



Soil Facts

The North Carolina Erosion and Sedimentation Pollution Control Program

Although erosion is a natural process that creates interesting landscapes, a sudden alteration of the natural land surface can dramatically accelerate this process with less pleasing results. The erosion rate from land disturbed at a construction site may be 1,000 times greater than the natural rate.

Accelerated erosion occurs whenever the soil surface is disturbed. Removing the vegetative cover, altering the natural topsoil, or changing the shape of the slope can increase the potential for erosion, increase runoff, and deposit more sediment in rivers and lakes. Erosion decreases the productive value of the soil and reduces the quality of the waters that receive the sediment. Sediments created by accelerated erosion clog streams, fill lakes, and often carry pollutants. Concern about these potential damages provided the impetus for the North Carolina Sedimentation Pollution Control Act of 1973.

The Law

The 1973 legislation (General Statutes 113A50 to 113A-70; amended in 2007) created the Sedimentation Control Commission to create and administer a program to reduce sedimentation resulting from erosion when people develop the land. The legislation authorizes the North Carolina Department of Environment and Natural Resources (DEHNR) to staff and manage this statewide program (Title 15A, North Carolina Administrative Code, Chapter 4). The Land Quality Section of DEHNR administers the program. The law is performance oriented. It prohibits visible off-site sedimentation from construction sites but permits the land developer to determine the most economical, effective methods for controlling erosion and sedimentation. This flexibility requires the builder to carefully plan construction activities and consider the erosion potential at each site. Construc-

tion plans must include measures to reduce erosion at the construction site and prevent off-site sedimentation.

Who Is Affected

The law governs all land-disturbing activities except those of agriculture, mining (which is regulated by the Mining Act of 1971), and forestry (if operations follow best management practices). Regardless of the size of the disturbed area, land developers and builders must plan and implement effective short-term and long-term measures to control accelerated erosion and prevent off-site sedimentation.

During construction, the landowner and the site developer are required to follow erosion and sedimentation control practices. After construction is complete and the soil surface stabilized, responsibility passes to the land-

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owner or the person managing the land.

Basic Mandatory Requirements

The act contains the following basic standards that provide the framework for erosion and sedimentation control practices.

- An erosion control plan must be submitted and approved before a land-disturbing activity begins that would remove or disturb the vegetation on more than an acre. The plan must be submitted 30 days before land disturbance begins unless an express permit program is in place.
- A buffer zone is necessary along any natural watercourse or lake. The buffer strip must be wide enough to retain all visible sediment within the first 25 percent of the buffer zone nearest the disturbed area. Along trout streams, the buffer zone must be a minimum of 25 feet wide.
- All disturbed areas must be able to be stabilized by vegetation or other suitable erosion control methods. Cut or fill slopes are of special concern. A disturbed soil area must be stabilized within 30 working days after completing any phase of land grading.
- The angle of a slope must not exceed that which can be stabilized by vegetation or other means.
- The erosion and sediment control plan must be followed during construction.

Performance Standards

The act does not specify erosion control practices, devices, or techniques. Rather, a performance-based

approach allows for innovation and site flexibility. The primary standard is that erosion and sedimentation control measures must provide protection from a rainfall event equivalent to the 10-year peak runoff. In areas with High Quality Waters, the design must meet the 25-year storm requirement. Run-off velocities must be controlled. The peak runoff from a 10-year frequency storm occurring during or after construction must not damage the receiving stream channel at the discharge point. The law requires protection of the receiving channel if storm water run-off velocities are excessive.

The Land Quality Section, with assistance from the Technical Advisory Committee of the Sedimentation Control Commission, has developed an Erosion and Sediment Control Planning and Design Manual to help guide those writing erosion and sediment control plans. This manual provides examples of typical devices as well as the types of calculations needed to correctly size the devices. It is available in hard copy for a fee or it can be downloaded from the Land Quality Web site (http://www.dlr.enr.state.nc.us/pages/sedimentation_new.html) for free. It is continuously modified to include new devices or practices and to remove those no longer deemed acceptable.

Penalties

The Sedimentation Pollution Control Act authorizes state or local agencies to inspect land-disturbing activities and to prosecute violators. Citizens damaged by violations of the act may also take legal action. Courts can issue civil penalties, criminal penalties, injunction relief, and stop-work orders.

Civil penalties can carry a fine of up to \$5,000 per-day for each violation

and for each day a site is in violation.

Criminal penalties for knowing or willful violations are up to six months in jail and up to a \$5,000 fine.

An injunction to abate or prevent a violation can be brought to a superior court when the state or local program authorities believe a person is violating or threatening to violate the law.

A stop-work order can be issued if a serious violation is found and the violation is knowing and willful.

Any citizen injured by a violation of the act may bring civil action against the persons alleged to be in violation.

