry and wet-weather. This TMDL only tested for the enterococci bacteria impairment.

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<sup>3</sup> TMDL for Maidford River, RIDEM, June 2011. Available at: <http://www.dem.ri.gov/programs/benviron/water/quality/swbpdf/maid2b.pdf>

#### URI Watershed Watch<sup>4</sup>

The URI Watershed Watch does not have any monitoring sites within the Maidford River subwatershed.

#### Groundwater Elevation Data

Groundwater elevation data was obtained from the United States Department of Agricultural National Cooperative Soil Survey and includes soil classification, standard groundwater depths, and infiltration rates.

## **Reduction Target Development**

According to the RIDEM's CWA Integrated List of Waterbodies – Appendix A 2016 Index of Waterbodies and Category Listing, the impairment(s) affecting Maidford River 2B (RI0007035R-2B) are fecal coliform. RIDEM developed a TMDL for this waterbody segment for fecal coliform bacteria in June 2011 as part of the Statewide Bacteria TMDL. The TMDL describes potential sources of bacteria impairments and identifies measures needed to restore water quality.

### **Impervious Cover Method**

As shown in **Table 4-A-2** the subwatershed's percent IC is greater than 10%, thereby indicating that stormwater is a likely contributor to the impairment. To meet RIDOT's apportioned responsibility for achieving the subwatershed IC reduction target, RIDOT's effective IC within the subwatershed will need to be reduced by the percentage calculated in **Table 4-A-2**. *(Note: The TMDL Method was not performed for this water body, and as a result, there is no Table 4-A-1: TMDL Method: Pollutant Reduction Target Summary)*

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<sup>4</sup> University of Rhode Island (URI) Watershed Watch. Available at: <https://web.uri.edu/watershedwatch/uri-watershed-watch-monitoring-data/>

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

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Subwatershed Total Area:	189 acres
Subwatershed Total IC Area (%):	23 acres (12%)
Subwatershed Target IC (10%):	19 acres
Subwatershed IC Reduction Target:	17%
RIDOT Contributing Total Area to Waterbody:	7.2 acres
RIDOT Contributing Total IC Area to Waterbody:	4.2 acres
RIDOT IC Reduction Target:	0.7 acres
Pollutants of Concern:	Fecal Coliform

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Additional TMDL Requirements

The following lists the TMDL information and recommendations applicable to RIDOT for this subwatershed:

**Non-Stormwater Related Impairments**

The Maidford River 2B (RI0007035R-2B) is not impaired by non-stormwater related impairments.

**Existing Stormwater Controls**

No stormwater treatment units (STUs) currently exist to treat stormwater from RIDOT’s property directly or indirectly discharging to Maidford River 2B (RI0007035R-2B). Under existing conditions, RIDOT’s estimated equivalent IC exceeds the RIDOT IC reduction target.

**Potential Enhanced Non-Structural Stormwater Controls**

RIDOT did not identify any non-structural stormwater controls. Enhanced street-sweeping is not required by the Consent Decree because the subwatershed does not drain to a Newport Water Supply Reservoir, and other potential non-structural controls were deemed infeasible.

**Potential Structural Stormwater Controls**

RIDOT has identified that structural control measures are needed to reduce its effective IC within the contributing subwatershed to achieve the required RIDOT IC reduction target. Appropriate locations are potentially available for control measures, as shown in **ArcGIS online Figure 4**.

Specific stormwater controls have been identified that may be considered for implementation, as described in the following section. See sub-section Evaluation of Infeasible Stormwater Controls for more information regarding locations where retrofit STUs are not currently feasible.

## Stormwater Controls Description

RIDOT identified specific locations and several general locations for potential structural STUs within this subwatershed. **ArcGIS online Figure 4** shows potential STU locations with catchment areas, including non-RIDOT areas and **Appendix C-A** lists site-specific constraints.

Below are descriptions of the potential STUs including location, conceptual design, RIDOT ROW treated, hydrologic soil group based on United States Department of Agriculture National Cooperative Soil Survey, major constraints, and any partnership required.

