



Canal Water Quality Committee Meeting Agenda – Sept. 08, 2010

1. *Pollution & Stormwater Control Strategy For The Anchorage Canal Drainage Area - Potential Retrofits*
 - Update on grant to the CIB to implement two recommendations from the above study
2. Educational Opportunities:

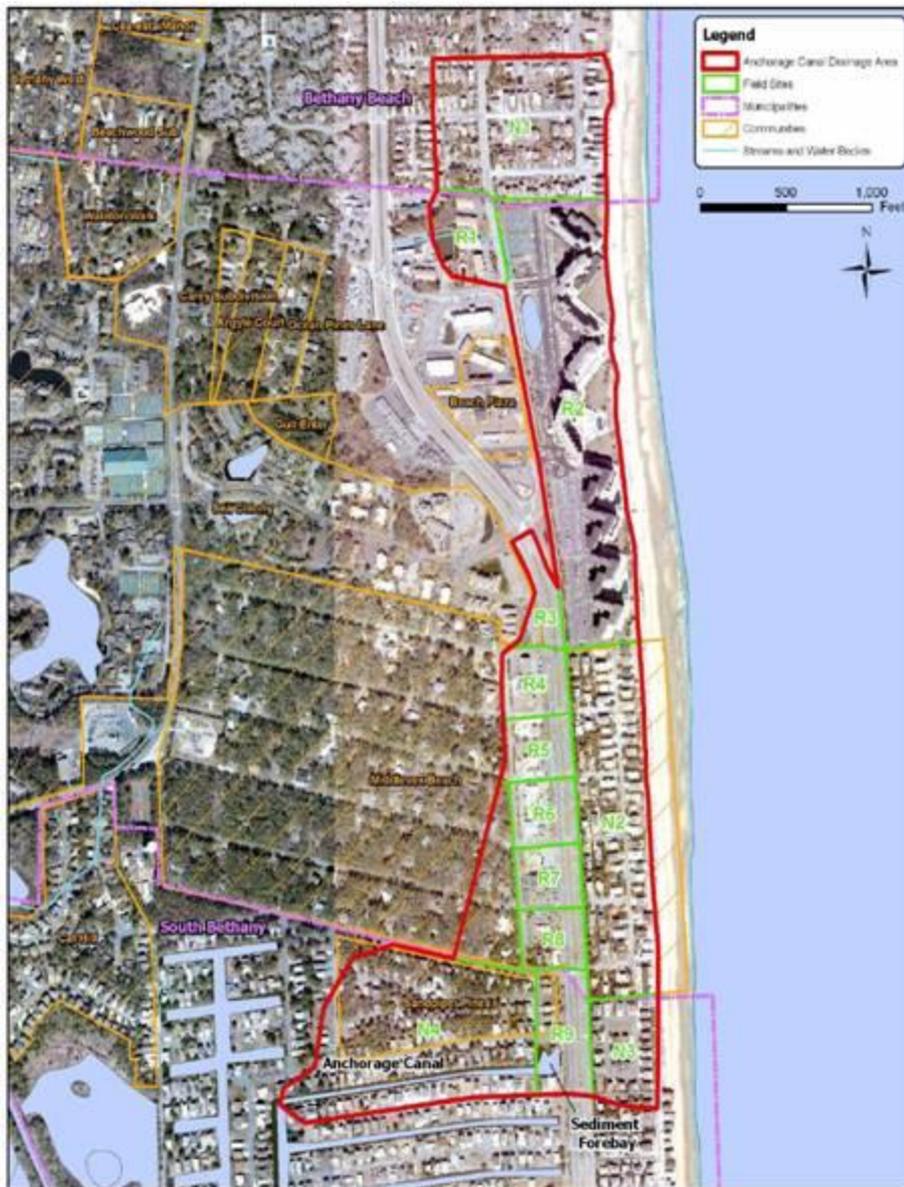
Note from Al:

George, I will be out of territory for the meeting. As for the Oyster Gardening Project, not much going on. We have been asked to take our baskets out of the Taylor Floats for the winter, hang the baskets close to the bottom of the canal and store the floats, preferably in a place where they will be protected. Will be back at the end of the month. cheers.....al



