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

To collect or intercept:

- Excess surface water, such as sheet flow from natural and graded land surfaces or channel flow from furrows and convey it to an outlet.
- Excess subsurface water and convey it 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 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 reuse of irrigation tailwater.
- Require control of the water table.
- Have adequate outlets available for disposal of drainage water by gravity flow or pumping.

This standard does not apply to the drainage of natural wetland areas.

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.

Plan field ditches as an integral part of a drainage system for the field to intercept, collect and convey water to an adequate outlet with continuity and without ponding. Design outlets to conform with Florida NRCS conservation practice standard Surface Drainage, Main or Lateral, Code 608.

Investigations. Make an adequate investigation to assure suitable outlets are available for discharge of drainage water by gravity flow or pumping.

Location. On extensive areas of uniform topography, install field ditches as required for effective drainage.

Design. Mannings equation shall be used to size the field ditch. Velocity shall 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).

The size, depth, side slopes, cross sectional area, and spacing shall:

- Be adequate to provide the required drainage for the site. The Florida NRCS Drainage Guide provides recommended depths and spacing for various crops and soils.
- Permit free entry of water from adjacent land surfaces without causing excessive erosion.
- Provide effective reuse of irrigation tailwater (if applicable).
- Convey 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.

Criteria Applicable to Interception of Excess Subsurface Water

Capacity. One or more of the following shall determine the required capacity:

- Application of locally tried and proven drainage coefficients to the acreage drained, including added capacity required to dispose of surface water entering through inlets.
- Yield of ground water based on the expected deep percolation of irrigation water from the overlying fields, including the leaching requirement.
- Comparison of the site with other similar sites where subsurface drain yields have been measured.
- Measurement of the rate of subsurface flow at the site during a period of adverse precipitation and ground water conditions.
- Application of Darcy's law to lateral or artesian subsurface flow.
- Estimates of lateral or artesian subsurface flow.

Design Depth. The depth, spacing, and location of field ditches shall 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 shall be based on the Florida NRCS Drainage Guide recommendations. 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 where applicable:

- Establish ditches, 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. Avoid excessive cuts and the creation of small irregular fields shall be avoided.
- Permit free entry of water from adjacent land surface without causing excessive erosion.
- Permit crossing by field equipment if feasible.
- Provide effective removal or reuse of excess irrigation water.
- 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.
- Effects on wetlands or water-related wildlife habitats.
- Effects of drainage water management on 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.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing field ditches shall comply with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose. As a minimum, the plans shall include:

- 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 utilites and notification requirements.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance (O&M) plan for use by the landowner or operator responsible for each drainage system installed.

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

O&M requirements shall be included as an identifiable part of the design. Depending on the scope of the project, this may be accomplished by brief statements in the plans and specifications, the conservation plan narrative, or as a separate O&M plan.

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).

The O&M plan as a minimum shall include the following requirements:

- Maintain cross section and gradient by controlling channel erosion and sloughing.
- 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 system operation.
- Install and maintain fences to control livestock access when adjacent fields are used for pasture.
- Replace weathered or displaced rock riprap to constructed grade.
- Immediately repair any vandalism, vehicular, or livestock damage.

REFERENCES

Florida NRCS Conservation Practice Standard,
Surface Drainage, Main or Lateral, Code 608
Florida NRCS Drainage Guide
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
Environmental Compliance Handbook
National Food Security Act Manual
National Planning Procedures Handbook
Florida Supplements to Parts 600.1 and 600.6