BEST MANAGEMENT PRACTICES FOR CONSTRUCTION

Land disturbance due to development can be a significant cause of erosion unless appropriate Best Management Practices are used. This erosion may not be damaging to the site itself, but can cause many problems to waters and wetlands off-site. The sediment from the erosion can affect water quality in rivers, streams, lakes and wetland by picking up soil particles and other pollutants, building up in these waters and adversely impacting indigenous aquatic species.

Erosion and sediment control practices are commonly referred to as "Best Management Practices" (BMP's). BMP's are often included in Water Quality Certifications and other state agency permits as conditions of approval. This document is a brief summary of the most commonly suggested BMP's and by no means covers all the possible measures that are available.

Best Management Practices (BMP's) are conservation and management practices which have been demonstrated to effectively control movement of pollutants from a land area, prevent degradation of soil and water resources, and are compatible with the planned land use.

Following are conditions typically found on 401 Water Quality Certifications. Each is followed by the purpose these measures serve and a brief explanation of how they are implemented.

"The applicant must implement best management practices during construction to minimize erosion and migration of sediments off site. These practices may include use of mulches, hay bales, silt fences, or other devices capable of preventing erosion and migration of sediments. All disturbed land surfaces must be stabilized upon project completion."

The purpose of hay/straw bales, silt fences or other physical barriers is to retain small amounts of sediments from small disturbed areas in order to prevent sediment from leaving the project site. It may also decrease the velocity of sheet flow from the area and low to moderate channel flows. Riprap is also used to prevent and control erosion from project sites.

Methods to implement the above condition:

Hay/Straw Bales

A hay/straw bale barrier is a temporary sediment barrier consisting of a row of entrenched and anchored hay or straw bales.

1. All bales, wire-bound or string-tied, should be placed in a single row, lengthwise along the contour of the area. The ends of the bales should be tightly against one another. The bindings should be oriented around the sides of the bales rather than over the tops and bottoms to prevent deterioration of the bindings.

2. The bales should placed in an excavated trench at least 4 inches deep and the excavated material should be backfilled against the barrier. This backfill should conform the contour of the area on the downhill side of the bale and be built up 4 inches on the uphill side.

3. Each bale should be securely anchored with at least two stakes or rebars driven through the bale. Any gaps between the bales should be chinked - filled by wedging - with straw to prevent water from escaping between the bales. Loose straw scattered over the area immediately uphill of the barrier will increase efficiency.

Hay/Straw Bales (continued)

4. Hay/straw bales should be removed upon project completion, provided the upslope area has been permanently stabilized.

Silt Fences

A silt fence is a temporary sediment barrier constructed of a synthetic filter fabric stretched across posts and a wire fence, for support.

1. The height of the fence should not exceed 36 inches.

2. Posts should be spaced a maximum of 10 feet apart and driven at least 12 inches into the ground; if extra strength filter fabric is used, the posts should be no more than 6 feet apart.

3. A trench should be excavated approximately 4 inches wide and 4 inches deep along the line of the posts, upslope from the fence.

4. A) If standard strength filter fabric is used, a wire support fence must be fastened to the upslope side of the posts. (This should be done with heavy duty wire staples, at least 1 inch long, tie wires or hog rings.) This wire fence should extend into the trench at least 2 inches. The filter fabric should be stapled to the fence and at least 8 inches of the fabric must extend into the trench. B) If extra strength filter fabric is used and the posts are more closely spaced, the wire fence can be eliminated. The filter fabric is stapled directly to the posts and 8 inches of the fabric is extended into the trench.

5. The trench should be backfilled and the soil compacted over the filter fabric.

6. This silt fence should be removed when the project is completed and the upslope area has been permanently stabilized.

Mulches

Mulching is the application of plant residues or other suitable materials to the soil surface. The purpose of the mulches are to prevent erosion by protecting the soil surface from raindrop impact and reducing the volume and velocity of overland flow. They also promote plant growth.

The choice of materials used for mulching should be based on the soil type, site conditions, season and economics. There are several basic types of mulches: organic, chemical and soil binders.

Organic Mulches:

1) small grain straw
2) pine straw
3) corn stalks
4) wood chips
5) bark chips, shredded bark
6) wood fiber
7) sericea lespedeza seed-laden hay

Chemical Mulches

A wide range of synthetic, spray-on materials are available. These may be used alone or with organic mulches. They are not as effective as the organic mulches, are more expensive and decompose quickly.

