

Conservation & You

A publication of the
Southeast Pennsylvania
Association of Conservation Districts

Bucks
Chester
Delaware
Montgomery



Fall 2008

Stabilize it! Don't Criticize it!

There is a wide range of erosion and sediment controls out there to choose from, many using different means to serve the same function. E&S controls, such as sediment basins, silt fences, rock filter outlets, and so on, technically should be called sedimentation controls, as they do nothing for the prevention of erosion, as much as they encourage sedimentation prior to runoff leaving the site.

While there is a variety of controls to prevent off-site sedimentation, very few controls exist for the prevention of erosion, which is the act of detaching soil particles from one another by means of wind or water. There are several types of erosion, including splash, sheet, rill, gully, and valley/stream erosions.

“... there is one main type of BMP suitable for controlling erosion.”

Even with the variety of types of erosion, there is one main type of BMP suitable for controlling erosion. You may be surprised to know that this BMP predates humans, let alone the E&S Pollution Control Program Manual.

What is this dark magic that I speak of? How may the mortals come to possess such power? It's quite simple. Stabilize it! Stabilization of disturbed areas is most often achieved through the growth of plants; grasses, shrubs, and trees. In addition to the foliage protecting the soil from the impacts of raindrops themselves, the root systems help hold the soil structure in place.

For urban development, erosion is often minimized through immediate stabilization. If an area has been final graded, the best way to keep the local Conservation District employee off your back is to stabilize the area according to the specification on your plan. If your site is too small and you don't have a plan, choose a perennial seed mix with purity and germination percentages higher than 80%, apply at roughly 40 lbs. per acre, and add straw/hay mulch. Choosing a seed with higher purity means you're getting more of the seed you paid for, with fewer weeds. High germination means more of the seed planted will grow. If a disturbed area is going to lay dormant but eventually be redisturbed, the area should be stabilized with an annual seed mix and mulched.

Agricultural practices are also subject to erosion. Some crops are better at minimizing erosive conditions than others, and some off-season practices also help. For example, contour farming helps minimize erosion by discouraging flows of runoff perpendicular to the slope. No-till farming helps prevent erosive conditions by using minimal disturbance when planting. The less soil exposed, the less soil available to be detached. Other practices such as terraces and diversions minimize erosion by preventing the flow of runoff perpendicular to the slope.

The best E&S controls are the controls that stop the process at its source. If erosion is prevented, you typically need not worry about sedimentation. If soil particles are not detached, they cannot be transported. And you can quote me on that, because those are my *sediments*, exactly.

*Benjamin Drover
Chester County CD*

Rain Gardens planted at Township Buildings

West Rockhill Township joins Solebury and Plumstead townships in promoting on-site management of stormwater with the installation of two rain gardens at their township building.

Judith Decker, Assistant Township Manager, felt so strongly that the township should serve as an example of environmentally sound management of stormwater for residents that she managed to have not one, but two rain gardens installed at the township building. Judith solicited help from a local Boy Scout to plant a rain garden on one side of the township building. The garden was so well received that township manager Greg Lippincott hired a professional landscaper to plant another garden on the other side of the building. Now rain water from the roof is captured in the gardens and allowed to percolate slowly into the ground.



Boy Scout plants a rain garden at West Rockhill Township building.

an effective way to reduce stormwater runoff. For more information on Rain Gardens consult the PA DEP Stormwater Best Management Practices manual, chapter 6, or go to www.raingardens.org.

*Mary Ellen Noonan
Bucks County CD*

Delaware County revises Fee Schedule

On September 19, 2008 the Delaware County Conservation District's new fee schedule for erosion and sediment pollution control services took effect. The last time the fee schedule was revised was in 2003. A major change is that school districts are no longer exempt from a review fee; only local municipalities and the Commonwealth of Pennsylvania remain exempt from this fee. A \$75 fee is now required if the design engineer requests a meeting for assistance regarding a review letter. This fee does not apply if the district plan reviewer requests the meeting. A \$75 recovery fee is also being requested for an administrative hearing meeting. If there are still major review comments after the second review, the plan reviewer will note in review comments that the project will be subject to a resubmission fee of 50% of the original fee. This 50% fee also applies to plans that are resubmitted where primary Erosion and Sediment Control BMP's are unchanged but other major revisions have been made.

