

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

SURFACE DRAINAGE, FIELD DITCH

(Ft.)

CODE 607

DEFINITION

A graded ditch for collecting excess water in a field.

- Require control of the water table.
- Have adequate outlets available for disposal of drainage water by gravity flow or pumping.

SCOPE

This standard applies to drainage ditches installed to collect water from a field. It does not apply to Surface Drainage, Main or Lateral (608) or to Grassed Waterways or Outlets (412).

CRITERIA

Drainage field ditches shall be planned as integral parts of a drainage system for the field served and shall collect and intercept water and carry it to an outlet with continuity and without ponding.

PURPOSE

To drain surface depressions; collect or intercept excess surface water, such as sheet flow, from natural and graded land surfaces or channel flow from furrows and carry it to an outlet; and collect or intercept excess subsurface water and carry it to an outlet.

Investigations

An adequate investigation shall be made of all sites.

Location

Ditches shall be established, insofar as topography and property boundaries permit, in straight or nearly straight courses. Random alignment may be used to follow depressions and isolated wet areas of irregular or undulating topography. Excessive cuts and the creation of small irregular fields shall be avoided.

On extensive areas of uniform topography, collection or interception ditches shall be installed as required for effective drainage.

CONDITIONS WHERE PRACTICE APPLIES

Applicable sites are flat or nearly flat and:

- Have soils that are slowly permeable (low permeability) or that are shallow over barriers such as rock or clay, which hold or prevent ready percolation of water to a deep stratum.
- Have surface depressions or barriers that trap rainfall.
- Have insufficient land slope for ready movement of runoff across the surface.
- Receive excess runoff or seepage from uplands.
- Require the removal of excess irrigation water.

Design

The size, depth, side slopes, and cross section area shall:

- Be adequate to provide the required drainage for the site.
- Permit free entry of water from adjacent land surfaces without causing excessive erosion.

- Provide effective disposal or reuse of excess irrigation water (if applicable).
- Conduct flow without causing excessive erosion.
- Provide stable side slopes based on soil characteristics.
- Permit crossing by field equipment if feasible.
- Permit construction and maintenance with available equipment.

Drainage field ditches shall be planned to be perpendicular to the rows, if practical. Plow furrow (quarter) drains or shallow “V” drains (0.3 foot or more in depth and 3 feet or more in width) may be used in lieu of standard drainage field ditches on lands that have continuous grade in the direction of drainage. The shallow “V” drains are maintained by blade equipment or by plow furrows (quarter drains). These shallow “V” drains may be reported as “drainage Field Ditches.”

Location

- Single drainage field ditches are preferable in most locations; however, double ditches may be needed in some locations. Locate ditches in depressions that pond water on lands with varying natural slopes and undulating topography.
- Locate ditches or drains at the lower end of rows on land with uniform sloping natural topography and on graded lands.
- Locate ditches or drains next to turnrows, roads, drainage mains and laterals, between field segments that have been leveled in planes of different elevations or at other physical barriers, and at changes in soil type.

In planning land leveling and land grading it is a must that drainage be planned as part of the leveling or grading operation. On fields that cannot be economically leveled graded with side fall, the landowner should consider leveling or grading a strip 50 feet or more in width at the lower end of the field with a minimum side fall of 0.05 foot per 100 feet. This procedure will establish a continuous grade in the direction of drainage and will permit the farmer to use a shallow “V” drain or

plow furrow at the end of the rows, instead of a standard drainage field ditch.

Depth and Side Slopes

The design depth and side slopes will depend on how each individual farmer plans to utilize the drains in his farming operation.

In lieu of using standard drainage field ditches as discussed below, shallow “V” drains or plow furrows should be used on land that have continuous grade in the direction of drainage.

If standard drainage field ditches are used on row cropland, the following types of ditches with corresponding depths and side slopes will allow the planning technician to recommend the type that will best suit each individual farmer.

- Ditches where rows will not be cultivated across the ditch – side slopes may vary from 4:1 to 20:1 or flatter and must not be steeper than 8:1. Minimum depth shall be 0.5 foot and must average not less than 0.8 foot.
- Ditches where rows will be cultivated across the ditch – side slopes are recommended to be 20:1 or flatter and must not be steeper than 8:1. Minimum depth shall be 0.3 foot and must average not less than 0.5 foot.
- Ditches at the end of rows next to roads or other physical barriers – recommended side slope adjacent to the rows in 20:1 and the opposite slope should be stable with a 1:1 slope, approximately.
- For standards on drainage field ditches for draining pasture land by corrugating, see Engineering Standard for Bedding (crowning or Corrugating).

Grade

Grade is the most important feature of shallow “V” drains and standard drainage field ditches; therefore, it is important that these ditches be constructed with a continuous grade throughout the entire length of the ditch. A grade of 0.1 foot per hundred feet is recommended. The minimum average grade should be 0.05 foot per hundred feet. Grades shall be such as not to cause excessive erosion.

Layout, Construction, and Maintenance

Procedures for drainage field ditch layout, construction, and maintenance are given in the Engineering Field Manual for Conservation Practices.

CONSIDERATIONS

When planning this practice, the following items should be considered where applicable:

- Potential impacts on downstream flows or aquifers that would affect other water uses or users.
- Potential water quality impacts for soluble pollutants, sediments and sediment-attached pollutants.
- Potential for uncovering or redistributing toxic materials.
- Impacts on cultural resources
- Effects on wetlands or water-related wildlife habitats.
- Effects of water level control on soil water, downstream water temperature or salinity of soils.
- The need for riparian buffers, filter strips and fencing.
- Effects on water budget components, especially the relationships between runoff and infiltration.
- The effects of changes in the water table on the rooting depth for anticipated land uses.

- Downstream effects of erosion and yields of sediment and sediment-attached substances.
- Effects on the salinity of the soil in the drained field.
- Effects on the loadings of dissolved substances downstream.
- Potential changes in downstream water temperature.
- Effects on the visual quality of downstream water courses.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing drainage field ditches shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

A site-specific operation and maintenance plan shall be provided to and reviewed with the landowner(s) before the practice is installed.

The plan shall adequately guide the landowner(s) in the routine maintenance and operational needs of the ditch(es). The plan shall also include guidance on periodic inspections and post-storm inspections to detect and minimize damage to the ditch(es).