CHAPTER 2

SEDIMENT AND EROSION CONTROL PROCESSES, PRINCIPLES AND PRACTICES

Erosion is the process by which the land surface is worn away by the action of wind, water, ice or gravity. Water-generated erosion is unquestionably the most damaging and is thus the problem to which this manual is primarily addressed.

Natural, or geologic, erosion has been occurring at a relatively slow rate since the earth was formed and is a tremendous factor in creating the earth as we know it today. The picturesque mountains of the north, the fertile farmlands of the Piedmont and the productive estuaries of the coastal zone are all products of geologic erosion and sedimentation in Georgia. Excepting some cases of shore and stream channel erosion, natural erosion occurs at a very slow and uniform rate and remains a vital factor in maintaining environmental balance.

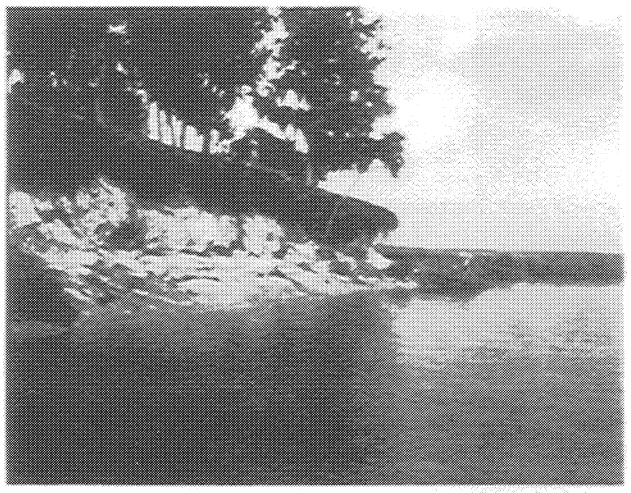


Figure 2-1. - Erosion of this coastal shore is an example of geologic erosion.

Human alteration of the earth's surface can lead to "accelerated erosion." This is a classic example of environmental abuse and is normally the result of poor planning and unorganized construction.

Erosion by water is a process of breaking loose and transporting soil particles. The energy of raindrops falling on denuded or exposed soils is the key element. The annual impact energy of raindrops, for instance, has been estimated to average approximately 30 billion foot-pounds or the equivalent of 10 thousand tons of T.N.T. per square mile (19). Water flowing over exposed soil picks up detached soil particles. As the velocity of flowing water increased, additional soil particles are detached and transported. Water flows have a tendency to concentrate. This first creates small channels or rills and eventually gullies of varying widths and depths. As the volume and velocity of runoff increases in unprotected streams and channels, additional erosion occurs on stream banks and bottoms.

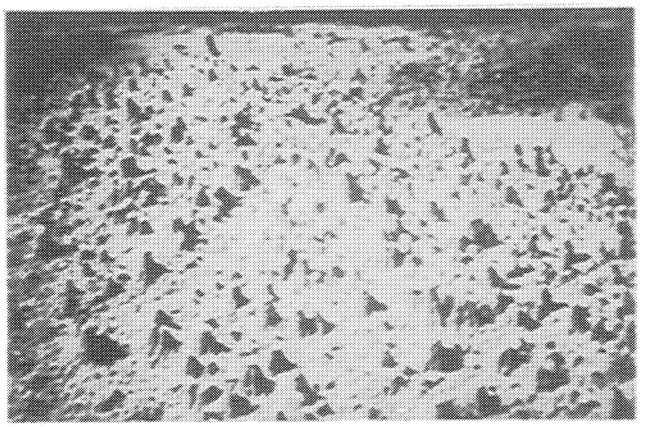


Figure 2.2. - Energy of falling raindrops has detached and transported soil particles from unprotected areas.

Sedimentation is the process where soil particles settle out of suspension as the velocity of water decreases. The heavier particles, gravel and sand, settle out more rapidly than fine silt and clay particles. The characteristic reddish color of Georgia's streams in the Piedmont results from suspended microscopic clay particles. Unfortunately, these particles are easily transported and settle out *very slowly*. It is difficult and perhaps impossible to totally eliminate the transportation of these fine particles even with the most effective erosion control programs.

FACTORS INFLUENCING EROSION

The erosion process is influenced primarily by climate,
topography, soils, and vegetative cover.

Climate. The frequency, intensity and duration of rainfall and temperature extremes are principle factors influencing the volume of runoff from a given area. As the volume and intensity of rainfall increases, the ability of water to detach and transport soil particle increases. When storms are frequent, intense, and of long duration, the potential for erosion of bare soils is high. Temperature has a major influence on soil ero-

sion. Frozen soils are relatively erosion resistant. However, soils with high moisture content are subject to "spew," or uplift by freezing action, and are usually very easily eroded upon thawing.