A separate erosion and sediment control plan and its associated \$100 fee are now required for Chapter 105 General Permit applications that are not associated with a larger project being reviewed by the district. Chapter 105 General Permits submitted without an erosion and sediment control plan or the required review fee will be considered insufficient. A Timber Harvesting Project will only be subject to a fee equivalent to 10% of the acreage for the entire timber sale area, or \$100, whichever is greater. The new fee schedule can be found online at <http://www.delcocd.org/EandSprogram.htm>.

*Michelle Ferri
Delaware County C.D.*

Montgomery County Soil Survey updated

In August 2008 the United States Department of Agriculture, Natural Resources Conservation Service, completed a three-year program to revise and digitize the Montgomery County Soil Survey. The updated survey is available on the USDA-NRCS Website (listed below) for your use.

The revised soil survey is the official Soil Survey for all federal programs which use soil information. For land developers, consultants, and engineers, the 1967 Soil Survey still has its place due to the planning process and local ordinances. The revised Soil Survey will benefit the private landowner or potential landowner by providing information on specific soil series. Montgomery County agriculture producers will also benefit from the revised soil survey for both crop information and livestock management.

John Chibirka, USDA-NRCS Soil Scientist, will conduct a presentation on the use of the revised Soil Survey for engineers and consultants to be held at the Cooperative Extension Office (4H Building) Route 113, in Creamery, from 9 a.m. until noon on **November 21, 2008**. There is no registration for this session.

The updated Soil Survey maps, tables and portions of the manuscript narrative are available on the USDA-NRCS Web Soil Survey Website at <http://websoilsurvey.nrcs.usda.gov/app/>. For GIS users, downloads of spatial and tabular data are available at the Soil Data Mart website (<http://soildatamart.nrcs.usda.gov/>).

*Rich Kadwill
Montgomery Co. CD*



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If a tree falls in the woods and someone 's around...

Let's start with some statistics about forests in Pennsylvania. Currently, about 59% of land in the state— or 17 million acres – is forested. Of these, 93%, or 15.9 million acres, is considered “timberland,” which historically has also been called “commercial forest land.” Further, 12.5 million acres of “timberland” is privately owned.

As a result, it is important for owners of private forested land to recognize their role in protecting the waters of the Commonwealth and minimize the effects of potential operations on the environment.

In accordance with Pennsylvania DEP's Chapter 102 Erosion and Sediment Control regulations under the Clean Streams Law, all activities, including timber harvests, resulting in 5,000 ft² of disturbance or greater require an Erosion and Sediment Control Plan. Additionally, timber harvests that disturb more than 25 acres require a permit from DEP. Other permits may be necessary if streams or wetlands may be impacted.

In cases where clearing is in preparation for development, the clearing is not considered a timber harvest. If the harvest is planned in anticipation of development greater than one acre, an NPDES permit is required because the timber harvest can no longer be classified as an agricultural practice.

For strictly timber harvests, several factors should be considered when preparing an erosion and sediment control plan:

Soils are essential to an effective E&S control plan. Information in soil surveys can show certain areas are better suited for access than others, some soils are more suitable for haul and skid roads, and some areas should be avoided all together. Soils can indicate seasonal saturated conditions, which could mean the presence of wetlands. Wetland encroachment requires a permit. As a result, it is important for the plan designer to understand the on-site soils and their limitations.

Additionally, stream channels should be protected. A stream crossing in a channel with a tributary area less than 100 acres will not require a permit, unless wetlands are impacted. Anything greater will require a General Permit from DEP.

The season which timber harvests are conducted can play a role in determining access to the site, the ease of conducting the proposed work, and maintenance of BMPs. It is recommended that timber harvest be conducted during drier times of the year.

Haul roads are essential to the timber harvest E&S control plan. Design haul roads as if it were a permanent road. Terminal points, including landings, must be shown. Locate landings away from streams and wet areas, limit haul roads to a 10% maximum grade. Haul roads with slopes should be equipped with waterbars, broad based dips, or culverts discharging onto stable areas to prevent long stretches of concentrated flows. Runoff should not be directed towards landings areas, as it can be quite messy.