Pollution & Stormwater Control Strategy For The Anchorage Canal Drainage Area Report

http://www.inlandbays.org/cib_pm/restoration_projects.php



The Drainage Area is 125 Acres

25 Retrofits Were Suggested

- 2 In Bethany Beach
- 9 In Sea Colony
- 13 Along Coastal Highway
- 1 In The Anchorage Canal

5 Neighborhood Recommendations

- I. Lawn Care Education
- II. Downspout & Outdoor Shower Disconnection
- III. Storm Drain Stenciling/Marking
- IV. Impervious Cover Reduction
- V. Inlet Retrofits



Neighborhood Recommendations (1 of 2)

I. Lawn Care Education -- Al Rae

- Although the average grass cover on individual lots was only 10-15%, a majority was medium to highly managed. Highly managed turf is defined as lawns where fertilizers, pesticides, and irrigation appear to be used to maintain a dense grass cover, which can result in polluted stormwater runoff. Lawns that are lush, dense, and consistently green may suggest the use of fertilizers and/or herbicides, particularly if they are managed by a lawn care company. Pollutants from the lawn can be washed into storm drains from either rainfall or routine lawn watering.

II. Downspout & Outdoor Shower Disconnection -- Andy Ross



III. Storm Drain Stenciling/Marking -- Gene Hendrix

- I. Inlets are sometimes used as a means of disposal for trash, yard waste and household products. Storm drain stenciling/marketing teaches residents that what enters a storm drain eventually goes downstream, or in this case, to the Anchorage Canal. A message, such as, "Don't dump, drains to Anchorage Canal" sends a clear message to keep trash and debris, leaf litter and organic matter out of the storm drain system.

Neighborhood Recommendations (2 of 2)

IV. Impervious Cover Reduction -- Al Rae



V. Inlet Retrofits

- There were many inlets located in small depression areas. One potential retrofit to improve stormwater quality is to remove the pavement and rip-rap surrounding these inlets. Grass and native vegetation can then be planted around the inlets to serve as pretreatment.





Educational Opportunities

- Storm Drain Stenciling/Marking Gene Hendrix
- Rain Gardens George Junkin
- Lawn Care Al Rae
- Rooftop Downspout Disconnection Education Andy Ross
- Outside Shower Disconnection Education Andy Ross
- Impervious Surface Reduction Education Al Rae



Review And Discussions Of Potential Retrofits

- Inlet Retrofits Sue, George and John Speer
 - Filters from DeIDOT
- Rt. 1 Median Bioretention Sue & George
- Rt. 1 East Side Bioretention Sue & George
- Rt. 1 West Side Bioretention Sue & George



Storm Drain Marking

Why are volunteers marking the storm drains?

Storm drains in your area are being marked by volunteers to let everyone in the neighborhood know that materials or liquids should not be dumped into the storm drains because it ultimately ends up in Delaware Bay.

As stormwater flows over driveways, lawns, and sidewalks, it picks up debris, chemicals, dirt and other pollutants. Storm drains allow excess water to be diverted to local waterways. Unfortunately, in the process, storm drains also allow pollution to enter our lakes, streams, rivers, wetlands, or coastal waters. Anything that enters a storm drain system is discharged into your local waterway, without being treated.

Funding for this project was provided through DNREC, Nonpoint Source Program, by EPA Clean Water Act, Section 319 grant.

For more information on this effort, please contact the DNREC Sediment and Stormwater Program at 302-739-9921.



DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
SEDIMENT AND STORMWATER PROGRAM



This artwork may not be reproduced without the prior written consent of the
© 2005 das Manufacturing, Inc.

**DELAWARE
STORM DRAIN
MARKING**



Storm Drain Marking

HOW TO HELP...



Vehicles

Don't dump anything down the storm drains. Remember that used motor oil can be taken to the Recycle Delaware Center through the Delaware Solid Waste Authority. To find out more, contact them at 1-800-404-7080 or visit them online at www.DSWA.com.

Check your car, boat, motorcycle, and other machinery and equipment for leaks and spills. Make repairs as soon as possible. Clean up spilled fluids with an absorbent material like kitty litter or sand, and don't rinse the spills into the storm drain.

Use a commercial car wash whenever possible. If you prefer washing your car at home, be sure to wash it on the lawn so that soapy water soaks into the ground and doesn't run directly into the storm drains, eventually making its way to your local waterbody.



