

Guidelines for Developing & Implementing an Effective E&S Control Plan¹

When developing an E&S plan keep in mind the goal is to develop an effective and *practical* plan that you and/or your contractor can readily implement in the field and easily maintain during construction. The foremost goal of your E&S plan should be to minimize accelerated erosion and deposition of sediment into waterways, roadways and onto neighboring properties down slope of your earth disturbance activity. Here are several common-sense guidelines to consider in developing and implementing an environment-friendly and contractor-friendly E&S plan:

1) Protect streams, drainage ditches, wetlands, and other bodies of water. Make it a priority to avoid grading or other earthmoving within at *least* 50 feet of a waterway. Preserve natural vegetated buffers. Riparian (streamside) buffers serve as sediment filter strips, provide important wildlife habitat, stabilize streambanks, and provide shade that cools stream temperatures for trout and other cold water aquatic life. Clearly mark or flag off these critical areas to keep construction equipment out. Diligently maintain all BMPs in these environmentally sensitive areas. Secure required permits for any work proposed within a wetland or within at least 50 feet of a stream. When in doubt contact the Conservation District or the DEP South Central Regional Watershed Mgmt. office (phone # 717-705-4802) to request a site meeting.

2) Avoid disturbing steep slopes. Steep slopes are difficult to stabilize and present a danger to equipment operators. Avoid excessive cutting which can alter the groundwater system and expose spring seeps and unstable soils. Improperly compacted fill can be highly erosive and unstable. Practice proper site grading. Avoid road grades more than 10%. Excavated driveways often collect dirty runoff from the construction site causing sediment to be deposited onto roadways, neighboring driveways, and streams. Construct properly spaced waterbars or broad-based dips on long sloping driveways to direct water off the roadway which slows the speed of runoff by reducing the length of slope. Provide a cross slope or crown (1/2" to 3/4" per foot) the center of the driveway.

3) Minimize the extent and time of disturbance. The more land area that is disturbed and the longer it remains exposed, the greater the potential for erosion and sediment problems. Allow undisturbed areas where work is not occurring to remain undisturbed for as long as possible especially over the winter months. Seed and mulch or otherwise stabilize areas on an on-going basis. Always seed and mulch immediately upon completion of final grade. Apply a stone base to the entire length of your driveway the same day it is excavated.

4) Keep clean water clean. When possible and prior to disturbing any earth install a *stabilized* temporary diversion channel on the uphill side of the project to divert additional offsite stormwater runoff around or away from the areas to be disturbed. This will reduce the amount of stormwater runoff flowing over disturbed ground, result in less mud in the work area, and decrease the need (and cost) for more extensive BMPs on the downslope side of the project. When constructing a temporary diversion berm or channel or otherwise redirecting runoff, be mindful of where it will discharge to. The outlet needs to be non-erosive and if flowing onto a neighboring property a stormwater easement will need to be obtained from the property owner. To keep roof runoff clean and avoid creating gullies in your newly seeded lawn, temporarily attach rain leaders (flexible pipe) to the roof downspouts and extend the pipe to a stable area such as well-established lawn or a storm drain until the grass becomes well established.

5) Provide for a clean stabilized access to the site. Avoid tracking mud onto state and township roadways which frequently results in complaints to the Conservation District. Use AASHTO #1 (PA #4 stone) with underlying geotextile fabric to keep muddy ground from mixing with clean stone. Clean up mud tracked onto roadways as soon as you become aware of it. Avoid using water which can freeze or otherwise create slippery conditions on roadways. *Make sure that all driveway and highway occupancy permits (HOP) have been acquired from Penn DOT and/or the local municipality before beginning your work.*

6) Locate BMPs along the downslope perimeter of all areas to be disturbed. *All runoff flowing over or through disturbed and/or exposed areas must pass through a BMP (ex. silt fence, sediment trap) prior to discharging offsite or into a stream, wetland, storm drain or other waterway. This is required by Section 102.4(b)(1).* Silt fence and other BMPs located along the down slope perimeter of your lot *and away from your immediate work area* will ensure that you capture all of the sediment-laden runoff. This will also result in less maintenance and repair due to equipment and vehicles running over silt fence and construction debris and clumps of soil pushing the silt fence down. It will also give you and/or your contractor the room to complete the job without silt fence getting in the way.

7) Properly install the proposed E&S BMP's shown on your plan prior to disturbing any earth. If clearing and grubbing of trees and brush is necessary to install BMPs such as silt fence, clear only as much as is needed before clearing the remainder of the wooded or brushy areas. Make sure the BMPs (ex. silt fence) are properly installed according to the manufacturer's instructions. *Improperly installed BMPs, such as silt fence running up and down a slope can create erosion and sediment problems rather than solve them.* If your project is located near a stream, make sure your well-driller is aware of the Chapter 102 regulations and is using BMPs to keep flow from the drilling operation from entering any ditches, streams, or wetlands.

