Water and Sediment Control Basin (WASCOB) (No.) 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 (WASCOB) may be applied as part of a conservation system to support one or more of the following purposes:

- 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 is generally irregular.
2. Watercourse or gully erosion is a problem.
3. Sheet and rill erosion in the contributing watershed is controlled by other conservation practices.
4. Runoff and sediment damage land and improvements.
5. Soil and site conditions are suitable for installation.
6. Adequate outlets are readily available or can be provided.

CRITERIA

General Criteria Applicable To All Purposes

The conservation system must reduce soil loss in the interval above and below the basin to prevent excessive maintenance and operation problems.

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

The design drawdown time must limit the basin inundation time so as to prevent crop damage, excess infiltration into and seepage through the embankment, and/or other problems. The drawdown time to completely empty the basin shall not exceed 48 hours. Certain crops may require drawdown times as short as 12 hours.

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

Spacing. The spacing shall be set to prevent watercourse or gully erosion between the WASCOBs. The maximum spacing for WASCOBs used for erosion control shall be determined by one of the following methods:

1.) V.I. = xs + y
2.) H.I. = (xs + y)(100/s)

Where:

V.I. = Vertical Interval in Feet
H.I. = Horizontal Interval in Feet
x = 0.8 north of Pentwater-Tawas City line
x = 0.7 south of Pentwater-Tawas City line
s = land slope, percent
y = a variable with values from 1.0 to 4.0
Values of y are influenced by soil erodibility, cropping system, and crop management practices.
y = 1.0 for erodible soils with tillage systems that provide little or no residue cover during periods of intense rainfall.

y = 4.0 for erosion-resistant soils with tillage systems that provide a large amount of residue cover (1.5 tons/acre straw equivalent) on the surface.
y = 2.5 where one of the above factors is favorable and the other is unfavorable.

Other y values between 1.0 and 4.0 may be used according to the estimated quality of the factors.

Spacing may be increased up to 20% to provide better alignment or location, or to adjust for farm machinery. In no case shall the maximum horizontal spacing exceed that shown in Table 1 for the conditions shown. The minimum horizontal spacing shall be 90 feet.

Adjust spacing or include other measures needed to prevent erosion in the watercourse between basins.

The system of basins and row arrangements shall be parallel where possible, and spaced to accommodate farm machinery widths and crop row spacing. Spacing design must consider embankment slope lengths, top width, and surface inlet location.

Table 1. – Maximum horizontal spacing for WASCOBS

Slope, %	Spacing, Feet (35<R<175) R = Rainfall Factor	Spacing, Feet (with Contour Stripcropping)
0 to 2	500	N/A
>2 to 6	400	N/A
>6 to 9	300	N/A
>9 to 16	250	N/A
>12	200	150

Alignment. The embankment orientation and row direction shall be approximately perpendicular to the land slope to permit contouring to the greatest extent possible. Embankment end closure sections suitable to farm and not parallel to the main dike section may be used. The arrangement should permit farmability without excessive point rows or sharp curves.

Earth Embankment Cross Section. Embankment slopes shall not be steeper than two (2) horizontal to one (1) vertical. For portions of the embankment extending beyond the basin and controlling only flowing water 3 feet deep or less, both embankment slopes may be 2H:1V or flatter. For all other portions of the basin, the sum of the upstream and downstream slopes must be 5H:1V or flatter. Slopes may be vegetated or flattened to permit cropping. Slopes to be cropped should be 8H:1V or flatter. Minimum effective top widths are shown below.

Fill Height (feet)	Effective Top Width (feet)
0 – 5	3
5 - 10	6
10 –15	8

The effective top width is the embankment width at the design minimum top elevation required to achieve the design storage capacity. The embankment may be over-built higher than the design top elevation with a constructed top width narrower than shown above, as long as the minimum required top width is achieved at the design elevation.

