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Yarmouth
MASSACHUSETTS

YARMOUTH MS₄ PROGRAM IMPLEMENTATION

Navigating the New Stormwater Permit
New Tools for Smooth Sailing through MS₄ Compliance
March 30, 2017



Presented at CEI's Navigating the New Stormwater Permit on March 30, 2017 in Marlborough, MA
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Overview

- About Yarmouth
- MS4 Program Approach
- Other Stormwater Projects
- Summary
- Questions



About Yarmouth

- **Population:** 23,793
- **Area (sq. mi):** 25.3 (18.8 in UA)
- **IA (sq. mi):** 4.5 (3.0 DCIA)
- **Land Use:**
 - Forest: 35%
 - Residential: 33%
 - Water: 20%
 - Comm/indust: 7%
 - Other: 5%
- **Sewer:** 100% Septic



<http://blog.yarmouthcapecod.com/snowy-beach-scenes-highlight-the-serenity-beauty-of-yarmouth-ma/>



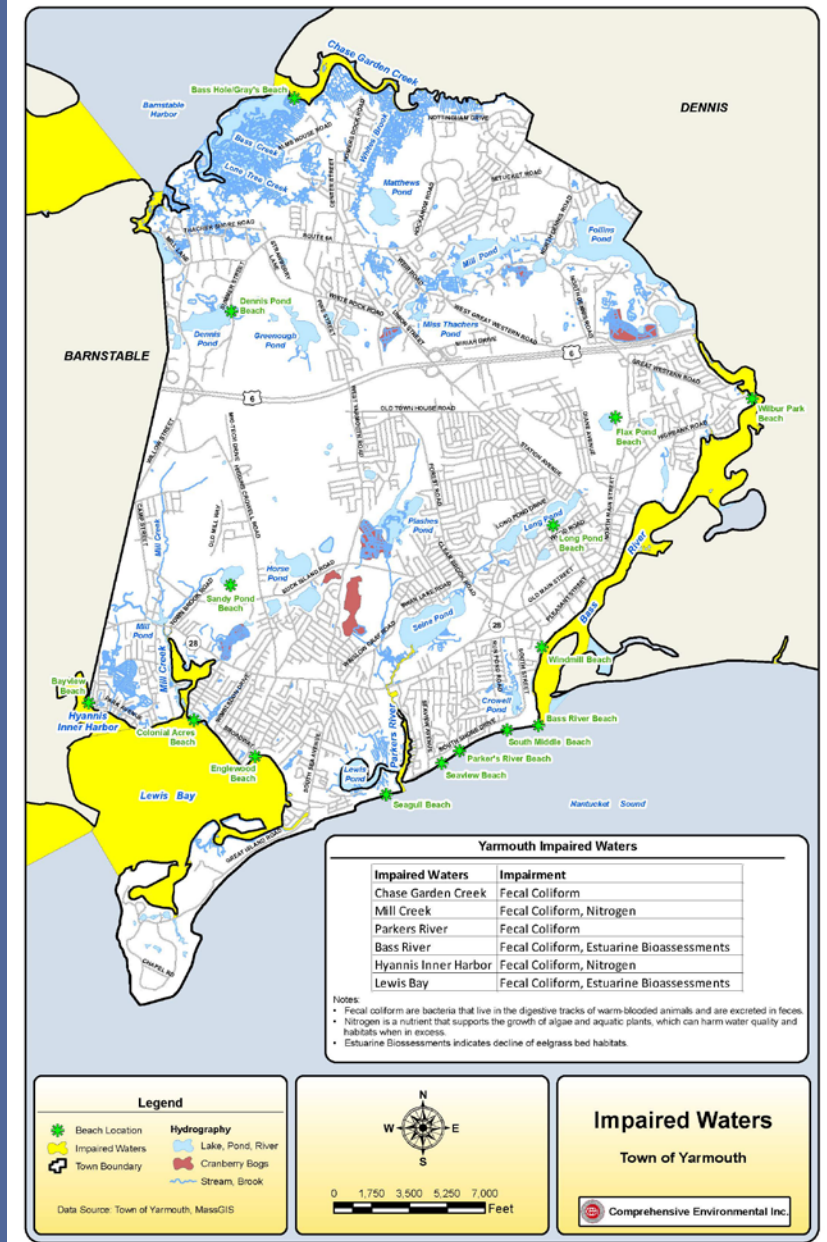
Water Quality Issues

• 6 Impaired Water Bodies

- Fecal coliform
- Nitrogen

Nitrogen in groundwater is a big concern on the Cape.