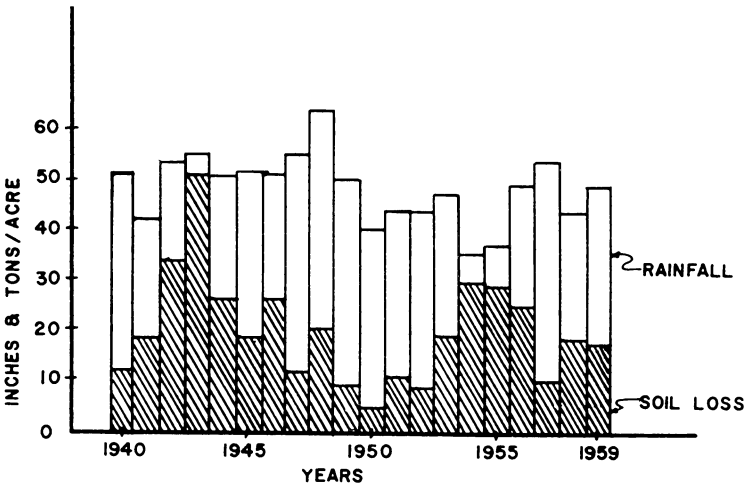
Topography. The size, shape and slope characteristics of a watershed influence the amount and duration of runoff. The greater the slope length and gradient, the greater the potential for both runoff and erosion. Velocities of water will increase as the distance from the top of the slope or the grade of the slope increases.

Soils. The soil type will determine its vulnerability to erosion. Properties determining the erodibility of a soil are texture, structure, organic matter content and permeability. Soil containing high percentages of fine sands and silt are normally the most erodible. As the clay and organic matter content of these soils increases, the erodibility decreases. Clays act as a binder to soil particles thus reducing erodibility. But, while clays have a tendency to resist erosion, they are easily transported by water once eroded. Soils high in organic matter resist rain drop impact and the organic matter also increases the binding characteristics of the soil. Clearly, well-graded and well-drained gravels are usually the least erodible soils. The high infiltration rates and permeabilities either prevent or delay runoff.

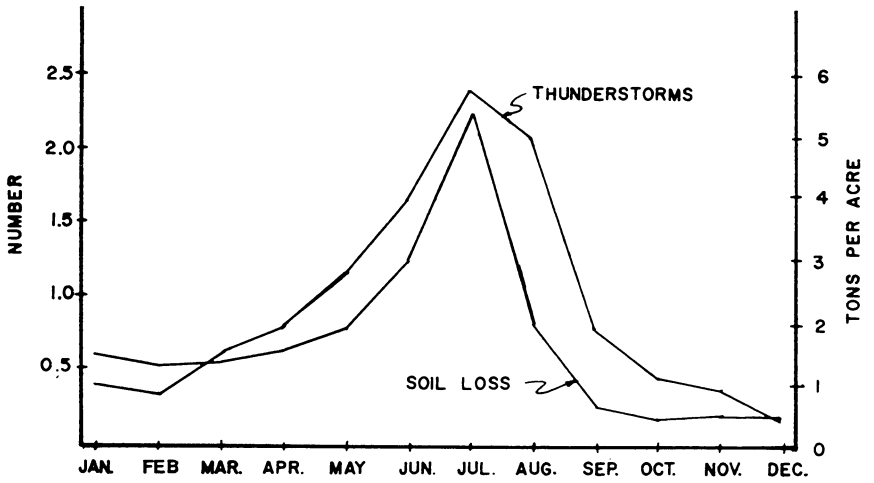
Vegetative Cover. Vegetative cover is an extremely important factor in reducing erosion from a site. It will:

a. Absorb energy of rain drops.
b. Bind soil particles.
c. Slow velocity of runoff water.
d. Increase the ability of a soil to absorb water.
e. Remove subsurface water between rainfalls through the process of evapotranspiration.

By limiting the amount of vegetation disturbed and the exposure of soils to erosive elements, soil erosion can be greatly reduced.



* Soil Loss Varies Annually



* Soil Loss Varies Seasonally

*Information taken from: Barnett, A. P. and B. H. Hendrickson, *"Erosion on Piedmont Soils," Soil Conservation Magazine, USDA, Soil Conservation Service, Volume XXVI, No. 2 Sept. 1960.*

Figure 2-3.

GENERAL DESIGN PRINCIPLES

For an erosion and sedimentation control program to be effective, it is imperative that provisions for sediment control measures be made in the planning stage. These planned measures, when conscientiously and expeditiously applied during construction, will result in orderly development without adverse environmental degradation.

From the previous discussion on erosion and sediment control processes and factors affecting erosion, basic technical principles can be formulated to assist the project planner or designer in providing for effective sediment control. It is felt that these certain key principles *must* be utilized to the maximum extent possible on all projects.