Show skid roads and trails on the E&S control plan drawings. Skid roads are more of a concern than the skid trails, as the roads should be flagged, cleared and graded. Because skid trails are necessary only for the transport of timber from the stump to the main skid road, grading is not necessary, and clearing should be minimized to only what is necessary. Skidding should never be through or across stream channels, spring seeps, temporary ponds, or wetlands.

Buffers of 50' must be maintained from streams and wetlands where crossings are not necessary. This buffer should be doubled if in a High Quality or Exceptional Value Watershed. Millions of dollars are spent in restoring Pennsylvania's riparian buffers. It is to no avail if the buffers are removed faster than they can be replaced.

Finally, E&S control plans should discuss the retirement of haul roads, skid roads, and landings. Smooth and shape the road and landing surfaces so that the soil is able to take on water, instead of channeling it. Remove temporary stream crossings and culverts in accordance with the General Permits obtained. Culverts in more than 2 feet of fill should remain, as the cost and disturbance required for removal outweighs the benefits. Temporary diversions (broad-based dips, waterbars) should be removed. Disturbed areas should be seeded with a permanent mix and mulched.

In conclusion, timber in the state of Pennsylvania is an important natural resource. We must understand that proper and careful undertaking of timber harvests is essential in maintaining and protecting one of Pennsylvania's most important natural resources – our waterways.

*Benjamin Drover
Chester County CD*



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An Alternative Worksheet for Structural BMP Volume Credits

As most of us know, the Department’s Stormwater Best Management Practices (BMP) Manual was finalized in December 26, 2006. In May 2007, the NPDES Application was revised, which requires several of the worksheets (found in Chapter 8 in the BMP Manual) to be submitted along with the application. A major reason for this requirement is to assist both designers and reviewers in properly following the technical guidelines in the manual. One of the key worksheets in the manual is Worksheet No. 5 – “Structural BMP Volume Credits”. Over the past year, we have noticed that Worksheet 5 in its current form is unclear for the breadth of information required. As a result, applicants have had difficulties providing key information. In response, a draft revision, labeled *Worksheet No. 5A*, has been developed by the Southeast Regional Office to help clarify the issue. (See below.) A copy of this worksheet can also be obtained in Microsoft Excel Format by visiting DEP’s website: www.depweb.state.pa.us. Click on “Southeast Region” on the left menu, select “Stormwater Information.” Then select from the menu.

An anticipated benefit to using this worksheet is that applications may be able to get through the system more expeditiously. Please be advised that this is not yet sanctioned as a final revision to the manual, and it is unknown whether this worksheet will be acceptable to other regions or districts outside of the Southeast

Region. Applicants should therefore use proper judgment and discuss the use of this worksheet with pertinent conservation district staff prior to its use.

Applicants are reminded that other volume control alternatives are available, and designers are encouraged to utilize all the BMPs at their disposal to diversify their stormwater management strategies to more closely reflect the natural water budget so that infiltration BMPs are not unduly overburdened. The Department realizes that this draft worksheet focuses on infiltration BMPs more than any other structural volume control BMP. Efforts are underway to formulate other worksheets that could be used for either *Capture and Reuse*; or *Vegetated Systems that provide Evapotranspiration*. When these are available, they will be posted on the same website. Since most design submittals have been focusing on infiltration for volume control, the Department is comfortable sharing this draft worksheet for your use which will hopefully improve both the quality of plan submittals and review times.

Domenic Rocco, P.E., CPSWQ
 Chief, Stormwater Section - Watershed Management Program
 Pennsylvania DEP – Southeast Region

Worksheet 5.A - Infiltration BMPs

Instructions: At a minimum, this worksheet needs to be completed for each Point of Interest/Discharge.