Sandy Cape Soils = Greater Infiltration & Less Stormwater Runoff



MS4 Program Approach

Funding Opportunity Arises

\$\$\$
Roadway



\$\$\$
Stormwater
Management

2003 MS4
Permit
Handled In-
house

2008-2014
NH & MA
Drafts
Released

2014-2015
Funding
Opportunity
Arises – Begin
Implementation

2016 On-call
Consulting
Contract to
Assist with
Program

On-call to help set
up the program with
option to handle
some components
internally.



Compliance With 2003 MS4 Permit

- **Performed In-house by Town Engineer**
 - Education – bookmarks, handouts, storm drain decals, door hangers, town meetings, website, HHW collection days
 - IDDE – outfalls mapped & screened, other stormwater infrastructure mapped, local regulations in place
 - Construction & Post-Construction regulations in place
 - Good Housekeeping – sweeping, catch basin cleaning, beneficial use determination, BMPs
- **Overall – Program is in Good Shape**
 - All the components are there
 - Mapping in great shape!
- **Town Engineer Approaching Retirement**
- **New Permit is More Complicated**
- **Stormwater Funding Opportunity**



Time for Some
Outside Help



Initial Estimated Budget

- \$200,000-\$350,000/year
- Based on Draft Permit
- Lots of assumptions
 - 10% flowing outfalls – testing
 - follow-up sampling on 25% of flowing outfalls
 - 20% of outfalls have System Vulnerability Factors – wet weather testing
 - 75% key junction structures – inspection
 - Nutrient Best Management Practices (BMPs) for Nitrogen impairments - \$\$\$
 - SWPPPs required



<http://www.pm4ngos.com/estimate-or-budget/>



Where to Begin?

- **Stormwater Management Program Plan (SWMP)**
 - Completed 2015-2016
 - Organize program into one “living” document
 - Established proposed BMPs for new permit
 - Established BMPs & schedule for implementation
 - Collect details to refine implementation budget



Photo source: <http://www.aulithotech.org/services/bindery/>



Continued Focus on Items Due Year 1

CHECKLIST

- SWMP
- NOI
- IDDE Plan
- Operations & Maintenance – 2003 Permit & Year 2 of New Permit
- Local Regulations – Year 1 & Year 2 of New Permit
- Public Education
- Training
-
-



Notice of Intent (NOI)

• Drafted 2016

- Proposed BMPs
- Identified Responsible Parties
- Presented to Town Staff

• Prepared But Not Yet Submitted

- Waiting till closer to due date to perform Endangered Species review

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued) Part II: Summary of Receiving Waters

Please list the waterbody segments to which your MS4 discharges. For each waterbody segment, please report the number of outfalls discharging into it and, if applicable, any impairments.

For Massachusetts list of impaired waters click here: [Massachusetts 2010 List of Impaired Waters: http://www.mass.gov/deplwater/resources/10list6.pdf](http://www.mass.gov/deplwater/resources/10list6.pdf)

For New Hampshire list of impaired waters click here: [New Hampshire Final 303\(d\) Materials: http://des.nh.gov/organization/divisions/water/wmb/swqa/2010/index.htm](http://des.nh.gov/organization/divisions/water/wmb/swqa/2010/index.htm)

Source of pollutants column should be completed with a preliminary source evaluation of pollutants for discharges to impaired waterbodies (see above 303(d) lists) without an approved TMDL in accordance with Section 2.2.2a of the permit

