Chapter 4 - BEST MANAGEMENT PRACTICE STANDARDS

CONSTRUCTION SEQUENCE

(Temporary Practice)

Definition

A work schedule that coordinates the sequence of land-disturbing activities with the installation of erosion and sedimentation control practices.

Purpose

To reduce on-site erosion and off-site sedimentation from land-disturbing activities by installing erosion and sedimentation control practices in accordance with a planned schedule.

Conditions Where Practice Applies

All land-development projects.

Planning Considerations

In planning construction work, it may be helpful to outline all land-disturbing activities necessary to complete the proposed project. Then list all practices needed to control erosion and sedimentation on the site. These two lists can then be combined in logical order to provide a practical and effective construction sequence schedule.

The removal of existing surface ground cover leaves a site vulnerable to accelerated erosion. Good planning will reduce land clearing, provide necessary controls, and restore protective cover in an efficient and effective manner. Appropriate sequencing of construction activities can be a cost-effective way to help accomplish this goal.

Scheduling considerations are summarized in Table A. The generalized construction activities shown in the table do not usually occur in a specified linear sequence, and schedules will vary due to weather and other unpredictable factors. However, the proposed construction schedule should be indicated clearly in the erosion and sedimentation control plan.

Construction access is normally the first land-disturbing activity. Exercise care not to damage valuable trees or disturb designated buffer zones.

Next, install principal sediment basins and traps before any major site grading takes place. Erect additional sediment traps and sediment fences as grading takes place to keep sediment contained on-site at appropriate locations.

Locate key runoff-control measures in conjunction with sediment traps to divert water from planned undisturbed areas out of the traps and sediment-laden water into the traps. Install diversions above areas to be disturbed prior to grading. Place necessary perimeter dikes with stable outlets before opening major areas for development. Install additional needed runoff-control measures as grading takes place.

Install the main runoff conveyance system with inlet and outlet protection devices early, and use it to convey storm runoff through the development site without creating gullies and washes. Install inlet protection for storm drains as soon as the drain is functional to trap sediment on-site in shallow pools and to allow flood flows to safely enter the storm drainage system. Install outlet protection at the same time as the conveyance system to prevent damage to the receiving stream.

Normally, install stream stabilization, including necessary stream crossings, independently and ahead of other construction activities. It is usually best to schedule this work as soon as weather conditions permit. Site clearing and project construction increases storm runoff, often making streambank stabilization work more difficult and costly.

Table A.

Construction Activity	**Schedule Consideration**
Construction access. Construction entrance, construction routes, equipment parking areas.	First land-disturbing activity ─ Stabilize bare areas immediately with gravel and temporary vegetation as construction takes place.
Sediment traps and barriers. Sediment fences, straw bale barriers, and outlet protection.	Install principal basins after construction site is accessed. Install additional traps and barriers as needed during grading.
Runoff control. Diversions, water bars, and outlet protection.	Install key practices after principal sediment traps and before land grading. Install additional runoff-control measures during grading.
Runoff conveyance system. Stabilize streambanks, storm drains, channels, inlet an outlet protection, slope drains.	Where necessary, stabilize streambanks as early as possible. Install principal runoff conveyance system with runoff-control measures. Install remainder of system after grading.
Land clearing and grading. Site preparation ─ cutting, filling and grading, sediment basins, barriers, diversions, drains, surface roughening.	Begin major clearing and grading after principal sediment and key runoff-control measures are installed. Clear borrow and disposal areas only as needed. Install additional control measures as grading progresses. Mark trees and buffer areas for preservation.

Construction Activity	Schedule Consideration
Surface stabilization. Temporary and permanent seeding, mulching, sodding, riprap.	Apply temporary or permanent stabilization measures immediately on all disturbed areas where work is delayed or complete.
Building construction. Buildings, utilities, paving.	Install necessary erosion and sedimentation control practices as work takes place.
Landscaping and final stabilization. Topsoiling, trees and shrubs, permanent seeding, mulching, sodding, riprap.	Last construction phase-- Stabilize all open areas, including borrow and spoil areas. Remove and stabilize all temporary control measures.

Begin land clearing and grading as soon as key erosion and sediment control measures are in place. Once a scheduled development area is cleared, grading should follow immediately so that protective ground cover can be reestablished quickly. Do not leave any area bare and exposed for extended periods. Leave adjoining areas planned for development, or to be used for borrow and disposal, undisturbed as long as possible to serve as natural buffer zones.

Runoff control is essential during the grading operation. Diversions, slope drains, and outlet protection installed in a timely manner can be very effective in controlling erosion during this critical period of development.

Immediately after land clearing and grading, apply surface stabilization on graded areas, channels, dikes, and other disturbed areas. Stabilize any disturbed area where active construction will not take place for 30 working days by temporary seeding and/or mulching or by other suitable means. Install permanent stabilization measures immediately after final grading, in accordance with the vegetative plan. Temporary seeding and/or mulching may be necessary during extreme weather conditions with permanent measures delayed for a more suitable time.

Coordinate building construction with other development activities so that all work can take place in an orderly manner and on schedule. Experience shows that careful project scheduling improves efficiency, reduces cost, and lowers the potential for erosion and sedimentation problems.

Landscaping and final stabilization is the last major construction phase, but the topsoil stockpiling, tree preservation, undisturbed buffer area, and well-planned road locations established earlier in the project may determine the east of difficulty of this activity. All disturbed areas should have permanent stabilization practices applied. Unstable sediment should be removed from sediment basins and traps. All temporary structures should be removed after the area above has been properly stabilized. Borrow and disposal areas should be permanently vegetated or otherwise stabilized.

A construction schedule is shown as part of the sample erosion plan in Chapter 7, Sample Erosion, Sediment, and Storm Water Control Plan.

Design Criteria

As a minimum, the construction schedule should show the following:

1. The erosion and sedimentation control practices to be installed,

2. Principal development activities,

3. What measures should be in place before other activities are begun,

4. Schedule of operations for construction performance time.

Construction Specifications

Many timely construction techniques can reduce the erosion potential of a site, such as (1) shaping earthen fills to prevent overflows and (2) constructing additional temporary practices ahead of anticipated storms. These types of activities cannot be put on the construction sequence schedule but should be used whenever possible.

Following a planned construction schedule to control erosion should help keep field personnel aware of the possibilities of erosion prevention through construction management.

Maintenance

Follow the construction sequence throughout project development. When changes in construction activities are needed, amend the sequence schedule in advance to maintain management control.

Orderly modification assures coordination of construction and erosion control practices to minimize erosion and sedimentation problems. When major changes are necessary, send a copy of the amended schedule to the appropriate agency.