Surface Drainage, Field Ditch (Ft.) 607

DEFINITION

A graded ditch for collecting excess water in a field.

PURPOSE

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;
- excess subsurface water and carry it to an outlet.

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

CRITERIA

General Criteria Applicable to All Purposes

Surface Drainage Field Ditches shall be planned, designed, and installed to meet all federal, state, local and tribal laws and regulations.

Surface drainage field ditches shall be designed according to the principles set forth in the National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage), or other applicable publications and reports.

Surface 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.

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.

Design. The surface drainage field ditch capacity shall be adequate to provide for the removal of excess water, based on climatic and soil conditions and the needs of crops. Surface drain field ditches shall be designed according to the principles set forth in the National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage), Section 650.1410.

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. Where field operations will cross the ditch, the side slopes shall be 8H:1V or flatter.

- Permit construction and maintenance with available equipment.

Outlet. The surface drainage field ditch shall have a stable outlet with adequate capacity to discharge the degree of drainage from the site.

Vegetation. Areas requiring vegetation after installation of Surface Drainage Field Ditches shall be vegetated according to the NRCS conservation practice standard Critical Area Planting (342). Use vegetation adapted to the site that will accomplish the desired purpose. Preference shall be given to native species in order to reduce the introduction of invasive plant species; provide management of existing invasive species; and minimize the economic, ecological, and human health impacts that invasive species may cause. If native plant materials are not adaptable or proven effective for the planned use, then non-native species may be used. Refer to the Field Office Technical Guide, Section II, Invasive Plant Species, for plant materials identified as invasive species.

CONSIDERATIONS

Consider the potential effects of installation and operation of Surface Drainage Field Ditches on the cultural, archeological, historic and economic resources.

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.
- Effects on wetlands or water-related wildlife habitats.
- Effects of water lever 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.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

Support data documentation requirements are as follows:

- Inventory and evaluation records
  - Assistance notes or special report
- Survey notes, where applicable
  - Design survey
  - Construction layout survey
  - Construction check survey
- Design records
  - Physical data, functional requirements and site constraints, where applicable
  - Soils/subsurface investigation report, where applicable
- Design and quantity calculations
- Construction drawings/specifications with:
  - Location map
  - "Designed by" and "Checked by" names or initials
  - Approval signature
  - Job class designation
  - Initials from preconstruction conference
  - As-built notes
- Construction inspection records
  - Assistance notes or separate inspection records
  - Construction approval signature
- Record of any variances approved, where applicable
- Record of approvals of in-field changes affecting function and/or job class, where applicable.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be developed for this practice. The O&M plan shall be consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for the design.