



**Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD**

HILLSIDE DITCH

Code 423

(ft)

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

This practice is applied 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 sites where—

- The topography is steeply sloping.
- Surface flow is damaging sloping upland.
- There is sufficient soil depth for construction.

Do not use a hillside ditch to provide protection to buildings, roads, or other improvements.

CRITERIA

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 constructing a hillside ditch, 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. For a grassed waterway outlet, use criteria in Conservation Practice Standard (CPS) Grassed Waterway (Code 412) and for grade control structures use the criteria in CPS Grade Stabilization Structure (Code 410).

Length

The maximum allowable length of a hillside ditch draining in one direction is 400 feet unless an extension is necessary to reach a stable outlet, in which the maximum distance is 500 feet.

Permissible velocities

Limit design velocities in the ditch to be compatible with the erosion resistance characteristics of soils of the site. Use guidance in NEH Part 650 EFH, Chapter 9, Diversions to determine maximum design velocities.

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, design a hillside ditch to convey 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 CPS Vegetative Barrier (Code 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.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for constructing hillside ditches that describe the requirements for applying the practice to achieve its intended purpose. As a minimum, include—

- A plan view of the layout of the hillside ditch system.
- A profile of the channel grade.
- Typical cross sections.
- Quantities.
- Material requirements.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for the operator. The minimum requirements in the operation and maintenance plan are—

- Maintain hillside ditch capacity, ridge height, and outlet capacity by removing sediment accumulated in the ditches.
- Remove vegetative growth or debris interfering with the proper functioning of the ditch.
- Remove debris interfering with the outlet operation, as necessary.

- Maintain well-established vegetation in the outlet at all times to provide stability.
- Perform maintenance and repairs on a routine basis with special emphasis on inspection as soon as possible after heavy rainfall events.

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.

USDA NRCS. National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 9, Diversions.