Constructed embankment height must be at least 5% greater than design height to allow for settlement. The maximum settled height of the embankment must be 15 feet or less measured from natural ground at centerline of the embankment. Embankment end closures that will be farmed shall be constructed a minimum of 0.5 feet higher than the design top elevation of the main embankment section.

Foundation cutoff and seepage control. Portions of basin ridges designed to impound more than a 3-foot depth of water must include foundation cutoff and seepage control as required by the NRCS conservation practice standard for Pond (378).

Capacity. As a minimum, WASCOBs must have capacity to prevent embankment overtopping by runoff from a 10-year frequency, 24-hour duration storm. Flood routing may be considered in determining the design storage capacity needed. The capacity of WASCOBs designed to provide flood protection or to function with other structures may be larger and shall be adequate to control the runoff from a storm of a frequency that is consistent with the potential hazard.

In addition to the above storage, basins must have capacity to store at least the anticipated 10-year

sediment accumulation, or periodic sediment removal must be provided to maintain the required capacity.

Embankment ends must be closed to an elevation that will contain the design capacity, or as required under "earth embankment cross section." Freeboard may be added to design height to provide for safe operation of auxiliary spillways. Auxiliary spillways must not contribute runoff to a lower basin (or pond) except where the lower basin (or pond) is designed to control the flow.

Outlets. Water and sediment control basins must have spillways, underground outlets or soil infiltration outlets that conform to NRCS conservation practice standards for Pond (378), Grassed Waterway (412), Diversion (362) or Underground Outlet (620) 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 cropped must be established to appropriate vegetation or otherwise protected from erosion using organic or gravel mulch or other measures.

Selection of vegetation species must consider environmental quantity and quality, endangered species needs, and wildlife food and habitat needs. Use vegetation adapted to the site that will accomplish the desired purpose. Preference shall be given to native species in order to reduce the introduction of invasive plant species; provide management of existing invasive species; and minimize the economic, ecological and human health impacts that invasive species may cause. If native plant materials are not adaptable or proven effective for the planned use, then non-native species may be used. Refer to the FOTG Section II, Invasive Plant Species, for plant materials identified as invasive species. Seedbed preparation, fertilizing, seeding, and mulching must be in accordance with NRCS conservation practice standards for Critical Area Planting (342) and Mulching (484).

CONSIDERATIONS

Consider the potential effects of installation and operation of WASCOBs on the cultural, archeological, historic and economic resources.

Water and sediment control basins should be part of a conservation system including such practices as 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 using flow deflectors, inlet and outlet selection, and by adjusting the length to width ratio.

Excavations for fill material should be made in a manner that enhances the topography, basin storage capacity and suitability of the area for farming when possible.

Field boundaries and row lengths should be considered in planning basin location and row direction.

Effects of delivery of manure-contaminated water through outlets should be considered in nutrient management plans.

Effects on streams and wetlands should be considered.

Where possible, the design should enhance habitat for native and endangered species.

Operation safety of vehicle and farming equipment should be considered when selecting cut and fill slopes, especially where cropping or haying is planned. Where sideslopes will be permanently vegetated and mowed frequently, consider building embankment sideslopes to 4H:1V or flatter.

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.

Support data documentation requirements are as follows:

- Inventory and evaluation records
  - Assistance notes or special report
- Survey notes, where applicable
  - Design survey
  - Construction layout survey
  - Construction check survey
- Design records
  - Physical data, functional requirements and site constraints, where applicable
  - Soils/subsurface investigation report, where applicable
- Design and quantity calculations
- Construction drawings/specifications with:
  - Location map
  - "Designed by" and "Checked by" names or initials
  - Approval signature
  - Job class designation
  - Initials from preconstruction conference
  - As-built notes
- Construction inspection records
  - Assistance notes or separate inspection records
  - Construction approval signature
- Record of any variances approved, where applicable
- Record of approvals of in-field changes affecting function and/or job class, where applicable

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be developed for this practice. The O&M plan shall be consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for the design.