Stormwater 101 Workshop

Oct. 13, 2022

Agenda

10:15 – 10:30   Welcome

10:30 – 11:15   Stormwater 101 Workshop
Jessica Watson, sediment and stormwater program manager
Sussex Conservation District
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1. History of Sediment and Stormwater Regulations in Delaware
2. Stormwater Facilities and Function
3. Maintenance
4. Best Management Practices

11:15 – 12:00   Questions

12:00   Nutrient Management CEUs

Presented by:
Stormwater 101 Workshop

Jessica Watson
Stormwater Program Manager
Sussex Conservation District
Oct. 13, 2022
In Delaware, you are never very far from water when land is developed.

The potential for impacts to ecosystems and natural areas is significant.
DNREC Sediment & Stormwater Program


Requires all land disturbing activities over 5,000 square ft. to operate under an approved plan.

Program is delegated to local municipalities, conservation districts, and DelDOT.

Delaware Department of Natural Resources and Environmental Control (DNREC) responsible for program performance statewide.
Sediment & Stormwater Delegation

- Sediment & Erosion Control
- Stormwater Management Review
- Construction Inspection
- Maintenance Inspection
- Outreach & Education
- Technical Assistance
Sediment & Stormwater Plan Review

- Conceptual Design Meeting
- Pre-application Meeting
- Plan Review
  - Stormwater Management
  - Erosion & Sediment Control
  - Downstream Analysis
  - Pollution Prevention
  - As-Built Review
- Technical Assistance
Sediment & Stormwater Inspection

- Pre-construction Meeting
- Routine Site Inspection
- Stormwater Maintenance Inspection
  - Including follow-up inspection
  - Meetings with contractors/HOA
- Technical Assistance
- Drainage Complaints
- Outreach & Education
Sediment & Stormwater Maintenance

• SCD is required to inspect all “closed out” projects and generate an inspection report.

• Approximately 2,000 closed out projects.

• SCD is required to follow-up on maintenance reports and inspect repairs.
Types of Stormwater Management Facilities

- Wet Ponds
- Dry Ponds
- Infiltration Ponds
- Bioswales
- Bioretention
- Filter Strips
- Constructed Wetlands
- Vegetated Roofs
- Underground Stormwater Systems
Wet Ponds

Provide quantity management
Improve water quality
Aesthetic appeal
Increase biodiversity
Wildlife habitat
Flood prevention
Minimize erosion
Stormwater Pond Function

RUNOFF FROM DEVELOPMENT

INLET

Water Flows Into Pond

Sediment Settles To Bottom

OUTLET STRUCTURE

Cleaner Water Drains Out

TRASH RACK

Cleaner Water To Stream

STONE (protects outlet)
Routine Maintenance

- Remove trash and debris
- Check for erosion
- Inspect structures
- Monitor vegetation growth
- Inspect water level after rain events
- Monitor overall function
Remove Debris

Remove trash

Remove debris from inlets and outlet structures
Mowing

Mostly done by landscapers

10’ access path to pond

Mow around inlets and outlets

Leave a buffer
   (optional, but strongly encouraged)
Buffers

“No mow zone”  Must be group decision
Work with landscaper  Width optional
Buffer Benefits

Controls geese
Uptakes nutrients

Less erosion
Better wildlife habitat
Maintain Vegetation

Remove small saplings
- Inlets
- Outlets
- Embankments

The longer you wait to remove a tree, the more expensive it becomes.
Stabilize Banks

Buffers reduce erosion of side slopes

Overseed and stabilize as needed

Major stabilization (hire a consultant)
- Erosion control matting
- Choosing durable grass species
Fencing

Not Required          Not Recommended
Hire a Professional

Removal of sediment (Forebay cleanout)
Hire a Professional

Structural Stabilization
Pipe Failure
(Sinkhole)
Riprap

Vegetative Stabilization
Hire a Professional

Mosquito Control
(DNREC)

Kent & Sussex
(302) 422-1512
Hire a Professional

Major vegetation removal
- Algae
- Non-native species
- Invasive species
Hire a Professional

Cracked or broken structural components
Hire a Professional
Hire a Professional
Hire a Professional
Hire a Professional
Hire a Professional
I wish I hired a professional.
Dry Ponds

Ponds are designed to drain 48 hours after a rain event

Maintenance Challenges
• Invasive plant management
• Soggy pond bottoms
• Difficult to mow

If the pond is holding water
• Possible blockage
• Downstream obstruction
• Seasonal groundwater
Infiltration Basin

Ponds typically do not have a discharge outlet.

Rely on permeable soils for infiltration.