Fit the Activity to the Topography and Soils. Detailed planning should be employed to assure that roadways, buildings and other permanent features of the activity conform to the natural characteristics of the site. Large graded areas should be located on the most level portion of the site. Areas subject to flooding should be avoided. Areas of steep slopes, erodible soils with severe limitations for the intended uses should not be utilized without overcoming the limitations through sound engineering practices. Erosion control, development and maintenance costs can be minimized if a site is selected for a specific activity rather than attempting to modify the site to conform to the proposed activity.

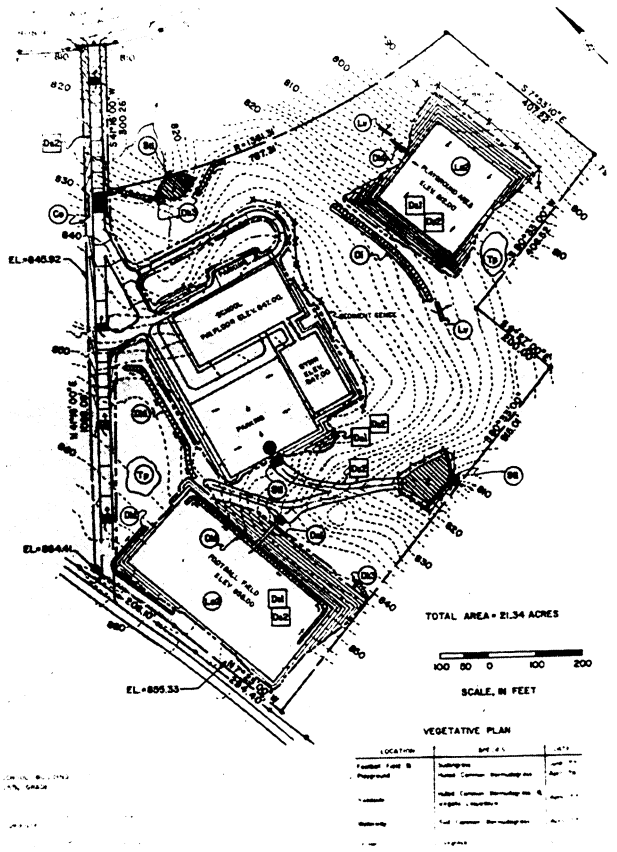


Figure 2-4. - Permanent facilities for this development were planned to fit the topography and soil type.

Figure 2-5. - Unstable soil conditions, as on this roadbank, should be avoided.

The Disturbed Area and the Duration of Exposure to Erosion Elements Should be Minimized. Clearing of natural vegetation should be limited to only those areas of the site to be developed at a given time. Natural vegetation should be retained, protected and *supplemented* with construction scheduling employed to limit the duration of soil exposure. Major land clearing and grading operations should be scheduled during seasons of low potential runoff.

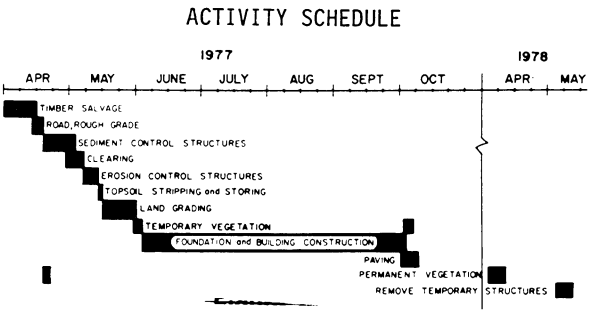


Figure 2-6.

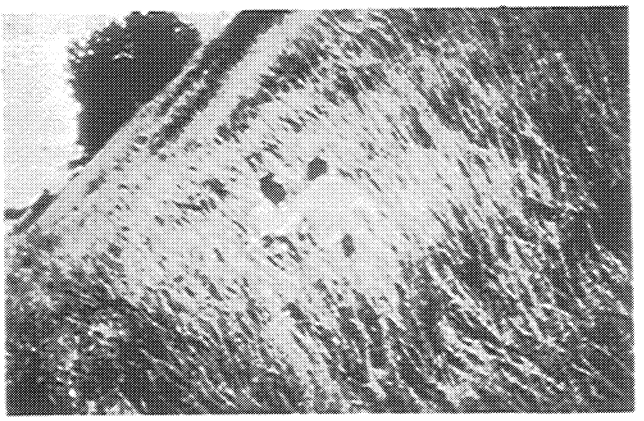


Figure 2-7. - Vegetation on this road bank will reduce erosion to a minimum.

Stabilize Disturbed Areas Immediately. Permanent structures, temporary or permanent vegetation, and mulch, or a combination of these measures, should be employed as quickly as possible after the land is disturbed. Temporary vegetation and mulches can be most effective on areas where it is not practical to establish permanent vegetation. These temporary measures should be employed immediately after rough grading is completed if a delay is anticipated in obtaining finished grade. The finished slope of a cut or fill should be stable and ease of maintenance considered in the design. Stabilize all roadways, parking areas, and paved areas with a gravel subbase, temporary vegetation or mulch.

