

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
WATER AND SEDIMENT CONTROL BASIN**

(No.)

CODE 638

DEFINITION

An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

PURPOSES

A water and sediment control basin may be established to:

- Improve farmability of sloping land.
- Reduce watercourse and gully erosion.
- Trap sediment.
- Reduce and manage onsite and downstream runoff.
- Improve downstream water quality.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to sites where:

1. The topography precludes installing and farming terraces with reasonable effort.
2. Watercourse or gully erosion is a problem.
3. Sheet and rill erosion is controlled by other conservation practices.
4. Runoff and sediment damage land and improvements.
5. Soil and site conditions are suitable.
6. Adequate outlets can be provided.

Water and sediment control basins shall not be used in place of terraces and other conservation measures. Where a ridge and/or channel extends beyond the detention basin or level embankment, Conservation Practice Standards

600, Terrace, or 362, Diversion, must be applied as appropriate.

CRITERIA

General Criteria Applicable to All Purposes

This practice applies to structures that have a settled fill height of 15 feet or less and 10-year frequency, 24-hour storm runoff of 10 acre-feet or less. Larger structures shall be designed using the requirements for Conservation Practice Standards 378, Pond, or 410, Grade Stabilization Structure (as appropriate).

In areas where the climate, the soils, and the crops grown are suited to terraces, water and sediment control basins may be constructed if they are to be used in combination with planned management practices. These practices (including residue management systems and crop rotations) must adequately reduce soil loss to acceptable limits in the intervals above and between the basins to prevent excessive maintenance and operation problems.

Where land ownership or physical conditions preclude treatment of the upper portion of a slope, a water and sediment control basin may be used to separate this area from and permit treatment of the lower slope.

The design must limit inundation, infiltration, and seepage to prevent crop damage and/or other problems.

Laws, rules, and regulations. This practice must conform to all federal, state, and local laws, rules, and regulations. Laws, rules, and regulations of particular concern include those involving water rights, land use, pollution control, property easements, wetlands, preservation of cultural resources, and endangered species.

Spacing. Water and sediment control basins must generally be spaced at terrace intervals (see Conservation Practice Standard 600, Terrace). Adjust spacing or include other measures needed to prevent erosion in the watercourse between basins.

If water and sediment control basins are to be used in conjunction with existing or planned terraces, the spacing shall be compatible with the appropriate terrace spacing.

Spacing design must consider embankment slope length, top width, and outlet location.

Basins may be placed at property lines, changes in land use, or other areas where needed to control head cutting--provided the soil loss in the watershed is at an acceptable level.

Alignment. The ridge or embankment of each basin shall be nearly perpendicular to the principal land slope, permitting rows to be farmed as closely on the contour as possible; but it must permit operation of modern machinery. If feasible, systems of water and sediment control basins shall be parallel.

Cross section. Embankments may consist of a broad-base configuration in which both the slopes and the top are suitable for farming or of a configuration in which 1 slope or both are steep and vegetated. Vegetated slopes shall not be steeper than 2:1. If the depth of the water impounded is 3 feet or deeper, the front slope shall not be steeper than 3:1. Slopes to be farmed shall not be steeper than 5:1.

Channel grade and velocity. Maximum channel grade and velocity for channels shall be non-erosive for the soil and planned treatment. Expected sedimentation and water surface elevations may be taken into consideration when calculating the erosion resistance of the channel. If not vegetated, the grade within the channel above the design storm water level will conform to the grade requirement contained in Conservation Practice Standard 600, Terrace.

Earth embankment. The constructed height of the embankment shall be increased 5 percent to allow for settlement. The increased height to allow for settlement shall not exceed 1 foot. The maximum settled height of the embankment must be 15 feet or less measured from natural ground at centerline of the embankment.

Minimum top width of the embankment shall be as follows:

Fill Height (feet)	Effective Top Width (feet)
0 - 5	4
5 - 10	6
10 - 15	8

Foundation cutoff and seepage control.

