



**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**SURFACE DRAIN, FIELD DITCH**

(Feet)  
Code 607



**DEFINITION**

A graded channel on the field surface for collecting excess water.

**PURPOSE**

This practice is applied for one or more of the following purposes:

- To intercept excess surface and shallow subsurface water from a field, conveying it to a surface main or lateral.
- To collect excess irrigation water for a tailwater reuse system.

**CONDITIONS WHERE PRACTICE APPLIES**

This standard applies to fields having one or more of the following conditions:

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

- Soils with low permeability or shallow barriers, such as rock or clay, which impede percolation of water to a deep stratum.
- Surface depressions or barriers that trap rainfall.
- Areas of insufficient land slope for sufficient movement of runoff across the surface.
- Excess runoff or seepage from uplands.
- Excess irrigation water.

## CRITERIA

### General Criteria Applicable To All Purposes

Impact to cultural resources, wetlands and Federal and state protected species shall be evaluated and avoided or minimized to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

All planned work shall comply with Federal, State, and local laws, rules and regulations. The landowner(s) shall be responsible for obtaining and complying with all applicable permits.

If wetlands are present then complete an appropriate wetland determination per established procedures.

Plan the field ditch as an integral part of a drainage system for the field served. Design the field ditch to collect and intercept water and convey it to an adequate outlet with continuity and without ponding. Design the field ditch to permit free entry of water from adjacent land surfaces without causing excessive erosion.

**Investigations.** Investigate the site to ensure adequate outlets are available for discharge of drainage water by gravity flow or pumping.

**Location.** Surface drain pattern, length, and location will depend on topography. Install collection or interception ditches as required for effective drainage.

**Capacity.** Size the capacity of the surface drain to provide for the removal of excess water, based on climatic and soil conditions and the needs of crops. Base the design capacity on the watershed area; the topographic, soil, and land use information; and use of the appropriate drainage curves or coefficients. Compute the size of the surface drain using Manning's formula.

**Velocity.** Design the surface drain so as not to exceed the maximum velocity contained in Table 14.3 of NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage). Depending on the velocity of the drain, account for additional capacity for accumulation of sediment deposit through the life of the conservation practice

### Criteria Applicable to Collection of Excess Surface Water

**Capacity.** Base the depth, spacing, and location of field ditches on site conditions, including soils, topography, ground water conditions, crops, land use, outlets, and saline or sodic conditions. Use hydrologic models as appropriate to the conditions.

### Criteria Applicable to Interception of Excess Shallow Subsurface Water

**Capacity.** Determine the required capacity using one or more of the following methods:

- Application of drainage coefficients to the acreage drained taken from the State drainage guide, if available. Include added capacity required to convey the calculated volume of surface water.
- Measurement of the rate of shallow subsurface flow at the site during a period of adverse precipitation and groundwater conditions.

- Estimates of locally tried and proven lateral shallow subsurface flow rates.

**Depth, Spacing, and Location.** Base the capacity, size, depth, side slopes, and cross sectional area on the State Drainage Guide recommendations, if available. If State or local information is not available, use the information contained in NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage).

#### **Criteria Applicable to Collection of Excess Irrigation Water**

Base the capacity, size, depth, side slopes, and cross-sectional area on guidance in the State irrigation guide or local information of potential runoff volume for the current irrigation system.

Apply all reasonable measures to minimize irrigation runoff.

Add additional capacity for surface runoff that occurs outside the irrigation season, if that runoff water is available for collection.

#### **CONSIDERATIONS**

When planning this practice, consider the following items as applicable:

- Establish ditches, insofar as topography and property boundaries permit, in straight or nearly straight courses. Use random alignment may be used to follow depressions and isolated wet areas of irregular or undulating topography. Avoid excessive cuts and the creation of small irregular fields.
- Allow crossing by field equipment if needed and feasible.
- 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.
- Potential benefits of drainage water management, including reduction of nutrient concentrations, improved plant productivity, and enhancement of seasonal wildlife habitat.
- Potential benefits 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**

Prepare plans and specifications for constructing the drainage field ditches in keeping with this standard and describing the requirements for constructing the practice to achieve its intended purpose.

The plans and specifications shall include, but not limited to, the following:

- Overall plan view, with location and spacing of field ditches, including spoil placement.
- Profile of the field ditches with grade and critical elevations shown.
- Typical cross section of field ditches, including spoil placement.
- Direction and grade of field ditches.
- Profile, cross section and details of all structures required.
- Type, quantity, and quality of materials used for structures.
- Exclusion requirements for livestock.
- Spoil spreading requirements.

- Location of spoil areas.
- Disposition of unsuitable excavated material.
- Vegetative requirements.
- Location of utilities and notification requirements.

### **OPERATION AND MAINTENANCE**

Provide a site specific operation and maintenance (O&M) plan to the landowner or operator before the practice is installed.

The O&M plan shall document and provide guidance the landowner(s) in the required inspections and needed actions for routine maintenance and operational needs of the ditch(es) to ensure the practice performs adequately throughout its expected life.

The O&M plan shall include as a minimum, but not limited to, the following requirements:

- Maintain ditch cross section and gradient.
- Immediately remove silt deposits, obstructions, or blockage of the drainage system that includes channel spillways, trash racks, inlets, or outlets.
- Control the growth of vegetative materials by the use of herbicides and/or mowing. Avoid direct drainage water contact with herbicides.
- Remove all foreign debris that hinders drainage system operation.
- Install and maintain fences to control livestock access when adjacent fields are used for pasture.
- Replace damaged or inoperable structures.
- Immediately repair any vandalism, vehicular, or livestock damage.

### **REFERENCES**

Florida NRCS Conservation Practice Standard, Surface Drainage, Main or Lateral, Code 608

General Manual

Title 420-Part 401

Title 450-Part 401

Title 190-Parts 410.22 and 410.26

National Cultural Resources Handbook

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

National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage), Appendix FL 14G, Florida NRCS Drainage Guide.

National Environmental Compliance Handbook

National Food Security Act Manual

National Planning Procedures Handbook

Florida Supplements to Parts 600.1 and 600.6