



Department of
Environmental
Conservation

NYS DEC 4-Hour Erosion and Sediment Control Training

NYSDOS Course Record #

NYS DEC Division of Water
www.dec.ny.gov

Information and Schedule

Per DEC guidelines, we will need to take a screen shot at the beginning of the class, before or after each break, and at the end of the class. Please be ready to have your **video on** at these times. If an attendee is not present during all of these times then they cannot receive credit for the class.

Class Begins: 8:00

Breaks: 9am, 10am, 11am

Class ends: 12:00



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AGENDA

- **Stormwater Construction Permit Regulations and Requirements**
- **Contractor Responsibilities**
- **Construction Site Inspections**
- **Erosion and Sediment Control**
- **Constructing Stormwater Management Practices**
- **Winter Site Operations**



DEC and SWCD Guidance

In training sessions ...

- We explain E&SC concepts
 - Why you need to *implement* E&SC
 - Why you need to *maintain* E&SC
- We explain General Permit requirements
- We provide and explain Blue Book specs

On the job site ...

- We do not tell the contractor or operator which practice to use or where to place them

If we become the designer, we could be held responsible if the practice fails!



What is Stormwater?

Stormwater is rainwater or snowmelt that flows from rooftops, paved areas, bare soil and lawns, picking up litter, sediment, pesticides, fertilizers, bacteria from animal waste, chemicals from automobiles and other pollutants and carrying it all to our streams, rivers, lakes and ocean.



Why is Stormwater a Concern?

Untreated stormwater runoff can create significant environmental and public health and safety problems.



Polluted runoff is one of our Nation's greatest threats to clean water



Stormwater Impacts from Erosion and Sedimentation

Property Damage

Damage to Roads and Bridges

Beach & Shellfishing Closures



Loss of Aquatic Habitat

Drinking Water Contamination

Streambank Erosion



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Where does all the eroded soil go?



Here.



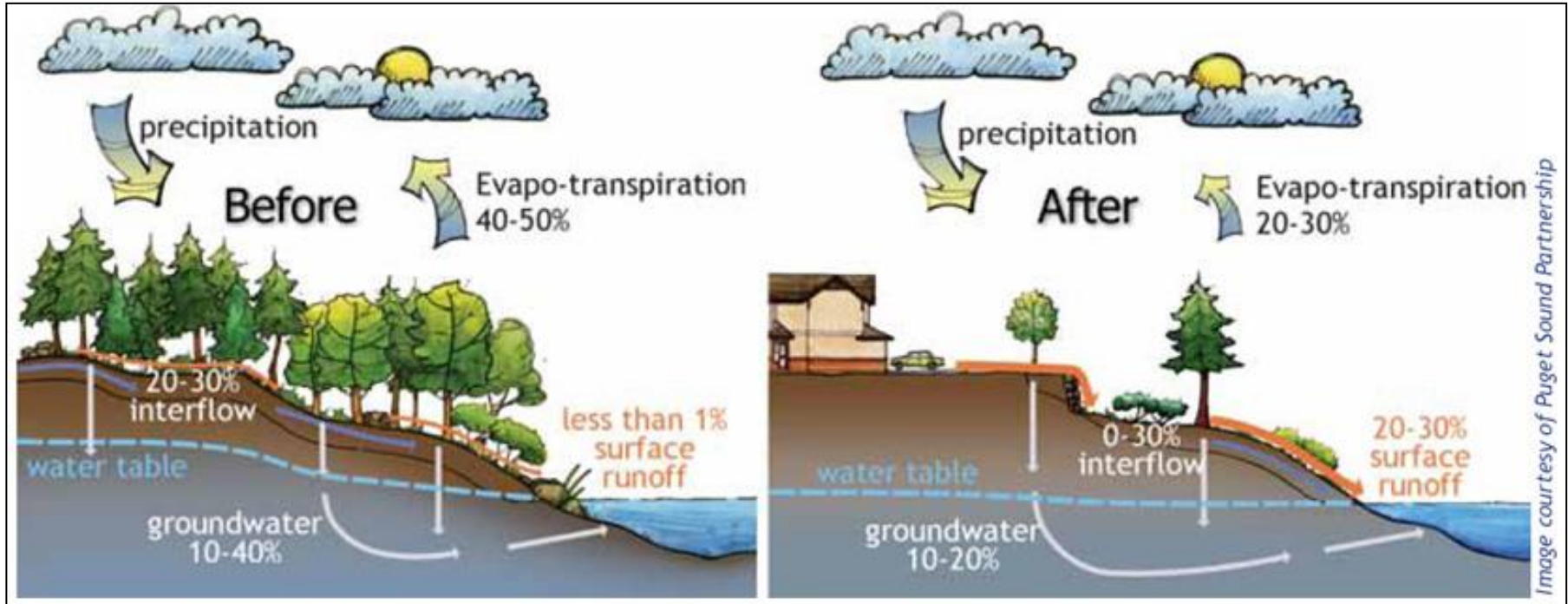
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Basic concept: We no longer want to pave over as much as possible and send water down the pipe as fast as we can



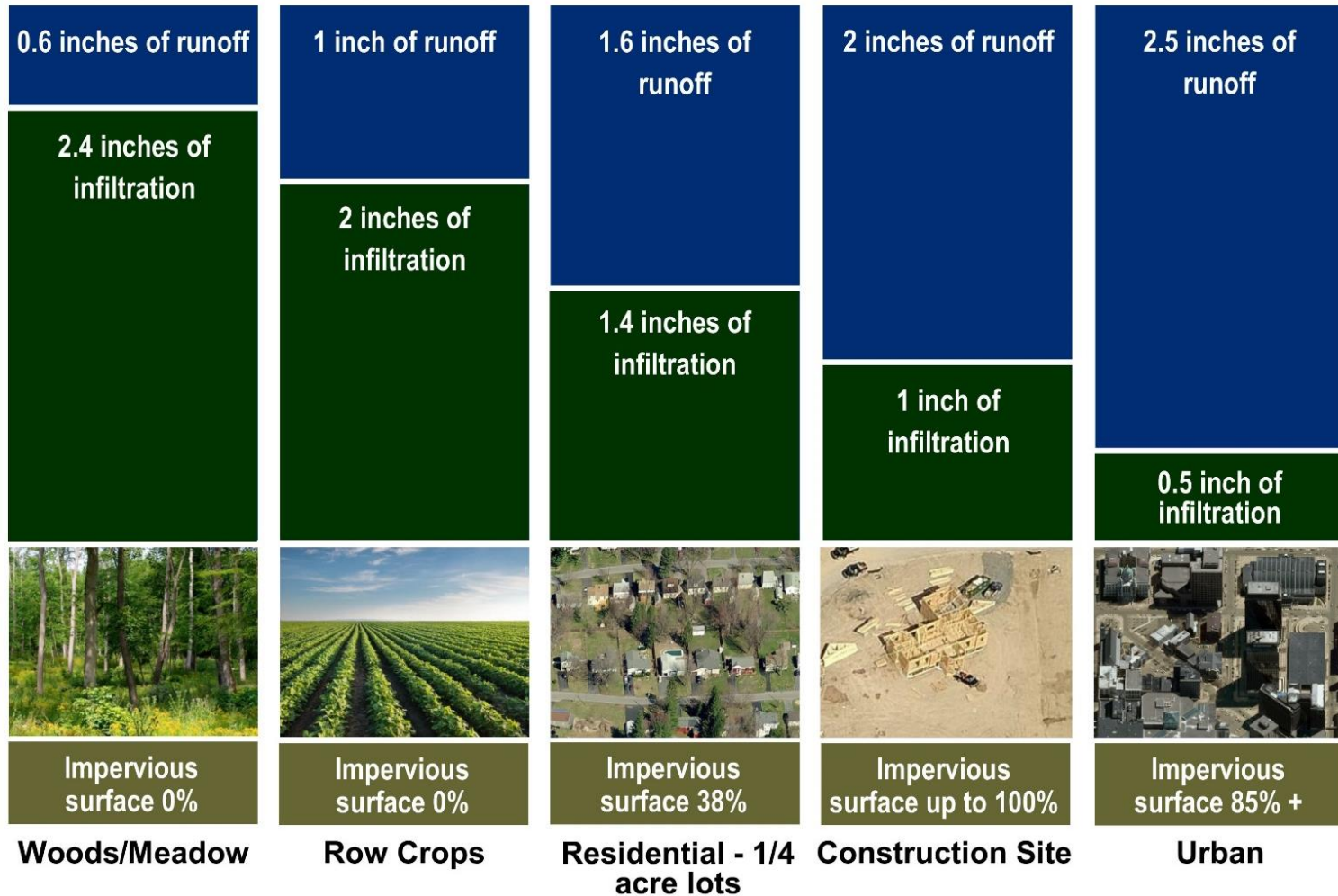
1 acre of land cleared for development \longrightarrow 10 tons of eroded sediment per year

1 acre of impervious cover \longrightarrow 1 million gallons of runoff per year



Stormwater runoff is a natural part of the hydrologic cycle ... but as land use changes, runoff can increase, resulting in erosion, pollutant transport, sedimentation, loss of aquatic habitat, & other damages.

Stormwater Runoff from Construction



How Can You Minimize Stormwater Impacts on your Construction Site?

1. Protect Natural Resources During Construction
2. Divert flows from off-site sources to keep the work area dry
3. Implement and Maintain
Erosion and Sediment Control
4. Manage Stormwater Runoff



Why Do We Have to Do This?

- Stormwater Management is mandated by the US Environmental Protection Agency (EPA)
 - Required by the 1987 Amendments to Clean Water Act
- Implemented in NYS by the DEC and regulated municipalities
- NYS DEC issued “General Permits” to regulate stormwater discharges from construction sites and municipalities



New York State Pollutant Discharge Elimination System (SPDES) Stormwater General Permits

SPDES General Permit for Stormwater Discharges from Construction Activity

Regulates Construction Activities that disturb 1 acre or more of land

SPDES General Permit for Stormwater Discharges from Municipal Separate Sewer Systems (MS4s)

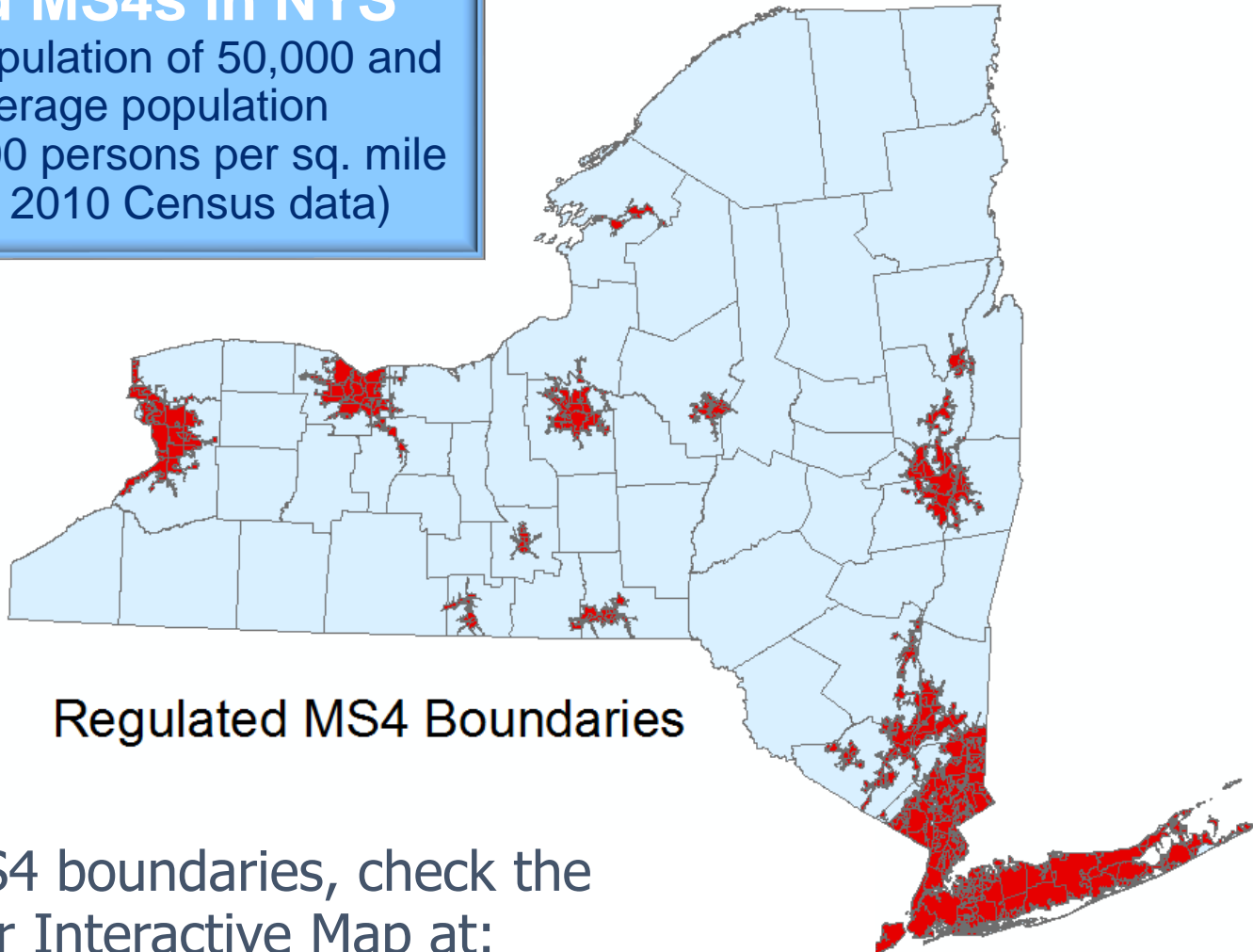
Regulates MS4s located in “urbanized areas”

MS4: A conveyance or system of conveyances owned by a State, City, Town, Village, or other public entity that discharges to the Waters of the United States



Regulated MS4s in NYS

- Minimum population of 50,000 and
- Minimum average population density of 1000 persons per sq. mile (based on the 2010 Census data)



Regulated MS4 Boundaries

To view MS4 boundaries, check the Stormwater Interactive Map at:

<http://www.dec.ny.gov/imsmaps/stormwater/viewer.htm>

Regulated MS4 Stormwater Management Program

1. Public education and outreach
2. Public participation & involvement
3. Illicit discharge detection and elimination
- 4. *Construction site runoff control***
- 5. *Post-construction site runoff control***
6. Pollution prevention & good housekeeping of municipal operations



**Even if a project
doesn't need any
permits...
It can cause a water
quality violation →**

**All site operators and
contractors should:**

- Take all reasonable steps to prevent unpermitted discharges
- Practice erosion and sediment control and “good housekeeping”



**NYS Environmental Conservation
Law Article 17**

**Turbidity Violation:
a substantial visible
contrast to natural conditions**

**Subject to Penalties up to
\$37,500 per day for each
violation**



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Stormwater Construction Permit



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Who Needs a Permit?