Guiding Principles of Erosion and Sedimentation Control

Relatively simple and basic measures can establish effective erosion and sedimentation control. Keeping the soil surface protected from rain and wind is the first line of defense. Disturbing as small an area as possible is of major benefit (Figure 1). Since most construction requires some soil disturbance and exposure, practices for capturing the eroded material before it leaves the construction site are needed. A comprehensive erosion and sediment control plan integrates these goals. Planning construction activities in phases to reduce erosion potential is a key to effective control. Clearing vegetation in phases as construction proceeds will expose smaller areas, making it easier to control erosion and retain sediment. Scheduling should account for the season and weather forecasts. Stabilize disturbed areas quickly.

Fit the planned development to existing site conditions and minimize disturbance.

Soil, slope, vegetation, and hydro-

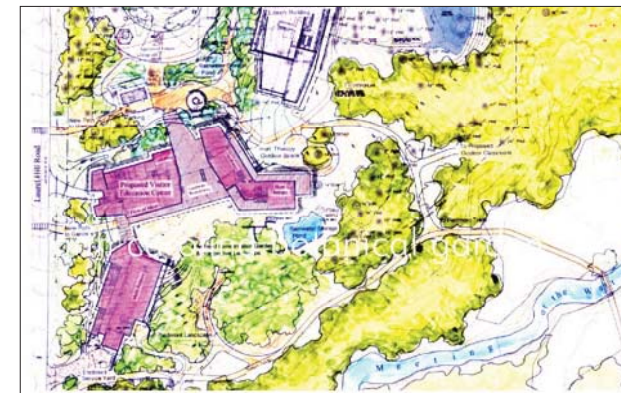


Figure 1. An example of minimizing construction impacts by fitting the new buildings (purple) into the parcel while leaving as much of the existing vegetation (green/yellow) undisturbed. Note that the undisturbed area is located at the lower end of the project, adjacent to a stream. Courtesy Frank Harmon Architect, PA.



Figure 2. Diversion ditch on the perimeter of a project to prevent clean water from running onto the site and to keep site water from leaving the project without being treated.



Figure 3. Graded area stabilized with vegetation except in the section being actively worked.

logic characteristics at a previously undisturbed site represent a natural harmony that should be considered, rather than forcing the land to conform to development needs. Maintaining natural slope contours will usually minimize soil disturbance.

Protect disturbed areas from storm water runoff.

Storm water runoff must be diverted from unstable disturbed areas or cut-and-fill slopes. Concentrations of runoff flow on bare soil must be minimized. Water diversions, dikes, and waterways should be installed and stabilized early in the construction process. Water collected by such structures must be directed into sediment trapping devices prior to release from the site (Figure 2).

Stabilize disturbed soil areas.

Any land disturbance that removes the vegetative cover, alters the slope, decreases rainfall infiltration, or changes surface-water flow can create erosion. Install measures to stabilize soil areas quickly, whether permanent or temporary vegetation, mulches, or other protective practices or devices. Channels for concentrated water flow must be protected through proper design and channel linings (Figure 3).

Minimize run-off velocities.

During the initial planning stages, give priority to reducing the speed and concentration of storm water flow. Interrupting the length of slopes, increasing surface roughness, and maintaining soil infiltration capacity will reduce the volume and velocity of water flow. Reducing water-flow volume and velocity decreases soil detachment, erosion, and sedimentation (Figures 4, 5).

Site clearing, preparation, and construction will always create some erosion. Sediment traps, basins, buffers, and barriers will retain sediment on site. Maintain such collection devices and remove accumulated sediment regularly. Sediment capture devices should not be the primary line of protection against off-site damage. Erosion prevention at the outset remains the best alternative (Figure 6).

Inspect and maintain control measures.

The best erosion-control plan will not be successful unless proper maintenance is provided for all control measures, including vegetation. Failing control measures can pose hazards for both people and property. Lack of maintenance may cause sudden release of all the sediment retained on site. The site should be inspected every week and after any rains totaling ½-inch or more, and a log of these inspections maintained on site (Figure 7).



Figure 4. A series of check dams slow runoff in a ditch to prevent scouring.



Figure 5. Creating a bench on a slope will slow runoff and help prevent erosion.



Figure 6. Silt fence sediment control illustrating the ponding necessary to capture sediment in runoff before the site is stabilized with vegetation.



Figure 7. This sediment trap filled completely with sediment and has begun to erode around the rock dam. All sediment trapping devices need to have sediment removed once they are half full.

Program Responsibility

The 1973 act created the Sedimentation Control Commission to oversee the erosion and sedimentation control program. The governor appoints the 12 members to represent a broad cross-section of natural resource interests. At the state level, the Land Quality Section of the North Carolina Department of Environmental and Natural Resources has the authority, under the commissioner's direction, for administering the program. The Land Quality Section approves erosion and sedimentation control plans, inspects land-disturbing activities, and takes enforcement actions. It reports to the Sedimentation Control Commission on the status of the program.

