

Berks County Conservation District EROSION CONTROL GUIDELINES FOR SMALL PROJECTS LESS THAN 0.50 acres (21,780 SF)

Introduction

In an attempt to alleviate the continuing problems of controlling sediment pollution, the Commonwealth of Pennsylvania, through the Department of Environmental Protection (DEP), adopted Chapter 102, Erosion Control Rules and Regulations. Chapter 102 requires that anyone undertaking an earth disturbance activity develop and implement a written Erosion and Sedimentation (E&S) Control Plan for any earth disturbances 5,000 sq. ft. or greater as well as any earth disturbance when in a special protection watershed. The plan must be submitted to the County Conservation District for review if required by the local municipality, or if requested by the District. The E&S plan must be available at all times at the site of the earth disturbance activity, regardless of the size of the project. Failure to have an E&S plan on site is a violation of Chapter 102. It is important to remember that both landowners and contractors may be held responsible for any violation of the Chapter 102 Regulations.

Small Projects Less than 0.50 acres (21,780 sf) shall be reviewed and approved within 10 business days, if the application is complete and correct. If the District does not respond within 10 business days from the date the application was submitted (applications submitted after noon are considered submitted the following business day), the project will be considered approved, with no further action by the District.

Use of This Guide

This guide may be used in the development of E&S plans for small projects where:

- Disturbance is less than 0.50 acres or 21,780 SF
- Impervious Area is less than 2,000 SF
- Accessory Residential Use (Pools, Patios, sheds, Pole Barns, etc.)
- There are no steep slopes in excess of 15%.
- There are no surface waters where earth disturbance is proposed.

Contact your local Conservation District to determine if your project meets these requirements or if there are any questions regarding the suitability of this guide for your project. For more complex projects, a detailed *Erosion and Sediment Pollution Control Manual* is available on DEP's website or contact a consultant to aid in plan development. In addition, check with your local municipality regarding specific ordinances or permit requirements.





Considerations in Plan Development

PROTECT EXISTING VEGETATION – Vegetation cover is the best and most economical protection against soil erosion. Protect existing vegetation during the construction process. Trees and shrubs should be marked and roped off to protect them from damage by construction equipment. Filling and soil compaction around trees should be avoided.

SAVE TOPSOIL FOR REVEGETATING – All of the topsoil from areas where cuts and fills have been made should be stockpiled and re-distributed uniformly after grading. This is key to re-vegetating a site.

MINIMIZE THE AREA AND TIME OF EXPOSURE – Disturb as little of the area as is required to construct the project. The construction sequence should be planned to keep the size and time of exposure to a minimum. In other words, stabilize disturbed areas as they are completed.

AVOID STEEP SLOPES – Steep sites generally will require more E&S controls than gently sloping sites. Avoid excessive cutting and filling and road grades in excess of 10%.

PROTECT DITCHES, STREAMS, OR OTHER SURFACE WATERS – Maintain vegetated buffers (50 FT from top of bank) where possible. Install temporary controls, such as compost sock or straw bale barriers to keep sediment pollution out of streams and other water sources.

PLAN TO MAINTAIN EROSION CONTROL MEASURES – Straw bale barriers deteriorate; and seeded areas wash out. Schedule regular maintenance to ensure properly functioning control measures. Continuous maintenance problems and failure of E&S facilities indicate a need to consider upgraded control measures or a professional design consultant for assistance.

AMENDED SOILS – If the residential development was constructed since 2010, it probably has amended soils throughout the lawn area. If amended soils must be removed to install the proposed improvements a Rain Garden will be required to offset the designed infiltration, the amended soils were installed to provide. Documentation should have been provided to the homeowner when they purchased the property if amended soils were included on the property and their location.





What is required in a “small projects less than 20,000 sf / 0.45 acre” Erosion & Sedimentation Control Plan -

- **The existing topography of the site – Roads, slope or grade of the land (flow arrows are acceptable), location of any water (streams, ponds, wetlands, springs, etc.) and any other significant features of the site (aerial/google maps photo are acceptable).**
- **A separate narrative description of the proposed improvements to the site and current land uses of the site.**
- **A sequence of Best Management Practices (BMP) installation and removal in consideration of the scheduled activities.**
- **Consistency with any required Post Construction Stormwater Management plans (if required).**
- **A Plan Drawing. (*template provided on last page*)**
- **If required, a maintenance program that will provide for the operation and maintenance of BMPs and the inspection of BMPs, including repair & replacement of BMPs. BMPs should be inspected on a weekly basis and after each rainfall event of greater than or equal to 0.25 inches precipitation. A written report must be kept to document each inspection and all BMP repair, replacement, and maintenance activities.**
- **Identification of any naturally occurring geologic formations or soil conditions that have the potential to cause pollution during earth disturbance activities (sinkholes, karst geology, etc.), and any BMPs proposed to avoid or minimize this potential pollution.**
- **Identify any existing or proposed riparian forest buffers (along streams or wetland areas).**

Keep a copy of this plan and application for your records and PROVIDE A COPY TO YOUR CONTRACTOR, if applicable. This plan must be on site at all times during earth disturbances.