Figure 2-8. - Hydroseeding equipment can efficiently and quickly establish disturbed areas.

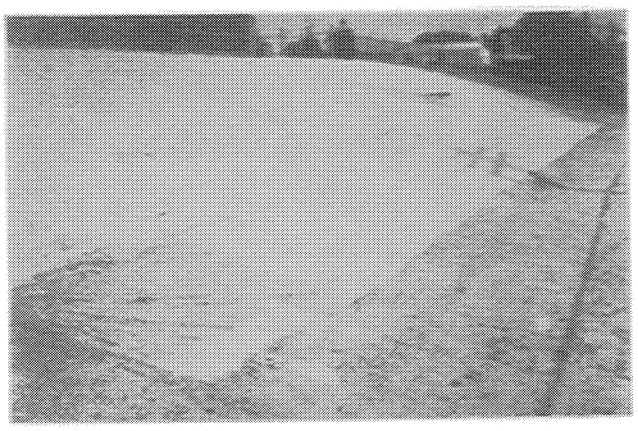


Figure 2-9. - Jute matting can assist in rapid establishment of vegetation.

Retain or Accommodate Runoff. Runoff from the development should be safely conveyed to a stable outlet using storm drains, diversions, stable waterways or similar measures. Consideration should also be given to the installation of storm water detention structures to prevent flooding and damage to downstream facilities resulting from increased runoff from the site. Temporary or permanent facilities for conveyance of storm water should be designed to withstand the velocities of projected peak discharges. These facilities should be operational as soon as possible after the start of construction.

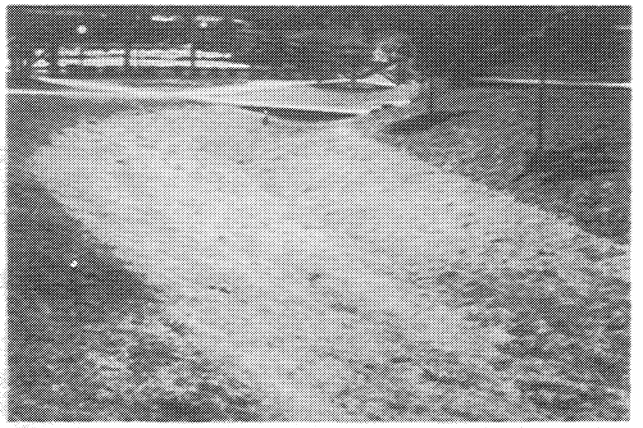


Figure 2-10. - This vegetated waterway will safely convey storm water away from this swimming pool.

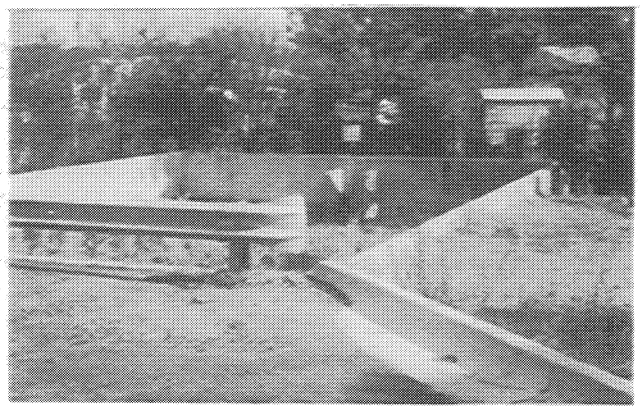


Figure 2-11. - Storm water detention structures will reduce storm water runoff from developed areas.

Retain Sediment. Sediment basins, sediment barriers and related structures should be installed to filter or trap sediment *on the site to be disturbed*. The most effective method of controlling sediment, however is to control erosion at its *source.* Sediment retention structures should be planned to retain sediment when erosion control methods are not practical, are insufficient, in the process of being installed, or have failed due to some unforeseen factor.

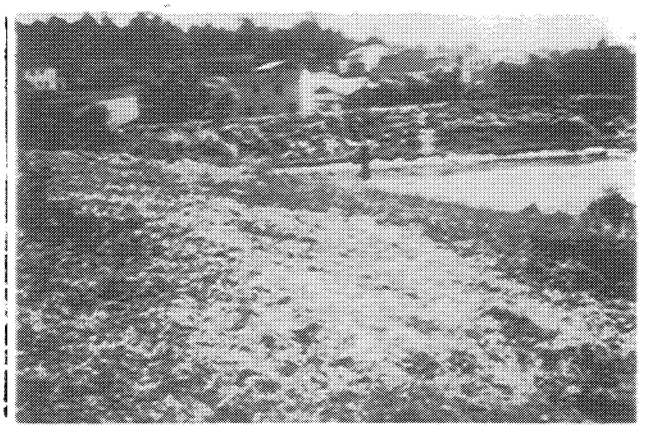


Figure 2-12. - This temporary sediment basin effectively trapped sediment from upstream erosion.