### *SCP-MRB-001, SCP-MRB-002*

These are linear infiltration trenches located along the northern side of Sachuest Point Road adjacent to Third Beach Road. The shoulder on the northern side of the road will be extended to construct the proposed STUs. The majority of the STU catchment is within the RIDOT ROW. Stormwater will enter the STU as sheetflow from Sachuest Point Road and pass through pretreatment systems. The soils in the area are mapped as hydrologic soil group A, therefore the STU will be designed to infiltrate to underlying existing soils, depending on the local depth to groundwater. Site review identified power lines crossing overhead of the site and utility poles within the ROW; however, these constraints are unlikely to prevent STU implementation at these locations.

### *SCP-MRB-003*

SCP-MRB-003 is a linear strip of permeable pavement along the southern side of Sachuest Point Road adjacent to Hanging Rock Road. The majority of the STU catchment is outside of the RIDOT ROW. Stormwater will enter the STU as sheetflow from Hanging Rock Road after passing through a pretreatment system. The soils in the area are mapped as hydrologic soil group A, so the STU will be designed to infiltrate to underlying existing soils, depending on the local depth to groundwater. No potential constraints were identified during the site inspection. This STU is located on Town of Middletown property and will require a partnership with the Town.

### TIP STUs

The RIDOT Transportation Improvement Plan (TIP) identifies RIDOT projects that are scheduled to be designed and constructed in the near future.

No TIP projects (as of November 2018) are scheduled for the next 5 years within the subwatershed.

### Limited ROW STUs

RIDOT did not identify any roadways as areas with limited ROW STUs.

### Infeasible Stormwater Controls

Through this evaluation, RIDOT determined that certain areas of the direct and indirect discharging area are not feasible for retrofit stormwater controls. These locations are shown in **ArcGIS online Figure 4** with specific constraints listed in **Appendix C-A**. In general, constraints included proximity to environmental resources and physical constraints limiting the construction and/or function of a potential STU. Although some constraints are manageable via creative design and permitting,

other constraints or the combination of multiple constraints make locations prohibitive for retrofit STUs. These locations may be feasible for STUs in the future if conditions change and will be evaluated as transportation designs occur.

### Stormwater Controls Calculations

Calculations showing effective IC reduction credit for potential stormwater controls is attached as **Appendix B-A** and summarized in **Table 1-A**.

## Implementation

Existing and potential enhanced non-structural and structural controls are summarized in **Table 5-A** below.

**Table 5-A: Stormwater Controls Summary**

STU ID	Stormwater Control Type	Catchment Area (ac)	Impervious Cover (ac)	Treatment Depth (in) (Depth of Runoff Treated)	Runoff Reduction (ac-ft)	Equivalent IC Reduction Credit (ac)	Estimated Cost	Cost per IC Reduction Acre (\$/ac)	Retrofit Priority
SCP-MRB-001	Infiltration Swale	0.3	0.2	1.2	0.7	0.2	\$17,000	\$85,000	1
SCP-MRB-002	Infiltration Swale	0.2	0.2	1.1	0.6	0.2	\$14,900	\$93,100	1
							Percent RIDOT Reduction Reached 57%		
SCP-MRB-003	Porous Pavement	2.7	1.9	0.3	3.5	1.3	\$78,500	\$61,300	2
							Percent RIDOT Reduction Reached 242%		
Total		3.2	2.3		4.8	1.6	\$110,400		

RIDOT will implement this SCP through:

1. Non-Constructed Measures
2. RIDOT New Construction and Re-Construction Projects
3. Retrofit Projects

RIDOT constructs STUs as part of either programmed or retrofit projects until the RIDOT IC reduction target is met.

### Non-Constructed Measures

RIDOT has performed various actions toward compliance with the municipal separate storm sewer system (MS4) General Permit:

- Middletown and RIDOT are MS4 operators in the Maidford 2B subwatershed and have prepared Phase II Stormwater Management Plans (SWMP). The entire watershed is regulated under the Phase II program. In 2009, stormwater outfalls and catch basins throughout Middletown were mapped as part of Phase II requirements.
- RIDOT’s SWMPP and its 2011 Compliance Update outline its goals for compliance with the MS4 General Permit. It should be noted that RIDOT has chosen to enact the General Permit

statewide, not just for the urbanized and densely populated areas that are required by the permit. RIDOT has finished mapping its outfalls throughout the state and is working to better document and expand its catch basin inspection and maintenance programs along with its BMP maintenance program. Storm Water Pollution Prevention Plans (SWPPP) are being utilized for RIDOT construction projects.