- Anyone disturbing **1 acre or more** of soil (about **208' x 208'**)
- Even if the soil is not all exposed at the same time
- Including single-family homes in subdivisions
- Sometimes smaller projects, in protected watersheds or sensitive areas

NOTICE OF INTENT
New York State Department of Environmental Conservation
Division of Water NYSR
625 Broadway, 4th Floor
Albany, New York 12233-3505

Stormwater Discharge Associated with Construction Activity Under State Stormwater Discharge Elimination System (SDDES) General Permit # SP-02-01

IMPORTANT - THIS FORM FOR HANDPRINT ONLY
RETURN THIS FORM TO THE ADDRESS ABOVE
PRINT CAPITAL LETTERS IN BLOCK AND AVOID CONTACT WITH THE EDGES OF BOXES
FILL IN CIRCLES COMPLETELY AND DO NOT USE CIRCUMFERS

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
Owner/Operator Contact Person Last Name (not company)
Owner/Operator Contact Person First Name
Owner/Operator Mailing Address
City
State Zip
Phone (Owner/Operator) Fax (Owner/Operator)
Email (Owner/Operator)



Activities Requiring Permit Coverage

- Grading
- Excavating
- Filling
- Stockpiling
- Demolition
- Clear-cutting
- Clearing and Grubbing
 - Tree cutting and skidding
 - Brush root removal
 - Stump removal



Ineligible Construction Activities

Residential, commercial or institutional projects that disturb 1 or more acres of steep slope* and are tributary to AA or AA-S classified waters (unfiltered drinking water)

Roadway or linear utility projects disturbing 2 acres or more on steep slopes* tributary to AA or AA-S waters



Owners/Operators of ineligible construction activities must obtain an individual permit



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Ineligible Construction Activities

Steep Slope = 25% or greater

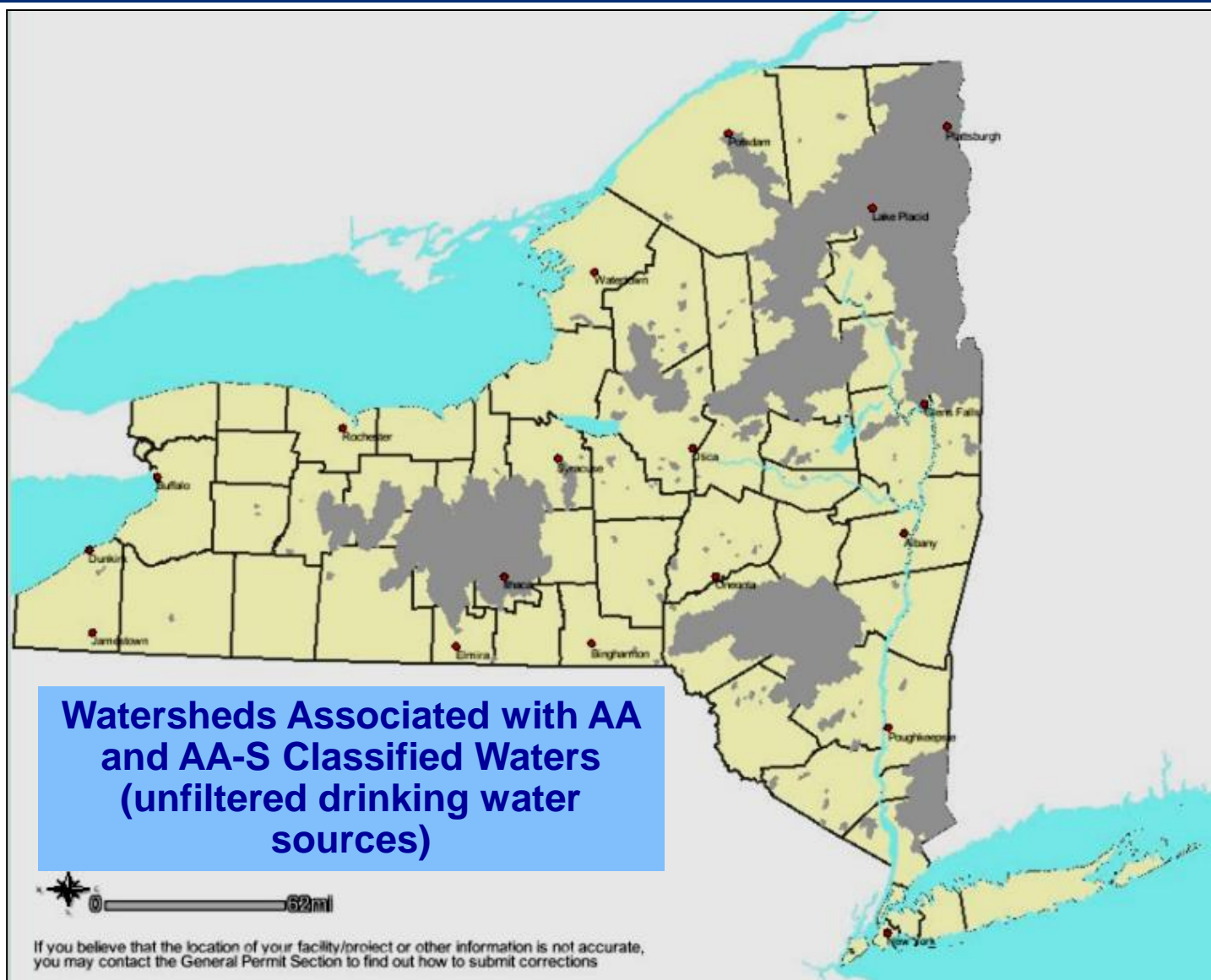
Slope Phase “E” or “F” on soil map

<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

AA and AA-S classified waters

<http://www.dec.ny.gov/imsmaps/stormwater/viewer.htm>





Ineligible Construction Activities

Construction activities that adversely affect archeologically sensitive areas or property listed or eligible for listing on the State or National Register of Historic Places



<http://parks.ny.gov/shpo/online-tools/>

Owners/Operators of ineligible construction activities must obtain an individual permit



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Construction Permit Requirement: Stormwater Pollution Prevention Plan must be developed to manage runoff and control erosion and sedimentation

- Sequencing and Phasing
- Operations & Maintenance
- Construction Plans
- E&SC Details and Specifications
- Stormwater Management Design and Details
- Contractor Certifications
- Weekly Inspection Reports
- Notice of Intent
- General Permit

Purpose of the SWPPP

Protect on-site and off-site resources and waterways by:

- Minimizing Erosion On-Site
- Reducing Channel Erosion
- Controlling Runoff
- Improving Water Quality
- Reducing Flooding

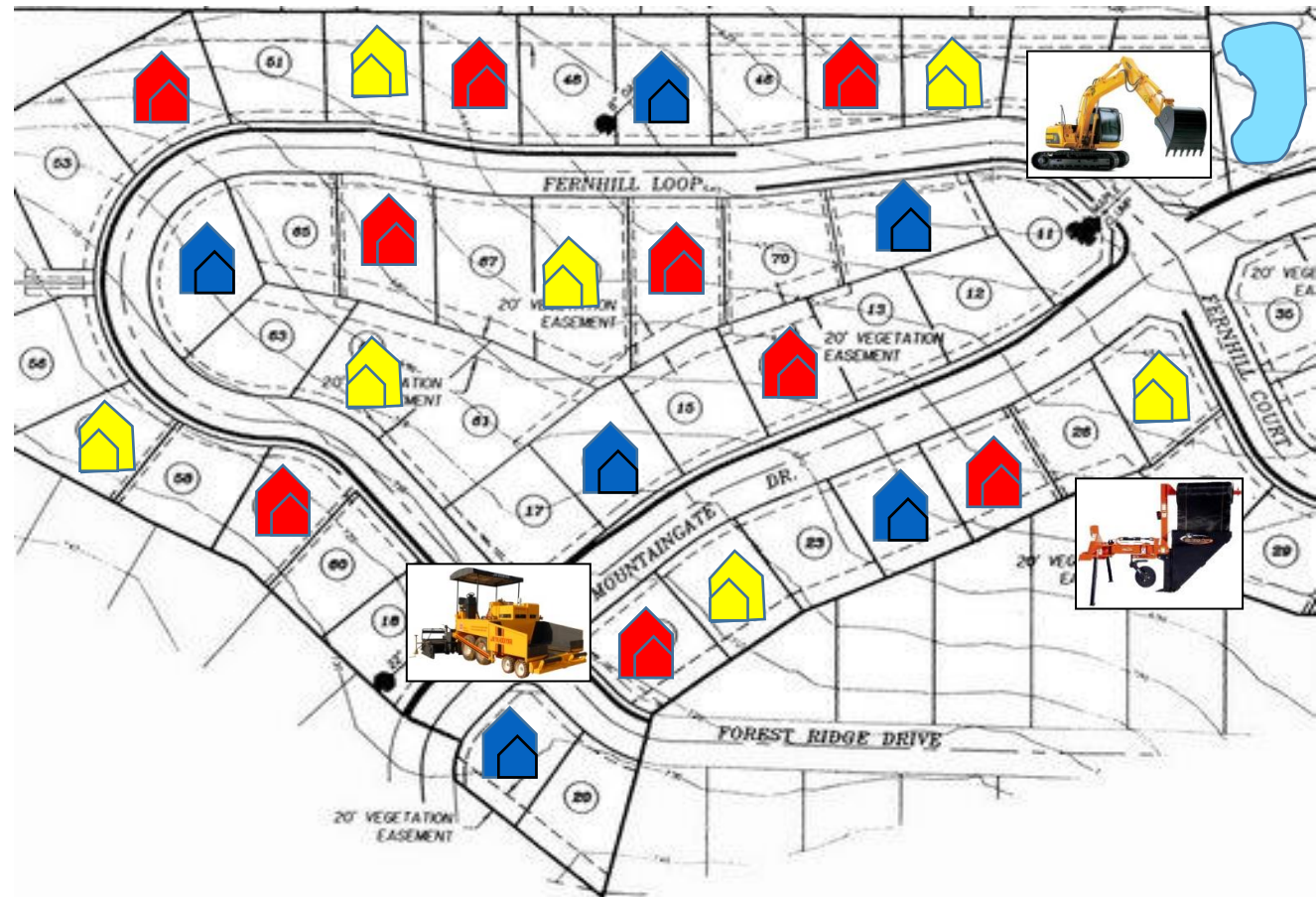


I'm only building one house in a subdivision – why do I need a permit?

A “larger common plan of development” is a situation in which multiple construction activities are occurring, or will occur, on a contiguous area (such as a residential subdivision or business park)

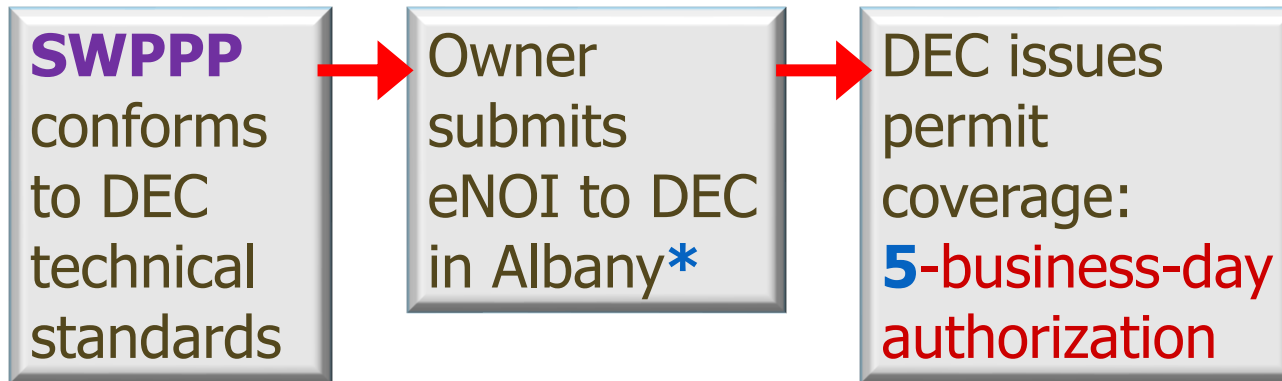
- Total disturbance of one or more acres ***but not necessarily all at once***
- One Full SWPPP prepared for ***entire subdivision***
- Notice of Termination filed after ALL lots are developed and stabilized

- Excavator
- Grading Contractor
- E&SC Installer
- Home Builders
- Utility Contractor
- Etc.



- One SWPPP
- One NOI
- Multiple contractors sign certification statements with their individual responsibilities but do not obtain their own permits

Obtaining Permit Coverage



* In regulated Traditional Land Use Control MS4s, the SWPPP must be reviewed and accepted by the municipality before the eNOI is sent to DEC



NOI Authorization – When Can Construction Start?