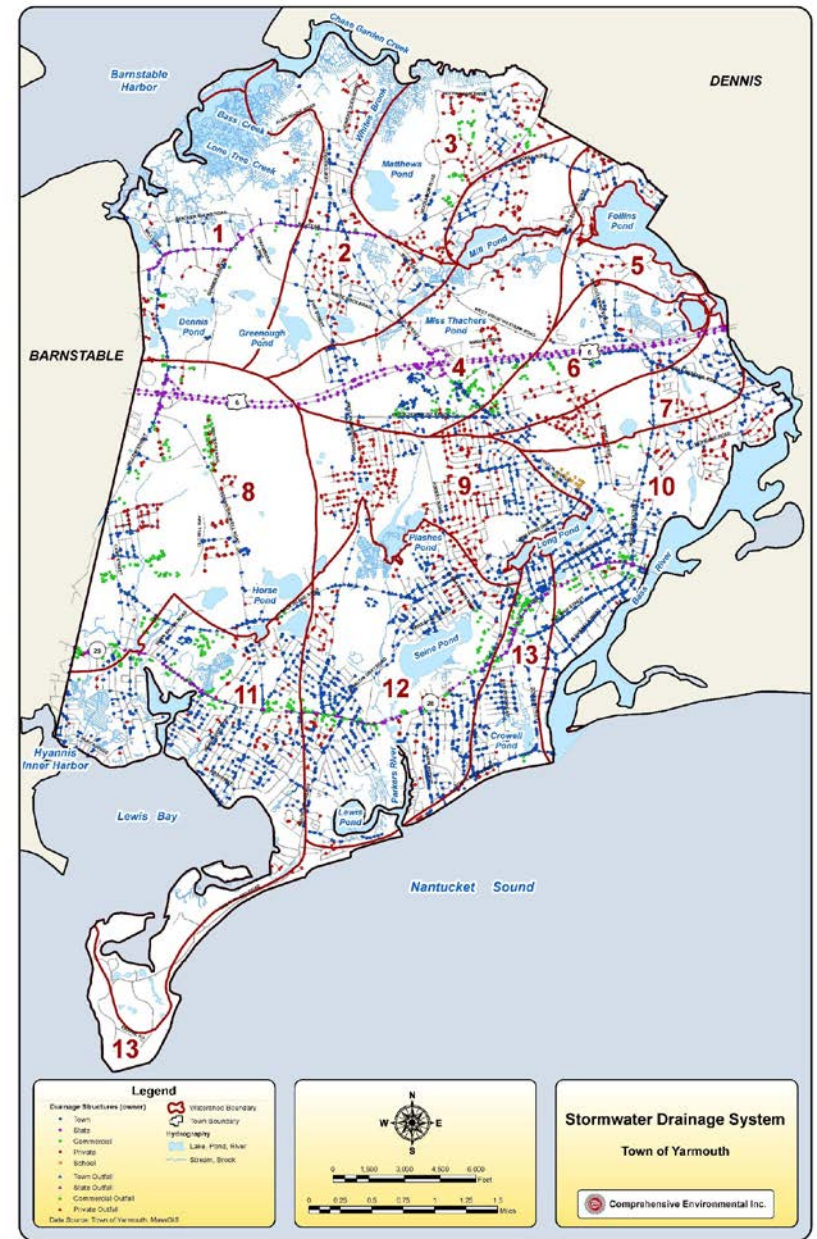
Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Pollutant list (select one at a time to add)	Click impairment at left to add, or at right to remove	Pollutant(s) causing impairment, if applicable (select one at a time to remove)
Bass Creek	2	Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved pH	Add/Remove	
Bass River	9	Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved pH	Add/Remove	Fecal coliform
Big Sandy Pond	2	Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved pH	Add/Remove	
Brook west of Wimbledon Drive	2	Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved pH	Add/Remove	
Cat Swamp Pond	2	Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved pH	Add/Remove	
Chase Garden Creek	2	Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved pH	Add/Remove	Fecal coliform
Crowell Pond	7	Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved pH	Add/Remove	
Dennis Pond	3	Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved pH	Add/Remove	



IDDE Plan – Mapping

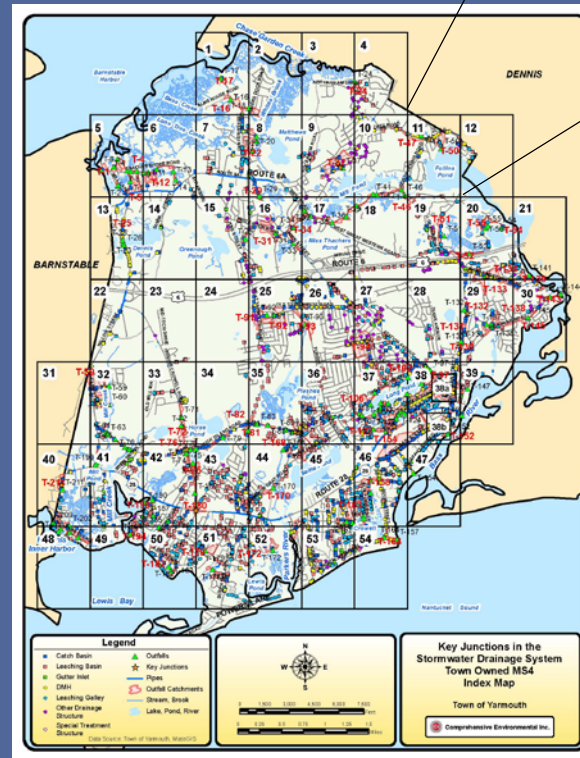
- Mapping Already Completed by Town in GIS
 - Town owns & maintains 58% of roads
 - Remainder is private or State owned
 - Much of the MS4 has been disconnected with the use of leaching structures
 - Outfall catchment areas delineated – 162 regulated outfalls