Portions of basin ridges designed to impound more than a 3-foot depth of water against the embankment must include foundation cutoff and seepage control as required by the Conservation Practice Standard 378, Pond.

Capacity. The capacity of the basin shall be large enough to control the runoff expected for a 10-year, 24-hour frequency storm from the contributing drainage area. A minimum of 0.5 foot shall be added to the design height for freeboard. Unless provisions are made for periodically cleaning the basin to maintain the design capacity, the capacity shall be increased to permit storing the anticipated 10-year sediment accumulation.

The capacity of basins designed to provide flood protection or to function with other structures shall be adequate to control a storm of a frequency consistent with the potential hazard.

Standard floodrouting procedures may be used to determine pipe size and storage requirements. An accepted procedure is in the Kansas Supplement to Chapter 8 of National Engineering Handbook Part 650, Engineering Field Handbook. The Storage Terrace Program (or equivalent) may be used and is found in the electronic Field Office Technical Guide (eFOTG) Section IVB, Tools.

End closures. Water and sediment control basins shall have ends closed to the elevation needed for the design capacity.

Outlets. Water and sediment control basins must have spillways, underground outlets, or soil infiltration outlets that conform to Conservation Practice Standards 378, Pond; 412, Grassed Waterway; 362, Diversion; or 620, Underground Outlet, as appropriate.

Topsoil. Where necessary to restore or maintain productivity, topsoil must be stockpiled and spread over disturbed areas.

Vegetation. Disturbed areas that are not to be farmed shall be established to grass as soon as practicable after construction. Non-vegetative means such as mulches or gravel may be used if soil or climatic conditions preclude the use of vegetation. Seedbed preparation and seeding, fertilizing, and mulching rates shall comply with recommendations in the Conservation Practice Standards 342, Critical Area Planting, and 484, Mulching. The sod shall be maintained, and trees and brush shall be controlled by chemical or mechanical means.

CONSIDERATIONS

Water and sediment control basins should be part of a resource management plan including such practices as terraces, grassed waterways, contouring, a conservation cropping system, conservation tillage, and crop residue management.

Where possible, the basin should be configured to enhance sediment deposition. This can be accomplished by the selected inlet and outlet and the length to width ratio.

The detention time for basins should be a minimum of 4 hours and a maximum of 48 hours (based on site conditions).

The controlled overflow (when the design storm is exceeded) should be planned to occur where the landscape can best accept the flowage.

The design should support farmability by limiting short point rows or sharp curves. Field boundaries and row lengths should also be considered in planning basin location and row direction.

Effects on streams and wetlands must be considered. Mitigation may be required where water is diverted or degraded for downstream uses.

This practice can be used to develop/enhance seasonally ponded areas for migratory waterfowl.

Where possible, the design should enhance habitat for native and endangered species. Effects on downstream water quality and temperature may be critical for some species.

Safety in the operation of vehicles and farm equipment should be considered when selecting cut and fill slopes, especially where cropping or haying is planned.

PLANS AND SPECIFICATIONS

Plans and specifications for installing sediment and water control basins must conform to requirements of this standard and must describe requirements for applying the practice and achieving its intended purpose.

OPERATION AND MAINTENANCE

A site-specific operation and maintenance (O&M) plan must be prepared for and reviewed with the landowner or operator. The plan shall contain guidance to maintain the embankment, design capacity, vegetative cover, and outlet.

All plans shall include a provision that, after each large storm, basins must be inspected and needed maintenance performed. When sediment storage is full, accumulated sediment must be removed or the basin must be redesigned and modified to raise the ridge to restore capacity. Excavations for fill material shall be made in a manner that enhances the topography and suitability of the area for farming.

Where designs include underground outlets, O&M plans should include checking for clogging and/or pipe damage. Each inlet must be kept clean and sediment redistributed so that the inlet is in the lowest place. Inlets damaged or cut off by farm machinery must be replaced or repaired immediately.