Soil Binders

Soil binders may also be used alone or with other types of mulches. When used

alone, they do not retain soil moisture or insulate the soil adequately. They will stabilize soil surfaces while grasses are being established. Continuous contact with the soil is absolutely necessary, otherwise erosion will occur.

"Riprap must consist of clean stone or masonry material free of all potential sources of pollution."

Riprap

Riprap is a permanent erosion-resistant ground cover of large, loose angular stone. The purpose of the riprap is 1) to protect the soil surface from erosive forces of runoff 2) to slow the velocity of concentrated runoff while enhancing the potential for infiltration and 3) to stabilize slopes with seepage problems and/or non-cohesive soils.

Graded Riprap - A mixture of stones of varying sizes. Cheaper to install (can be dumped into place) and forms a more flexible self-healing cover.

Uniform Riprap - Stones which are all fairly close in size. More difficult to install (usually requiring hand or mechanical labor) and forms a more rigid cover that cannot withstand movement of the stones.

Sequence of placement: Because riprap is used in areas where erosion is expected (or has already occurred), the stones should be placed as soon as possible once the area has been disturbed. When riprap is used for outlet protection, it should be placed before or in conjunction with the construction of the pipe or channel to that is in place when the pipe or channel begins to function.

"Upon project completion, all fill material or excavated material must be permanently stabilized with a vegetative cover. This may include sprigging, trees, shrubs, vines or ground cover."

The purpose of permanent stabilization of all fill material is to establish a permanent turf area and to prevent erosion of the newly placed fill material and/or excavated material.

Methods to implement the above condition:

Sprigging

Sprigging is the establishment of permanent grass with sprigs on fine-graded disturbed areas to establish permanent turf more quickly than with seed and to reduce erosion and sedimentation from disturbed areas.

Sprigging includes a mixture of sprigs and stolons, planted by hand or machine.

Sprigs are the small underground sections with at least one node or joint and leaves growing from it. These sections should be 3 to 5 inches.

Stolons are the above ground stems.

Examples of grasses used for sprigging: bermuda, zoysia, centipede and St. Augustine.

Planting of Sprigs

1. Sprigs may be broadcast by hand or planted in rows by hand or machine or applied with a

hydroseeder (hydrosprigging).

2. a) Broadcast or hydosprigged: should be partially covered with soil and half the sprig should be covered and half exposed. The soil should be firmed over the sprigs.
   b) planted in rows: usually 6 to 12 inches apart in 1 foot rows, closer spacing will provide quicker coverage. Soil should be firmed once the sprigs are in place.

3. A thin layer of straw mulch will reduce erosion on slopes while the grass is becoming established.

Trees, Shrubs, Vines and Ground Cover

The establishment of a vegetative cover of trees, shrubs, vines or ground cover is often used to aid in stabilizing soil in areas where vegetation other than grasses is preferred. These methods also provide shade, screening, aesthetics and food and shelter for wildlife.

Trees: The following characteristics should be considered when selecting trees:

1. Climate
2. Mature height and spread
3. Growth rate
4. Root system
5. Cleanliness
6. Moisture and fertility requirements
7. Ornamental effects
8. Evergreen vs. deciduous

Shrubs

Balled and burlapped plants or container-grown plants are commonly used when shrubs are desired.

Vines and Ground Covers

Vines and ground covers are useful in:

1. Providing cover on areas where grasses are hard to establish and maintain.
2. Providing attractive cover that does not need mowing.
3. Helping to define traffic areas and control pedestrian movement.

Additional information about trees, shrubs, vines and ground cover is available from commercial nurseries and county offices of the Clemson University Cooperative Extension Service.

This information was condensed from Erosion and Sediment Control Practices for Developing Areas published by the S. C. Land Resources Commission. To obtain copies of this publication or further information, contact the Erosion and Sediment Control Division, S. C. Land Resources Conservation Commission, 2221 Devine Street, Suite 222, Columbia, South Carolina 29205, telephone (803) 758-2823.

Additional information on Best Management Practices can be found in:

Storm Water Management for Construction Activities. Developing Pollution Prevention Plans and

Best Management Practices. U. S. Environmental Protection Agency, September 1992.

Storm Water Management Guidelines. South Carolina Coastal Council. revised September 1988.

Nonpoint Source Management Program for the State of South Carolina. S. C. Department of Health and Environmental Control. October 1989.