SMALL PROJECT EROSION CONTROL PLAN

Property Owner: _____ Date: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Municipality: _____

Email: _____

Contact person (if other than property owner): _____

Location (include copy of topographic/google earth map): _____

If known, name of nearest receiving stream or body of water: _____

Will Amended Soils removal be required to install the proposed improvements: Yes: _____ No: _____

Type of project (pool, addition, patio, etc.): _____

Project acres (entire property): _____ Disturbed acres: _____

Present site conditions (lawn/grass, woods, meadow, farm field, etc.): _____

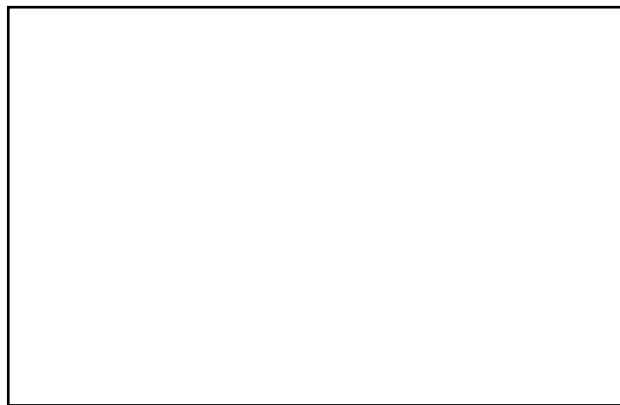
Estimated dates for start-up and completion: Start: _____ End: _____

Contractor: _____ Contact Person: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ Email: _____



Leave this Space Blank for Conservation District Stamp





NARRATIVE (Give detailed description of proposed work.)

SEQUENCE OF CONSTRUCTION (Label each step in numerical order – be specific.)

Sequence of Earth Disturbance Activity

1. Delineate area to be disturbed and protect (flag/rope/fence) any sensitive areas such as tree protection, wetlands, springs and stormwater management areas.
2. Install a tire cleaning, rock construction entrance. (see detail)
3. Install temporary control measures such as compost sock, straw bale barriers, etc. (see details)
4. Rough grade site to the minimum needed, stockpile topsoil and provide temporary stabilization.
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. Install and immediately stabilize any conveyances (swales, ditches, etc.) with appropriate lining (e.g., seed and mulch, matting or netting, sod, and stone filter)
12. Conduct project construction activities.
13. Finish grade and permanently stabilize (seed and mulch, sod, stone, etc.) the site. Maintain erosion controls for any stormwater management areas that may be constructed after site stabilization. (this protects the natural infiltration capacity of the soil)
14. Remove temporary erosion controls upon achieving 70% vegetated ground cover.



TEMPORARY SOIL EROSION CONTROLS

Detail any temporary erosion control practices that will be implemented. List each control practice separately, explain why it is needed, and when it can safely be removed. Drawings and designs for any practice not illustrated in this guide should be attached and referenced in this section. (**Select All that apply**) If selected BMP is listed below, the standard detail must be followed and the construction detail need not be included in the application. If "Other" is selected, than construction details and the necessary calculation need to be attached to the application.

- Rock Construction Entrance (RCE)
- Compost Filter Sock (CFS)
- Straw Bale Barrier
- Concrete Washout Facility
- Other _____ (Construction Details and necessary calculations must be provided)

PERMANENT STORMWATER AND SOIL EROSION CONTROLS

Prior to completion of the project, state law requires that steps be taken to provide permanent stabilization. Re-establishment of vegetation, pavement, etc. are examples of permanent controls. Descriptions for re-vegetating should include the seeding mixture to be used, top soil applications, and lime and fertilizer instructions. (Select All that apply) If "Other" is selected, than construction details and the necessary calculation need to be attached to the application.

- Rain Garden (Use standard detail and provide information below)
- Fertilizer, Seed and Straw Mulch (No Construction Detail Required)
- Other _____ (Provide Construction Detail, necessary calculations and long-term operation and maintenance instructions)

