Erosion and Sedimentation Control in North Carolina

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When the land is disturbed at construction sites the soil erosion rate accelerates dramatically. The major problem associated with erosion at a construction site is the movement of soil from the site and the impact of the soil on water quality in streams and rivers and wildlife habitat. This fact sheet describes the North Carolina regulations and practices that address sediment control for construction activities.

Erosion begins when water or wind detaches soil and rock particles from the land’s surface. After detachment, soil particles are transported by air or water movement. Factors affecting erosion rates include climate, soil type, slope length, slope steepness, and vegetative cover. Anytime the land is disturbed the potential for soil erosion increases. Eroded soil particles carried by water often move into streams where sedimentation and suspended solids can lead to a number of problems. Stream impacts can be reduced by first preventing soil erosion and then by preventing the detached soil particles from leaving the site.

Sedimentation occurs when flowing water slows down enough to allow suspended soil particles to settle. Heavier sands and silts settle out sooner than do finer clay particles. Sedimentation destroys fish-spawning beds, reduces the useful storage volume of reservoirs, clogs streams, and
increases filtration costs for municipal water supplies. Suspended sediment, as measured by turbidity and total suspended solids (TSS), can reduce in-stream photosynthesis and alter a stream’s ecology.

A recent summary of water quality in North Carolina concludes that sediment is a leading cause of problems in many of the state’s streams and rivers. Major sources of sediment are construction, agriculture, and urban areas. Sedimentation from construction activities can be controlled by

- Reducing erosion
- Reducing sediment transport from the construction site to receiving waters
- Remedying sediment pollution when it occurs.

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**Sedimentation Pollution Control Act**

In 1973 North Carolina legislation established a statewide program to control soil erosion and sedimentation. The law covers all land-disturbing activities, regardless of the size of the disturbance, except those involving agriculture, forestry, and mining, which are addressed in other legislation. The law and the rules do not specify a rigid set of practices; rather, they require the land developer to prepare an erosion and sedimentation control plan and employ appropriate measures to meet the performance standards.

The law requires installation and maintenance of sufficient erosion control devices and practices to retain sediment within the boundaries of the site. Under the law, compliance is determined by assessing performance. It prohibits visible off-site sedimentation from construction sites but permits the owner and developer to determine the most economical, effective methods for controlling erosion and sedimentation. This flexibility in the law allows for innovation and variations to account for the uniqueness of each construction site.

The law requires that developers plan and implement effective temporary and permanent control measures to prevent accelerated erosion and off-site sedimentation. An erosion and sedimentation control plan must be submitted at least 30 days before land disturbance begins for any site larger than 1 acre. A preapproved plan is not required for sites of less than 1 acre; however, the same control regulations apply. The law also requires that surfaces be nonerosive and stable within 30 working days or 120 calendar days after completion of the activity, whichever period is shorter.

In addition to the state regulations, there may be local ordinances and regulations. It is wise to check with local governments about their erosion and sedimentation control programs before disturbing the land.

The primary requirements of an erosion and sedimentation control plan are as follows:
• A sufficient buffer zone must be retained or established along any natural watercourse or lake to contain all visible sediment from the site in the first 25 percent of the buffer strip nearest the disturbed area (Figure 1). Waters that have been classified as trout waters by the Environmental Management Commission must have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the 25 percent of the buffer zone nearest the land disturbing activity, whichever is greater.
• The angle of cut-and-fill slopes must be no greater than that sufficient for proper stabilization. Graded slopes must be planted with vegetation or otherwise stabilized within 30 working days.
• Off-site sedimentation must be prevented, and a ground cover sufficient to prevent erosion must be provided within 30 working days or 120 calendar days after activity is completed, whichever is shorter.

Figure 1. Stream buffer zone.

During construction, the person financially responsible for site development is responsible for maintaining the erosion and sedimentation control devices and practices. The landowner may also be held responsible. After construction is complete and the surface has been permanently stabilized, maintenance responsibility passes to the landowner or the person managing the land. Specific questions regarding the interpretation of this law should be addressed to your regional office of the Division of Land Resources of the North Carolina Department of Environment, Health, and Natural Resources (DEHNR).

Controlling Erosion and Sedimentation

The control practices outlined here are designed to decrease raindrop impact; to decrease runoff depth, volume, and velocity; and to increase on-site sedimentation. Effective erosion and sedimentation control includes: (1) minimizing erosion by protecting the soil surface from the erosive forces of wind, rain, and runoff; and (2) preventing eroded soil from moving from the site. The following practices should be employed to reduce erosion and sedimentation from construction sites.
Schedule construction activities to minimize the amount of soil surface exposed and the duration of that exposure, considering the season and the weather forecast. Winter and spring are the rainy seasons in North Carolina. When possible, schedule construction projects that cause soil disturbance during the summer or fall.

Use erosion control structures such as dikes, diversions, and waterways to divert runoff from disturbed areas (Figures 2 and 3). To reduce on-site erosion, install these structures before clearing and grading.

**Figure 2. Diversion with dike and channel.**

**Figure 3. Diversion of runoff from a disturbed site using dike-and-channel diversion.**

Use temporary or permanent vegetation and mulches (Figure 4). Vegetative cover is relatively inexpensive to establish on most disturbed sites in North Carolina. Preserve natural vegetation where possible. Good planning reduces costs, minimizes maintenance and repair, and makes structural erosion control measures more effective. When construction activities and erosion expose infertile subsoil, saving the original topsoil for later replacement may be helpful in establishing vegetative cover. Fertilization is frequently required to achieve adequate vegetative growth.
Some erosion is unavoidable. The resulting sediment must be trapped on the site. Construct sediment fences (Figure 5) and sediment traps and basins (Figure 6) before other land-disturbing activities occur. Sediment fences, traps, and basins must be properly maintained, regularly inspected, and cleaned as necessary. Dispose of the sediment removed during cleaning in a place where it will not flow back into the control structure.
Figure 6. Temporary sediment trap. Minimum flood pool volume is 1,800 cubic feet per acre of drained area.

Maintenance Required

Consider the maintenance and repair costs of each erosion control practice before construction. Erosion and sediment control structures should be inspected and maintained. If not properly maintained, some practices may cause more damage than they prevent.

Information Sources

Construction. The Erosion and Sediment Control Planning and Design Manual serves as a basic reference for land developers in the preparation of a comprehensive erosion and sedimentation control plan and for the design, construction and maintenance of individual practices. The Field Manual is a condensed version of the design manual. They are available for $30 and $20 per copy, respectively, from the Land Quality Section, P.O. Box 27687, Raleigh, NC 27611. For further information or assistance, please contact the nearest Regional Engineer or the Land Quality Section Sedimentation Education Specialist of the North Carolina Department of Environment, Health, and Natural Resources. P. O. Box 27687, Raleigh, NC 27611, (919) 733-4574

Agriculture. A statewide program that deals with agricultural sources of erosion and sedimentation is the North Carolina Agriculture Cost Share Program. Administered by the Division of Soil and Water Conservation, DEHNR, the objective of this program is to reduce the impacts of agricultural nonpoint source pollution. Contact your county Soil and Water Conservation District office for information on participation in this program.
Forestry. Performance standards for forestry operations are given in Forest Practice Guidelines Related to Water Quality (15A NCAC 11 .0101 -.0209). The Forestry Best Management Practices Manual by DEHNR, Division of Forest Resources is a resource document for landowners, loggers, and managers for planning and conducting forestry activities.

Additional Information


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