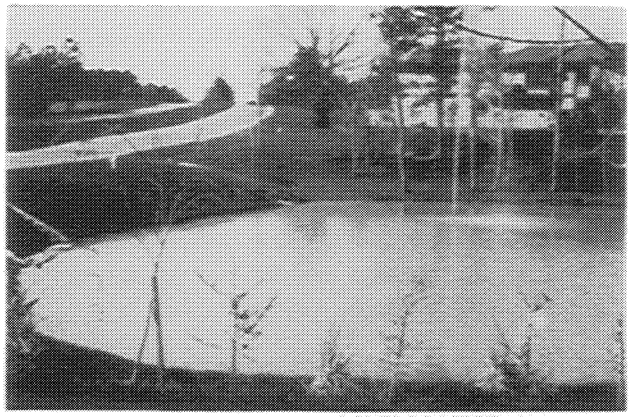


Figure 2-13. - A temporary sediment basin converted to a permanent pond enhances landscape.

Do Not Encroach Upon Watercourses. Permanent buildings should not be subjected to flooding, sediment damages or erosion hazards. Earth fills should not be constructed in flood-prone areas so as to adversely obstruct water flows or increase downstream velocity of water flows. When necessary to span a flood-prone area or watercourse, bridge and culvert openings should be sized to permit passage of peak discharges without causing undue restrictions in water flows or without creating excessive downstream velocities. Uses of flood-prone areas should be limited to activities which would not suffer excessive damages from flooding, scour and sediment. Temporary bridges or culverts should be employed when construction equipment is required to cross natural or constructed channels.

Figure 2-14. - An undersized culvert in this roadway has created an obstruction to floodwaters.

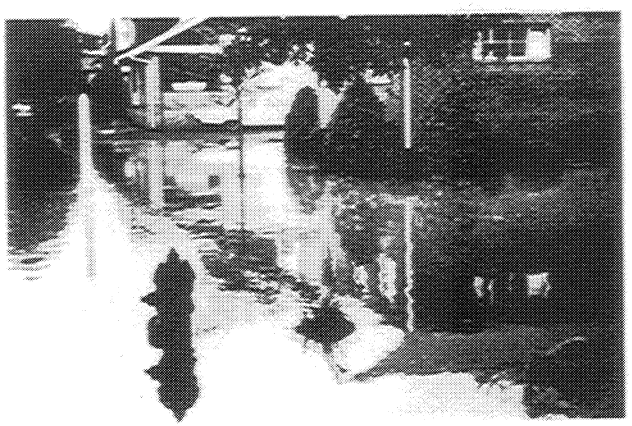


Figure 2-15. - The result when residences are constructed in flood prone areas.

EROSION AND SEDIMENTATION CONTROL PRACTICES

Severe erosion on lands undergoing land-disturbing activities can be reduced if proper control measures are implemented. The timely application of erosion and sediment control measures will minimize the time that the soils are exposed, control runoff, shield the soil from erosive forces, and bind the soils.

A most effective tool in controlling erosion is good site planning which includes planning and installation of erosion sediment control practices. In Chapter 6 of this manual are standards and specifications for such practices which can be utilized on areas undergoing land-disturbing activities. These standards were developed to establish statewide uniformity in selection, design, review, approval, installation and maintenance of conservation practices. They establish minimum requirements for planning, designing and installing the practices on disturbed areas.

For effective erosion control, a combination of these measures must be employed. Alternates may be approved for individual erosion and sediment control plans. In general, they fall into the rather broad categories of structural practices and vegetative measures.

VEGETATIVE CONSERVATION MEASURES

Vegetative practices may be applied singularly or in combination with other conservation measures. They may be either short lived or of a permanent nature. Sub-soils, mixtures of soils and soils with varying organic matter content will be encountered when soil surfaces are disturbed. Unfavorable growth conditions such as acidity, low fertility, compaction and adverse moisture contents are often prevalent. These conditions are difficult to overcome but must be eliminated if adequate plant growth is to be obtained. Steep gradients and long slopes are often present on areas to be vegetated. These areas are subject to erosive forces from rainfall impact and flowing water and will require special techniques and grasses which will resist erosion. Establishing vegetation is possible

with techniques and plants developed over the years.

Temporary Vegetation. In many instances, grading of areas is completed at a time when it is not practical to try to establish permanent vegetation. These areas can be stabilized by planting instead a variety of temporary annual grasses such as rye grass, rye, small grains and similar species. These temporary grasses will provide a rapid cover that can later be worked into the soil to provide organic matter when permanent vegetation is established. Every effort should be made to select temporary plants that will be compatible with the final permanent vegetation.

Permanent Vegetation. A wide selection of various grasses, legumes, ground cover, trees and shrubs can be used for permanent vegetation. If a high level of management is possible, an even wider range of plants can be used.

