

MONTGOMERY COUNTY CONSERVATION DISTRICT

Municipal Workshop

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Conserving Natural Resources for Our Future

Conservation District History

The Montgomery County Conservation District (MCCD) was formed in 1956 to assist farmers in better managing their soil and water resources.

<u>Provide Technical Assistance</u>: residents, municipalities, farmers, businesses, and conservation groups, in order to protect our natural resources.

Permitting: NPDES only (Chap 102)

Approvals: Nutrient Management Plans (Act 38)



MCCD Program Responsibilities

- Erosion & Sediment (E&S) Control and Post-Construction Stormwater Management (PCSM) program for construction activities. AKA – Chapter 102 and NPDES
- Dirt & Gravel and Low Volume Roads Grant Program
- Montgomery County Envirothon Coordination
- Nutrient and Manure Management & Conservation and Compliance Assistance for Farmers
- Farmland Preservation Inspections
- Watershed Management & Protection Projects
- Invasive Species Monitoring (some not all)



History of stormwater related to Chapter 102

- Prior to March 2003, the state did not regulate Stormwater Management other than E&S. <u>It was purely regulated at the</u> <u>local level.</u>
- Some municipalities did a good job most did not.
- Act 167 (Stormwater Management Act) had been around since 1978 - it was more of a planning tool and did not really regulate stormwater from land development activities.
- MCCD took PCSM Delegation from DEP in 2016. This allows MCCD to conduct technical PCSM review.



History of stormwater related to Chapter 102

 Early PCSM requirements focused only on rate control – resulting in large detention basins.

 In 2003- Phase 2 of the NPDES regs. kicked in and required much more for NPDES Construction Permits (Stormwater Policy implemented by DEP).

• PCSM - new volume control and WQ requirements.



History of stormwater related to Chapter 102

 Phase 2 also created the small MS4 permit for municipalities having "urbanized areas." Virtually all municipalities in SEPA required a permit.

 12/2006 - DEP came out with the PA Stormwater BMP Manual to supplement the Stormwater "Policy"

 11/2010 - The 102 regs. were updated to directly include PCSM.





Future of stormwater?

- Need for more effective enforcement, better BMP design & implementation. <u>We need a complete paradigm shift!</u>
- DEP does enforcement on MCCD's behalf.
- Better communication, cooperation and coordination will be needed between DEP, Conservation Districts and Municipalities.
- More cross-coordination within the regulatory permitting programs (ex. NPDES & MS4).
- Establishment of long term WQ monitoring programs.
- PAG-13 General Permit MS4 permit new requirements for pollutant reductions (to address impairments).



- Compaction
- Lack of topsoil replacement depths
- Changes in root structures
- Changes in infiltration rates
- Inaccurate post-development curve numbers
- Lack of adequate seedbed preparation



Perhaps our biggest stormwater problem <u>is</u> soil related!

Roots cannot penetrate overly compacted soils - this is from an area of compost soil amendments where compaction has been removed



Bulk Densities in Soil

Bulk Density of Soils in New Jersey

Permeability Measurements of Sampled Layers within 20" of Soil Surface

Site	Bulk Density (g/cubic cm)	Permeability (in/hr
Woods	1.42	15
Pasture	1.47	9.9
Single House	1.67	7.1
Subdivision Lawn	1.79	0.14
Garage Lawn	1.82	0.04
Cleared Woods	1.83	0.13
Subdivision Lawn 2	2.03	0.03
Athletic Field	1.95	0.01

Reference: Bulk Density for Concrete is 2.2 g/ cubic cm

Post-Construction Stormwater BMPs - Overview

- <u>Rate Control</u> traditional detention basins
- <u>Water Quality</u> treats runoff to remove pollutants
- <u>Volume Control</u> deals with extra volume of runoff created by land use change with infiltration BMPs, capture & reuse or evapotranspiration, and recently "managed slow release BMPs"
- Volume control is generally the most difficult for designers to meet permit requirements for, especially when the full build-out of the site is the Developer's goal and infiltration rates are slow or nonexistent.
- 102.8(b)(4) Minimize impervious areas (subjective and hard to enforce).



Effects of Detention in a Hypothetical Watershed

Traditional detention on a watershed scale: Peak rate is actually increased!!



Act 167 plans supposed to deal with rate control issues caused by locations in each watershed.....