Projects that conform to DEC technical standards

- **Electronic NOI (eNOI) authorized in 5 business days**
- **Paper NOI authorized in 10 business days**

Electronic filing of the NOI will be authorized within **5 business days** from the date DEC receives a complete **eNOI** for projects that conform to DEC technical standards

Projects that deviate from DEC technical standards

Projects not subject to the requirements of a regulated, traditional land use control MS4 (Town, City, Village) will be subject to a 60 business-day review/authorization period if the plan deviates from the technical standards.



Additional Authorization Requirement:

For disturbances over 5 acres at any given time

- Requires written authorization from DEC Regional Office or from the regulated, traditional land use control MS4
- 2 site inspections per week separated by 2 full days
- Soil stabilization required within 7 days
- Requires phasing plan & cuts and fills plan



Construction Permit Paperwork

must be available at the construction site



- **NOI Acknowledgment Letter** from DEC
- **Notice of Intent** (NOI) signed by owner and SWPPP preparer
- **MS4 SWPPP Acceptance Form**
- **General Permit** (most current version)
- **Stormwater Pollution Prevention Plan** (SWPPP)
- **Site Log Book** including certifications, site inspection reports, SWPPP updates
- **Letter of permission to disturb > 5 acres** (for projects with authorization)
- **SHPA documentation**

Contractor Responsibilities



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Contractor Responsibilities

All contractors and sub-contractors involved in SWPPP implementation activities must sign a certification statement agreeing to implement and maintain the control measures identified in the SWPPP

Contractors shall begin implementing corrective actions identified during site inspections within one business day of notification and complete corrective actions in a reasonable time frame



★ Violators may incur fines of up to \$37,500 per day for each violation

Contractor Certification Statement

I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations.

Name _____ Title _____

Signature _____ Date _____

Contractor Address _____ Phone _____

Project Name _____ Site address _____

Provisions Responsible for _____

Trained Contractor _____ Trainee ID _____



Contractor Training

Owner shall identify contractor(s) responsible for SWPPP implementation

Contractor(s) shall identify at least one individual trained in Erosion and Sediment Control who will be on site

★ **The Trained Contractor must be on site on a daily basis during soil disturbance activities**

- 4 hours of E&SC training required every 3 years
- Only DEC-endorsed training accepted



DEC 4-hour training does not qualify contractors to conduct Qualified Inspector site inspections!



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Contractor Responsibilities: Inspection and Maintenance

- Inspect erosion and sediment control practices every day before you leave the site!
- Perform maintenance within 1 day of notification



The trained contractor shall inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If maintenance deficiencies are identified, the contractor shall begin implementing corrective maintenance actions within one business day and shall complete the maintenance activities in a reasonable time frame.

Contractor Responsibilities: Inspection and Maintenance

- If the practice fails to perform as designed – let the SWPPP preparer know!
- You should never change the SWPPP on your own – talk to the site owner



Contractor Responsibilities: Stabilization and Maintenance

Seed and Mulch disturbed soil areas promptly

Remove sediment from silt fences, sediment traps and check dams when the capacity is reduced by 50%



Maintain Erosion and Sediment Controls throughout building construction (not just during road construction)

Contractor Responsibilities: Follow Sequencing and Phasing Plans

Basic Sequence of Operations

1. Install runoff & sediment controls
2. Clear, grub, excavate, grade
3. Maintain Erosion and Sediment Controls during construction
4. Stabilize current phase

Phasing Plan

1. Implement Sequence of Operations in Phase 1
2. Limit the extent and duration soil is exposed in each Phase
3. Temporarily stabilize exposed soil in Phase 1
4. Move to Phase 2 and implement Sequence of Operations

**Avoid clearing vegetation
until absolutely necessary!**



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Contractor Responsibilities: Follow Sequencing and Phasing Plans



Improper Construction Sequencing



Silt fence and other sediment controls must be installed before grading and excavating

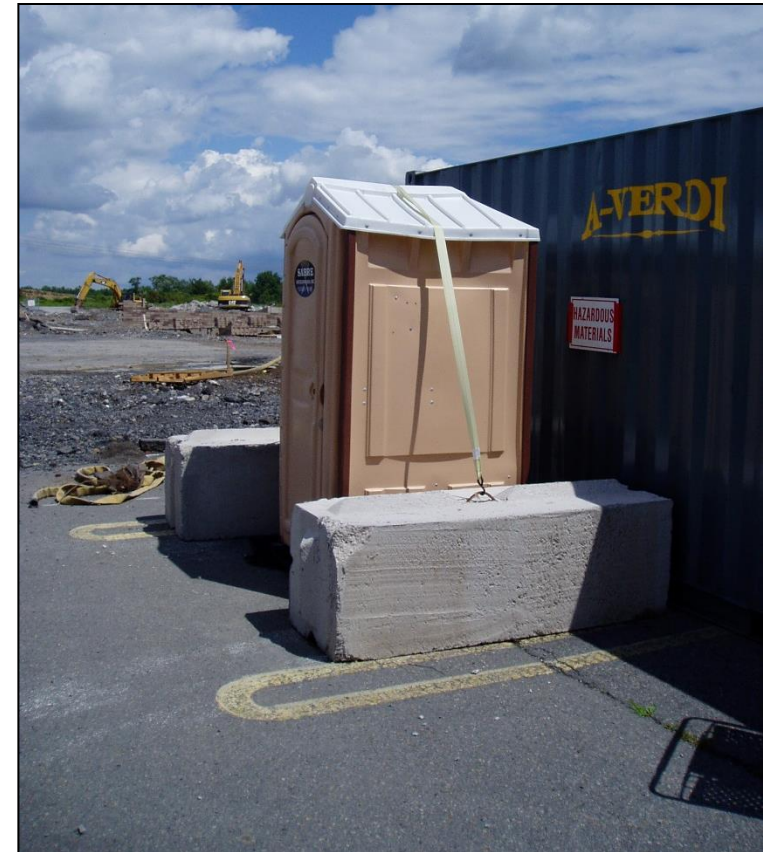
Improper Construction Phasing



There are a lot of building lots already opened up here with no builders in sight yet

Contractor Responsibilities: Pollution Prevention Measures

- Fuel, paints and solvents containment
- Spill prevention and spills response
- Temporary sanitary facilities
- Litter and dust control



Spills Hotline: 1-800-457-7362

Petroleum spills must be reported to DEC *unless* they meet *all* of the following criteria:

1. The spill is known to be less than 5 gallons; **and**
2. The spill is contained and under the control of the spiller; **and**
3. The spill has not and will not reach the State's waterbodies or any land (spill is on a paved surface); **and**
4. The spill is cleaned up within 2 hours of discovery.



Contractor Responsibilities: Yard and Waste Storage and Control

Designated spoils and waste disposal areas

Locate waste away from sensitive areas

E&SC for borrow and spoil areas

Concrete truck washout area



Why controlling Stormwater Runoff should matter to the Construction Industry:

Bare Soil + Precipitation = \$\$\$

Cleanup costs
Lost work days
Materials and equipment
replacement costs
= \$\$\$



and . . .

Water Quality Standards
Violation and potential fines
from DEC

= more \$\$\$



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Construction Site Inspections



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Construction Site Inspections

- Contractor's DAILY Site Inspection
- Qualified Inspector's Site Inspection
- NYS DEC Compliance Inspection
- Municipal Site Inspection (MS4s)



Inspections for Stormwater and Erosion & Sediment Controls

Purpose – to assure that:

The approved stormwater and erosion & sediment control measures are being implemented

Implementation deficiencies are identified and addressed

The site is being kept in compliance with State and Local regulations.



Contractor's Daily Site Inspection

As required by the Construction Permit:

The Trained Contractor shall inspect the erosion and sediment control practices **within the active work area DAILY** to ensure that they are being maintained in effective operating condition at all times

If maintenance deficiencies are identified, the contractor shall begin implementing **corrective maintenance actions within one business day** and shall complete the maintenance activities in a reasonable time frame

Qualified Inspector's Site Inspection



This filter log has NOT been applied properly!

Performed for the Owner by:

- Licensed Professional Engineer
- Registered Landscape Architect
- Certified Professional in Erosion and Sediment Control (CPESC)
- New York State Erosion & Sediment Control Certificate (NYSESCC)
- Trained technician who has completed the 4-hour training *and* is working under the direct supervision of, and at the same company as, a P.E. or R.L.A.

Today's course does not qualify contractors to conduct THESE site inspections

Qualified Inspector's Site Inspection

Site Inspections twice every seven (7) calendar days:

- Disturbance **greater than 5 acres** at any one time
- Direct discharge to **impaired waterbodies** (listed in Appendix E of the SPDES general permit)
- Located within **phosphorus-impaired watersheds** (listed in Appendix C)
- Projects covered by an individual permit
- The two (2) inspections shall be separated by a minimum of two (2) full calendar days

Site Inspections once every seven (7) days for all other active construction sites

Qualified Inspector's Site Inspection

Within 1 business day, the Qualified Inspector must notify the owner and contractors of any corrective actions that need to be taken

Within 1 business day, the Contractor must initiate corrective actions



Inspection Reports
with **CO****LO****R** photos
must be kept on site

What your inspector looks for:

- Are E&SC measures installed per SWPPP?
- Are E&SC measures being maintained?
- Are Phasing and Sequencing Plans being followed?
- Are inactive areas stabilized?
- Are permanent stormwater measures in place?
- Is there a discharge to receiving waters?
- Are there signs of a water quality violation (turbidity, sedimentation, or an oil sheen)?



Inspection for Termination of Coverage

When the project is complete and fully stabilized, the permittee (owner/operator) must submit a Notice of Termination (NOT) to the DEC to terminate coverage of the SPDES Permit

- Qualified Inspector certifies that final stabilization has been achieved
- PE or RLA certifies that post-construction stormwater management practices have been constructed in accordance with the SWPPP
- Owner/operator (and MS4) sign NOT
- Owner shall ensure maintenance commitment, identify responsible party on NOT



Final Stabilization

- All construction and soil-disturbing activity has been completed
- A uniform perennial vegetative cover with a density of 80% has been established on all unpaved areas, or permanent stone surface is implemented
- Post-construction controls have been constructed, are operational, and conform to the SWPPP
- Temporary structural E&SC measures have been removed
- A Qualified Site Inspector (hired by the permittee) certifies on the NOT that the site has been stabilized



10-20%



40-50%

Perennial Vegetation Density

80-90%



Temporary Shutdown

If you need to temporarily shut down the site the Qualified Inspector's inspection frequency may be reduced if:

1. The Owner notifies the DEC Regional office or regulated MS4
 2. The Contractor implements temporary stabilization on all disturbed areas
 3. The Qualified Inspector performs at least 1 inspection every 30 days
- **Weekly inspections must resume when soil-disturbing activity resumes**
 - **Weekly inspections must resume if a permit violation occurs**



Temporary Stabilization:

Exposed soil has been covered with mulch, seed and mulch, stone, geotextile or erosion control mats to prevent the soil from eroding.



This is not proper temporary stabilization!

- Too much bare soil is visible through the mulch
- Mulch is not evenly applied
- Tracked in the wrong direction



NYS DEC Compliance Inspection



Purpose:

- Document Permit Compliance
- Evaluate SWPPP Performance
- Provide Technical Guidance Materials
- Protect Water Resources

NYS DEC Compliance Inspection

Site Selection:

- Citizen Complaints
- Non-Compliant Site Inspections
- Unannounced Random Inspection
- High Risk Sites
 - > 5 acre disturbance approval
 - poor soils and/or steep slopes
 - proximity to water resources
 - prior history
 - large-acreage sites
 - sensitive watersheds/pollutants of concern



DEC Inspection Rating

“Marginal” or “Unsatisfactory” rating

- Implementing non-compliant practices
- Gross failure to implement SWPPP
- Failure to maintain E&SC practices
- Over 5 acres disturbed without prior DEC or MS4 authorization
- Inactive areas not temporarily stabilized within 14 days (7 days for > 5 ac. disturbance)



DEC Inspection Rating

“Marginal” or “Unsatisfactory” rating

- SWPPP/SPDES permit/ inspection reports not kept on site
- Weekly self-inspections not being conducted
- Contractors not implementing corrective actions outlined by self-inspector
- Water quality standards violation – “Unsatisfactory”



DEC Follow-Up on Non-Compliant Sites

- Letter to owner / consulting engineer / contractor asking for permit compliance through voluntary measures and corrective actions
- Follow-up inspection with all interested parties

If remediation is unsatisfactory:

1. Meeting with DEC Regional discuss deficiencies compliance criteria
2. Notice of Violation
3. Stop Work Order and assessment of penalty



Tips for a successful DEC Inspection

- Follow NYS Technical Standards for Erosion and Sediment Control
- Follow SWPPP
- Follow Construction Sequence schedule and Phasing Plan
- Conduct DAILY and “wet-weather” inspections
- Maintain Erosion & Sediment Control practices
- Ask the SWPPP designer to inspect the site with you to review SWPPP implementation

Municipal Construction Site Inspection

Municipalities in regulated urban areas (MS4s) must conduct periodic site inspections.