### **RIDOT New Construction and Re-Construction**

No new or re-construction projects whose scope and limits have been defined at the time of this SCP have been identified.

### **Retrofits**

Retrofit STUs have been identified as part of this SCP. **Table 5-A** includes estimated costs and implementation priority for these controls. Cost estimates for STUs were obtained from guidance in EPA's memo "Methodology for developing cost estimates for Opti-Tool", RIDOT Weighted Average Unit Prices for calendar years 2017 and 2018, and experience from prior stormwater projects. Costs from EPA's memo have not been adjusted to the current year. Average unit costs were developed based on a typical STU retrofit scenario and include considerations for mobilization and demobilization, soil erosion and sediment control, contingency, engineering and design fees, and construction administration. Individual STU costs were then adjusted based on STU size, with larger systems being more cost-effective than smaller systems. Cost estimates presented in this SCP should be considered as Order of Magnitude as defined by the American Association of Cost Engineers and are expected to be accurate within a plus 50% or minus 30% range as they were developed without detailed engineering data.

STU retrofit priorities were determined based on per-acre cost of IC reduction, constructability, and necessity for achieving the RIDOT IC reduction target. STUs more difficult and/or expensive to implement were generally given lower priority, unless they are necessary for achieving the reduction target, in which case they were tagged as priority 1 or 2. STUs located in TIP areas were given retrofit priorities based on the project start date, where near-term projects are higher priority and longer-term projects are lower priority.

**Table 6-A** shows the implementation schedule for the major milestones for design and construction of the retrofit STUs. Although these target implementation dates have been identified at this time based on the STU prioritization, RIDOT may implement certain STUs on an alternate schedule if cost efficiencies are identified. Examples of potential cost saving opportunities include:

- Constructing STUs along a highway corridor that spans multiple SCP subwatersheds at the completion of all associated SCPs
- Modifications in planned roadway project timelines or scopes
- Identification of partnering opportunities.

### **Table 6-A: Structural Controls Target Implementation Schedule**

STU Priority Level	Feasibility & Scope Start	Recommended Target Dates by		
		Design Start	Construction Advertise	Construction Finalized
Priority Level 1	June 2019	January 2021	June 2022	June 2023
Priority Level 2	June 2021	January 2023	June 2024	June 2025
Priority Level 3	June 2023	As Needed to Fulfill Target	As Needed to Fulfill Target	As Needed to Fulfill Target

Note: Target dates are based on an assumed EPA approval within six months of SCP submittal. The dates only apply to STU's that are determined feasible and are needed to fulfill the required RIDOT reduction target.

### Municipal and Private Partnerships

There are no existing partnerships, therefore **Appendix E-A** is not included.

There is one potential STU proposed on land that is not within the RIDOT ROW. SCP-MRB-003 is proposed in the north west section of the Second Beach parking lot, south of Hanging Rock Road. RIDOT will coordinate with the Town of Middletown to discuss the possibility of easements or other mechanisms to construct this STU.

### **IDDE Activities**

RIDOT has completed IDDE dry-weather screenings at its outfalls within this subwatershed.

During system mapping activities, dry-weather discharge was not observed at any outfalls in the subwatershed. Between April 1 and November 30, 2019, for all RIDOT MS4 Discharge Points located in areas where SCPs are required and where flow was not observed during dry-weather inspections RIDOT will inspect and sample discharge points under wet weather conditions for parameters listed in Paragraph 21c.

### **Public Outreach**

During development of this SCP, RIDOT met with the Town of Middletown on May 11<sup>th</sup>, 2018. RIDOT conveyed the Consent Decree requirements and the SCP Plan development schedule and made a request for available stormwater system mapping data. RIDOT will continue coordination with the Town of Middletown to share data, findings and plans for improvements.

### **STU Operations and Maintenance Plan**

Existing and newly constructed STUs will be inspected, operated and maintained to ensure functionality and longevity of the STUs. The inspection, operation and maintenance procedures for STUs are consistent with those outlined in RIDEM's Stormwater Design and Installation Standards

Manual, amended in March 2015,<sup>5</sup> and include inspections and maintenance that is customized to the functioning components of the STU.