Extra Pavement

Reduce the amount of paved area and increase the amount of vegetated area in your yard. Consider directing downspouts away from paved surfaces onto lawns to increase infiltration and reduce polluted runoff.



Hazardous Substances

Use hazardous substances like paints, solvents, and cleaners in the smallest amounts possible. Be sure to clean paint brushes in a sink, not outdoors. Properly dispose of excess paints through the Household Hazardous Waste Program. To find out more, contact the Delaware Solid Waste Authority at 1-800-404-7080 or go online at www.DSWA.com. Remember that latex paint is not hazardous and can be mixed with kitty litter, sand, or sawdust and left to harden. Dispose of hardened material in the regular trash.



Lawn and Garden

Use pesticides and fertilizers sparingly. If used, apply chemicals in recommended amounts only. Avoid application if the forecast calls for rain. Otherwise, chemicals will be washed into your local stream.

Cover piles of dirt and mulch being used in landscaping projects. Do this to prevent sediment from washing into nearby waterbodies.



Lawn Care

Promote Environmentally-friendly Landscaping

Traditional landscaping often has harmful environmental impacts. Clearing woodlands and other natural habitats for urban/suburban growth and planting vast lawns place a heavy toll on the environment. This type of landscape requires extensive use of mechanical equipment, unnecessary consumption of our limited natural resources (water and fossil fuels), frequent application of fertilizers and pesticides, and the generation of significant quantities of solid waste (yard waste). As a result, our surface and ground waters are being polluted and our landfills are filling up. Furthermore, the native plants that once naturally existed are being replaced by invasive plants, most commonly introduced through landscaping practices.

Limit Fertilizer Use

Fertilizers can contaminate both groundwater and surface water. Fertilizers contain nutrients such as phosphorus and nitrogen that not only promote grass growth, but also cause excessive algae growth in ponds and lakes. Ultimately, the survival of fish and other aquatic life is threatened. This is why the proper use and application of fertilizers are extremely important.

Reduce turf areas. Install woodland, meadow or other natural plantings. Where lawns are needed (such as play areas), follow Best Management Practices available from your county's cooperative extension agent.

Practice soil and water conservation. Stabilize slopes with natural plantings, mulch around plants, and install drought-tolerant species. Capture roof runoff in a rain barrel, and use this to water your plants.

Use plantings to reduce heating and cooling needs. Deciduous trees planted appropriately along the south sides of buildings can reduce air conditioning costs by up to 20 percent. In winter, they allow the sun's rays to warm buildings. Coniferous trees planted to block prevailing northwest winter winds can reduce heating costs.

Avoid use of invasive exotic species. These out-compete native plants and result in the decline of biodiversity. Examples include: Norway maples, kudzu, purple loosestrife, autumn olive, Japanese honeysuckle, multiflora rose, and barberry. If these species appear they should be eradicated.

For more information, please contact the DNREC Sediment and Stormwater Program at (302) 739-9921.



References:
Delaware Nutrient Management Commission.
Educational Pamphlet: Managing Nutrients for Your Turf, Grass, and Lawns. Dover, Delaware.

New Hampshire Department of Environmental Services.
Factsheet: Proper Lawn Care Can Protect Waters.
Concord, New Hampshire.

*Helping the
Environment
Starts in Your
Back Yard*





Lawn Care

Proper Lawn Care

1. Test the pH of your soil. Plants are happiest and grow the best with a pH between 5 ½ and 7 ½. The University of Delaware Soil Testing Program can test your soil for a small fee. They will explain how to properly balance your soil pH.

2. Leave the grass clippings on the lawn. This is the best and most efficient way to fertilize your lawn. It will cut your mowing time by an average of 38 percent and reduce the amount of solid waste in landfills. This also naturally adds nutrients to your soil like nitrogen and potassium.

3. A single application of slow release, low phosphate fertilizer at the beginning of fall is adequate in most cases. Fertilizer should not be applied anywhere near open water such as a drainage area, lake, or stormwater pond.

4. Cut your grass from about 2 to 3 inches in height. The longer the grass, the deeper the roots. Deeper roots enable the grass to tap into a larger volume of nutrients and moisture in the ground. Also, longer grass will discourage weed growth.