Municipalities may:

- **Withhold building permit** if SWPPP does not meet permit requirements or design standards
- **Withhold Certificate of Occupancy** if site does not pass inspection
- **Issue Stop Work Orders** and assess penalties

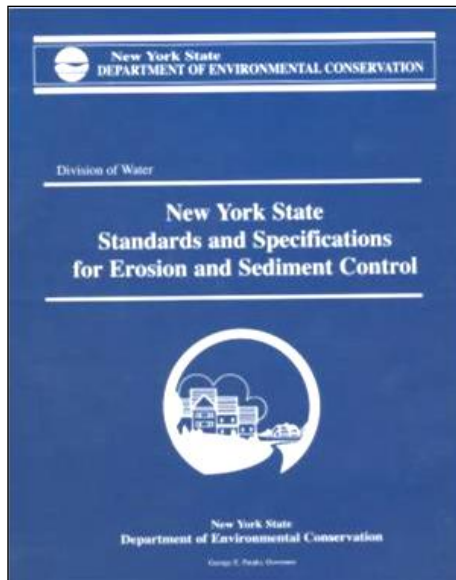


Erosion and Sediment Control



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New York State Technical Standards



New York State Standards and Specifications for Erosion and Sediment Control (“Blue Book”)

New version: 2016

New York State Stormwater Management Design Manual

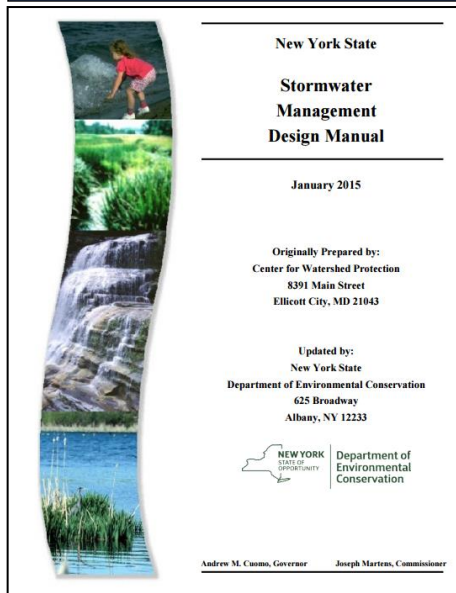
Current Version: January 2015

Download:

<http://www.dec.ny.gov/chemical/8694.html>

Order Printed Manuals:

http://www.swcsnewyork.org/books_and_publications.html

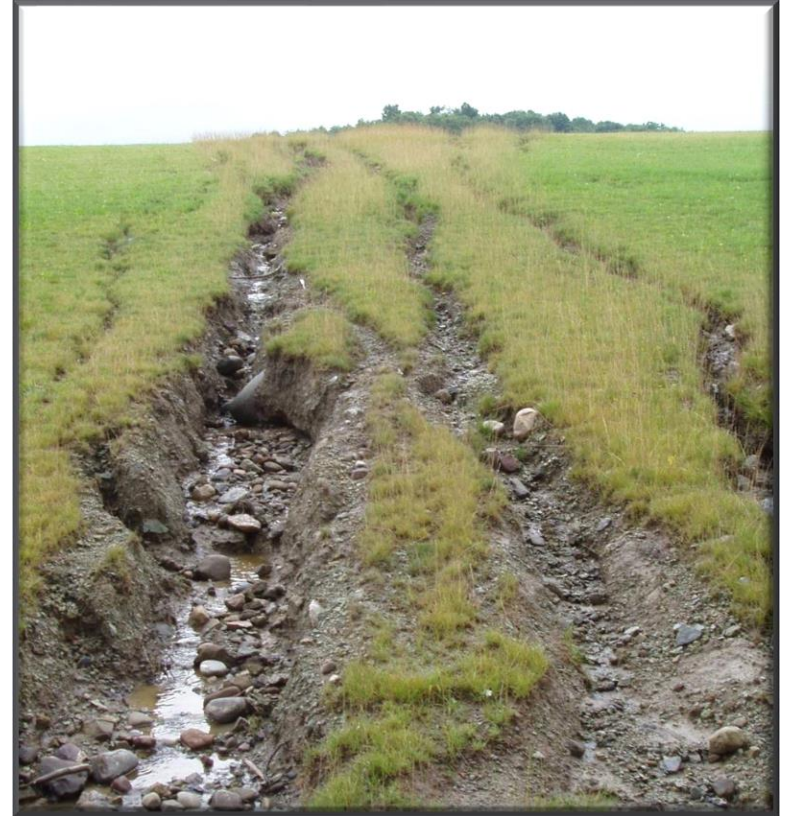


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E&SC Basics

Erosion Controls

- 1st line of defense
- Prevent erosion thru runoff controls and soil stabilization
- Relatively easy and very effective



Control erosion at the source and you'll be able to work more efficiently throughout the job site

E&SC Basics

Sediment Controls

- Last line of defense
- Remove sediment from water
- Very challenging



***It's easier to keep water out of sediment
than to get sediment out of the water***

Runoff Controls

- Diversions
- Swales and Grassed Waterways
- Check Dams
- Lined Waterways
- Outlet Protection
- Pipe Slope Drain
- Water Bars

Clean runoff from offsite not diverted or controlled soon becomes dirty runoff



Temporary Lined Channel (Diversion)

A conveyance channel to divert off-site drainage from the active construction site

- Reduces amount of water flowing onto the construction site
- Usually not permanent
- Rock lining stabilizes channel
- Stone size based on flow rate
- Lined with fabric



Grassed Waterway

A wide, shallow channel below adjacent ground level that is stabilized by vegetation

- Conveys runoff without causing erosion
- If erosion occurs, place permanent check dams in the waterway
- Vegetation helps to slow runoff velocity



Check Dam

A small barrier or dam, constructed of stone, bagged sand or gravel across a drainage way

- Restricts runoff velocity
- Usually temporary
- Downstream crest at equal elevation to upstream toe
- Stone size = 2-9"
- Lined with fabric
- Cutoff trench (stone dam)



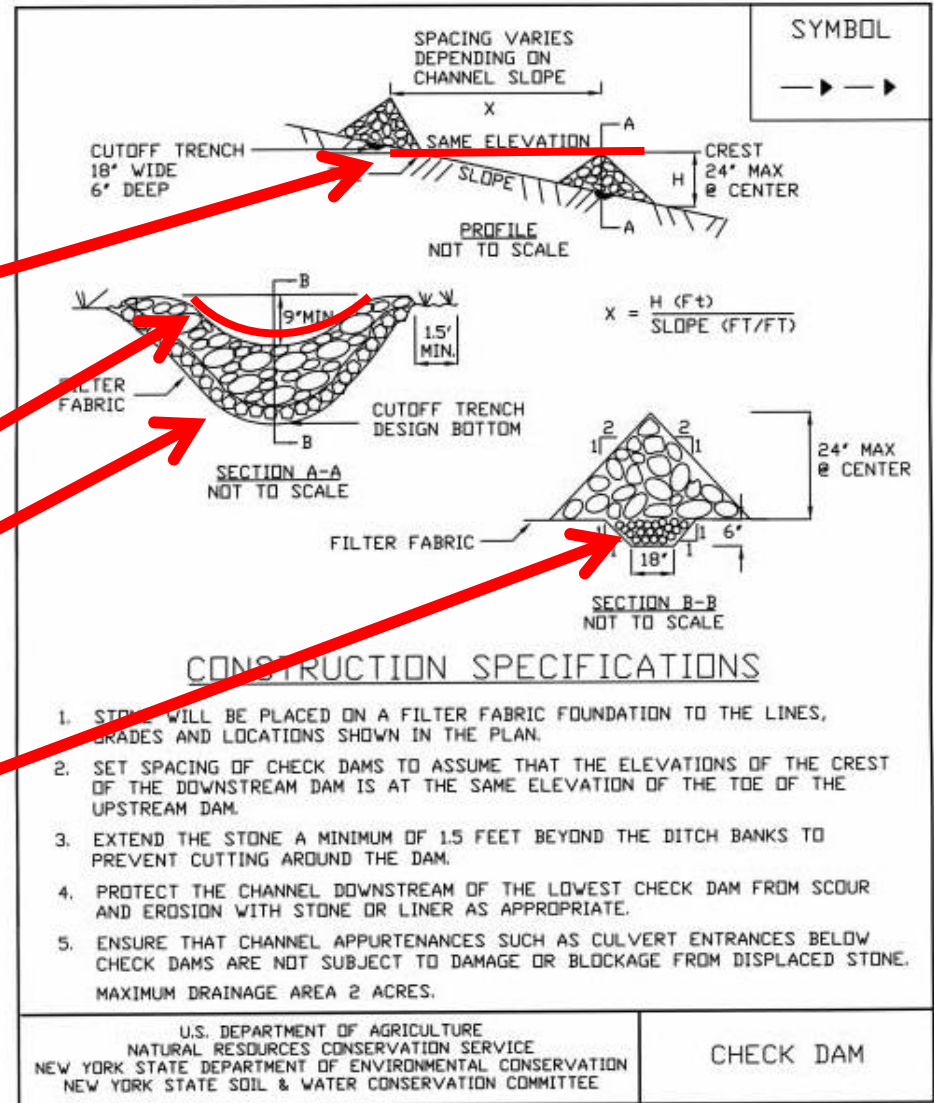
Check Dam

Downstream crest at
equal elevation to
Upstream toe

Parabolic shape

Filter fabric

Cutoff trench



Manufactured Check Dam

A flexible, reusable runoff control product for use in shallow channels

- Restricts velocity
- Temporary
- Downstream crest = upstream toe
- Filter fabric apron for stabilization



Check Dam



Check Dam

Errors and Deficiencies

Unacceptable check dam materials cause erosion and no flow concentration over center of dam



Check Dam

Errors and Deficiencies

Wrong materials, too many Flat top, need more dams



Check Dam

Errors and Deficiencies

Wrong materials used



Lined Waterway

A channel lined with rock, concrete or other permanent material

- Conveys runoff without causing erosion
- Reduces velocity
- Underlined with filter fabric
- Rock size based on velocity



Outlet Protection

Rock, Riprap or concrete placed at the outlet end of a culvert or channel

- Reduces velocity, depth and energy of water in a non-erosive manner
- Rock size and apron length based on velocity and drainage area



Rock riprap below these outlets reduces flow velocity so that it is non-erosive...



Rock riprap below these outlets reduces flow velocity so that it is non-erosive...



... and it also allows sediment to drop out



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Lined Waterway or Outlet

Errors and Deficiencies

No rock below pipe causes scour in the channel
Rounded rocks are unstable – use angular rock



Pipe Slope Drain

Temporary drainage to reduce erosion on slopes

- Conveys runoff down slopes in a non-erosive manner
- Temporary
- Runoff must be directed to the pipes at the top of slope



Pipe Slope Drain Errors and Deficiencies



This project could have benefitted from a pipe slope drain to convey runoff over the embankment while vegetation was establishing

Water Bar

Temporary or permanent drainage structure to reduce erosion on sloping roads

- Conveys runoff in a non-erosive manner along slopes at pre-designed intervals
- Placed at points of concentrated flow
- Aligned diagonally to low side of road
- Spacing depends on slope percent



Water Bar



Soil Stabilization

- Land Grading
- Topsoiling
- Seeding
- Mulching
- Rolled Erosion Control Products
- Dust Control

Land Grading

Reshaping of the land surface to provide for erosion control and vegetative establishment

- Incorporates slope stability, drainage patterns and diversions
- Includes a cuts-and-fills plan and phasing plan
- Tracking is done up and down slopes to slow runoff



Topsoiling

Spreading topsoil materials on graded areas to provide acceptable plant cover growing conditions

- Reduces erosion
- Reduces fertilizer need
- Reduces irrigation need
- 6-20% organic matter
- Free of woody debris and stones
- **REQUIRED** on most construction sites



Seeding

Perennial vegetative cover such as grasses

- Required on inactive areas
- Stabilizes soil
- Reduces soil loss by up to 90%
- The most cost-effective erosion control available
- Filters runoff



Seedbed preparation – Rake or scarify the soil surface before seeding and de-compact if necessary

Track up and down the slope to create mini terraces to slow runoff



Seeding



The contractor working on this site seeded the stockpile immediately after building it to avoid losing valuable topsoil to rill or windblown erosion.

Grass Seed applied before snow cover will germinate in spring before the soil is dry enough to work



Seeding

Errors and Deficiencies

Insufficient application rate

Soil left exposed for greater than 14 days

Lack of maintenance, mulch, or watering



Hydroseeding

Pressure spraying a seed mix, in liquid form, through a nozzle – can also include mulch, fertilizer, a polymer (tackifier), etc.

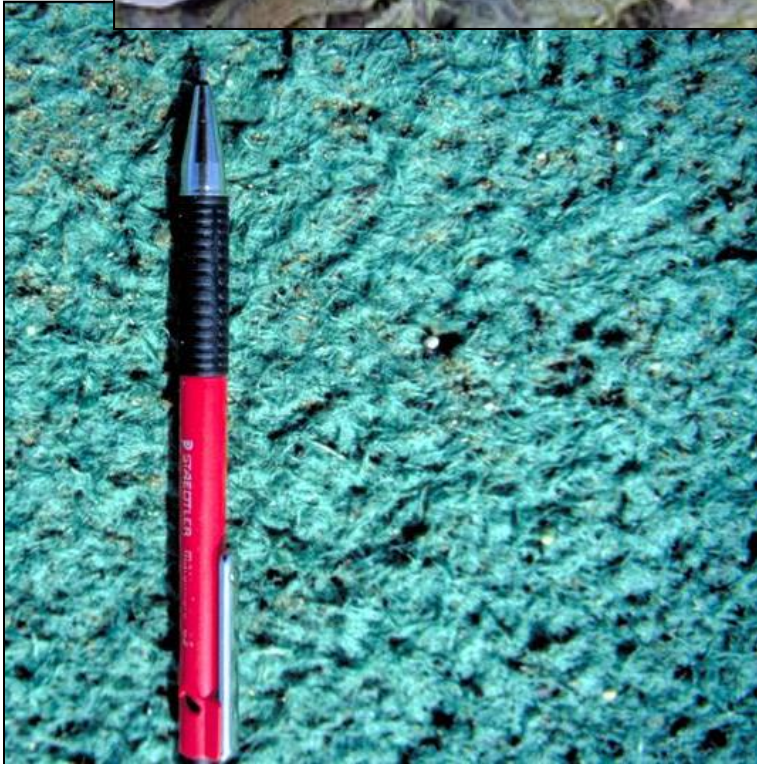
- Fast
- Effective – good germination rate
- Easy
- Expensive
- Good on critical areas and slopes



Hydroseeding



Hydroseeding



Hydroseeding

Errors and Deficiencies

Don't spray hydroseed on top of Rolled Erosion Control Products
Avoid application on steep slopes without mulch