Sandy Soils = 1,000+ Leaching Structures



IDDE Plan – Mapping

- Added Key Junction Structures
- Maps Formatted for IDDE
 - Town split into 54 grids
 - Each grid can be printed as 8 1/2x 11 for field use
 - Corresponding inspection tables



IDDE Plan

• Drafted 2016

- Outfalls ranked & prioritized
- System Vulnerability Factors (SVFs)
 - No sewer = no 'required' SVFs
 - Septic - No wide-spread code-required septic system upgrades required & no history of multiple BOH actions
 - Wet weather sampling not required at this time
- Standard Operating Procedures Developed
 - Dry weather outfall inspection
 - Wet weather sampling
 - Dry weather key junction screening
 - Formats for processing data

DRY WEATHER OUTLET INVENTORY AND INSPECTION

Today's Date:	Outfall ID:
Inspector:	Photos:
Rainfall (in.): Last 24 hours: Last 48 hours:	Other:

Outfall Description					
Location	Material	Shape	Dimensions (In.)	Submerged	
<input type="checkbox"/> Closed Pipe	<input type="checkbox"/> RCP <input type="checkbox"/> CMP <input type="checkbox"/> HDPE <input type="checkbox"/> Aluminum <input type="checkbox"/> Other:	<input type="checkbox"/> Circular <input type="checkbox"/> Elliptical <input type="checkbox"/> Box <input type="checkbox"/> Other:	Diameter/Dimensions:	In water:	With sediment:
<input type="checkbox"/> Open drainage	<input type="checkbox"/> Paved <input type="checkbox"/> Grass <input type="checkbox"/> Rip-rap <input type="checkbox"/> Other:	<input type="checkbox"/> Trapezoid <input type="checkbox"/> Parabolic <input type="checkbox"/> Other:	Depth: _____ Top Width: _____ Bottom Width: _____	<input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully	<input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully
Flow Present? <input type="checkbox"/> Yes <input type="checkbox"/> No Notes:					
Flow Description (if present) Trickle <input type="checkbox"/> Moderate <input type="checkbox"/> Substantial					
Flow Depth & Width (if present) Depth in Center of Flow (in): _____ Width (in): _____					

Physical Indicators for Flowing Outfalls Only

Are any physical indicators present in the flow? Yes No

Indicator	Description	Relative Severity Index (1-3)		
<input type="checkbox"/> Odor	<input type="checkbox"/> Sewage <input type="checkbox"/> Rancid/sour <input type="checkbox"/> Petroleum/gas <input type="checkbox"/> Sulfide <input type="checkbox"/> Other:	<input type="checkbox"/> 1 - Faint	<input type="checkbox"/> 2 - Easily detected	<input type="checkbox"/> 3 - Noticeable from a distance
<input type="checkbox"/> Color	<input type="checkbox"/> Clear <input type="checkbox"/> Brown <input type="checkbox"/> Gray <input type="checkbox"/> Yellow <input type="checkbox"/> Green <input type="checkbox"/> Orange <input type="checkbox"/> Red <input type="checkbox"/> Other:	<input type="checkbox"/> 1 - Faint colors in sample bottle	<input type="checkbox"/> 2 - Clearly visible in sample bottle	<input type="checkbox"/> 3 - Clearly visible in outfall flow
<input type="checkbox"/> Turbidity	See severity	<input type="checkbox"/> 1 - Slight cloudiness	<input type="checkbox"/> 2 - Cloudy	<input type="checkbox"/> 3 - Opaque
<input type="checkbox"/> Floatables Does not Include Trash! <input type="checkbox"/> Suds <input type="checkbox"/> Petroleum (oil sheen) <input type="checkbox"/> Other:	<input type="checkbox"/> Sewage (toilet paper, etc.) <input type="checkbox"/> Sulfide <input type="checkbox"/> Petroleum (oil sheen) <input type="checkbox"/> Other:	<input type="checkbox"/> 1 - Few/slight, origin not obvious	<input type="checkbox"/> 2 - Some; indications of origin (e.g. possible suds or oil sheen)	<input type="checkbox"/> 3 - Some; origin clear (e.g. obvious oil sheen, suds, or floating sanitary materials)

