

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

**Surface Drainage, Field Ditch
(FT)
No. 607**

Definition

A graded ditch for collecting excess water in a field.

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.

Conditions Where Practice Applies

Applicable sites are flat or nearly flat and:

1. 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. **Refer to the Drainage Handbook for West Virginia for applicability of surface drainage and design information.**
2. Have surface depressions or barriers that trap rainfall.
3. Have insufficient land slope for ready movement of runoff across the surface.
4. Receive excess runoff or seepage from uplands.
5. Require the removal of excess irrigation water.
6. Require control of the water table.
7. Have adequate outlets available for disposal of drainage water by gravity flow or pumping.

Federal, State, and Local Laws¹

Design and construction activities shall comply with all federal, state, and local laws, rules, and regulations governing pollution abatement, health, and safety. The owner or

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operator shall be responsible for securing all required permits or approvals and for performing in accordance with such laws and regulations. NRCS employees are not to assume responsibility for procuring these permits, rights, or approvals, or for enforcing laws and regulations. NRCS may provide the landowner or operator with technical information needed to obtain the required rights or approvals to construct, operate, and maintain the practice.

Permits may be required from the following agencies:

1. **West Virginia Department of Health**
2. **West Virginia Department of Agriculture**

Planning Considerations

Water Quantity

1. Effects on water budget components, especially relationships between runoff and infiltration.
2. Effects of changes in the water table on the rooting depth for anticipated land uses.

Water Quality

1. Downstream effects of erosion and yields of sediment and sediment-attached substances.
2. Effects on the salinity of the soil in the drained field.
3. Effects on the loading of dissolved substances downstream.
4. Potential changes in downstream water temperature.

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5. Effects on wetlands or other water-related wildlife habitat.
6. Effects on the visual quality of downstream water courses.

Design 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.

Investigations. An adequate investigation shall be made of all sites.

Investigation surveys and design shall be in accordance with Chapters 1 and 5 of the Engineering Field Handbook. Installations shall be based on a plan showing locations, grades, depths, cross sections, soils, and other pertinent data.

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

1. Be adequate to provide the required drainage for the site.
2. Permit free entry of water from adjacent land surfaces without causing excessive erosion.
3. Provide effective disposal or reuse of excess irrigation water (if applicable).
4. Conduct flow without causing excessive erosion.
5. Provide stable side slopes based on soil characteristics. **Side slopes shall be 4:1 or flatter.**
6. Permit crossing by field equipment if feasible.

7. Permit construction and maintenance with available equipment.

8. Provide a nonerosive ditch. The minimum grade shall be greater than 0.0005. The elevation of the bottom of the outlet for each ditch shall be no less than 0.5 ft below the elevation of the bottom of the ditch 20 ft distant from point of discharge.

The minimum depth is specified by the Drainage Handbook for West Virginia.

Farming operations should be parallel to all ditches where feasible; in the case of cross slope ditches it is mandatory. Farm equipment may cross the field ditch. Where crossings are anticipated, 8:1 side slopes will facilitate usage.

Drainage field ditches must have sufficient capacity to carry and dispose of the runoff from the contributing watershed in sufficient time to permit crop production on the area treated. Runoff will be determined from drainage runoff curves, Exhibit 14-2, or Exhibit 14-2.1 of the Engineering Field Handbook. The minimum drainage coefficient will be the curve "C" in accordance with the Drainage Handbook for West Virginia. Curves "A" and "B" may be used where a higher degree of drainage or protection from flooding is justified.

The design for capacity and stability will be calculated by Manning's equation in accordance with the procedures outlined in detail in Chapter 14 in the Engineering Field Handbook. Capacities may be determined from Exhibit 14-6.2, Chapter 14, Engineering Field Handbook, in lieu of computed values. The shape of the ditch shall be "V" type.

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

Operation and maintenance considerations for field ditches shall be included in a

management plan for the whole drainage system, including ditches, outlets, and appurtenances. These considerations should include, but not be limited to, the following:

- 1. Periodic inspection.*
- 2. Repair of rills, gullies, and washouts, as needed.*
- 3. Mowing or selectively grazing ditches in pasture or hayland.*
- 4. Removing sediment deposits, as needed.*
- 5. Reshaping of ditches if necessary after several years.*

¹*Bold italics is information added to the National standard by West Virginia*

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE GENERAL SPECIFICATIONS**

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Field Ditch Specifications

Areas to be excavated and areas to be occupied by spoil shall be cleared of trees, brush, and other debris as required for construction and maintenance.

Ditches shall be constructed to the line, grade, and section shown on the drawings. The excavated surfaces shall be reasonably uniform and smooth.

Spoil shall be placed or graded in such a manner that surface water may enter the ditch freely without scour. Spoil shall be used to fill depressions or wasted on down slope side of ditch.

All combustible refuse shall be burned or buried. When buried, all roots, brush, stumps, stones, and similar material shall be placed a minimum of 18 inches below finished grade.

Construction shall be carried out in such a manner that erosion and air and water pollution will be minimized and held within legal limits. This shall be done by:

- 1. Placing spoil to prevent sloughing or washing into the ditch or water course.*
- 2. Keeping chemicals, fuel, lubricants, sewage, and waste materials out of the ditch and drainageways.*
- 3. Establishing vegetation on all designated areas as soon as possible after exposure or disturbance, especially on ditch side slopes. Establishment of vegetation shall be in accordance with the standard for Critical Area Planting (342).*