Mulching

Coarse plant residue or chips as a soil cover

- Protects seeding
- Conserves moisture
- Lessens temperature fluctuations
- Breaks raindrop velocity
- Stabilizes soil in non-growing months
- Usually temporary (biodegradable)
- Can be permanent (stone)



Mulching



Stabilization With Sod

Rolled grass turf

- Stabilizes soil
- Filters runoff
- Provides quick cover
- Enhances natural beauty
- Can be installed late in growing season



Rolled Erosion Control Products

Natural fiber or synthetic soil cover

- Protects seeding
- Conserves moisture
- Lessens temperature fluctuations
- Breaks raindrop velocity
- Stabilizes soil in non-growing months
- Usually temporary (biodegradable)
- Can be permanent (turf reinforcement mat)



Rolled Erosion Control Products



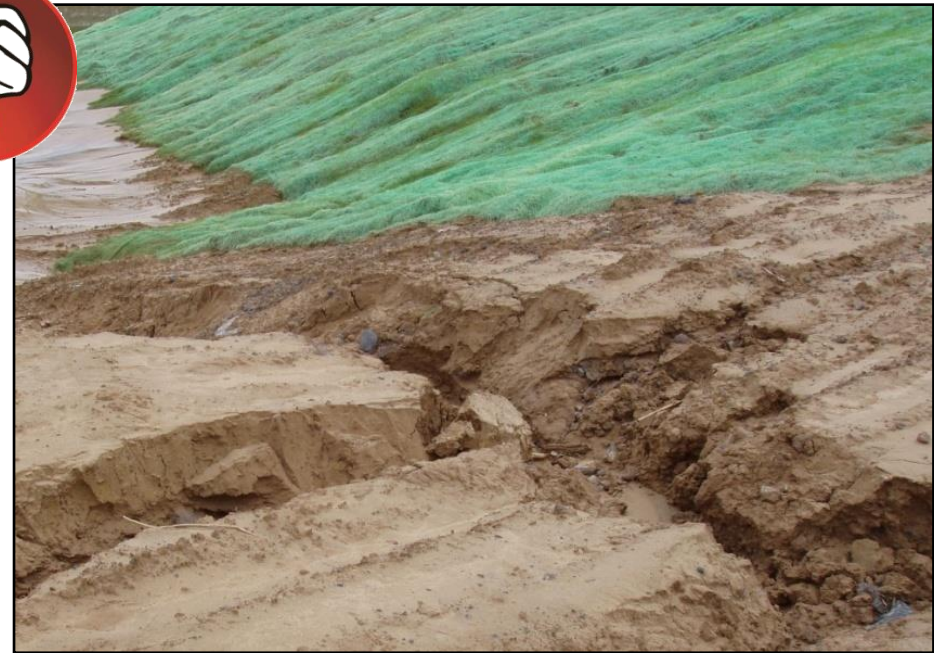
Rolled Erosion Control Products

Errors and Deficiencies



Applied across slope (should be vertical)

Uneven terrain



Ran out of materials

Rolled Erosion Control Products

Errors and Deficiencies



Slopes should always be graded evenly before applying RECP

Overly steep slopes should be terraced

Dust Control

The control of dust movement to prevent off-site damage

- Driving areas
 - Sprinkling
 - Polymer additives
 - Barriers
 - Windbreaks
- Non-driving areas
 - Vegetation
 - Mulch
 - Spray adhesives



Dust Control

The control of dust movement to prevent off-site damage

- Driving areas
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 - Barriers
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- Non-driving areas
 - Vegetation
 - Mulch
 - Spray adhesives



Stockpile stabilization

- Keep pile height low to minimize wind erosion
- Surround pile with sediment control practice 10 feet from the toe
- Apply mulch or seed and mulch if it will be idle for >14 days



Sediment Control

- Stabilized Construction Access
- Silt Fence
- Compost (Mulch) Filter Sock
- Sensitive Area Protection
- Sediment Basins and Traps
- Concrete Washout
- Rock Dam
- Inlet Protection
- Dewatering and Geotextile Filter Bag
- Temporary Waterway Crossing
- Turbidity Curtain



Stabilized Construction Access

A stabilized pad of aggregate over geotextile at points of ingress and egress

- Reduces sediment tracking onto public roads
- Required at all points of ingress and egress
- Width at least 24'
- Length at least 50' (30' on residential lots)
- Stone size 1-4"



Stabilized Construction Access



Stabilized Construction Access

Errors and Deficiencies

No stabilized construction access to the lot



Not being maintained
Stone size less than 1"

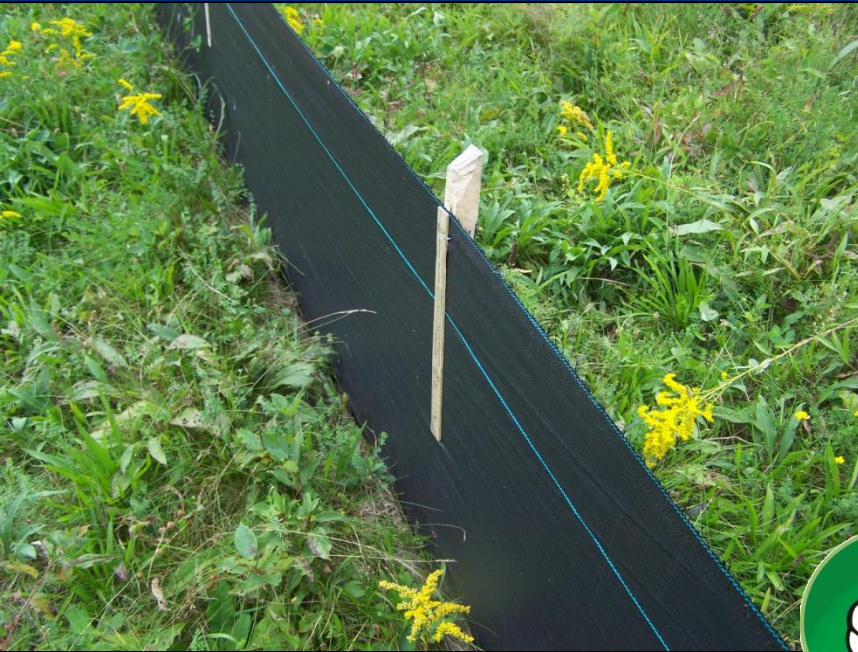


Silt Fence

A temporary barrier of geotextile fabric

- Intercepts sediment laden runoff
- Reduces velocity
- Traps sediment
- Not a filter
- Sheet flow only
- Install on contour
- No concentrated flow
- Bury toe minimum 6"
- Stakes go on low side
- 1-year design life





Silt Fence

Errors and Deficiencies

Toe not buried – muddy water flows under the fence

Never install in concentrated flow



Silt Fence

Errors and Deficiencies

Installed parallel to slope concentrates flow

Poor splice allows runoff and sediment to escape



Silt Fence

Errors and Deficiencies

Not maintained when
50% capacity is reached

Not embedded
Stakes on wrong side



Compost (Mulch) Filter Sock

A temporary practice to filter sediment and other pollutants to prevent their migration offsite

- Intercepts sediment-laden runoff
- Sheet flow only
- Install on contour
- Angle ends upslope to prevent bypass
- 12" to 32" diameter
- 6-month to 1-year design life
- Fill can be used as mulch after use



Compost (Mulch) Filter Sock



Compost (Mulch) Filter Sock Errors and Deficiencies



Just a lack of maintenance, or was the wrong practice used? The designer should be brought in to assess the failure.

Compost (Mulch) Filter Sock

Errors and Deficiencies

Undercutting –
Stakes should
go through the
socks

Backfill the
upslope side of
the sock with
soil to seal
gaps, or embed
the bottom sock
a few inches



Compost (Mulch) Filter Sock

Errors and Deficiencies

Insufficient fill – flat sock
doesn't trap much sediment

Left in place too long – may
become buried



Sensitive Area Protection

Special fence and signage to delineate sensitive or regulated areas

- Special fence to protect from sediment-laden runoff
- Must be seen by equipment operators
- Must be understood by public users of the site
- Heavy-duty stakes
- Signage identifying the protected area



Sensitive Area Protection

Errors and Deficiencies

Silt fence dumped on
No signage or reinforcement
of sensitive area



Cleared in a wetland because
it wasn't protected with fence
or signage



Sediment Basin

A temporary excavation and/or embankment sediment control device

- Intercepts sediment-laden runoff
- Drainage area < 50 ac.
- Sediment must be removed when half of basin capacity is lost
- Pipe outlet structure with trash rack
- Dewater by Skimmer
- Minimum 2:1 length to width



Sediment Trap

A temporary excavation and/or embankment sediment control device

- Intercepts sediment-laden runoff
- Drainage area ≤ 5 ac.
- Sediment must be removed when half of basin capacity is lost
- Pipe or rock outlet structure
- Dewater by Skimmer
- Minimum 2:1 length to width



Sediment Trap

Errors and Deficiencies

Outlet is insufficient

Too close to foundation and too small



Concrete Washout

A temporary excavated or above ground lined pit where equipment can be washed to prevent highly alkaline runoff from entering storm drainage systems and waterways or leaching into soil

- Minimum size 8' x 8' and 2' in depth
- Locate at least 100' from storm drainage system or surface waters
- Must be lined to prevent leaching into the ground
- Hardened concrete disposed of in C&D landfill or reused on site
- Remove material when filled to 75% of capacity



REQUIRED



Department of
Environmental
Conservation

Concrete Washout Errors and Deficiencies



Unfortunately, this contractor is washing his truck onto the ground above the storm drainage system.

Rock Dam

A rock embankment to capture sediment

- Retains sediment onsite
- Do not locate in stream channel
- Small, fine stone on inside face of dam to reduce seepage rate
- 3600 cu. ft. of storage per acre of drainage area



Storm Drain Inlet Protection

A temporary, permeable barrier around an inlet

- Traps water
- Deposits sediment
- Use with upslope soil stabilization
- Acceptable types:
 - Excavated
 - Fabric
 - Stone and Block
 - Paved Surface Inlet Protection
 - Mechanical Insert



Storm Drain Inlet Protection

Errors and Corrections



Filter sock is broken, sits partially on the grate and is too flat



Filter log does not block the grate and is not flattened

Storm Drain Inlet Protection Errors and Corrections



Collapse caused by missing horizontal frame and posts are too small



Solid frame of 2" x 4" keeps fabric from collapsing

Storm Drain Inlet Protection

Errors and Corrections

Sediment log
keeps road
debris out



Sand bags placed
directly on the grate
cause ponding

Front of inlet is exposed



Storm Drain Inlet Protection Errors and Deficiencies



Filter fabric under grate blocks flow and causes ponding



The same scene a few months later – the basin is still off-line

Dewatering

A temporary device to remove water from a sediment basin or trap

- Dewateres a basin or trap constructed with a riser pipe
- Skimmer floats just below surface to remove clearest water
- Alternative device is a perforated riser pipe surrounded by stone



Geotextile Filter Bag

A temporary portable device through which sediment-laden water is pumped to trap and retain sediment prior to its discharge to drainageways or off-site

- Filter sediment-laden construction site water
- Locate for ease of removal and disposal and proper release of filtered water
- Locate at least 50 feet from water bodies
- Must be placed on a stone or gravel bed



Temporary Waterway Crossing

A structure placed across a waterway to provide access for construction purposes

- Minimize sediment tracked into stream
- Protect aquatic habitat
- Must allow fish passage
- At right angle to stream
- Remove as soon as no longer needed
- Stabilize streambank upon removal



Turbidity Curtain

A flexible, impenetrable barrier to trap sediment in water bodies

- Prevents migration of sediment from a work site in water into the larger body of water
- Top of curtain is floatable
- Bottom is weighted
- Use for short duration
- Do not use across flowing water



Sediment Control Maintenance

- Remove accumulated sediment from practices when the capacity is reduced by 50% or as specified in the standards (Blue Book)
- The capacity is often less than the total height
- Dispose of sediment in an upland area away from the practice, streams or drainageways
- Do not use sediment as fill associated within building or road foundations
- Spread/grade sediment
- Stabilize with Seed and Mulch





Steep slopes call for additional erosion and sediment control measures and more frequent inspections

E&SC Combinations to Maximize Effectiveness



E&SC Combinations to Maximize Effectiveness



E&SC Combinations to Maximize Effectiveness



E&SC Combinations to Maximize Effectiveness



E&SC Combinations to Maximize Effectiveness



E&SC Combinations to Maximize Effectiveness



Soil Restoration

Restore original properties and porosity of the soil by deep till and compost amendment to reduce runoff

- Increases soil health
- Promotes sustainable vegetative cover
- Improves water quality
- Reduces runoff volume
- Filters pollutants
- **REQUIRED** on most construction sites



Soil Restoration Requirements

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A&B	HSG C&D	Protect area from any ongoing construction activities.
	Apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A&B	HSG C&D	
	Aerate* and apply 6 inches of topsoil	Apply full Soil Restoration**	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (decompaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		
* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.			
** Per "Deep Ripping and De-compaction, DEC 2008".			