5. Plant a well distributed stand of trees to shade the grass from the full sun. Seed mixes that are tolerant of lower light conditions are available. A shaded lawn also requires less watering.

Plant Native Grasses Where Possible

Native Grass Mixture	Seeding Rate		Remarks
	(lb/Ac)	(lb/1000 ft ²)	
Switchgrass or Coastal Panicgrass	10	0.23	Warm-season mixture Tolerant of low fertility soils
Big Bluestem	5	0.11	Drought tolerant
Little Bluestem	5	0.11	Poor shade tolerance
Indian Grass	5	0.1	Nitrogen fertilizer discouraged
Planting (Coastal Plains): February - October, May - mid Aug optimal Planting (Piedmont): March - October; May - July optimal			

Note: These grasses are native warm season grasses, and should be planted in well drained soils. They are available by request at several locations in the state of Delaware and Maryland.

How to Take a Soil Sample

Soil tests will help you develop and maintain a more productive soil by providing information about your soil's fertility. Information from a soil test will help you select the proper fertilization program to obtain optimal growth of your lawn and garden. One of the most important steps in soil testing is collecting the sample. Soil sample kits can be obtained from the University of Delaware Soil Testing Program, Department of Plant and Soil Science, at (302) 831-1392. Soil sample bags and other important information are also available at your county cooperative extension office. Each soil sample should represent only one soil condition. Although soils can be tested any time during the year, be sure to sample well before planting or spring green-up. This is particularly important in areas where it is likely that lime will be needed. Use the results of your soil test to determine how much lime and fertilizer your soil needs. Retest the soil each year until your soil fertility is well balanced.



Route 1 Median Retrofits (1 of 3)

Description

Coastal Highway and its drainage system make up the majority of the Anchorage Canal Watershed. Where the highway runs through the community of Middlesex Beach, potential retrofit locations exist in the median.

Existing Conditions

Coastal Highway is a four-lane road, including wide shoulders and turn lanes in both directions. Northbound and southbound traffic is separated by a series of uncurbed medians between each intersection, generally ranging from 30 to 34 feet wide. The highway is crowned to drain runoff from the inside lanes (both northbound and southbound) to the medians. One drop inlet is located in the center of each median, with shallow grass swales conveying water to them. The drop inlets connect to a storm sewer running along the west side of the highway.





Route 1 Median Retrofits (2 of 3)

Proposed Conditions

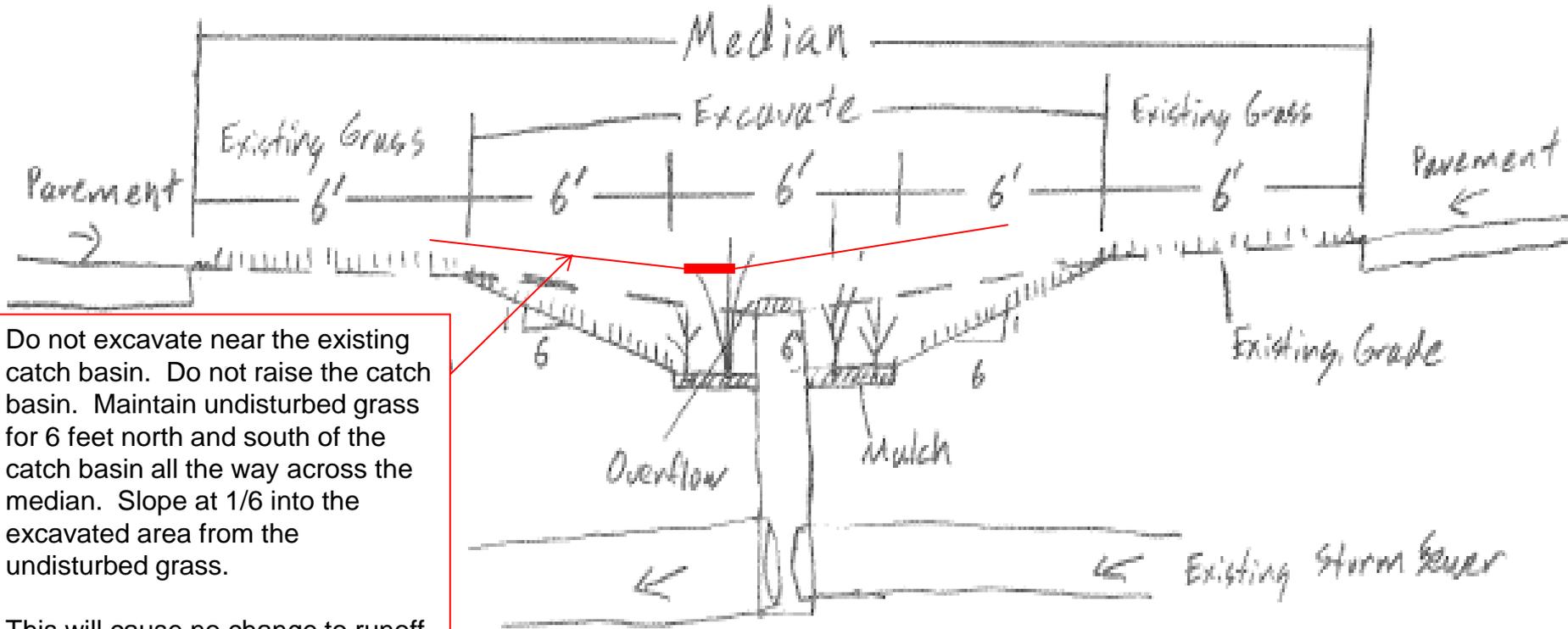
There is ample room for construction of a bioretention area in each of the medians. The bioretention areas would be narrow and long, with uniformly flat, safe, slopes from the outer edge to the center. Due to the presence of sandy soils on site, underdrains and replacement soil media will not be necessary, and construction of the bioretention areas will be relatively simple:

- Maintain a 6' wide undisturbed grass strip along the road edges of the median. (Site R3 can only accommodate a 4' side undisturbed strip as the width of the median is narrower than other sites.)
- Excavate a 6' wide strip in the center of the median to a depth at least fifteen inches below the road elevation and nine inches below the existing drop inlet grate elevation. ~~(It may be necessary to raise the drop inlet grate if the existing elevation is too low.)~~ (Site R3 can only accommodate a 4' wide excavation.)
- Keep slopes from the undisturbed grass strip to the bottom of the bioretention at 6:1 or flatter.
- Vegetate the slopes and bottom of the bioretention area using one of the following strategies: See slides at the end of presentation

With this design, during all rain events, stormwater runoff from the highway will be directed to the bioretention area. Water will then pond to a depth of at least six inches. Excess runoff during larger storm events will overflow into the existing drop inlet. The ponded water will slowly infiltrate into the soil media and underlying soils. The primary pollutant removal mechanisms operating in the bioretention area will be settling, infiltration, and plant uptake.

Route 1 Median Retrofits (3 of 3)

Notional Cross Section Of Rt. 1 Median



Do not excavate near the existing catch basin. Do not raise the catch basin. Maintain undisturbed grass for 6 feet north and south of the catch basin all the way across the median. Slope at 1/6 into the excavated area from the undisturbed grass.

This will cause no change to runoff from the road.

This will eliminate potential damage to the existing catch basin.

Cross Section A-A'