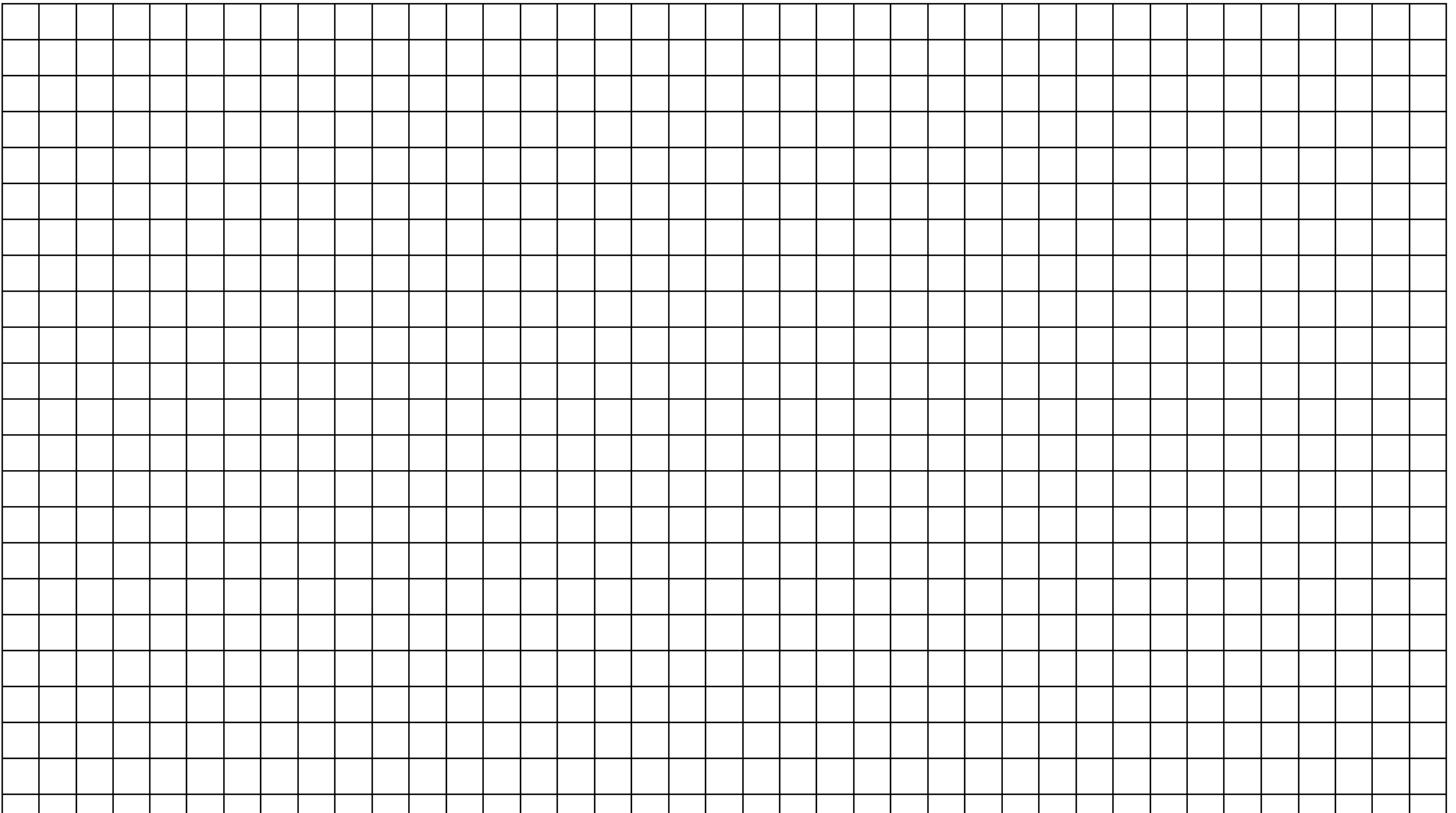
Rain Garden Data

Bottom Area _____ SF
 Length _____ FT
 Width _____ FT
 Depth _____ FT


Proposed Plants

*****IMPORTANT – ONLY INCLUDE THOSE BMPs THAT ARE BEING USED ON YOUR PROJECT*****





ROAD 

STREAM 

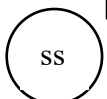
PROPERTY BOUNDARY 

SLOPE 

ROCK CONSTRUCTION
ENTRANCE



SEPTIC SYSTEM -



CULVERT 

STRAW BALE BARRIER 

FILTER FABRIC FENCE 

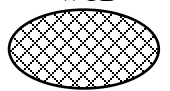
ROCK FILTER BERM 

LIMIT OF DISTURBANCE 

COMPOST SOCK 

WOODCHIP BERM 

SOIL STOCKPILE



CONCRETE WASHOUT



DIVERSION 

NORTH ARROW 

WELL 

INFILTRATION AREA 

APPROXIMATE SCALE; 1" = _____

STANDARD E&S PLAN NOTES

The following notes are part of the application package and should be followed.

1. All earth disturbances, including clearing and grubbing as well as cuts and fills shall be done in accordance with the approved E&S plan. A copy of the approved drawings (stamped, signed and dated by the reviewing agency) must be available at the project site at all times. The reviewing agency shall be notified of any changes to the approved plan prior to implementation of those changes. The reviewing agency may require a written submittal of those changes for review and approval at its discretion.
2. At least 7 days prior to starting any earth disturbance activities, including clearing and grubbing, the owner and/or operator shall invite all contractors, the landowner, appropriate municipal officials, the E&S plan preparer, the PCSM plan preparer, the licensed professional responsible for oversight of critical stages of implementation of the PCSM plan, and a representative from the local conservation district to an on-site preconstruction meeting.
3. At least 3 days prior to starting any earth disturbance activities, or expanding into an area previously unmarked, the Pennsylvania One Call System Inc. shall be notified at 1-800-242-1776 for the location of existing underground utilities.
4. All earth disturbance activities shall proceed in accordance with the sequence provided on the plan drawings. Deviation from that sequence must be approved in writing from the local conservation district or by the Department prior to implementation.
5. Areas to be filled are to be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots and other objectionable material.
6. Clearing, grubbing, and topsoil stripping shall be limited to those areas described in each stage of the construction sequence. General site clearing, grubbing and topsoil stripping may not commence in any stage or phase of the project until the E&S BMPs specified by the BMP sequence for that stage or phase have been installed and are functioning as described in this E&S plan.
7. At no time shall construction vehicles be allowed to enter areas outside the limit of disturbance boundaries shown on the plan maps. These areas must be clearly marked and fenced off before clearing and grubbing operations begin.
8. Topsoil required for the establishment of vegetation shall be stockpiled at the location(s) shown on the plan maps(s) in the amount necessary to complete the finish grading of all exposed areas that are to be stabilized by vegetation. Each stockpile shall be protected in the manner shown on the plan drawings. Stockpile heights shall not exceed 35 feet. Stockpile slopes shall be 2H:1V or flatter.
9. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the operator shall implement appropriate best management practices to minimize the potential for erosion and sediment pollution and notify the local conservation district and/or the regional office of the Department.
10. All building materials and wastes shall be removed from the site and recycled or disposed of in accordance with the Department's Solid Waste Management Regulations at 25 Pa. Code 260.1 et seq., 271.1, and 287.1 et. seq. No building materials or wastes or unused building materials shall be burned, buried, dumped, or discharged at the site.
11. All off-site waste and borrow areas must have an E&S plan approved by the local conservation district or the Department fully implemented prior to being activated.
12. The contractor is responsible for ensuring that any material brought on site is clean fill. Form FP-001 must be retained by the property owner for any fill material affected by a spill or release of a regulated substance but qualifying as clean fill due to analytical testing.
13. All pumping of water from any work area shall be done according to the procedure described in this plan, over undisturbed vegetated areas.
14. Vehicles and equipment may neither enter directly nor exit directly from lots _____ onto _____.
(specify lot numbers) (specify road names)
15. Until the site is stabilized, all erosion and sediment BMPs shall be maintained properly. Maintenance shall include inspections of all erosion and sediment BMPs after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, re-

mulching and re-netting must be performed immediately. If the E&S BMPs fail to perform as expected, replacement BMPs, or modifications of those installed will be required.