Sample ID: _____ Sample time: _____
(Attach Water Quality Screening Form)

Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? Yes No

Indicator	Check if Present	Description
Outfall Damage	<input type="checkbox"/>	<input type="checkbox"/> Spalling, Cracking or Chipping <input type="checkbox"/> Corrosion <input type="checkbox"/> Other:
Deposits/Stains	<input type="checkbox"/>	<input type="checkbox"/> Oily <input type="checkbox"/> Flow Line <input type="checkbox"/> Paint <input type="checkbox"/> Other:
Abnormal Vegetation	<input type="checkbox"/>	<input type="checkbox"/> Excessive <input type="checkbox"/> Inhibited Notes:
Poor Pool Quality	<input type="checkbox"/>	<input type="checkbox"/> Odors <input type="checkbox"/> Colors <input type="checkbox"/> Floatables <input type="checkbox"/> Oil Sheen <input type="checkbox"/> Suds <input type="checkbox"/> Excessive Algae <input type="checkbox"/> Other:
Pipe Benthic Growth	<input type="checkbox"/>	<input type="checkbox"/> Brown <input type="checkbox"/> Orange <input type="checkbox"/> Green <input type="checkbox"/> Other:

Possibility of Illicit Discharge

Unlikely Potential (presence of two or more indicators) Suspect (one or more indicators with a severity of 3) Obvious

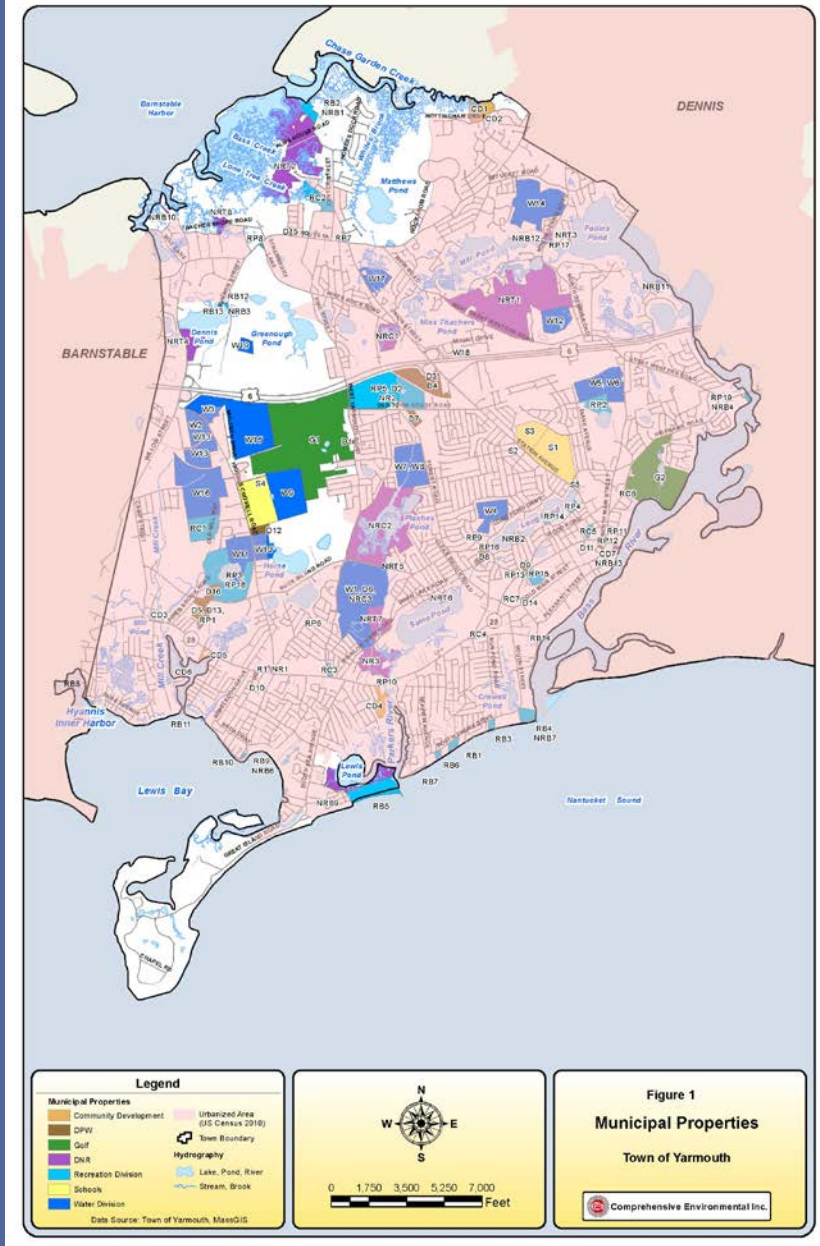
Any Non-Illicit Discharge Concerns (e.g. trash, sediment buildup (note depth) or needed infrastructure repairs)?