Table 4.6 in the Blue Book includes soil restoration requirements by type of soil disturbance



Key Tips for Managing Runoff, Preventing Erosion and Controlling Sediment

- Keep “Clean Water Clean” (divert stormwater entering the work area from upslope)
- Preserve natural drainages and vegetative buffers
- Install runoff controls and sediment controls ***before*** grubbing and grading
- Direct runoff to sediment trapping practices

Key Tips for Managing Runoff, Preventing Erosion and Controlling Sediment

- Prevent erosion at the source – ***stabilize promptly*** after grading an area if it will be idle for 14 days (or 7 days on sites with over 5 acres exposed)
- Completely stabilize one phase of construction before moving on to the next
- Maintain Erosion and Sediment Controls throughout building construction (not just during road construction phase)





Constructing Stormwater Management Practices

Retention • Green Infrastructure



Department of
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Conservation

Stormwater Management Practices are **not permitted** in Federal or New York State regulated wetlands



Ponds: *Water Quantity* Control

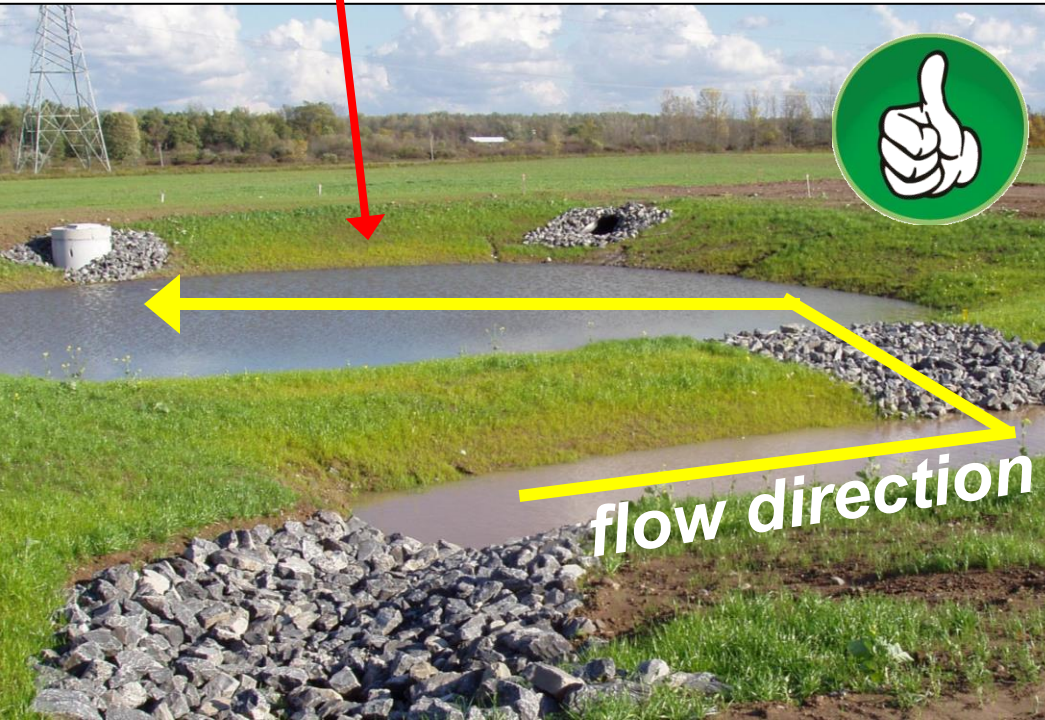
Old technology: Detention Basins (Dry Basins) – they provide only flood control



New standards: Retention Basins (Wet Ponds) – they provide water quality treatment and flood protection

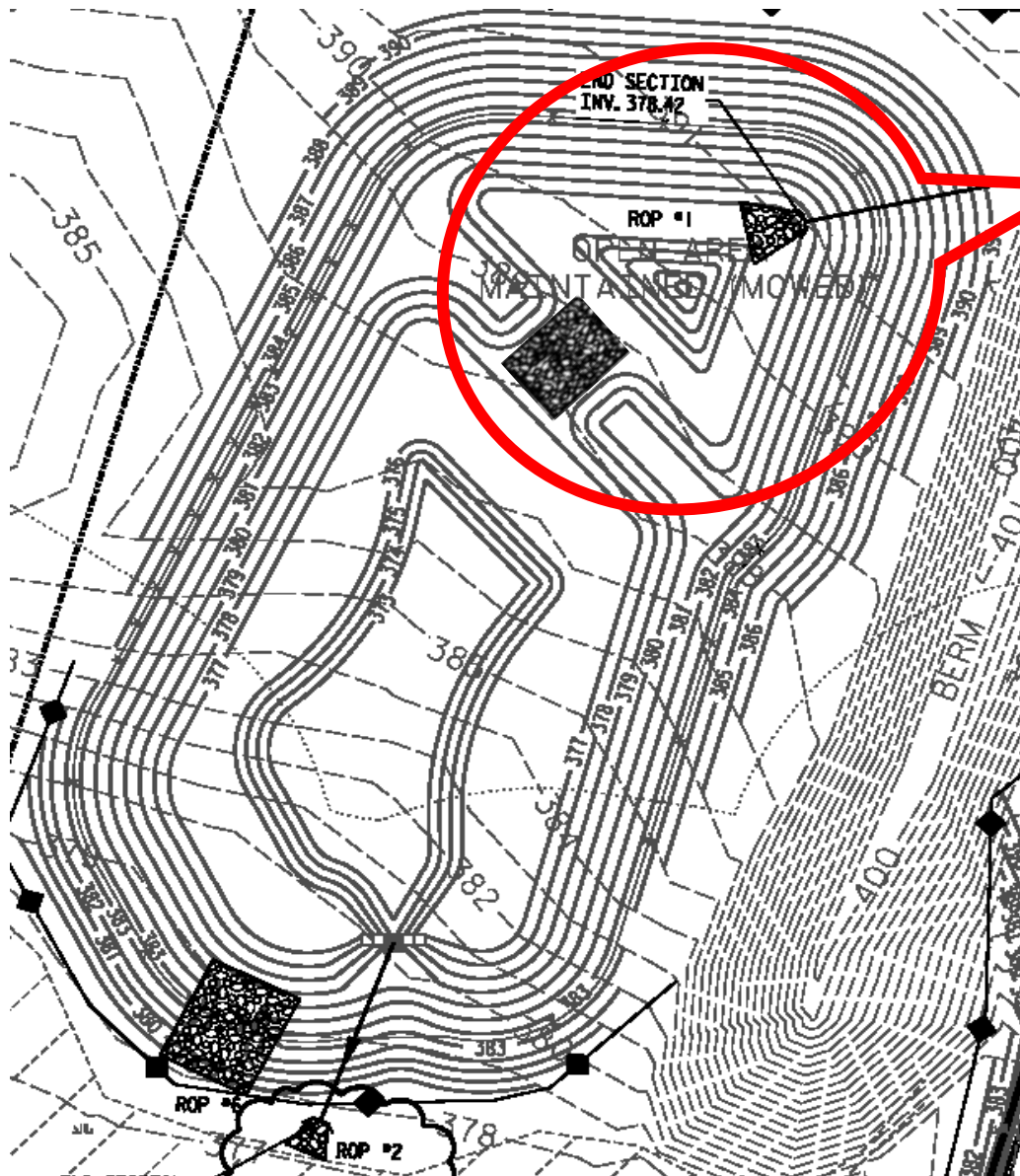
Forebay: Water Quality Control

Pond with a forebay (a small pond cell at the inlet) and a rock-lined spillway to the permanent pool provide sediment settling and water quality treatment



Forebay that has not been cleaned – forebays must be dredged when the sediment accumulates to 50% of the capacity

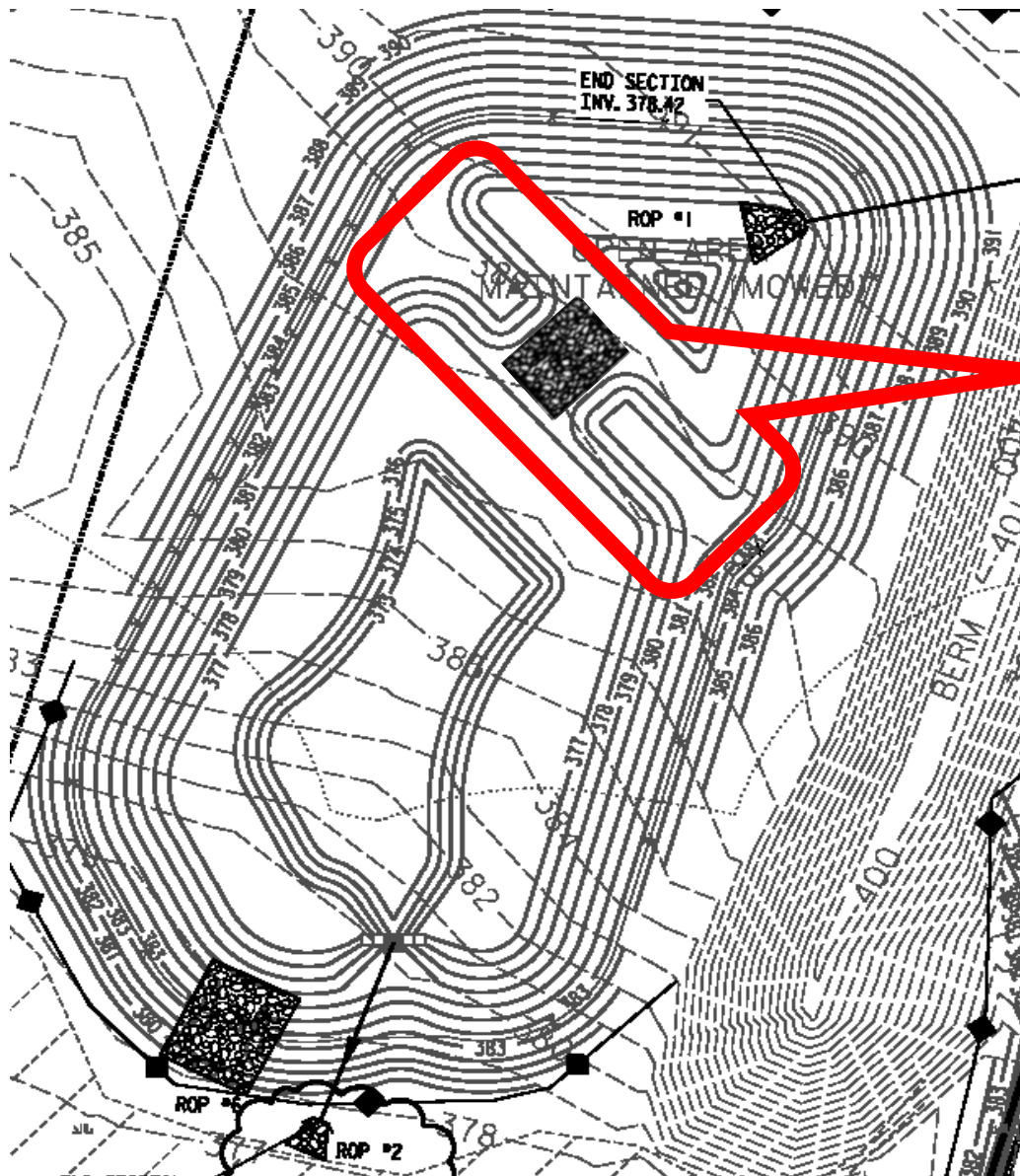
Pond Construction



Forebay

- Small pond “cell” at inlet
- Berm between forebay and main pond
- Spillway in berm

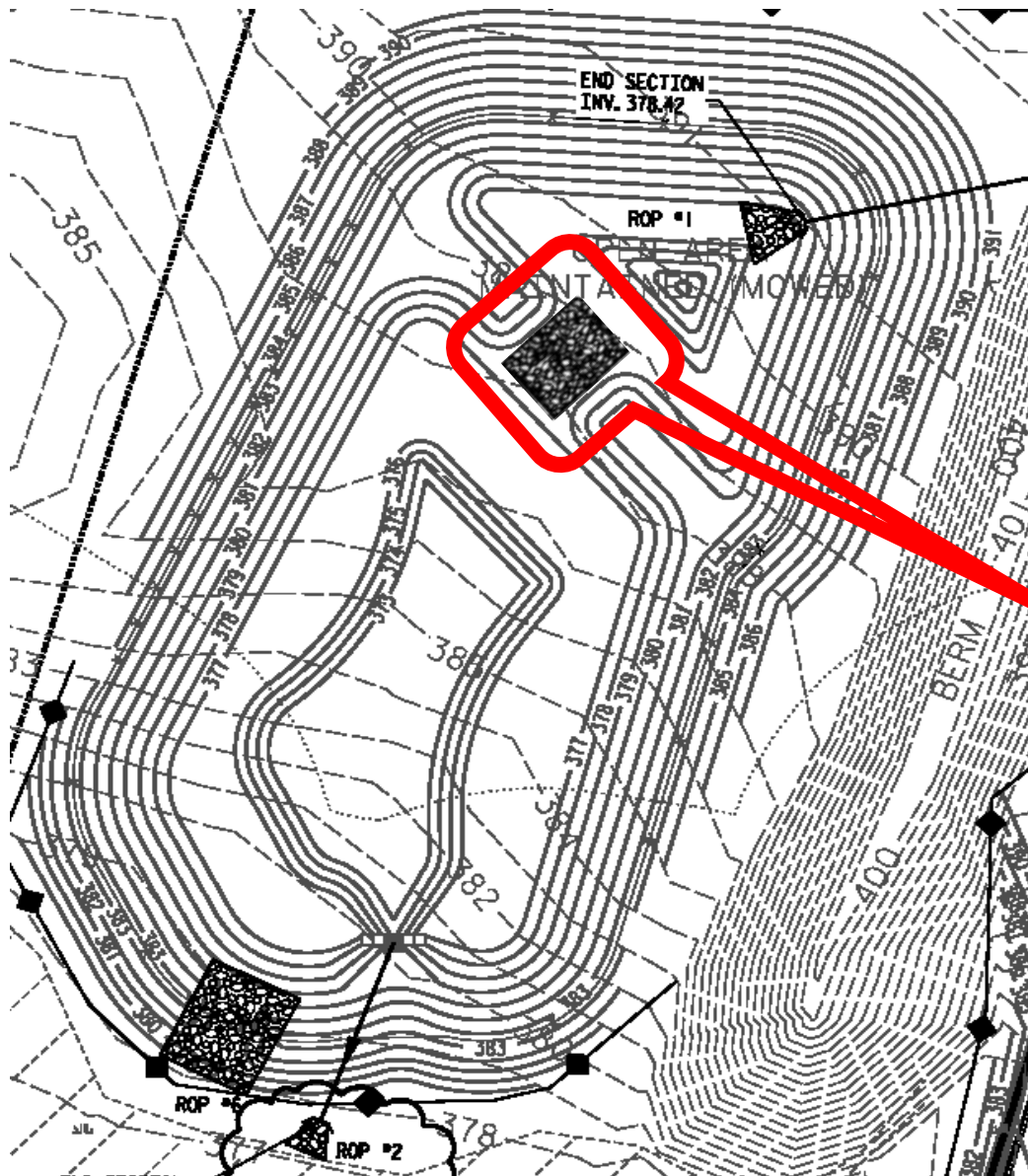
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Pond Construction