It is imperative that the final selection of plants be based on the adaptability of those plants to the topography and climate. Ease of establishment, life expectancy, maintenance requirements, aesthetics and any other special qualities should be considered. It is desirable to select plants requiring little maintenance. Many plants can be used to improve the aesthetics of a site and still be effective soil stabilizers. Special attention should be given to steep cut and fill slopes where plants requiring little maintenance must be utilized.

Mulching. Due to time constraints, it may be impractical to stabilize an area with vegetation. Excellent temporary soil stabilization can be otherwise achieved using wood chips, straw, hay, asphalt emulsion, jute matting and synthetic fibers. Areas where final grade has been reached can be stabilized with mulch and over seeded at the proper time for permanent grasses. Mulches allow for greater infiltration of water into soil; reduce the amount of runoff; retain seeds, fertilizer and lime in place; and improve soil moisture and temperature conditions. Mulch is essential in establishing good stands of grasses and legumes on disturbed areas. In order to prevent movement by wind or water, it is important that it be anchored to the soil.

Following are examples of vegetative practices suitable for utilization on disturbed land. A map code has been assigned to teach practice and appears at the beginning of the title of each practice.

Bf - BUFFER ZONE

A strip of undisturbed original vegetation, enhanced or restored existing vegetation, or the re-establishment of vegetation surrounding an area of disturbance or bordering streams, ponds, wetlands, lakes, and coastal waters.

Cs - COASTAL DUNE STABILIZATION (WITH VEGETATION)

Planting vegetation on dunes that are denuded, artificially constructed, or re-nourished.

Ds1 - DISTURBED AREA STABILIZATION (WITH MULCHING ONLY)

Using plant residues or other suitable materials on the soil surface to reduce runoff and erosion, conserve moisture, prevent soil compaction and crusting, control undesirable vegetation, modify soil temperature and to increase biological activity in the soil. This practice is applicable where stabilizing disturbed or denuded areas is not practical utilizing seeding or plantings.

Ds2 - DISTURBED AREA STABILIZATION (WITH TEMPORARY SEEDING)

A temporary vegetative cover with fast growing seedings for disturbed or denuded areas. This practice is applicable for up to six months or until permanent vegetative cover can be installed. It should be coordinated with permanent measures to assure economical and effective stabilization. Techniques for establishing temporary cover utilizing both conventional and hydraulic seeding equipment are included.

Ds3 - DISTURBED AREA STABILIZATION (WITH PERMANENT VEGETATION)

A permanent vegetative cover such as trees, shrubs, vines, grasses and legume on disturbed or denuded areas. It will apply on cut and fill slopes, earth spillways, borrow areas, spoil areas and severely eroded or gullied lands. Techniques utilizing both conventional and hydraulic seeding equipment are discussed.

Ds4 - DISTURBED AREA STABILIZATION (WITH SODDING)

A permanent vegetative cover using sods on high-

ly erodible or critically eroded lands. Sods provide immediate ground cover and help filter sediments and nutrients.

Du - DUST CONTROL ON DISTURBED AREAS

Controlling the surface and air movements of dust on construction sites, roadways and similar sites. Methods and materials which can be used include mulches, vegetative cover, spray-on adhesives, mechanical manipulation of existing soils surfaces, irrigation, barriers, chemicals, and stone surface covers.

Mb - EROSION CONTROL MATTING AND BLANKETS

A protective covering (blanket) or soil stabilization mat used to establish permanent vegetation on steep slopes, channels, or shorelines. Blanket and mats provide an excellent microclimate, which protects young vegetation and promotes establishment.

Pm - POLYACRYLAMIDE (PAM)

The land application of product containing anionic polyacrylamide (PAM) as temporary soil binding agents to reduce soil erosion. PAM reduces erosion from wind and water on construction sites.

Sb - STREAMBANK STABILIZATION (USING PERMANENT VEGETATION)

The use of readily available native plant materials to maintain and enhance streambanks, or to prevent, or restore and repair small streambank erosion problems.

Tb - TACKIFIERS AND BINDERS

Substances used to anchor straw or hay mulch by causing the organic material to bind together. Tackifiers and binders reduce runoff and erosion as well as conserve moisture and prevent surface compaction.

EFFECTIVENESS OF GROUND COVER ON EROSION AND SEDIMENT CONTROL ON CONSTRUCTION SITES

Kinds of Ground Cover	Soil Reductions Related to Bare Surfaces
Seedings[1]	
Permanent grasses	99
Ryegrass (perennials)	95
Ryegrass (annuals)	90
Small grain	95
Millet or sudangrass	95
Grass sod	99
Hay (2 tons/acre)	98
Small grain straw (2 tons/acre)	98
Corn stalks (4 tons/acre)	98
Woodchips (6 tons/acre)[2]	94
Wood cellulose fiber (1 3/4 tons/acre)[2]	90
Fiberglass (1000 lbs/acre)[2]	95
Asphalt emulsion (1250 gal/acre)	98

Other kinds of mulches that may be used are gravel, stones, fiber matting and excelsior.