Project Name: _____ Test _____
 Point of Interest/Discharge: _____ 1 _____
 Impervious Drainage Area = 3.5 acres = 152,460 square feet
 Total Drainage Area = 10.0 acres = 435,800 square feet

Key for Cells Input
 Shaded Cells = requires user input
 Unshaded Cells = no user input required

Proposed Infiltration BMP(s)	Infiltration Rate		Infiltration Period				Hydraulic Loading								Actual BMP Area ⁶ sq. ft.	Computed Infiltration Volume cu. ft.		
	Measured Infiltration Rate ¹ in/hr	FCR	Design Infiltration Rate in/hr	Infiltration Period hrs	Active Infiltration hrs	Total Infiltration Period hrs	Imperv. Drainage Area Loading				Total Drainage Area Loading							
							Imperv. DA sq. ft.	% area draining to BMP	Imperv. Area Loading Ratio	Imperv. Target Area sq. ft.	Total Drainage Area sq. ft.	% area draining to BMP ⁵	Total Area Loading Ratio	Total Target Area sq. ft.				
BMP 6.4.1 Pervious Permit w. Infil. Bed	1.50	2	0.90	24		24	152,460	25.0	5	7,823	435,800	20.0	8	10,890	10,890	10,890	17,424	
BMP 6.4.2 Infiltration Basin	0.90	2	0.40	24		24	152,460	90.0	5	15,246	435,800	90.0	8	27,225	27,225	27,225	21,790	
							152,460				435,800							
							152,460				435,800							
BMP 6.4.3 Subsurface Infiltration Bed		2					152,460		5		435,800		8					
							152,460				435,800							
							152,460				435,800							
BMP 6.4.4 Infiltration Trench	1.00	2	0.90	24		24	152,460	5.0	5	1,525	435,800	3.0	8	1,634	1,634	1,634	1,634	
							152,460				435,800							
							152,460				435,800							
BMP 6.4.5 Rain Garden/Bio-retention	1.50	2	0.75	24		24	152,460	4.0	5	1,220	435,800	2.5	8	1,361	1,361	1,361	2,042	
							152,460				435,800							
							152,460				435,800							
BMP 6.4.5 Dry Well / Seepage Pit	0.65	2	0.33	24		24	152,460	8.0	5	1,830	435,800	3.0	8	1,634	1,630	1,630	1,189	
							152,460				435,800							
							152,460				435,800							
BMP 6.4.7 Constructed Filter ⁷		2					152,460		5		435,800		8					
BMP 6.4.8 Vegetated Swale ⁷		2					152,460		5		435,800		8					
BMP 6.4.9 Vegetated Filter Strip ⁷		2					152,460		5		435,800		8					
BMP 6.4.10 Infil. Berm & Ret. Grading		2					152,460		5		435,800		8					
							90.0				78.5				TOTAL:		44,069	

1 Assumes a soil testing procedure which finds hydraulic conductivity. (e.g. perc tests may also require a reduction factor)
 2 Time it takes for BMP to empty once it is full. (Minimum 24 hrs, Maximum 72 hours)
 3 Infiltration that occurs during the storm (before becoming full). Not to exceed 6 hours.
 4 A portion of the total area draining to BMP from non-pervious area may be diverted.
 5 Inherent in these calculations are the allowable loading ratios (5:1 and 8:1) from the BMP Manual. Higher loading ratios will need to be justified. In Karst Areas, the max. loading ratio should be 3:1.
 6 Actual BMP Area may be larger than (but not smaller than) the Target BMP Area. Default value will be the Target BMP Area unless modified by the user.
 7 These BMPs don't fall well into this computational process. For vegetated swales and filter strips, go to WS No. 5.C.

Center for Watershed Protection releases Municipal Pollution Prevention/Good Housekeeping Manual

The Center for Watershed Protection has recently released the final installment of the Urban Subwatershed Restoration Manual Series, Manual 9: Municipal Pollution Prevention/Good Housekeeping Practices.

Historically most communities have had little reason to consider the stormwater pollution generated by their own municipal operations. Over the last decade, this reality has begun to change as the National Pollution Discharge Elimination System (NPDES) spurred communities across the country to begin developing comprehensive pollution prevention/good housekeeping programs. While these concepts are relatively simple, many communities have found that developing a program can be both confusing and intimidating.