Greg Hoffmann
8/19/09
Coastal Highway



Typical Rt. 1 Median Retrofit From The Study – Site R7

Anchorage Canal - Drainage Area for R7



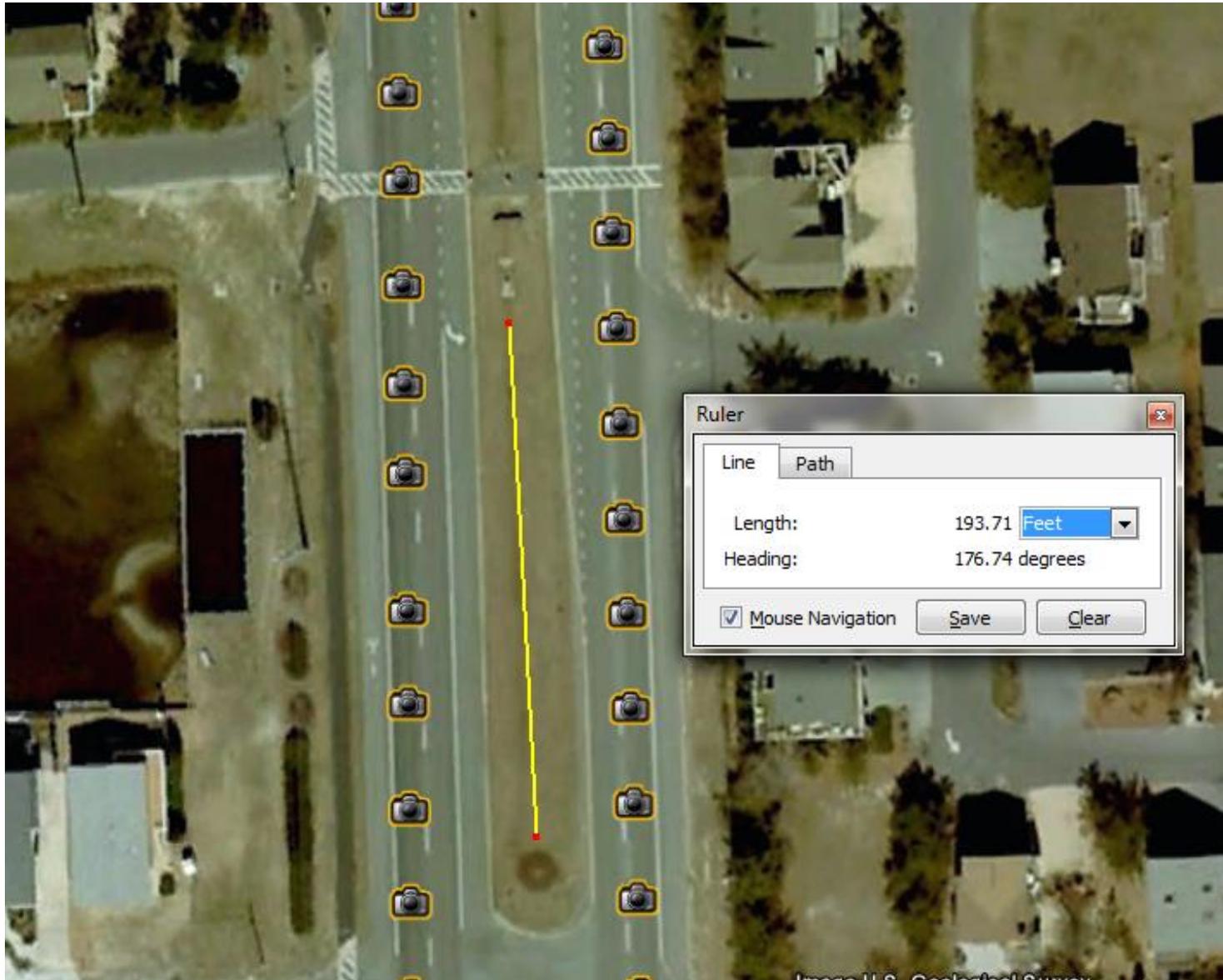


Cost For Median Bioretention Sites From The Study

Parameter	R3	R4	R5	R6	R7	R8
Median Width (ft)	24	30	30	30	30	30
Median Length (ft)	440	260	320	250	320	220
Median Area (sf)	10,560	7,800	9,600	7,500	9,600	6,600
Bioretention Width (ft)	16	18	18	18	18	18
Bioretention Length (ft)	430	170	210	160	200	130
Bioretention Area (sf)	6,880	3,060	3,780	2,880	3,600	2,340
COST						
Mobilization	\$ 1,700	\$ 1,000	\$ 1,200	\$ 1,000	\$ 1,100	\$ 900
Safety Fence	\$ 4,640	\$ 2,100	\$ 2,500	\$ 2,050	\$ 2,400	\$ 1,700
Traffic Control	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000
Erosion and Sediment Control	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
Excavation Required (cubic yards)	159	73	91	71	87	56
Excavation Cost	\$ 2,387	\$ 1,100	\$ 1,367	\$ 1,067	\$ 1,300	\$ 833
Hauling	\$ 1,591	\$ 733	\$ 911	\$ 711	\$ 867	\$ 556
Site Stabilization w/ seeding & mulching	\$ 987	\$ 496	\$ 603	\$ 482	\$ 576	\$ 400
Mulch	\$ 1,064	\$ 592	\$ 745	\$ 573	\$ 706	\$ 441
Bioretention Plants (material only)	\$ 1,867	\$ 1,040	\$ 1,307	\$ 1,007	\$ 1,240	\$ 773
Monitoring Well	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300
TOTAL COST w/o Contingencies	\$ 18,536	\$ 11,361	\$ 12,933	\$ 11,190	\$ 12,489	\$ 9,903
Cost/(Bioretention Length) (\$/ft)	\$ 43.11	\$ 66.83	\$ 61.59	\$ 69.94	\$ 62.45	\$ 76.18