8) Save existing native trees, shrubs, and other vegetation. A good stand of existing vegetation is the most effective and economical means of preventing soil erosion problems. A good sod can be up to 98% effective in controlling erosion. Saving trees can be highly desirable to reduce erosion, avoid costs of planting new trees, enjoy instant shade, provide wind protection for your home, supply valuable wildlife food and nesting cover, and preserve a bit of the predevelopment natural setting. Native tree and shrub species with desirable landscape characteristics (for example, oaks, black gum, red maple, flowering dogwood, serviceberry, mountain laurel, etc.), having wildlife value, and trees with healthy well-developed crowns should be selected for protection. Mature trees have been shown to increase property values by as much as 12% (PSU). In wooded areas the ground does not freeze solid over the winter which allows beneficial rainfall and melting snow to soak into the ground and recharge wells rather than create runoff problems. Desired trees and shrubs should be marked and roped off limits to all construction activity along the tree's entire drip line (area from the trunk to the end of the outermost branches in the tree's crown). Soil compaction from construction equipment, root and bark damage, filling around the base of the tree, and dumping of construction wastes often will result in decreased vigor and the death of selected trees. For more information on preserving trees see "A Guide to Preserving Trees in Development Projects" available from PSU Cooperative Extension.

9) Save the topsoil. *This is required by Chapter 102 Section 102.22* The topsoil should be stripped from only those areas to be immediately cut, filled, or otherwise graded. Temporarily stockpile the topsoil for revegetating disturbed areas upon completion of your project. Seed and mulch the topsoil stockpile to keep it from washing away. When the site is at final grade the stockpiled topsoil should be uniformly redistributed over all disturbed areas to a minimum depth of 6". This is key to achieving a quick grass cover on unfertile, disturbed areas and will reduce stormwater runoff and require less fertilizers and other chemicals to achieve a healthy, well-established lawn.

10) Schedule your earth disturbance activities during the growing season. Attempt to time your project during the growing season. Permanent grass seedlings will become better established and in a shorter period of time during the spring and early fall when temperatures and rainfall are optimal for growth of cool-season grasses. Projects completed during late fall or winter will require additional maintenance of BMPs until the disturbed areas can be permanently stabilized the following spring.

11) Inspect & maintain BMPs. *This is required by Section 102.4(b)(5)(X).* Silt fence fills with sediment and gets knocked down by equipment. Rivulets turn into gullies. Grass seed and straw wash away. Once BMPs are installed they must be inspected at least weekly and after every runoff event and cleaned out or repaired immediately. Immediately backfill utility trenches and repair any affected silt fence, channels, or other BMPs. Install an erosion control blanket wherever runoff concentrates to form rills and/or gullies.

12) Permanently stabilize or temporarily stabilize all disturbed areas. Established vegetation is the most practical and effective erosion control practice. Upon final grading, *immediately* spread topsoil, seed, straw-mulch, lime, and fertilize all disturbed areas. Conduct a soil test to determine lime and fertilizer needs (available from the Conservation District). Select seed mixtures adapted to your site's conditions. Areas that have been disturbed typically are acidic and infertile thereby requiring more soil amendments (lime and fertilizer). Hay or straw mulch is the preferred method of mulching because it shields soil particles on the ground from the impact of falling raindrops (the first step in the erosion process), prevents the soil surface layer from sealing, keeps valuable moisture from evaporating, insulates the ground, and shelters young grass seedlings from wind and the scorching summer sun. Straw-mulch should be applied at 2 tons per acre (about 100 bales of loosely spread straw completely covering exposed soil). Tack the straw down to keep it from blowing away. When work has temporarily stopped (for example, over the winter months), seed with a temporary seed mix, such as annual rye grass or winter rye, and straw mulch the area. Disturbed areas may also be wood-mulched, stoned, or paved. All proposed grass-lined channels and areas of concentrated runoff (rills or gullies) should be lined with wood excelsior blanket, straw net, or adequately sized rock. Slopes or embankments with a slope steeper than 3:1 (i.e., more than one foot of vertical rise for every 3 feet of horizontal ground distance) should have an erosion control blanket installed. *Permanent stabilization is required by Chapter 102.22.*

13) Remove BMPs and properly recycle or dispose of construction waste.

Once *all* disturbed areas achieve a minimum uniform 70%, well-established, perennial vegetation, or have been stoned or paved, the BMPs should be removed and areas disturbed by their removal stabilized. All construction wastes, including silt fence, should be recycled or properly disposed of in accordance with DEP Solid Waste Management regulations. No construction wastes should be burned, dumped, buried, or discharged on the site.