Comments:



O&M Plan

- Drafted in 2015
- SOPs – 26 SOPs
 - Parks & Open Space
 - Buildings & Facilities
 - Vehicle Maint. & Storage Yards
 - Municipal Infrastructure
 - Spill Prevention, Response & Reporting
 - Construction Management
- 1-2 Pages Each
- Map & Matrix of Town Facilities & Applicable SOPs



Training

- **Current Focus is Overall Program & Responsibilities**
 - Key players in program development: DPW Director, Town Engineer, Highway Superintendent, Conservation Administrator
 - Include Other Town Departments
- **Introduced MS₄ Permit Requirements & Draft SWMP at Town Department Head Meeting – 2015**
- **NOI – To Be Presented in April 2017**
- **Future Planned Training Topics**
 - IDDE investigations
 - Good housekeeping O&M
 - Municipal site inspections



<https://www.fodcontrol.com/training-employees/>



Public Education & Participation

- **Town Has Considerable Public Education Information from 2003 Permit**
- **Considering Additional Information for Website**
 - Managing stormwater
 - Preventing stormwater pollution
 - Yarmouth's program
 - Links to guidance and fact sheets
- **Future Incorporation – SWMP Identified Messages & Distribution for Each Audience**



Storm Drain Decals



Public Education & Participation – Proposed Messages & Distribution

Residential

Topics:	Distribution:
<ul style="list-style-type: none"> • IDDE • Lawns • Pet waste • Septic maint. 	<ul style="list-style-type: none"> • Printed materials • Door hangers • Pet license renewal • Website

Developers

Topics:	Distribution:
<ul style="list-style-type: none"> • Eros. & sed. controls • LID • CGP 	<ul style="list-style-type: none"> • Permit applications • Website

Business

Topics:	Distribution:
<ul style="list-style-type: none"> • IDDE • Lawns • Infiltration • Parking lots 	<ul style="list-style-type: none"> • Toxic / hazardous material license application • Business license • Website

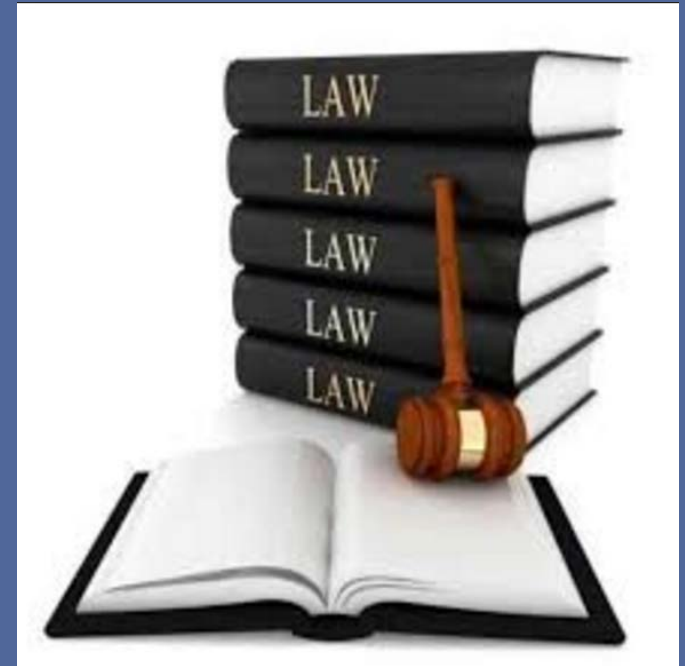
Industry

Topics:	Distribution:
<ul style="list-style-type: none"> • IDDE • Parking lots • CGP 	<ul style="list-style-type: none"> • Toxic / hazardous material license application • Website



