

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
SURFACE DRAIN, FIELD DITCH
(Feet)

CODE 607

DEFINITION

A graded ditch for collecting excess water in a field.

PURPOSE

This practice may be applied as part of a resource conservation system to achieve one or more of the following:

- Interception of excess subsurface water and conveyance to an outlet.
- Collection or interception of excess surface water, such as sheet flow from natural and graded land surfaces or channel flow from furrows, and conveyance to an outlet.
- Drainage of surface depressions.

CONDITIONS WHERE PRACTICE APPLIES

The practice is applicable to sites that:

- Have soils that are slowly permeable (low permeability) or are willow 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.
- Require control of the water table.

CRITERIA

General Criteria Applicable to All purposes

Use of this standard will comply with all applicable federal, state, and local laws and regulations.

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

Investigations. An investigation will be made to assure adequate outlets are available for discharge of drainage water by gravity flow or pumping.

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

Size. The size of field ditch will be computed by applying Manning's formula.

Velocity. The design velocity will not exceed the maximum velocity contained in Table 14.3 of NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage).

Capacity. A field ditch will have at minimum the capacity to handle the "C" drainage curve before having out of bank flow. The "C" drainage curve capacity is found in Figure 14-4a, Indiana supplement to Chapter 14 of the Engineering Field Handbook.

The design for the ditch may be made from tables or charts based on Manning's formula for non-vegetated channels or on retardance values for vegetated channels. Non-vegetated

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ditches should be based on appropriate “n” values of .045 or less. Ditches that are farmed with adjoining cropland may be considered non-vegetated ditches. When vegetated, establish according to Indiana (IN) Field Office Technical Guide (FOTG) Standard (342) Critical Area Planting.

Side slopes will be 2:1 or flatter. If the ditch is to be crossed with farm equipment, the side slopes will be 6:1 or flatter.

Criteria Applicable to Interception of Excess Subsurface Water

Depth, Spacing, and Location. The depth, spacing, and location of field ditches will be based on site conditions, including soils, topography, ground water conditions, crops, land use, outlets, and saline or sodic conditions.

Criteria Applicable to Collection or Interception of Excess Surface Water

The capacity, size, depth, side slopes, and cross sectional area will be based on the Drainage and Wet Soil Management Guide. If local information is not available, use the information contained in NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage).

CONSIDERATIONS

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

- Ditches will 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 will be avoided.
- Permit free entry of water from adjacent land surfaces without causing excessive erosion.
- Permit crossing by field equipment if feasible.
- Provide effective removal or reuse of excess irrigation water.
- Potential water quality impacts for soluble pollutants, sediments and sediment-attached pollutants.
- Potential for uncovering or redistributing toxic materials.
- Effects on wetlands or water-related wildlife habitats.
- Potential benefits of Drainage Water Management, including reduction of nutrient concentrations, improved plant productivity, and providing seasonal wildlife habitat.
- Potential effects of Drainage Water Management on downstream water temperatures 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.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing drainage field ditches will be in keeping with this standard and will describe the requirements for properly installing the practice to achieve its intended purpose. At a minimum, plans and specifications will include:

1. Plan view of layout of field ditch.
2. Profile and grade of field ditch.
3. Cross section of field ditch.

OPERATION AND MAINTENANCE

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

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

REFERENCES

National Engineering Handbook, Part 650,
Engineering Field Handbook, Chapter 14,
Water Management (Drainage).

Drainage and Wet Soil Management, Drainage
Recommendations for Indiana Soils, Purdue
Publication AY-300, Franzmeier, Hosteter,
Roeske, 2001