Discharge

Compost Soil Amendment Stormwater BMP



Add compost or other products to topsoil and relieve compaction of subsoil







Dark inclusions of compost are clearly seen in soil samples

Compost soil amendments were done on the right side of the photo.



Soil Amendment as a PCSM BMP

- Soil Amendment BMP Options vary widely
- Intent is to remove compaction of subsoil first
- Add topsoil/compost mixture (approx. 6"-10")
- Rake, seed, straw
- Use low ground pressure equipment!



It takes Mother Nature approximately 500 years to make 1" of topsoil so put it all back, it's a resource!



Are check dams in swales a good idea?

The mower guy doesn't like it!

And....they don't work most of the time

Homeowners likely to remove them



Failing Infiltration BMPs,

Lots of them!



Slow release concept to "manage" volume



Infiltration into Subsoil (Limited or Zero in/hr) Slow Release Control Valve (accessible for maintenance)

Layfield Park – Slow Release BMP



Rain Garden - Unsealed Inlet = 80% WQ volume lost



Eroded soil at sides of unsealed inlet in grassed area



Require Butyl Mastic Seals in BMPs

Butyl mastic is used to seal sanitary sewer manholes.

It also works great to seal storm sewer joints.

Do not use grout! It cracks and leaks after only a winter or two.





Caulk & Grout Will Fail



<u>Curb Cuts</u>: work at the bottom of the slope....but,

small lip in
curb prevents
flow to BMP



What about spray irrigation as a PCSM BMP?

Technically Yes, but a water budget must accompany the design.

Does the landscaping need irrigation?

What about winter irrigation?

Not a good BMP in most cases unless in sinkhole areas



What Can Municipalities Do?

- Update ordinances!
 - 1. Require pre-treatment (Infiltration BMPs, Hot Spots)
 - 2. Require proper BMP <u>function</u> prior to escrow release
 - 3. Require NPDES N.O.T. prior to escrow release
 - 4. Reduce allowable impervious percentage (where allowed by MPC)
- Share BMP inspection responsibilities (Home Inspector observes on-lot Soil Amendment BMPs since it is outside of the R.O.W.)
- Establish allowable bulk densities in topsoil areas



- At the completion of the project, and as a prerequisite for the release of the performance guarantee, the applicant or his representatives shall:
- (1) Provide a certification of completion from an engineer, architect, surveyor or other qualified person verifying that all permanent facilities have been constructed according to the plans and specifications and approved revisions thereto.
- Recommendation insert language indicating an applicant must prove it's functioning, not just constructed!
- Release escrow upon NPDES permit termination...very helpful
- Withhold occupancy permit until all PCSM properly installed <u>& functional</u>



Proper Conveyance & Signage



Runoff is bypassing the rain gardens due to poor parking lot grading



Runoff bypassed the rain gardens, causing overflow onto major roadway.



Observe PCSM Soil Testing.....(SEOs do!)





Homeowners Modifying BMPs

The homeowner dug a hole through the berm to drain his failing rain garden BMP

Adequate function prior to final occupancy?





Valves in PCSM BMPs – Potential for Abuse

Valves are often added to infiltration BMPs to drain the BMP in case of failure. This often eliminates much or all of the water quality benefits of the BMP.

BMPs can easily be pumped out for necessary maintenance.





Soil Mixes in Basin BMPs is Critical!

Sandy, engineered soil mixtures in BMPs help it function properly and can help eliminate premature failure and stabilization concerns

Use ASTMC-33 Sharp Sand only!

Use <u>hardwood</u> bark mulch for bulking agent and slow release nutrients



Soil Mixes & Underdrains

Be careful with compost percentages. Compost will help with plant growth and pollutant removal but can become a source of nutrient pollution if too much is used.

The dark color of the water coming out of this soil mix shows a "compost tea" (70% sand, 30% compost)





Soil Mixes & Underdrains

The same underdrain from the previous photo with the required cap reinstalled.

Drain only if needed.



Mosquito Concerns?

PA Code Title 25 Environmental Protection, Chapter 243. Nuisances:

- Section 243.12 Stagnant Water states: A person may not maintain or permit to be maintained, a pond, privy vault, cesspool, well, cistern, rain barrel or other receptacle containing water unless the receptacle is constructed or maintained in a manner to prevent the breeding of mosquitoes.
- Most mosquito larval control are considered pollutants under the Clean Water Act and now requires a NPDES permit for use