Several guidance documents have been written about the source control practices that can be used to address individual pollution-generating activities (e.g., building maintenance, waste handling and disposal), but few have focused on the development of comprehensive pollution prevention/good housekeeping programs.

For this reason, the Center developed Manual 9. It provides "how to" guidance, and outlines the Center's most recent ideas on how municipal pollution prevention/good housekeeping practices can be used to address local water quality issues and watershed restoration goals. Key topics covered include:

- The basics of municipal pollution prevention/good housekeeping and the reasons for developing comprehensive programs for it in the first place.
- How to investigate and improve ten major municipal operations, including park and landscape maintenance, street repair/maintenance and hotspot facility management.
- How to identify which major municipal operations have the greatest impact on water quality and how to craft a pollution prevention/good housekeeping strategy addressing those threats.
- How to set measurable goals and scope the level of effort needed to develop an effective pollution prevention/good housekeeping program.





The manual is intended primarily for use by smaller NPDES Phase II communities and other unregulated communities interested in protecting and restoring local water resources. However, other entities regulated under Phase II of the NPDES program (e.g., departments of transportation, military installations, school districts), as well as communities regulated under Phase I of the NPDES program, will also find it useful.

The manual is available for free download from the Center for Watershed Protection's website: <http://www.cwp.org>

*Center for Watershed Protection
Ellicott City, MD*

Amy S. Greene Environmental Consultants, Inc.

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Bucks District hosts Delaware Estuary Watershed Workshop

Bucks County Conservation District (BCCD), in cooperation with the Partnership for the Delaware Estuary and DCNR Bureau of State Parks, hosted a week-long workshop for teachers in July. The workshop focused on issues related to watersheds, stormwater, water quality, and associated topics.

One day of the workshop was spent touring sites that represented a variety of Best Management Practices (BMPs) found in Bucks County. Representatives from BCCD, Natural Resources Conservation Service, Pennswood Village, Bucks County Planning Commission and St. Mary's Medical Center gave presentations on erosion and sedimentation control, agricultural BMPs, ecological restoration of business development sites and green roofs.

Speakers from Delaware River Basin Commission, Delaware Riverkeeper and BCCD gave presentation on the Delaware River watershed, the Buffers 100 initiative, and environmental laws and regulations pertaining to the Clean Water Act.



Bonnie Tobin of Delaware Canal State Park looks down on the green roof at St. Mary's Hospital in Langhorne

Additional field trips included the Waterworks in Philadelphia, the PSEG Estuary Restoration site in Alloway, NJ, the Del River oil spill response boat and the University of Delaware for presentations on the horseshoe crab, native plants and seining of the Delaware Bay. This workshop was sponsored in part by a DEP Environmental Education grant.

For more information on this or other environmental education programs please contact BCCD at 215-345-7577 or visit www.bucksccd.org.

Mary Ellen Noonan
Bucks County CD





Austin Drager of NRCS explains the value of swales in farm fields located at Tyler State Park

New staff member at Delaware County Conservation District



Brian Vadino is Delaware County Conservation District's new Watershed Specialist. After graduating from Penn State in 1997 with a B.S. degree in Wildlife and Fisheries Science, Brian spent two years with the PA Fish and Boat Commission's Habitat Management Section, assisting in administering the statewide, cooperative "Adopt-A-Stream" program. He then went on to work with Wildlands Conservancy, Inc., (Emmaus, Lehigh County) where he worked on various watershed assessment and restoration initiatives, and eventually served as Director of Rivers Conservation Program until August 2008. Brian is excited to return to his native Delaware County and is looking forward to making a positive contribution toward local watershed conservation efforts. Brian resides in Wallingford with his wife, daughter and grandmother, and enjoys angling in his spare time.

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Record turnout for North Branch Watershed Association's 8th Stream Clean-up

The North Branch Watershed Association, in collaboration with Bucks County Conservation District and Chalfont Borough, held the Eighth Annual Stream Cleanup on Saturday September 20th, 2008. This year boasted a record turnout of over 70 volunteers, who donned boots and gloves and waded through the North and West Branches of the Neshaminy Creek in Chalfont to collect trash deposited along the streambed and the riparian area.