Authorized local governments or agencies may adopt, administer, and enforce their own ordinances with the approval and oversight of the Sedimentation Control Commission. Local (city or county) ordinances must meet or exceed the minimum state standards. The Land Quality Section of the North Carolina Department of Environment, Health, and Natural Resources reviews local programs periodically to ensure uniform enforcement of the act and reports the status to the Sedimentation Control Commission. Today, 48 local programs are in effect.

The Sedimentation Control Commission can delegate other state agencies to administer an erosion and sedimentation control program. The Department of Transportation (DOT) approves erosion control plans for all land-disturbing activities under its purview. The commission receives regular reviews and reports on the status of the transportation department's program.

Magnitude of the Program

The Land Quality Section administers the program through seven regional offices. (See map.) Contact your regional engineer for assistance with program compliance. The staff reviews over 3,300 erosion control plans and conducts approximately 16,000 inspections each year. At the local level, the 48 city and county programs annually review about 2,500 plans and make over 60,000 inspections. DOT annually reviews about 130 erosion control plans on contract construction. It has over 1,000 plans prepared for its own

maintenance work and for projects by DOT personnel.

Information and Assistance

The Sediment Control Commission sponsors an educational program that includes workshops for engineers, erosion control plan preparers, and local program enforcement officials. Publications and videotapes provide information on controlling erosion and sedimentation pollution at all levels of land-disturbing activity. These include a comprehensive *Erosion and Sediment Control Planning and Design Manual*, a *Field*

Manual, and an *Inspectors Guide*. These are all available in PDF form on the Land Quality Section Web site: http://www.dlr.enr.state.nc.us/pages/sedimentation_new.html. For more information, contact:

**Land Quality Section
Department of Environment and Natural Resources
1612 Mail Service Center
Raleigh, NC 27699-1612
(919) 733-4574**

For local assistance, contact your regional office of the North Carolina Department of Environment and Natural Resources. Also check to see if your city or county has an erosion and sediment control program.

Regional Offices of the Land Quality Section of the Department of Environment, Health, and Natural Resources

Asheville Regional Office

- Address: 2090 U.S. Highway 70, Swannanoa, NC 28778
- Voice: 828.296.4500
- Facsimile: 828.299.7043
- Courier - 12-59-01
- Regional Engineer: Janet Boyer, PE

Mooresville Regional Office

- Address: 610 East Center Ave., Mooresville, NC 28115
- Voice: 704.663.1699
- Facsimile: 704.663.6040
- Courier: 09-08-06
- Regional Engineer: Zahid Khan

Winston-Salem Regional Office

- Address: 585 Woughtown Street, Winston-Salem, NC 27107
- Voice: 336.771.5000
- Facsimile: 336.771.4630
- Courier: 13-15-01
- Regional Engineer: Matthew Gantt, PE

Fayetteville Regional Office

- Address: 225 Green Street, (Systel Building), Suite 714, Fayetteville, NC 28301-5094
- Voice: 910.433.3300
- Facsimile: 910.486.0707
- Courier: 14-56-25
- Regional Engineer: Steve Cook, CPESC

Raleigh Regional Office

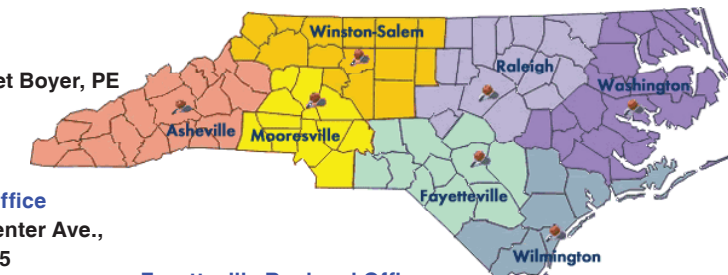
- Address: 1628 Mail Service Center, Raleigh, NC 27699-1626 or 3800 Barrett Drive, Raleigh, NC 27609
- Voice: 919.791.4200
- Facsimile: 919.571.4718
- Courier: 52-01-00
- Regional Engineer: John Holley, PE

Washington Regional Office

- Address: 943 Washington Square Mall, Washington, NC 27889
- Voice: 252.946.6481
- Facsimile: 252.975.3716
- Courier: 16-04-01
- Regional Engineer: Pat McClain, PE

Wilmington Regional Office

- Address: 127 Cardinal Drive Extension, Wilmington, NC 28405
- Voice: 910.796.7215
- Facsimile: 910.350.2004
- Courier: 04-16-33
- Regional Engineer: Dan Sams, PE



Sediment Emergencies Call 1-866-STOPMUD