16. A log showing dates that E&S BMPs were inspected as well as any deficiencies found and the date they were corrected shall be maintained on the site and be made available to regulatory agency officials at the time of inspection.

17. Sediment tracked onto any public roadway or sidewalk shall be returned to the construction site by the end of each work day and disposed in the manner described in this plan. In no case shall the sediment be washed, shoveled, or swept into any roadside ditch, storm sewer, or surface water.

18. All sediment removed from BMPs shall be disposed of in the manner described on the plan drawings.

19. Areas which are to be topsoiled shall be scarified to a minimum depth of 3 to 5 inches — 6 to 12 inches on compacted soils — prior to placement of topsoil. Areas to be vegetated shall have a minimum 4 inches of topsoil in place prior to seeding and mulching. Fill out-slopes shall have a minimum of 2 inches of topsoil.

20. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence or other related problems. Fill intended to support buildings, structures and conduits, etc. shall be compacted in accordance with local requirements or codes.

21. All earthen fills shall be placed in compacted layers not to exceed 9 inches in thickness.

22. Fill materials shall be free of frozen particles, brush, roots, sod, or other foreign or objectionable materials that would interfere with or prevent construction of satisfactory fills.

23. Frozen materials or soft, mucky, or highly compressible materials shall not be incorporated into fills.

24. Fill shall not be placed on saturated or frozen surfaces.

25. Seeps or springs encountered during construction shall be handled in accordance with the standard and specification for subsurface drain or other approved method.

26. All graded areas shall be permanently stabilized immediately upon reaching finished grade. Cut slopes in competent bedrock and rock fills need not be vegetated. Seeded areas within 50 feet of a surface water, or as otherwise shown on the plan drawings, shall be blanketed according to the standards of this plan.

27. Immediately after earth disturbance activities cease in any area or subarea of the project, the operator shall stabilize all disturbed areas. During non-germinating months, mulch or protective blanketing shall be applied as described in the plan. Areas not at finished grade, which will be reactivated within 1 year, may be stabilized in accordance with the temporary stabilization specifications. Those areas which will not be reactivated within 1 year shall be stabilized in accordance with the permanent stabilization specifications.

28. Permanent stabilization is defined as a minimum uniform, perennial 70% vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated erosion. Cut and fill slopes shall be capable of resisting failure due to slumping, sliding, or other movements.

29. E&S BMPs shall remain functional as such until all areas tributary to them are permanently stabilized or until they are replaced by another BMP approved by the local conservation district or the Department.

30. Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the owner and/or operator shall contact the local conservation district for an inspection prior to removal/conversion of the E&S BMPs.

31. After final site stabilization has been achieved, temporary erosion and sediment BMPs must be removed or converted to permanent post construction stormwater management BMPs. Areas disturbed during removal or conversion of the BMPs shall be stabilized immediately. In order to ensure rapid revegetation of disturbed areas, such removal/conversions are to be done only during the germinating season.

32. Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the owner and/or operator shall contact the local conservation district to schedule a final inspection.

33. Failure to correctly install E&S BMPs, failure to prevent sediment-laden runoff from leaving the construction site, or failure to take immediate corrective action to resolve failure of E&S BMPs may result in administrative, civil, and/or criminal penalties being instituted by the Department as defined in Section 602 of the Pennsylvania Clean Streams Law. The Clean Streams Law provides for up to \$10,000 per day in civil penalties, up to \$10,000 in summary criminal penalties, and up to \$25,000 in misdemeanor criminal penalties for each violation.

OPTIONAL NOTES

The following notes are included as part of the application.

1. Concrete wash water shall be handled in the manner described on the plan drawings. In no case shall it be allowed to enter any surface waters or groundwater systems.
2. Erosion control blanketing shall be installed on all slopes 3H:1V or steeper within 50 feet of a surface water and on all other disturbed areas specified on the plan maps and/or detail sheets.
3. Fill material for embankments shall be free of roots, or other woody vegetation, organic material, large stones, and other objectionable materials. The embankment shall be compacted in maximum 9 inch layered lifts at 95% density.



Best Management Practice (BMPs) Guide

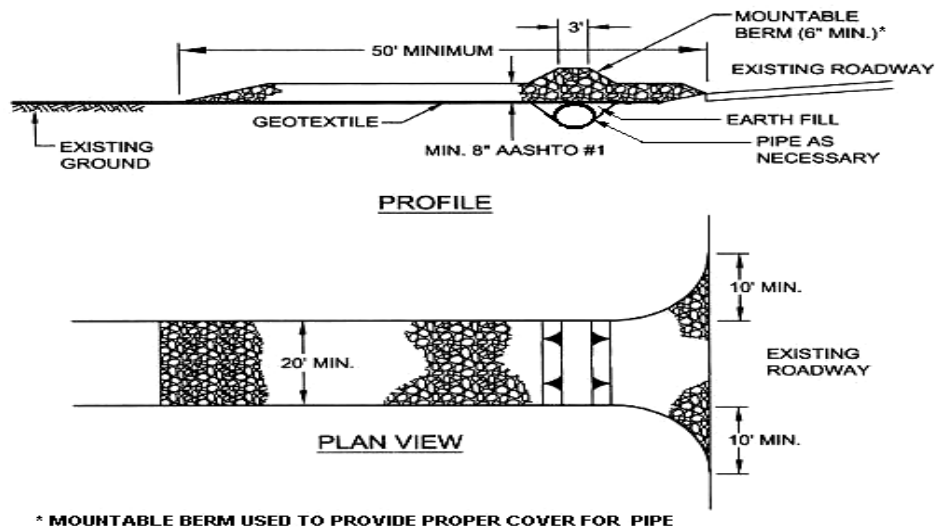
The Best Management Practices (BMPs) provided in this guide are those that are the most common for small projects in low hazard settings. Other BMPs may be utilized from the Erosion and Sediment Pollution Control Program Manual at the web address below. <http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-88925/363-2134-008.pdf>

ROCK CONSTRUCTION ENTRANCE

A rock construction entrance should be installed wherever it is anticipated that construction traffic will exit the project site onto any roadway, public or private. Access to the site should be limited to the stabilized construction entrance(s).