[1] Values of seeded vegetation are based upon a fully established stand.

[2] Based on research in progress.

Reference: USDA, Agricultural Research Service.

STRUCTURAL CONSERVATION PRACTICES

In some instances, vegetative cover and mulches alone will not provide sufficient protection from the erosive forces of water. In such cases, alternate structural practices can be used to curb erosion and sedimentation during land-disturbing activities. These practices should be planned and employed in a practicable combination with vegetative and mulching measures.

Structural practices must be adequately designed and properly installed to accomplish the desired objective. Design should be based on the appropriate storm discharge and velocities. Consideration should be given to the damage potential, safety hazards, planned life and required maintenance of each individual structural practice.

Following is an overview of standards and specifications for structural practices contained in Chapter 6 of this Manual.

Cd – CHECKDAM

A small temporary barrier or dam constructed across a swale or drainage ditch. This is applicable for use in small channels which drain five (5) acres or less (not to be used in a live stream) in order to reduce erosion by slowing the velocity of concentrated storm water flows.

Ch – CHANNEL STABILIZATION

Improving, constructing or stabilizing a natural or artificial channel for conveying water flows. In certain instances on selected development, it will be found that existing channels will not be adequate to convey desired discharges. New channels may be required to eliminate flooding. In many cases existing channels cannot be considered stable. Therefore, this practice may be employed to assist in stabilizing these channels.

Co - CONSTRUCTION EXIT

A stone-stabilized pad located at any point where vehicular traffic will be leaving a site onto a public right-of-way, street, roadway, or parking area. Its purpose is to reduce or eliminate transportation of soil (by motor vehicles) from the construction area onto public rights-of-way.

Cr - CONSTRUCTION ROAD STABILIZATION

Roads, parking areas, and other transportation routes that are stabilized with coarse aggregate between the time of initial grading and final stabilization. This travelway provides a fixed route for travel for construction traffic, reduces erosion, and subsequent regrading of permanent roadbeds, and provides a stable base for paving.

Dc - STREAM DIVERSION CHANNEL

A temporary channel that diverts a stream around a construction site to protect the streambed from erosion and allow work "in the dry". This diversion is used when in-stream work is unavoidable, as with linear projects such as utilities or roads that frequently cross and impact live streams and create a potential for excessive sediment loss by both the disturbance of the approach areas and by the work within the streambed and banks.

Di - DIVERSION

An earth channel with a compacted supporting ridge on the lower side, constructed above, across, or below a slope. The purpose of this practice is to reduce slope lengths, break-up concentrations of runoff and move water to stable outlets at non-erosive velocities. Diversions should be designed to discharge water into established disposal areas.

Dn1 - TEMPORARY DOWNDRAIN STRUCTURE

A flexible conduit of heavy-duty plastic or other material used as a temporary structure to convey concentrations of stormwater down the face of a cut or fill slope. Flexible downdrains are used on slopes where concentrations of stormwater would cause substantial erosion. They are removed once the permanent water disposal system is installed.

Dn2 - PERMANENT DOWNDRAIN STRUCTURE

A paved chute, pipe or a sectional conduit of prefabricated material designed to safely conduct surface runoff from the top to the bottom of a slope. Downdrain structures are to be used where concentrated water will cause excessive erosion of cut and fill slopes.

Fr - FILTER RING

A temporary stone barrier used in conjunction with other sediment control measures and constructed to reduce flow velocities and filter sediment. A filter ring can be installed at or a around devices such as inlet sediment traps, temporary downdrain inlets, and detention pond retrofits to provide additional sediment filtering capacity.

Ga - GABION

Large, rock-filled baskets wired together to form flexible monolithic building blocks. They are used in channels, retaining walls, abutments, check dams, etc., to prevent erosion and sediment damage to a specific structure.

Gr - GRADE STABILIZATION STRUCTURE

Structures of concrete, rock masonry, steel, aluminum, treated wood, etc. They are installed to stabilize the grade in natural or artificial channels and to prevent the formation or advance of gullies and to reduce erosion and sediment pollution.

Lv - LEVEL SPREADER

A temporary structure constructed with a flat grade across a slope where concentrated runoff may be intercepted and diverted onto a stabilized outlet. Concentrated flow of stormwater is converted to sheet flow at the level spreader.

Rd - ROCK FILTER DAM

A permanent or temporary stone filter dam installed across small streams and drainageways with a drainage area of 50 acres or less. This structure is installed to serve as a sediment-filtering device and to reduce storm water flow velocities.

Re - RETAINING WALL

A constructed wall of concrete, masonry, reinforced concrete, cribbing, treated timbers, gabions, stone dry wall, riprap or other durable material. They are installed to stabilize cut or fill slopes where maximum permissible slopes of earth are not obtainable. Each situation will require a specific design by a design engineer.