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Aquatic Bench: Water *Quality* Treatment

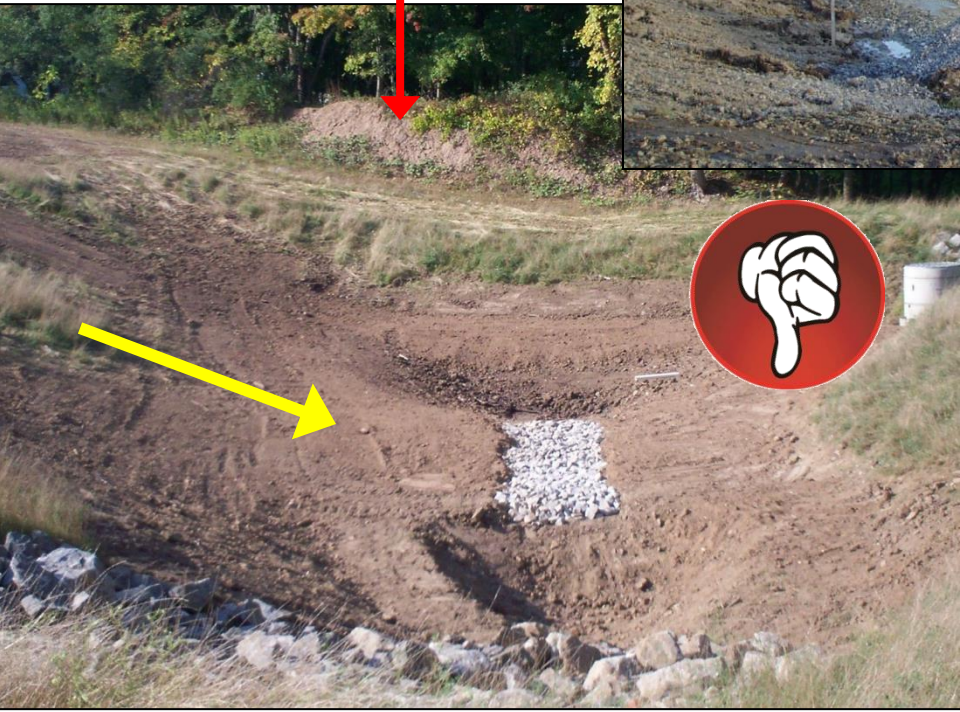
Pond constructed without aquatic bench – not in compliance with DEC Technical Standards, poor slope stability and habitat



Aquatic bench – provides vegetation for pollutant filtering and habitat for fish and frogs that feed on mosquitoes

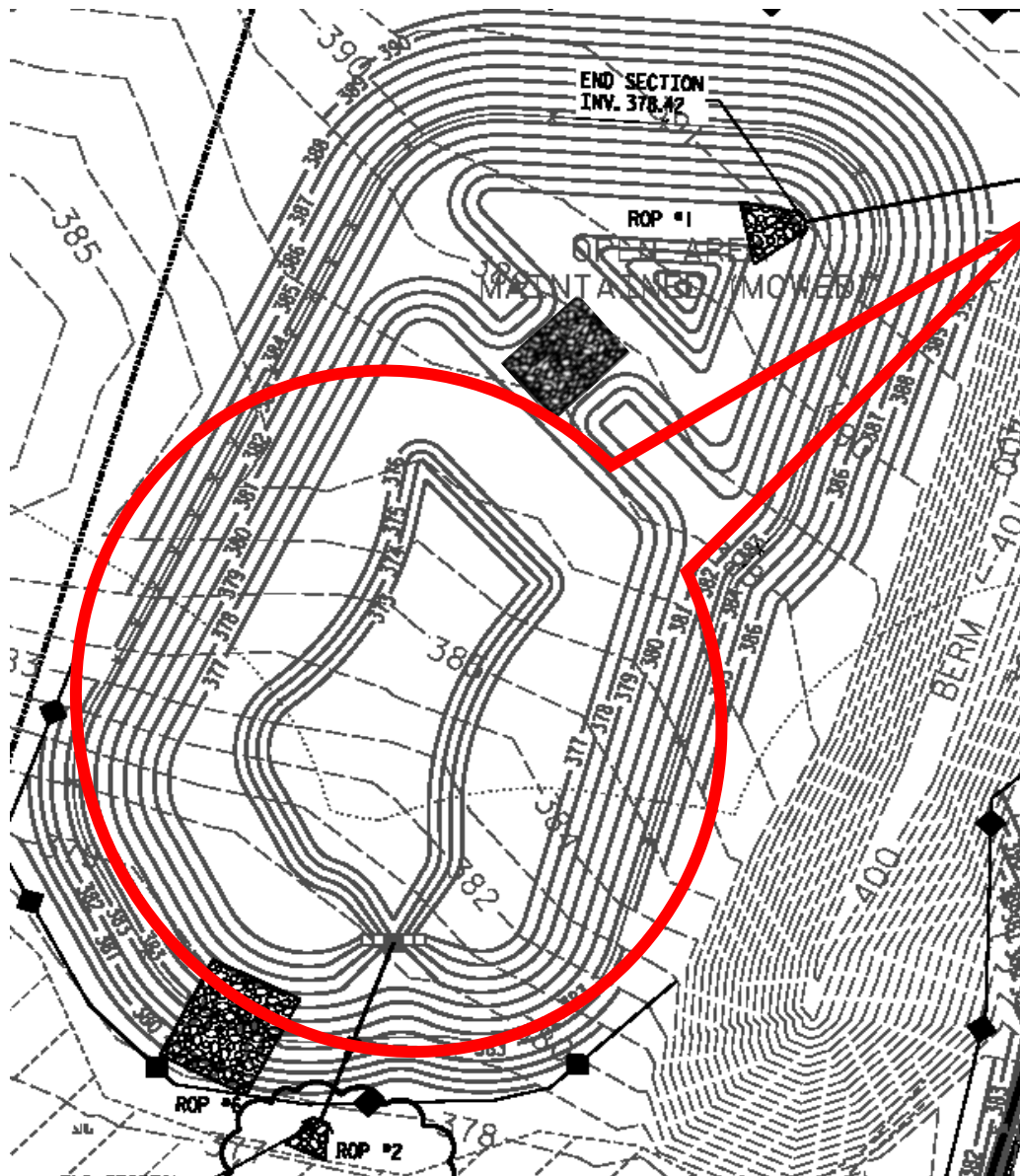
Aquatic Bench: Water *Quality* Treatment

No aquatic bench – limited space for plants for filtering and habitat



The Aquatic Bench is a flat shelf below the permanent water level – use a survey level to make sure it is 12-18" below the low flow orifice

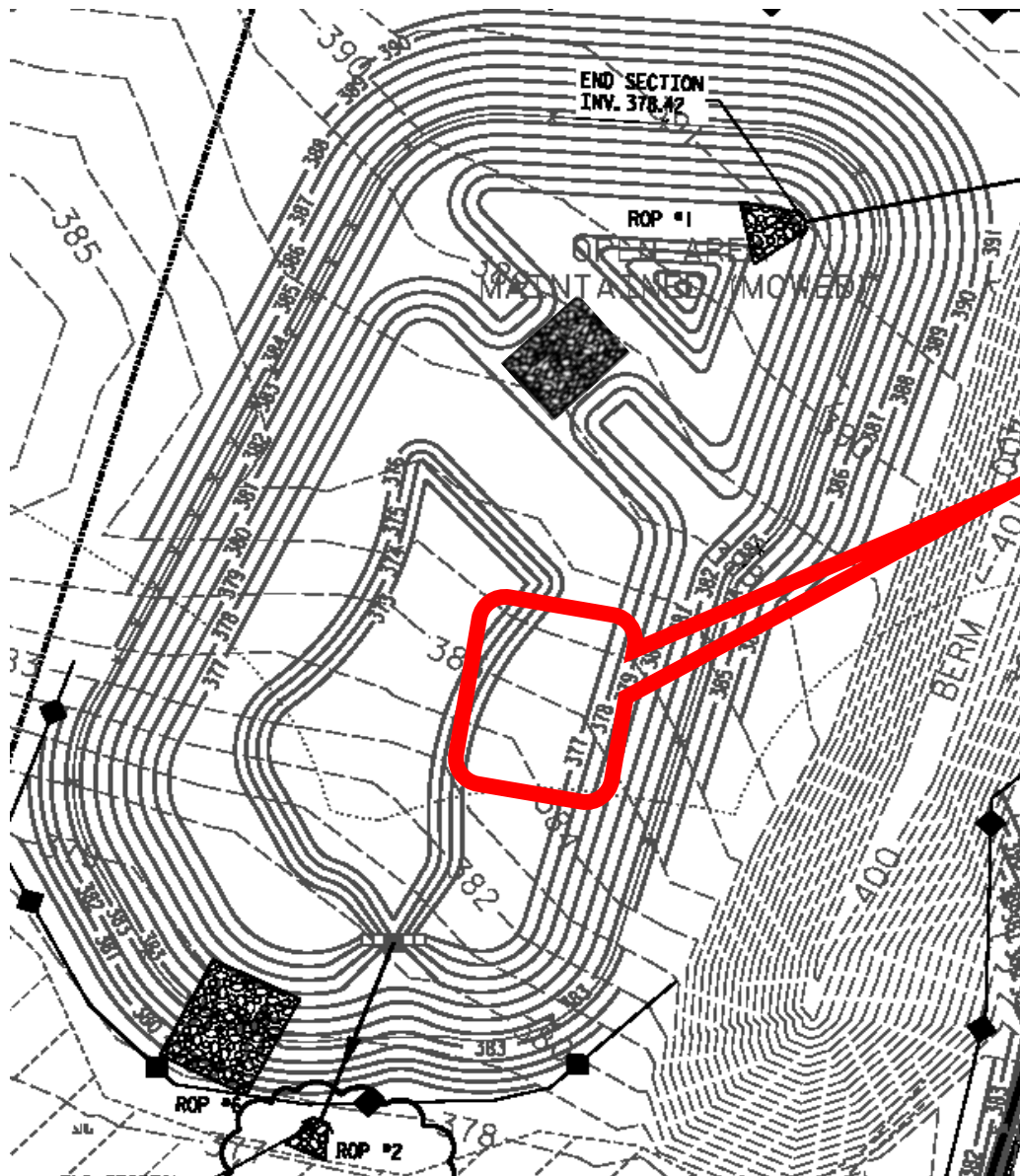
Pond Construction



Aquatic Bench

- Flat shelf 12-18" below water surface
- Extends up to 15 feet into pond
- Irregular shape
- Pond slopes 3:1 (h:v) or less – otherwise a fence is required