Rock construction entrances are not effective sediment removal devices for runoff coming off the roadway above the entrance. Surface runoff should be directed off the roadway by means of appropriate drainage devices described later in this chapter. Where these devices do not discharge to a suitable vegetative filter strip, an appropriately sized sediment trap should be provided. For locations not having sufficient room for a conventional sediment trap, consideration should be given to use of a compost sock sediment trap. Compost sock traps may also be used instead of conventional sediment traps at other points of discharge. Where used, care should be taken to provide continuous contact between the sock and the underlying soil in order to prevent undermining. It is also important to properly anchor the sock (Standard Construction Detail #4-1).

STANDARD CONSTRUCTION DETAIL # 3-1 Rock Construction Entrance



Remove topsoil prior to installation of rock construction entrance. Extend rock over full width of entrance.

Runoff shall be diverted from roadway to a suitable sediment removal BMP prior to entering rock construction entrance.

Mountable berm shall be installed wherever optional culvert pipe is used and proper pipe cover as specified by manufacturer is not otherwise provided. Pipe shall be sized appropriately for size of ditch being crossed.

MAINTENANCE: Rock construction entrance thickness shall be constantly maintained to the specified dimensions by adding rock. A stockpile shall be maintained on site for this purpose. All sediment deposited on paved roadways shall be removed and returned to the construction site immediately. If excessive amounts of sediment are being deposited on roadway, extend length of rock construction entrance by 50 foot increments until condition is alleviated or install wash rack. Washing the roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable.





CONCRETE WASHOUT

For any project on which concrete will be poured or otherwise formed on site, a suitable washout facility must be provided for the cleaning of chutes, mixers, and hoppers of the delivery vehicles unless such a facility will be used at the source of the concrete. Under no circumstances may wash water from these vehicles be allowed to enter any surface waters. Make sure that proper signage is provided to drivers so that they are aware of the presence of washout facilities. Washout facilities should not be placed within 50 feet of storm drains, open ditches or surface waters.

Compost Sock Washout

Wherever compost sock washouts are used, a suitable impervious geomembrane should be placed at the location of the washout. Compost socks should be staked in the manner recommended by the manufacturer around perimeter of the geomembrane so as to form a ring with the ends of the sock located at the upslope corner (Figure 3.18). Care should be taken to ensure continuous contact of the sock with the geomembrane at all locations. Where necessary, socks may be stacked and staked so as to form a triangular cross-section.

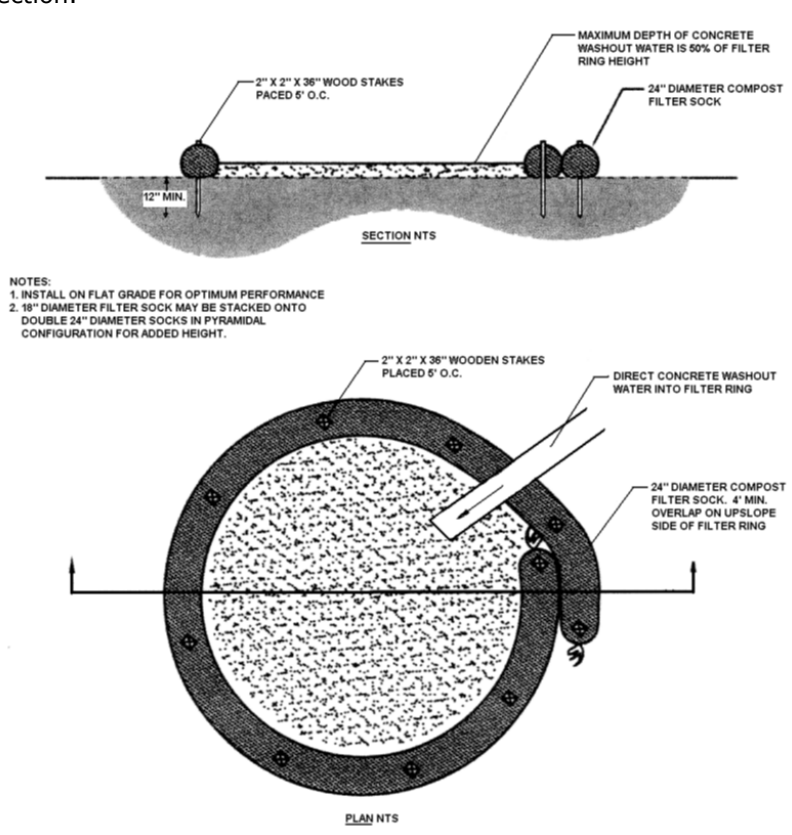


FIGURE 3.18 - Typical Compost Sock Washout Installation

A suitable impervious geomembrane shall be placed at the location of the washout prior to installing the socks. Plastic liners should be replaced with each cleaning of washout facility. Accumulated materials should be removed when they reach 75% capacity. Washout facilities should not be placed within 50 feet of storm drains, open ditches or surface waters. Washout facilities should be located on slopes not exceeding 2% grade (1/4" / foot). All concrete washout facilities should be inspected daily. Damaged or leaking washouts should be deactivated and repaired or replaced immediately.