Rt - RETROFITTING

The physical modification of a storm water management outlet structure, using a half round corrugated metal pipe or similar device, to trap sediment contained in runoff water.

Sd1 - SEDIMENT BARRIER

A temporary structure constructed of silt fences, straw or hay bales, brush, logs and poles, gravel or other filtering materials. They are installed to prevent sediment from leaving the site or from entering natural drainageways or storm drainage systems. They are not to be used on high-risk areas or where there will be a possibility of failure. Formal design is normally not required for sediment barriers.

Sd2 - INLET SEDIMENT TRAP

Small temporary basins excavated around a storm drain inlet. They are employed to trap sediment in runoff water from small, disturbed areas. Cleanout of these facilities is normally required after each heavy rainfall.

Sd3 - TEMPORARY SEDIMENT BASIN

A basin created by an embankment or dam containing a principal spillway pipe and an emergency spillway. These structures are normally situated within natural drainageways and at the lowest point on a construction site and are used to trap sediment contained in runoff water. Excavated basins may be employed where sites for embankment do not exist. Sediment basins serve only during the construction phase and are removed from the site when the disturbed area has been permanently stabilized.

Structure size will vary depending on the size of the drainage area, volume of sediments to be trapped, rainfall, structure location, etc. These structures can be regarded as being hazardous if constructed in areas of dense population. In these cases, it is advisable to protect them from trespassing.

Permanent sediment basins are designed to fit into the overall plan of the completed development. They may be converted to storm water retention facilities to reduce storm water discharges.

This specification does not apply to the design of permanent sediment basins.

Sr - TEMPORARY STREAM CROSSING

A temporary structure installed across a flowing stream or watercourse for use by construction equipment. The structure may consist of a pipe, bridge, or other suitable device permitting vehicular traffic without damaging stream banks and beds.

St - STORM DRAIN OUTLET PROTECTION

A paved or short section of riprap channel placed at the outlet of a storm drain system. The purpose is to reduce the velocity of water flows below storm drain outlets, and to prevent erosion from concentrated flow.

Su - SURFACE ROUGHENING

Providing a rough soil surface with horizontal depressions created by operating a tillage or other suitable implement on the contour, or by leaving slopes in a roughened condition by not fine grading them. This aids in the establishment of vegetation, reduction of runoff, and reduction of sediment.

Tp - TOPSOILING

Topsoiling areas to be vegetated by utilizing a suitable quality soil. The purpose is to provide a suitable soil medium for vegetative growth on areas where desired stands of vegetation are difficult to establish and maintain.

Wt - VEGETATED WATERWAY OR STORMWATER CONVEYANCE CHANNEL

Outlets for diversions, terraces, berms, or other structures. They may be natural or constructed, shaped to required dimensions and paved or vegetated for disposal of storm water runoff. They may be of two general cross sections: parabolic or trapezoidal. Parabolic waterways are the most commonly used. For waterways to be successful, it is essential that a protective cover of vegetation or other erosion protective measures be implemented. Flow velocities must be selected that will produce non-erosive flows within the waterway during peak discharges.

CONSTRUCTION TECHNIQUES

Other construction techniques may be employed by field personnel to assist in implementing an effective erosion control program. A few of these are discussed below.

a. **Leave Exposed Soil Surfaces Rough.** Smooth soil surfaces will erode more readily than rough ones. Therefore, cut or fill slopes should not be "dressed" or smoothed until time to establish vegetation. Cut or fill slopes may be scarified or serrated using conventional earth moving equipment to provide this roughening effect. The cleated tracks of bulldozers are effective in compacting as well as roughening cut or fill slopes.

b. **Selective Fill Placement.** Fills over culverts and conduits can be left in a condition to drain rain water to the upstream side of the culvert. This operation can be performed at the end of each construction day and will assist in retaining sediment on the site.

c. **Selective Clearing.** Clearing operations should be confined to the removal of timber and heavy brush only. Ground covers consisting of small plants, weeds and organic matter should be retained until the start of the grading operation.

d. **Retain Natural Sediment Traps.** Small depressions in the land surface, natural creek berms and other natural sediment traps may be preserved in a natural state until such time as building sequences will require their alteration.

e. **Retention of Natural Vegetation.** Natural Vegetation on disturbed area perimeters and adjacent to stream channels should be retained.

UNIFORM CODING SYSTEM

The following coding system chart has been developed to provide statewide uniformity for erosion and sediment control plans. A code has been assigned to each practice. This code should appear at the desired location on the plan. In some instances, more than one code will appear. For example, an area planted in temporary vegetation will eventually be established to permanent seeding. Therefore, both codes should appear on the plans at the appropriate location. A symbol also has been assigned to most practices. For certain practices it will be necessary to place both the symbol and code letter on the plans.

To assist the user, a small detail drawing and a brief description of the major characteristics of the practice have been included on the coding system chart.

CHAPTER 3
Planning and Plans