Jesse Lautenbach of Dublin summed up the general consensus expressed by all the volunteers when he said "I think it's important to clean up your community and take pride in the area you live in." Volunteers met at the Creekside Inn on Route 202 in Chalfont Borough at 10 a.m. and worked until 1 p.m. Among the typical plastic and glass bottles, more unusual items were collected including 3 bicycles, several rusty steel plates, a lawn chair (good as new) and an old wheelbarrow. Special thanks to Chalfont Borough Public Works Department who hauled the trash from designated drop-off locations and to the Creek Side Inn for once again serving as the meeting location. Finally, a very special thanks to all of the volunteers who came out and donated their Saturday to benefit the Neshaminy watershed!

For more information on this program, contact Meghan Rogalus at 215-345-7577 x107 or email meghanrogalus@bucksccd.org.



Zac and Jake Druce remove the 3rd bike they discovered in the North Branch.



Debris pile at the Creek Side Inn drop-off location.

*Meghan Rogalus
 Bucks County CD*

Sheet Erosion on Construction Sites

Sheet Erosion is caused by the shallow flow of water over the land's surface before it concentrates. Almost all of the erosion and sediment control BMPs are designed to handle sheet erosion. They are not utilized for rill, gully, or channel erosion.

I have taken on the task of identifying the tons of soil per year lost to sheet erosion from a bare earth construction site with no controls, and the same site with erosion and sediment control. The RUSLE 2 equation was utilized to calculate the soil loss. The following site parameters were used:

Manor Soils
8 % slopes
200 ft slope length
5 acres disturbed
Tolerable Soil Loss =5/tons/acre/yr.

Bare earth/no BMPs
R=170
K=0.03
LS=1.72
P=1+

RUSLE calculates that the sheet erosion soil loss rate is 87.72 tons/acre/year. Potential soil loss for the 5-acre site is 439 tons/year.

Add BMPs to the equation, with an average sediment removal efficiency of 60% the total soil loss is reduced to 176 tons per year.

Granted the above calculation was done with the seat of the pants approach, but it does serve the purpose of a demonstration. There are many additional variables that could have been included, and there are other methods to determine sheet runoff from a parcel of land.

Three lessons are to be learned:

1. Sheet erosion from construction sites is significant.
2. BMPs do reduce sheet erosion by a factor of more than 50%.
3. Even with BMPs the sheet erosion accounts for a significant amount of soil loss in respect to the Tolerable Soil Loss for Manor soils.

I envision that some time in the near future engineers and designers will be required to provide soil loss rates for projects. Municipal and other governmental jurisdictions will need the information to meet the requirement of the MS4 permits. Several states currently require the information as part of the application process for NPDES Construction and Post Construction Stormwater Management permits.

Regardless of whether it is a requirement or not, it is a good exercise to perform occasionally to predict the extent of soil loss from sheet erosion on a construction site. The exercise can also emphasize the importance of the BMPs you design. All engineers and design consultants should learn to do the soil loss calculations.

Additional information on RUSLE can be obtained from the Natural Resources Conservation Service.

*Dan Greig
 Chester Co. CD*



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The Conservation Districts in Southeastern PA offer advertising space in this quarterly newsletter, **CONSERVATION & YOU**, distributed to some **2000** developers, engineers, architects, municipalities, and other related businesses in the region. Please contact the conservation district in your county with comments and suggestions.

Two size ads are offered: **Business card size** (2" x 3 1/2") \$75/issue **Quarter Page** (3 1/2" x 4 1/2" – vertical) \$125/issue
 A 10% discount is offered for inserting an ad in two or more issues. Ad deadline for the Fall issue is December 15, 2008. Send your check payable to the Delaware County Conservation District and camera-ready copy to Ed Magargee, Delaware County Conservation District, Rose Tree Park - Hunt Club, 1521 N. Providence Road, Media, PA 19063; Phone (610) 892-9484. Email: MagargeeE@co.delaware.pa.us

CONSERVATION & YOU is published by the Bucks, Chester, Delaware and Montgomery County Conservation Districts in cooperation with the PaDEP, Bureau of Waterways, Wetlands and Erosion Control. For advertising information, call (610)892-9484.

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