COMPOST FILTER SOCK

Compost filter socks are a type of contained compost filter berm. They consist of a biodegradable or photodegradable mesh tube filled, typically using a pneumatic blower, with a coarse compost filter media that meets certain performance criteria (e.g. hydraulic flow through rate, total solids removal efficiency, total suspended solids removal efficiency, turbidity reduction, nutrient removal efficiency, metals removal efficiency, and motor oil removal efficiency).

Compost filter socks are flexible and can be filled in place or in some cases filled and moved into position. They are especially useful on steep slopes. Heavy vegetation should be removed prior to installing the sock. Compost socks can also be used on rocky slopes if sufficient preparation is made to ensure good contact of the sock with the underlying soil along its entire length. They may also be used on pavement as a perimeter control. Socks used in this manner range in diameter from 8" to 32". **Note: The flat dimension of the sock should be at least 1.5 times the nominal diameter. Also, some settlement of the tube typically occurs after installation.** The nominal diameter of the tube is the dimension to be used for design purposes (i.e. Figure 4.2). Socks with diameters less than 12" should only be used for residential housing lots of ¼ acre or less that are tributary to a sediment basin or sediment trap.

As with other sediment barriers, filter socks should be placed parallel to contour with both ends of the sock extended upslope at a 45 degree angle to the rest of the sock to prevent end-arounds (Figure 4.1). Socks placed on earthen slopes should be anchored with stakes driven through the center of the sock (Standard Construction Detail #4-1) or immediately downslope of the sock at intervals recommended by the manufacturer. Where socks are placed on paved surfaces, concrete blocks should be used immediately downslope of the socks (at the same intervals recommended for the stakes) to help hold the sock in place.

The anticipated functional life of a biodegradable filter sock should be 6 months; for photodegradable socks it is 1 year. Some other types may last longer.

Upon stabilization of the tributary area, the filter sock may be left in place and vegetated or removed. In the latter case, the mesh is typically cut open and the mulch spread as a soil supplement. In either case, the stakes should be removed.

STANDARD CONSTRUCTION DETAIL #4-1 COMPOST FILTER SOCK – (8 inch sock)



Compost filter sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 8 feet up slope at 45 degrees to the main sock alignment (Figure 4.1). Maximum slope length above any sock shall not exceed that shown on Figure 4.2. Stakes may be installed immediately downslope of the sock if so, specified by the manufacturer. Biodegradable filter socks shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be replaced according to manufacturer's recommendations.

Traffic shall not be permitted to cross filter socks.

Accumulated sediment shall be removed when it reaches half the aboveground height of the sock and disposed in the manner described elsewhere in the plan.

Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.





Biodegradable filter socks shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be replaced according to manufacturer’s recommendations.

Upon stabilization of the area tributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement.

**TABLE 4.2
Compost Standards**

Compost Standards Organic Matter Content	80% - 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5 - 8.0
Moisture Content	35% - 55%
Particle Size	98% pass through 1” screen
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) Maximum

**TABLE 4.1
Compost Sock Fabric Minimum Specifications**

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio-degradable	Photo-degradable	Photo-degradable
Sock Diameters	12” 18”	12” 18” 24” 32”	12” 18” 24” 32”	12” 18” 24” 32”	12” 18” 24” 32”
Mesh Opening	3/8”	3/8”	3/8”	3/8”	1/8”
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply systems					
Inner Containment Netting			HDPE biaxial net		
			Continuously wound		
			Fusion-welded junctures		
			3/4" X 3/4" Max. aperture size		
Outer Filtration Mesh			Composite Polypropylene Fabric (Woven layer and non-woven fleece mechanically fused via needle punch)		
			3/16" Max. aperture size		
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

Filtrex & JMD





STRAW BALE BARRIER

Straw bale barriers may be used to control runoff from small disturbed areas provided that runoff is in the form of sheet flow. Since straw bales tend to deteriorate within a 3-month period, they should be considered as short-term control measures. Straw bale barriers should not be used in areas of concentrated flows (e.g. channels, swales, erosion gullies, across pipe outfalls, as inlet protection, etc.) or in areas where they cannot be properly staked (e.g. paved areas).

Straw bale barriers should not be used in areas where rock prevents full and uniform anchoring of the bales.

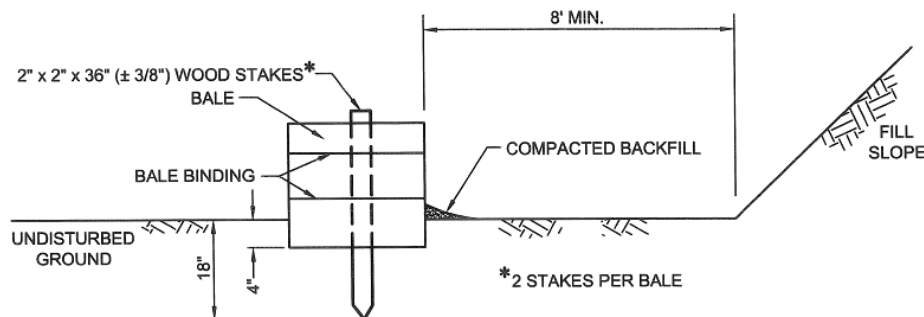
Straw bale barriers should be installed according to Standard Construction Detail # 4-13.

Bales should be installed in an anchoring trench. When improperly placed and installed (such as staking the bales directly to the ground with no soil seal or entrenchment), undercutting and other failures typically occur.

Two support stakes should be driven through each bale to a depth 18" below the ground surface.