## Next Steps

In the year following submission of this SCP, RIDOT will develop feasibility studies for all Priority 1 STUs listed in **Table 2-A**. These feasibility studies will further evaluate site characteristics and constraints, including soil infiltration rates, utility conflicts, and catchment areas to each potential STU. In addition, a 30% design, 90% design, PS&E and required Contract Advertising Documents and as-build plans will be developed for each of the Priority 1 STUs.

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<sup>5</sup> Rhode Island Stormwater Design and Installation Standards Manual, Rhode Island Department of Environmental Management and Coastal Resources Management Council, Amended March 2015. Accessed: <http://www.dem.ri.gov/pubs/regs/regs/water/swmanual15.pdf>.

**APPENDIX A-A**  
**Maidford 2B (RI0007035R-2B)**  
**RIDOT DISCHARGING AREA SUMMARY**

**Appendix A-A: RIDOT Discharging Area Summary**

Structure ID	Discharge Location	Description	Total Area (ac)	Impervious Cover (ac)	Pervious Cover (ac)	Pervious Cover Types
<i>OF-900218</i>	<i>Wetland</i>	<i>Vegetated Swale</i>	<i>1.3</i>	<i>0.9</i>	<i>0.4</i>	<i>Wetland/ Beach</i>
<i>OF-900217</i>	<i>Wetland</i>	<i>Vegetated Swale</i>	<i>0.4</i>	<i>0.3</i>	<i>0.1</i>	<i>Wetland/ Beach</i>
<i>OF-900216</i>	<i>Wetland</i>	<i>Vegetated Swale</i>	<i>1.6</i>	<i>0.9</i>	<i>0.7</i>	<i>Wetland/ Beach</i>
<i>OF-900215</i>	<i>Wetland</i>	<i>Vegetated Swale</i>	<i>0.4</i>	<i>0.3</i>	<i>0.1</i>	<i>Wetland/ Beach</i>
<i>OF-17959</i>	<i>Wetland</i>	<i>Vegetated Swale</i>	<i>3.5</i>	<i>1.9</i>	<i>1.6</i>	<i>Wetland/ Beach</i>

**APPENDIX B-A**  
**Maidford 2B (RI0007035R-2B)**

**STORMWATER CONTROLS**  
**POLLUTANT CALCULATIONS**

**APPENDIX C-A**  
**Maidford 2B (RI0007035R-2B)**

**IDENTIFIED CONSTRAINTS**  
**FOR STU IMPLEMENTATION**

**Appendix C-A: Identified Site Constraints Limiting STU Implementation**

Catchment ID	Environmental Constraints														Physical Constraints						Access Constraints		Other	STU Recommended				
	FEMA Floodplain (FIRM)	Inundation Surfaces (RIGIS)	Outstanding Resource Waters (RIGIS)	Surface Water Protection Areas (RIGIS)	Freshwater Wetlands (RIGIS)	OWTS Critical Resource Area (RIDEM)	Coastal Features (CRMC)	Endangered Species (RI Natural Heritage Program)	Environmental Justice Area (RIDEM)	Open Space / Conservation Land (RIGIS)	Cultural / Historic Resources (RIGIS)	Underground Storage Tanks (RIDEM)	Leaking Underground Storage Tanks (RIDEM)	CERCLIS/National Priority List (US EPA)	Environmental Land Use Restriction (RIDEM)	Other Resource Area	Non-RIDOT Property / Limited Right-Of-Way	Soils (Poor Infiltration Capacity) (Urban Fill)	Groundwater Resources	Ledge (Bedrock)	Existing Vegetation	Steep Slopes	Elevated Topography		Utilities	Safety	Road Closure	Other
PT-MRB-006	X																						X					X
PT-MRB-007	X																						X					X
PT-MRB-008	X																X						X					X
NF-MRB-001	X				X				X								X			X			X					
NF-MRB-002	X				X				X								X			X			X					
NF-MRB-003	X				X				X								X			X			X					
NF-MRB-004	X				X				X								X			X			X					
NF-MRB-005	X				X				X								X			X			X					

**APPENDIX D-A**  
**Maidford 2B (RI0007035R-2B)**

**TIP PROJECTS**

**Appendix D-A: TIP Projects Scheduled for FY 2019-2025 as of October 2018**

TIP ID	TIP Project Name	Location	TIP Project Description	TIP Project Status
<i>None</i>				



**FIGURE 1-A**  
**Maidford 2B (RI0007035R-2B)**  
**SUBWATERSHED OVERVIEW**