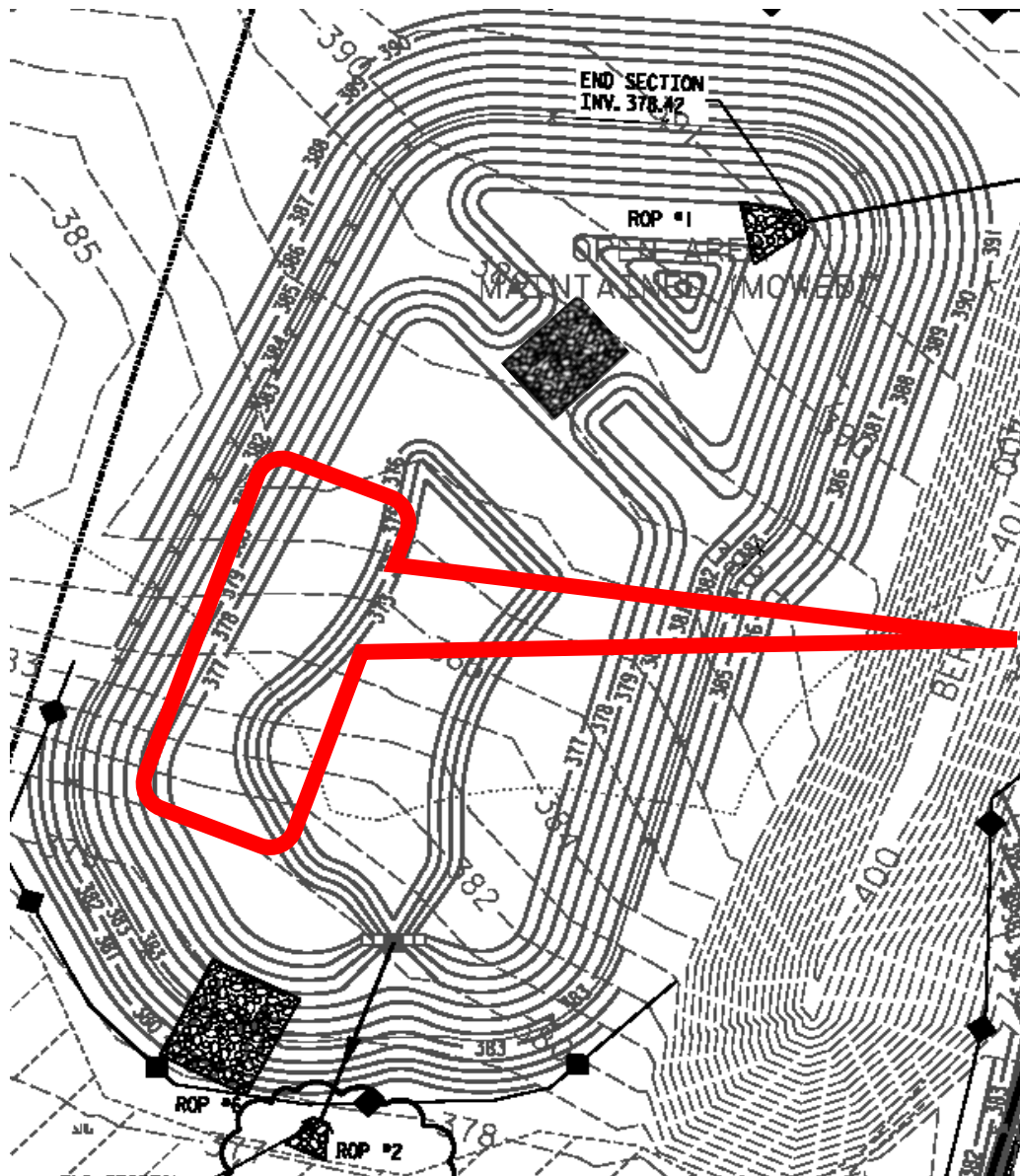
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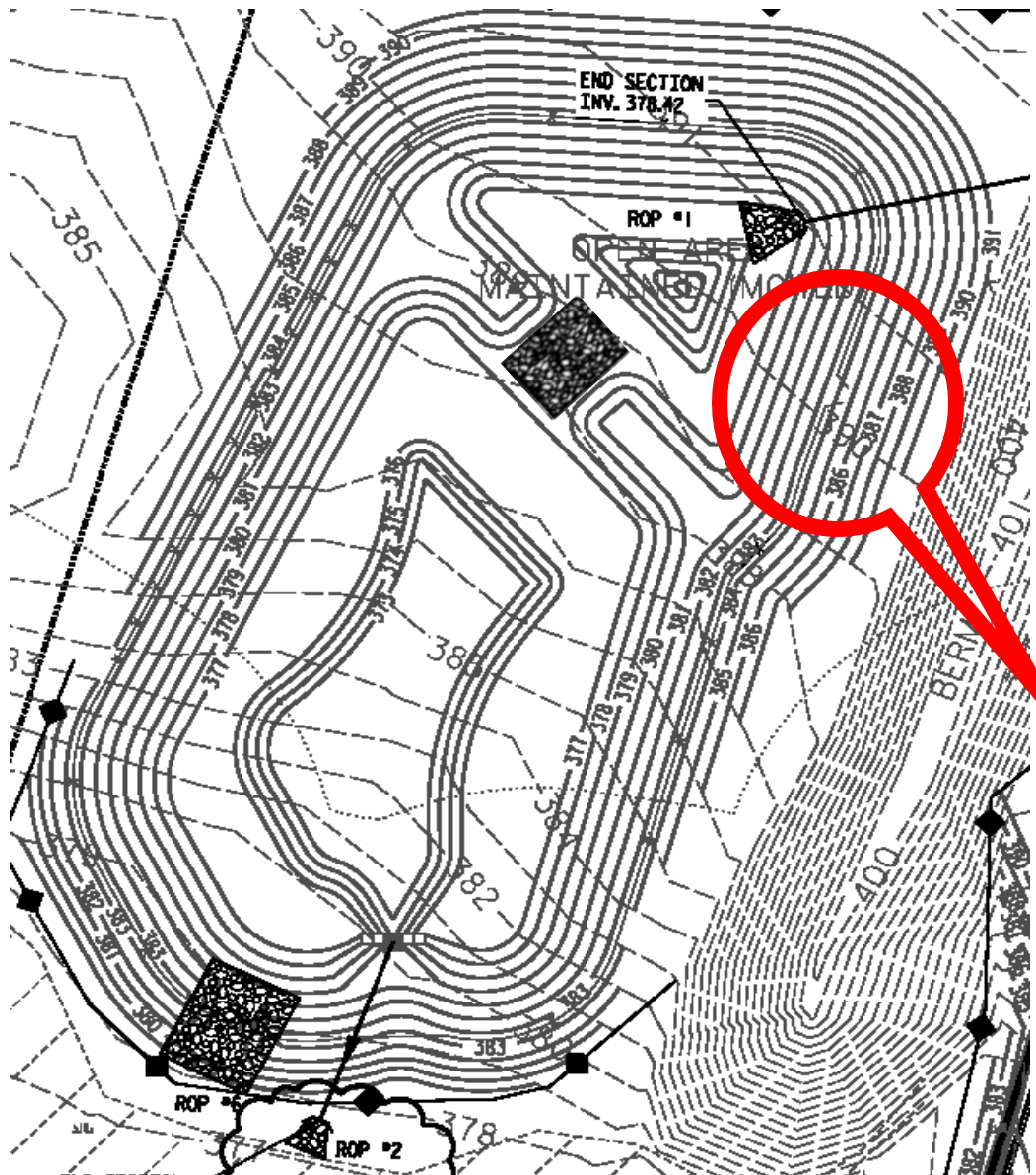
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Aquatic Bench

- Flat shelf 12-18" below water surface
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Establish proper depth in ponds to preserve water quality

Protect existing vegetation during and after construction to reduce runoff



Green Infrastructure

Objective:

Reduce runoff and improve water quality

- Bioretention
- Rain garden
- Infiltration basin
- Dry swale



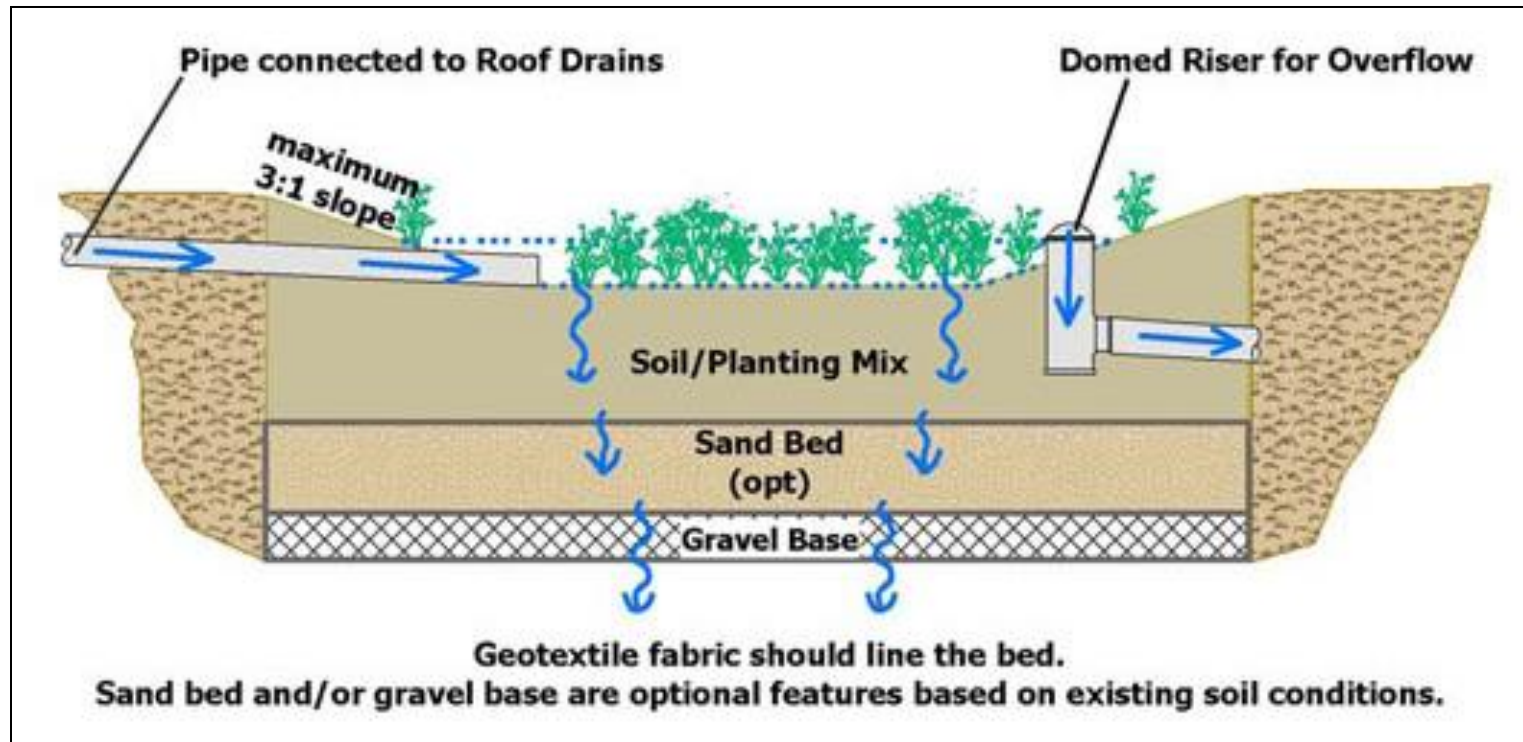
Installation:

Use light equipment to minimize soil compaction

Use topsoil to achieve best infiltration

Perform Soil Restoration before planting

Bioretention / Rain Garden



- Stone/gravel base
- Optional underdrain
- Overflow inlet
- Observation port
- Topsoil for planting

Bioretention / Rain Garden



Bioretention / Rain Garden



Infiltration and Dry Swale

- Gradual side slopes
- Mowable surface
- Underdrain
- No woody plants



- Observation port (infiltration basin)
- Forebay (infiltration basin)

Green Infrastructure Concerns

Soils are a key component:

- Heavy equipment compacts soil
- De-compaction may be required
- Using heavy native soils inhibits infiltration





Winter Site Operations



**Department of
Environmental
Conservation**

Winter Operations

An enhanced E&SC Plan must be developed to manage runoff on sites with exposed soil between November 15 and April 1

- Drainage patterns change
- Access points are smaller
- Practices hidden by snow
- Limitations of frozen soil
- Stockpiling and snow management



Winter E&SC Plan

- Enlarge and stabilize access points
- 25 foot buffer from perimeter controls
- 2 rows of silt fence where disturbed area is within 100 feet of waterbodies
- Keep drainage structures open and free from snow
- Sediment barriers around stockpiles and sensitive areas



Winter E&SC Plan

- Protect all stockpiles and slopes greater than 3:1 with rolled erosion control blankets
- Mulch all other exposed soil at **4** tons/acre (straw)
- Do not leave unprotected more than 3 days
- A sediment barrier must be installed at least 15 feet away from stockpiles and slopes to prevent soil transport



Winter Stabilization

Errors and Deficiencies



Equipment operator parked on top of silt fence



Too late to install drop inlet protection – soil has frozen

Neglected sites are difficult to fix in spring and often cause sediment transport to water resources



Runoff from soil/snow piled over silt fence will be uncontrolled in spring



Winter Shutdown

Inspection frequency can be reduced to every 30 days if **ALL** of these conditions are met:

- Soil disturbance is ***completely*** suspended
- The site is ***properly stabilized***
 - Vegetation, Mulch, RECP or Rock
- Written notification to Regional DEC office or regulated traditional MS4

Check sediment control measures after rain or snowmelt events

- You can't totally abandon the site between inspections – if there's a rain-on-snow event or snowmelt, you could have significant runoff and sediment transport



Nobody ever plans to fail, but:

If Erosion and Sediment Controls are not maintained...

If Stormwater Management facilities are not functioning properly...

... the owner, the contractor, and the MS4 municipality may be financially and legally responsible for damages!



What this all means to Contractors ...

- ✓ Make sure the project has permit coverage before you start any soil disturbance – ask the site owner for a copy of the DEC “Acknowledgment Letter”
- ✓ Sign the “Contractor Certification Statement” before you start work
- ✓ Follow the Stormwater Pollution Prevention Plan (SWPPP) and construction sequence and phasing plans
- ✓ Inspect the site DAILY to be sure Erosion and Sediment Control measures are effectively controlling sediment and runoff
- ✓ Notify the site owner/operator if any practices aren’t performing as they were intended



Sources for Assistance

DEC and SWCD staff can provide information and administrative assistance regarding the Construction and MS4 Permits and the development and proper implementation of Stormwater Pollution Prevention Plans

- **DEC Division of Water Stormwater Web Page**
<http://www.dec.ny.gov/chemical/8468.html>
- **County Soil and Water Conservation Districts**
<http://nyacd.org/local-districts/>
- **EPA Stormwater Homepage**
<http://www.epa.gov/npdes/npdes-stormwater-program>
- **DEC Conservation Officers (Environmental Conservation Law violations)**
1-844-DEC-ECOs (1-844-332-3267)



NYS DEC Regional Stormwater Contacts

- Region 1:* 631-444-0405 Nassau, Suffolk
- Region 2:* 718-482-4933 Bronx, Kings, New York, Queens, Richmond
- Region 3:* 914-428-2505 Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester
- Region 4:* 518-357-2045 Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady, Schoharie
- Region 5:* 518-623-1200 Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren, Washington



NYS DEC Regional Stormwater Contacts

- Region 6:* 315-793-2554 Herkimer, Jefferson, Lewis, Oneida, St. Lawrence
- Region 7:* 315-426-7500 Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Oswego, Tioga, Tompkins
- Region 8:* 585-226-2466 Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, Yates
- Region 9:* 716-851-7070 Allegany, Cattaraugus, Chautauqua, Erie, Niagara, Wyoming



Additional Training & Information

- DEC Stormwater Training Calendar
<http://www.dec.ny.gov/chemical/8699.html>
 - NYSDEC-Endorsed 4-Hour Erosion and Sediment Control Training dates and locations
 - Online 4-Hour E&SC Training
 - Stormwater Management Training Series
Ballston Spa, Middletown, Rochester, Syracuse
- Certified Professional in Erosion and Sediment Control
<http://www.envirocert.org>
- New York State Erosion and Sediment Control Certificate Program
<https://www.nyscdea.com/nysesccp/>
- International Erosion Control Association
<http://www.ieca-nechapter.org>
- Center for Watershed Protection
<http://www.cwp.org>



Questions

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