The excavated soil should be backfilled and compacted on the upslope side of the bales.

STANDARD CONSTRUCTION DETAIL # 4-13 Straw Bale Barrier



Straw bale barriers shall not be used for projects extending more than 3 months.

Straw bale barriers shall be placed at existing level grade with ends tightly abutting the adjacent bales. First stake of each bale shall be angled toward adjacent bale to draw bales together. Stakes shall be driven flush with the top of the bale (see Figure 4.4). Both ends of the barrier shall be extended at least 8 feet up slope at 45 degrees to the main barrier alignment (see Figure 4.1).

Compacted backfill shall extend approximately 4 inches above ground level.

Sediment shall be removed when accumulations reach 1/3 the aboveground height of the barrier. Damaged or deteriorated bales shall be replaced immediately upon inspection.

Any section of straw bale barrier which has been undermined or topped shall be immediately replaced with a rock filter outlet (Standard Construction Detail # 4-6).

Bales shall be removed when the tributary area has been permanently stabilized.



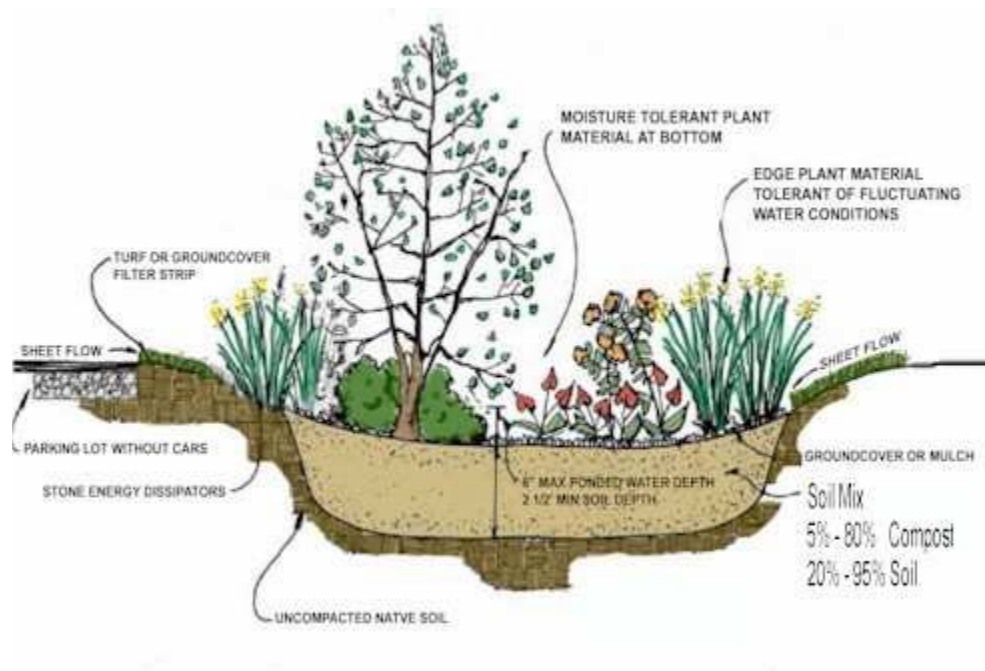


RAIN GARDEN

A Rain Garden (also called Bioretention) is an excavated shallow surface depression planted with specially selected native vegetation to treat and capture runoff. Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quantity reduction.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

Rain Gardens are often very useful in retrofit projects and can be integrated into already developed lots and sites. An important concern for all Rain Garden applications is their long-term protection and maintenance, especially if undertaken in multiple residential lots where individual homeowners provide maintenance. In such situations, it is important to provide some sort of management that insures their long-term functioning (deed restrictions, covenants, and so forth).



Design Considerations

Sizing criteria

- a. Surface area** is dependent upon storage volume requirements but should generally not exceed a maximum loading ratio of 5:1 (impervious drainage area to infiltration area).
- b. Surface Side slopes** should be gradual. For most areas, 5:1 maximum side slopes are recommended, however where space is limited, 3:1 side slopes may be acceptable.
- c. Surface Ponding depth** should not exceed 6 inches in most cases and should empty within 72 hours.
- d. Ponding area** should provide sufficient surface area to meet required storage volume without exceeding the design ponding depth. The subsurface storage/infiltration bed is used to supplement surface storage where feasible.
- e. Planting soil depth** should generally be at least 18" where only herbaceous plant species will be utilized. If trees and woody shrubs will be used, soil media depth may be increased, depending on plant species.



Planting Soil should be a loam soil capable of supporting a healthy vegetative cover. Soils should be amended with a composted organic material. A typical organic amended soil is combined with 20-30% organic material (compost), and 70-80% soil base (preferably topsoil). Planting soil should be approximately 4 inches deeper than the bottom of the largest root ball.

Volume Storage Soils should also have a pH of between 5.5 and 6.5 (better pollutant adsorption and microbial activity), a clay content less than 10% (a small amount of clay is beneficial to adsorb pollutants and retain water), be free of toxic substances and unwanted plant material and have a 5 –10% organic matter content. Additional organic matter can be added to the soil to increase water holding capacity (tests should be conducted to determine volume storage capacity of amended soils).

Proper **plant selection** is essential for bioretention areas to be effective. Typically, native floodplain plant species are best suited to the variable environmental conditions encountered. If shrubs and trees are included in a bioretention area (which is recommended), at least three species of shrub and tree should be planted (shrub to tree ratio should be 2:1 to 3:1). An experienced landscape architect is recommended to design native planting layout.

