NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

HILLSIDE DITCH

(Ft.)

CODE 423

DEFINITION

A channel that has a supporting ridge on the lower side, constructed across the slope at defined gradient and horizontal or vertical interval, with or without a vegetative barrier.

PURPOSE

To safely control the flow of water by diverting runoff from upland sloping areas to a stable outlet.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to steeply sloping sites where surface flow is damaging sloping upland, and there is sufficient soil depth for constructing a hillside ditch system. Hillside ditches shall not be used to provide protection to buildings, roads, or other improvements.

CRITERIA

Federal, State and Local Laws and Permits

Design and construction activities shall comply with all federal, state, and local laws, rules, and regulations governing activities in or along streams and pollution abatement, health, utility and safety activities.

The owner or operator is responsible for securing all required permits or approvals and for performing all planned work in accordance with such laws and regulations. NRCS employees are not to assume responsibility for procuring these permits, rights, or approvals, or for enforcing laws and regulations. NRCS may provide the landowner or operator with technical information needed to obtain the required rights or approvals to construct, operate, and maintain the practice.

Permits may be required from the following agencies when obstruction removal is performed within the boundaries of a stream or floodplain or if burning is required:

1. ***WV Department of Environmental Protection (Air, Land, Water and Waste, Permitting, other)***
2. ***Division of Natural Resources Office of Land and Streams***
3. ***US Fish and Wildlife Service***
4. ***WV Division of Forestry***
5. ***WV Dept. of Agriculture***
6. ***Local, state and county ordinances***

All required permits shall be approved before construction implementation.

Location. Locate hillside ditch systems to fit land conditions, soil texture, and field slope, and to drain to a stable outlet.

Outlets. Locate or establish adequate outlets prior to the construction of hillside ditches, with enough capacity to dispose of discharged water without creating an erosion hazard. An outlet may be a grade control structure, a natural or

constructed waterway, a stable watercourse, or a stable disposal area such as a well-established pasture. Criteria for grassed waterways are found in NRCS Conservation Practice Standard, Grassed Waterway (412).

Length. The maximum allowable length of ditch draining in one direction is 400 feet, unless an extension is necessary to reach a stable outlet. In no case shall a ditch exceed 500 feet in length.

Permissible velocities. Design the ditch to be compatible with the erosion resistance characteristics of soils of the site.

Maximum channel velocities shall not exceed those recommended in NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 9, Diversions.

Horizontal spacing

Use Table 1 to determine the maximum horizontal spacing.

Table 1

Land Slope (percent)	Maximum Spacing (feet)
<12	40
12-25	35
25-40	25
>40	20

Capacity

At a minimum, hillside ditches shall safely carry the peak discharge from a 10-year frequency, 24-hour duration, rainfall event.

CONSIDERATIONS

When planning this practice, consider the following as applicable:

Effects upon components of the water budget, especially effects on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

Filtering effects of vegetation on movement of sediment and dissolved and sediment-attached substances.

Short-term and construction-related effects of this practice on the quality of downstream water.

Steep fields with sandy soils may benefit more from NRCS Conservation Practice Standard, Vegetative Barrier (601), than from hillside ditches.

Potential for development of saline seeps or other salinity problems resulting from increased infiltration in the presence of restrictive layers.

Potential to affect significant cultural resources.

Effects of snowdrift and melt on water budget components.

Effects on erosion and movement of sediment, pathogens, and soluble sediment attached substances by runoff.

Effects on the visual quality of the water resources.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing hillside ditches shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

The plan shall specify the locations, grades, dimensions, quantities, and materials requirements for the hillside ditch. Provisions must be made for necessary maintenance.

As a minimum, include the following items in the plans and specifications:

- ***A plan view and map of the layout including limits of hillside ditch construction with the associated drainage area, land slope grade, ditch grade, spacing and elevation***
- ***Minimum of two typical sections of the ditch***
- ***Profile of the hillside ditch***
- ***Measures to control erosion and prevent sedimentation***
- ***Disposal methods and designated areas for disposal of trash and debris***
- ***Site stabilization requirements***
- ***Additional requirements for support data are provided in 210-VI-EFH,***

Amendment WV-45 (Nov 1996), WV5-23, "Preparation of Engineering Plans Design and Construction Support Data for Conservation Practices."

OPERATION AND MAINTENANCE

An Operation and Maintenance plan shall be prepared for use by the landowner or operator. The plan shall include provisions to address the following, as a minimum:

Maintain hillside ditch capacity, ridge height, and the outlet capacity.

Remove vegetative growth or debris interfering with the proper functioning of the ditch, as necessary.

Remove debris interfering with the outlet operation, as necessary.

Maintain well-established vegetation in the outlet at all times, to provide stability.

Maintenance and repairs should be done on a routine basis with special emphasis on inspection as soon as possible after heavy rainfall events. Sediment accumulated in the ditches shall be removed and disposed of properly, as needed, to maintain the required minimum cross section and grade.

REFERENCES

Temple, D.M., K.M. Robinson, R.M. Ahring, A.G. Davis. 1987. Agriculture Handbook 667, Stability Design of Grass-Lined Open Channels. USDA-Agricultural Research Service.