Low groundwater table.
Infiltration Basin Maintenance

Crust forms over time
• Scrape topsoil surface to encourage/revitalize infiltration

Failure due to poor drainage and improper soils
• Hire a professional
• $$$
Green Technology: Bioswale

Provides water quality treatment by removing sediment and nutrients

Low Maintenance

Provide routine maintenance

Inspect for drainage obstructions/holding water

Maintain grass height 6-8 inches – for increased water quality
Do not mow in the swale flow line

Bioswale enhanced with native plants
Bioretention Maintenance

Maintain as a landscape feature

• Provide routine maintenance
• Inspect for erosion, reseed as needed
• Management of vegetation (No large trees)
• Remove trash & debris
• Add triple shredded hardwood mulch as needed
Bioretention Maintenance

If facility does not drain within 48 hours:

• Remove accumulated sediment

• Replace biosoil mix (every 15-20 years)

• Must use DNREC certified soil media supplier
Maintenance Inspection Report
Stormwater Facility Erosion
Before & After
Pond Components:
Embankment + Emergency Spillway

• Vegetation and ground cover adequacy
• Embankment erosion
• Animal burrows
• Unauthorized plantings
• Cracking, bulging or sliding of dam
• Slope protection or riprap failures
• Emergency spillway clear of obstructions and debris
Pond Components:
Riser + Principal Spillway

- Low flow orifice obstructed
- Weir trash rack maintenance
- Debris removal necessary
- Excessive sediment accumulations inside riser
- Pipe condition
- Outfall channels functioning
Maintenance Inspection Report

**Dry Ponds**

- Adequacy of vegetation
- Undesired vegetative growth
- Woody vegetation
- Low flow channels clear of obstructions
- Standing water or wet spots
- Sediment and or trash accumulation
- Erosion problems
- Forebay – status of sediment
- Pond functionality
- Encroachments on pond
Maintenance Inspection Report

Infiltration Ponds

• Adequacy of vegetation
• Undesired vegetative growth
• Woody vegetation
• Infiltrating between storms
• Sediment/trash accumulation
• Erosion problems
• Forebay – status of sediment
• Pond functionality
• Encroachments on pond
• Upstream areas stabilized
Ponds are overgrown with invasive species and woody vegetation which obstructs drainage.
Grass clippings or lack of maintenance can restrict drainage causing temporary flooding.

Temporary sediment and erosion controls inadvertently left on catch basins restrict drainage.
Trash racks and low flow orifices are blocked by debris and overgrown vegetation
Stormwater Facility Erosion

Riprap outlet is designed to convey 100-year storms non-erosively.

Events that exceed “design storms” have the potential to erode.
Stormwater Facility Erosion

Change in upstream watershed

Highly erodible soils

Improper installation

Significant rain event
Erosion of Stormwater Facilities

Can compromise the storage capacity

Added maintenance costs

Creates instability around the outlet structure

Downstream impacts
Maintenance: Before
Maintenance: Before
Maintenance: After
Sediment-laden runoff into stormwater pond increases future maintenance costs
Remove trash and debris regularly
Overgrown and invasive vegetation is difficult to manage.
Overgrown vegetation increases maintenance costs.
Successful Maintenance
Buffer, bird boxes, flowering vegetation
Buffer, inlet and outlet structures clear, trash and debris removed.
Buffer, flowering vegetation, trash and debris removed.
Aeration, buffer, flowering vegetation, trash and debris removed.
Aeration, buffer, flowering vegetation, trash and debris removed.
Infiltration basins improve water quality and provide wildlife habitat.
HOMEOWNERS & HOA'S

Once stormwater projects are completed, routine maintenance is needed to ensure quantitative and qualitative function. The District is available to provide technical assistance on the operation of the stormwater system.

ONLINE RESIDENTIAL APPLICATION

WORKSHOPS

PowerPoint presentations for all events linked below. Recordings available for events marked “webinar” at the bottom of the page, or watch them on YouTube.

OCT. 8, 2021 (WEBINAR)
• Turfgrass Best Management Practices, updated 10/18/2021

CONTACT US

For more information about the Stormwater Program, please click Request More Information below and provide your contact information. Someone from the District will be in touch.

LEARN MORE

- Design & Construction
- Developers
- Residential Standard Plan Application
- Homeowners & HOA's
- Conservation Stewardship Award
Welcome to the Sussex Conservation District's Online Store

Visit our applications tab for Residential Stormwater Standard Plans or browse through the variety of plants we offer for sale.

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Sussex Conservation District
302-856-2105
www.sussexconservation.org

University of Delaware Cooperative Extension
302-856-7303
https://www.udel.edu/canr/cooperative-extension/

DNREC
https://dnrec.delaware.gov/

Division of Watershed Stewardship
https://dnrec.alpha.delaware.gov/watershed-stewardship/

Division of Fish & Wildlife – Mosquito Control
302-422-1512
https://dnrec.alpha.delaware.gov/fish-wildlife/mosquito-control/

Sussex County Public Works
302-855-7703
https://www.sussexcountyde.gov/public-works
CERTIFIED CONSTRUCTION REVIEWER
Residential or Commercial

DESIGN TEAM
Engineer, Surveyor, or Other

DEVELOPER
Residential and Commercial

GREEN CONSERVATION
Residential, Commercial, Municipal, Agricultural, or Other

HOME BUILDER
1-50 and 51+ homes per year

PROJECT MANAGER
Residential and Commercial

SITE CONTRACTOR
Residential and Commercial

DEADLINE: DEC. 15, 2022
Thank you

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