Planting periods will vary, but in general trees and shrubs should be planted from mid-March through the end of June, or mid-September through mid-November 6. A maximum of 2 to 3 inches of shredded **mulch** or leaf compost (or other comparable product) should be uniformly applied immediately after shrubs and trees are planted to prevent erosion, enhance metal removals, and simulate leaf litter in a natural forest system. Wood chips should be avoided as they tend to float during inundation periods. Mulch / compost layer should not exceed 3" in depth so as not to restrict oxygen flow to roots.

Maintenance Issues

1. Properly designed and installed Bioretention areas require some regular maintenance. While vegetation is being established, pruning and weeding may be required.
2. Detritus may also need to be removed every year. Perennial plantings may be cut down at the end of the growing season.
3. Mulch should be re-spread when erosion is evident and be replenished as needed. Once every 2 to 3 years the entire area may require mulch replacement.
4. Bioretention areas should be inspected at least two times per year for sediment buildup, erosion, vegetative conditions, etc.
5. During periods of extended drought, Bioretention areas may require watering.

Construction Sequence

The following is a typical construction sequence; however, alterations might be necessary depending on design variations.

1. Install temporary sediment control BMPs as shown on the plans.
2. Complete site grading. If applicable, construct curb cuts or other inflow entrance but provide protection so that drainage is prohibited from entering construction area.
3. Stabilize grading within the limit of disturbance except within the Rain Garden area. Rain garden bed areas may be used as temporary sediment traps provided that the proposed finish elevation of the bed is 12 inches lower than the bottom elevation of the sediment trap.
4. Excavate Rain Garden to proposed invert depth and scarify the existing soil surfaces. Do not compact in-situ soils.
5. Backfill Rain Garden with amended soil as shown on plans and specifications. Overfilling is recommended to account for settlement. Light hand tamping is acceptable if necessary.
6. Presoak the planting soil prior to planting vegetation to aid in settlement.
7. Complete final grading to achieve proposed design elevations, leaving space for upper layer of compost, mulch or topsoil as specified on plans.
8. Plant vegetation according to planting plan.
9. Mulch and install erosion protection at surface flow entrances where necessary.





SEEDING AND MULCHING SPECIFICATIONS

Time of Seeding –Through proper seed selection and seeding methods, disturbed sites may be re-vegetated at almost any time from spring to fall. Check for recommended spring and fall seeding dates in your area.

Surface Preparation – Spread topsoil and prepare smooth seed bed by rolling and/or raking.

Lime and Fertilizer – Lime and fertilizer should be applied in accordance with soil test recommendations. If soil test results are not available, apply at least 6 tons of agricultural grade limestone and 1000 pounds of 10-20-20 fertilizer per acre.

Seeding Methods – Apply seed at required rates. Seed may be broadcast on the surface and a layer of straw mulch applied at the necessary rates. Seed to soil contact is required for successful germination.

Mulching – All earth disturbance areas, regardless of seeding method, should be mulched to reduce erosion and aid seed germination. Straw is the preferred mulch and should be applied to produce a layer ¾ to 1 inch deep. Generally, 3 tons of mulch per acre (approximately 3 bales per 100 sq. ft.) is sufficient.

TEMPORARY SEEDING MIXTURES

Species Mix	Pounds/Acre	Pounds/1000 sq. ft.
Spring Oats, or	96	2.2 (35 oz.)
Winter Wheat, or	180	4.1 (66 oz.)
Winter Rye, or	168	3.8 (62 oz.)
Annual Ryegrass	40	1/0 (16 oz.)

PERMANENT SEEDING MIXTURES

Species Mix	Pounds/Acre	Pounds/1000 sq. ft.
Slopes & Banks (non-mowed) Well Drained/Sunny		
Flatpea, plus	20	0.5 (8 oz.)
Tall Fescue, or	20	0.5 (8 oz.)
Perennial Ryegrass	20	0.5 (8 oz.)
Slopes & Banks (mowed) Variable Drainage/Shaded		
Birdsfoot Trefoil, plus	6	0.15 (3 oz.)
Tall Fescue, plus	30	0.7 (11 oz.)
Redtop	3	0.1 (2 oz.)
Tall Fescue, plus	60	1.4 (22 oz.)
Redtop	3	0.1 (2 oz.)
Slopes & Banks (mowed) Well Drained/Shaded		
Tall Fescue	60	1.4 (22 oz.)
Red (fine) Fescue, or	35	0.8 (13 oz.)
Kentucky Bluegrass, plus	25	0.6 (10 oz.)
Redtop, or	3	0.1 (2 oz.)
Perennial Ryegrass	15	0.3 (5 oz.)
Tall Fescue, plus	40	1.0 (16 oz.)
Red (fine) Fescue	10	0.2 (3 oz.)





This guide was developed in effort to assist landowners in the development of property for residential type uses. This guide contains common BMPs for low hazard site development situations. A basic understanding of the principles of Erosion and Sediment Control (and environmental protection) will prove beneficial to anyone utilizing this guide for the purpose of submitting an E&S plan for review. The introduction section of the Erosion and Sediment Pollution Control Program Manual (web address above) is recommended reading for those not familiar with the program and its principles. Further information pertaining to the Clean Stream Laws and Environmental Protection can be found at the following web address

<http://www.pacode.com/secure/data/025/chapter102/chap102toc.html>

This guide references other sources of information that may need to be utilized in performing due diligence for your project and providing complete and accurate information for adequacy reviews. The Berks County Conservation District Website (below) provides information specific to projects less than one acre of disturbance that will need to be utilized to submit a complete submission.

<http://berkscd.com/erosion-and-sediment-control-2/es-program-npdes/>

For more information about Erosion and Sediment Control contact:

**Berks County Conservation District
1238 County Welfare Road
Leesport, PA 19533
Telephone: 610-372-4657
FAX: 610-478-7058
<http://berkscd.com/>**