Local Regulations – In Progress

- **Written Procedures for Site Plan Review & Inspection & Enforcement – Due Year 1**
- **Updated Regulations – Due Year 2**
- **Assessment for LID & Green Infrastructure – Due Year 4**
 - Update bylaws, SW Handbook
 - Update regulations, LID
 - Site plan review
 - Town property BMPs
- **Currently Working on All Components**



**Bylaws Take Time –
Start Early**

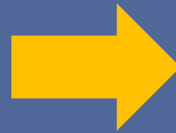


Other Stormwater Projects

- Yarmouth Has Several Nitrogen Impaired Waters
- Septic Wastewater is the Primary Source
- Small Amount From Stormwater Runoff
- Bacteria is Also a Problem



Yarmouth Has An Aggressive Roadway Drainage Disconnection Program



What If We Could Incorporate Nitrogen Treatment?

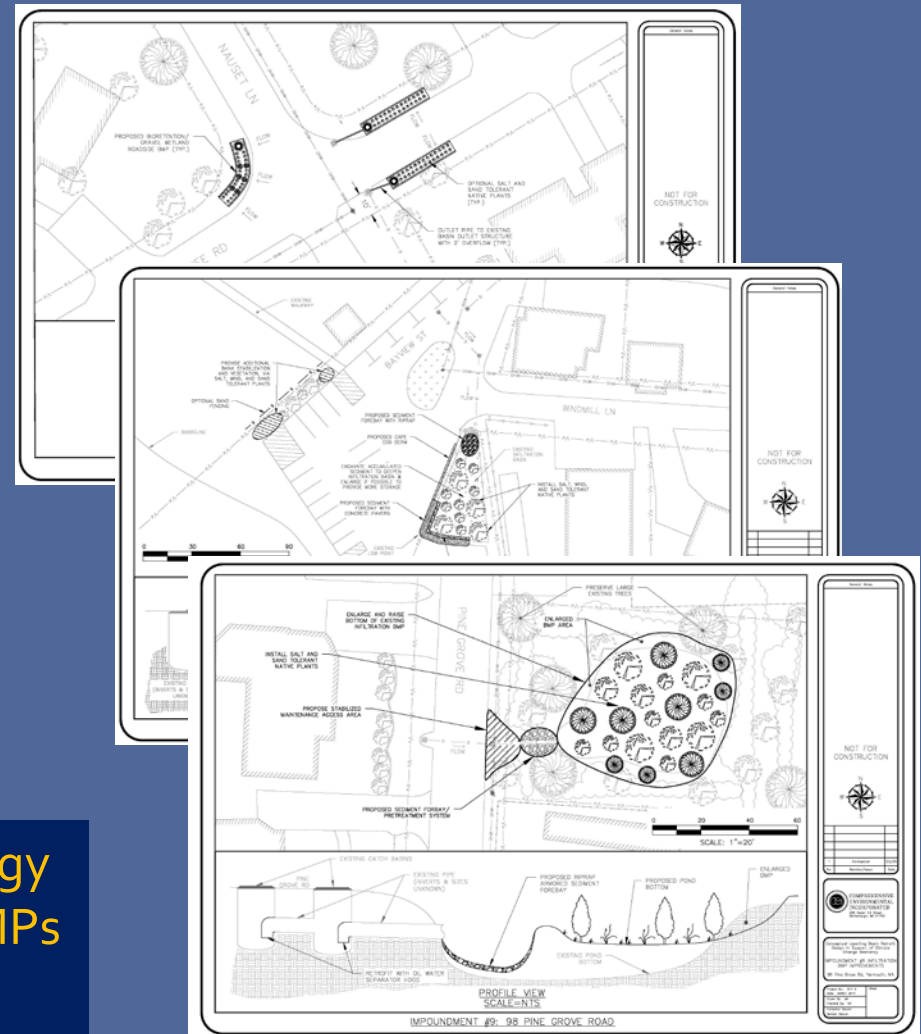


Other Stormwater Projects

Roadway BMPs

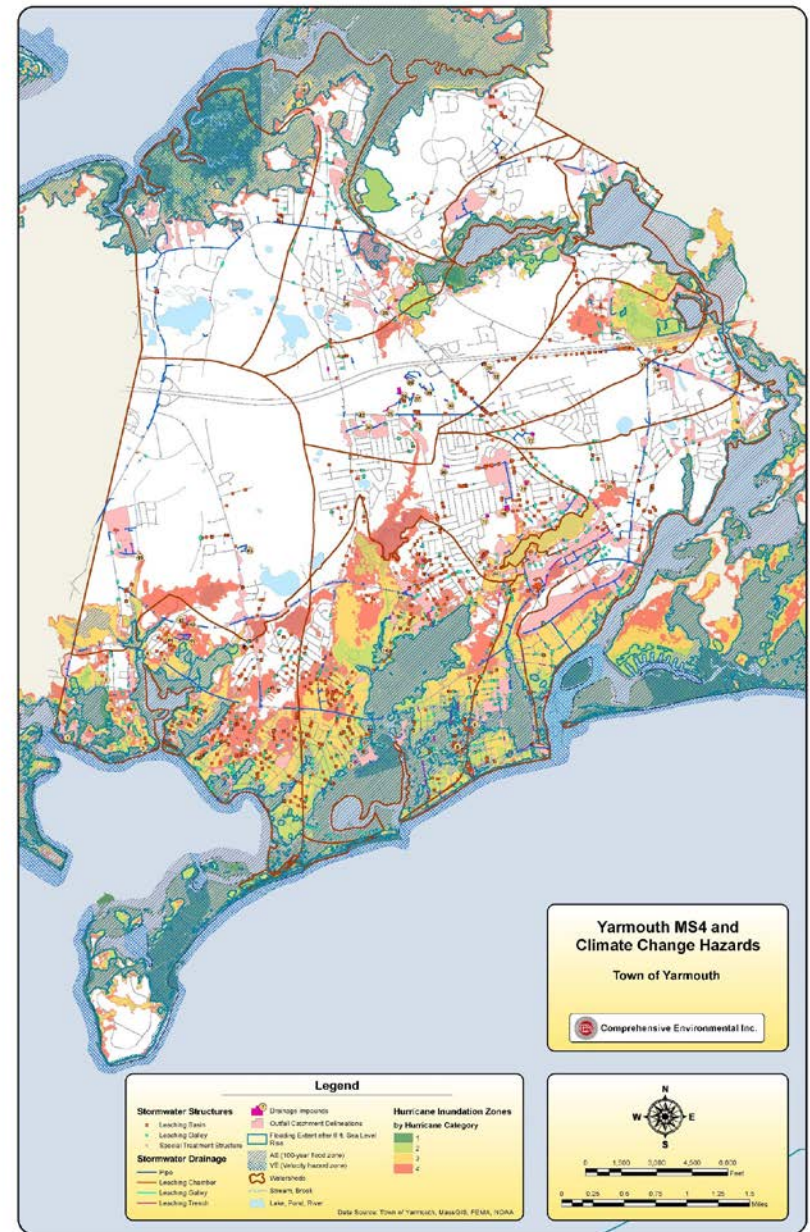
- Incorporate Nitrogen & Bacteria Treatment Into Roadway Infiltration Projects
- Obtained CZM CPR Grant
 - Identify & rank potential BMP Sites – high N & bacteria
 - Conceptual designs for 3 locations
 - Final design for one location
 - Design & build by June 2017

Applying Nitrogen Treatment Technology Applied to Barnstable and Chatham BMPs to Roadway BMP Designs



Other Stormwater Projects

- **Climate Resiliency – CZM Grant**
 - Evaluate existing BMPs impacted by climate change
 - Conceptual design for 3 locations
 - Final design for one location
- **Pursuing 319 Grant**
 - Construct one of the conceptual designs from the CZM Grant Projects



Updated Estimated Budget

- Under \$200,000/year
- Reduced assumptions
 - SWMP & IDDE already drafted
 - Catchment delineations already performed by Town
 - No SVFs, no wet weather sampling
 - Minimal key junction structures
 - O&M Plan already drafted
 - Reduced Nitrogen BMP from 2 to 1 – likely won't need any



<http://www.pm4ngos.com/estimate-or-budget/>



Summary of Key Points

- **Funding Opportunity Allowed for Early Implementation – Use it or Lose It**
 - MS₄ Assistance
 - Leverage Grant Funds
- **On-Call Contract Allows Yarmouth to Seek Help Where Needed**
 - Program set-up and plan development
 - Training
- **Upfront Mapping & SWMP Helped Refine Budget Assumptions**





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QUESTIONS?

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