Potential Site For Median Strip Bioretention Demonstration In South Bethany





Potential Vegetation Strategies From Study Report (1 of 2)

Strategy 1, Cool Season Turf – Cool season turf – Plant cool season turf grass and mow routinely.

Kill existing vegetation with a non-selective herbicide (glyphosate) in late August and reseed with turf type tall fescue between August 15 and September 30. Mow the median on a routine mowing schedule to a height of 4-6 inches. *This strategy provides a highly maintained traditional median and would be acceptable where neat, controlled vegetation is desired.*

Strategy 2, Meadow – Discontinue mowing and allow existing vegetation to grow. Mow annually to prevent shrubs from developing.

Allow new vegetation to seed in. Maintain meadow by mowing annually. If invasive species develop, spot spray with herbicides to control. *This strategy will allow native and naturalized plants to develop and a mixed meadow will be created. Most likely the meadow will be dominated by panic grass, seaside goldenrod and thoroughwort. It will look highly naturalized. The mowed edge will provide a sense of maintenance and control, but most of the median will be a loose mix of plants. This will be appropriate where a more natural look is acceptable.*



Potential Vegetation Strategies From Study Report (1 of 2)

Strategy 3, Meadow and Shrubs – Discontinue mowing and allow existing vegetation to grow.

Allow new vegetation to seed in. Allow shrubs to grow. Maintain median by mowing only when shrubs become overgrown and too large for the median (every 5-7 years). If invasive species develop, spot spray with herbicides to control. *This strategy will allow native and naturalized plants to develop and a mixed shrubby meadow will be created. Most likely the meadow will be dominated by panic grass, seaside goldenrod, thoroughwort, groundsel bush, bayberry and sumac. It will look highly naturalized. The mowed edge will provide a sense of maintenance and control, but most of the median will be a loose mix of plants. This will be appropriate where a more natural look is acceptable.*

Strategy 4, Planted Meadow – Plant the bioretention area with appropriate species that are both water-tolerant and drought-tolerant. These could include warm season meadow grasses, herbaceous perennials, or shrubs. Add a 3-inch layer of mulch at establishment but allow plants to grow together such that routine mulching is no longer necessary.

Strategy 5, Planted Meadow with Shrubs – Plant a highly ornamental mix of perennials and shrubs that is managed routinely as a beautification planting. Add a 3-inch layer of mulch and re-mulch yearly.

–

Strategy 6 – Planted Ornamental Traffic Island – Plant a highly ornamental mix of perennials that is managed routinely as a beautification planting. Add a 3-inch layer of mulch and re-mulch yearly.



Filters Received From DeIDOT





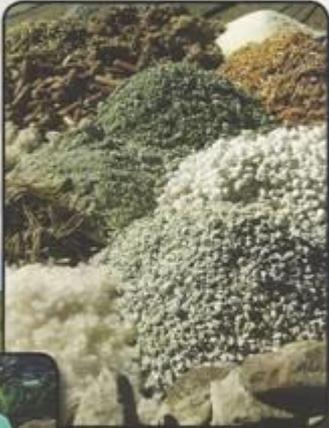
The Filtrexx[®] Treatment Train

Filtrexx Post Construction BMP

The Filtrexx[®] Treatment Train

Targeting Water Quality Pollutants with Filtrexx[®] Technologies

- Sediment Control
- Hydrocarbons
- Bacteria
- Nutrients
- Heavy Metals



Palletizable for Delivery

The Filtrexx[®] Treatment Train

Post-Construction, Water Quality, & Urban Retrofits

- Parking Lots
- Industrial Sites
- Streets
- Urban Discharge

