United States Department of Agriculture

Notice of Proposed Changes to the National Handbook of Conservation Practices for the Natural Resources Conservation Service

[Docket No. NRCS-2025-0004]
PROPOSED FULL TEXT FOR PRACTICE STANDARD CODE 388

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

IRRIGATION FIELD DITCH

CODE 388

(ft)

DEFINITION

A permanent irrigation ditch, constructed in or with earth materials, to convey water from the source of supply to a field or fields in an irrigation system.

PURPOSE

This practice is used to accomplish one or more of the following:

- Improve distribution uniformity of water applied on irrigated land.
- Improve irrigation efficiency of water applied on irrigated land.

CONDITIONS WHERE PRACTICE APPLIES

This standard is limited to open channels and elevated ditches of 25 cubic feet per second or less in capacity and constructed of earthen materials.

This standard applies where field ditches are needed as an integral part of an irrigation water distribution system designed to facilitate the conservation use of soil and water resources.

CRITERIA

General Criteria Applicable to All Purposes

Ensure water supplies and irrigation deliveries for the area served are sufficient to make irrigation practical for the planned crops and irrigation water application methods.

Construct field ditches in earthen material that contains sufficient fines to prevent excessive seepage losses and where shrinkage cracks will not endanger the ditch or cause downstream water quality problems.

Plan, design, and construct the practice to comply with all Federal, State, Tribal, and local laws and regulations. The landowner is required to obtain all necessary permits prior to construction. The landowner/contractor is responsible for locating all buried utilities in the project area.

Capacity requirements
Design field ditches with adequate capacity to deliver the—

- Design peak consumptive use of the crops to be grown in the field, with proper provisions for the expected field irrigation efficiency.
- Largest irrigation stream required for the irrigation methods planned for the field.

Design the capacity of ditches to include the additional flow necessary to compensate for losses due to ditch seepage and to safely carry surface runoff from adjacent lands that must be transported to waterways or overflow points.

For capacity design, select the value of Manning's roughness coefficient "*n*" based on the materials of the ditch, alignment, hydraulic radius, and additional retardance due to vegetation. For all ditches, use a maximum Manning's roughness coefficient "*n*" of 0.025 to ensure that velocities do not exceed permissible values.

Velocities
Design field ditches for flow velocities that are nonerosive for the soil materials in the ditch. Use local information on the velocity limit for specific soils if available. If such information is not available, do not exceed the maximum design velocity shown in NRCS National Engineering Handbook (NEH) (Title 210), Part 654, Chapter 8, "Threshold Channel Design," Figure 8–4, or another equivalent method, unless protective measures are implemented.

Cross section
For embanked field ditches the required freeboard is one-third of the maximum design depth of water, or
0.5 feet, whichever is less. Ensure side slopes are stable against slope failure. Design the top width of banks, as measured at the freeboard elevation, at least 1.0 foot and equal to or exceeding one-half the flow depth.

If a field ditch is constructed on a fill section, ensure side slopes of the fill are not steeper than the values shown in Table 1.

Table 1. Allowable Steepness of Slide Slopes for Field Ditches Constructed of Fill Material

Height of Fill to Water Surface on Centerline of Fill (feet)	Steepest Allowable Side-slope of Fill (horizontal to vertical)
< 3	1.5:1
3–6	2:1
> 6	2.5:1

Water surface elevations
Design all field ditches so that water surface elevations at field takeout points are high enough to provide the required flow onto the field surface. If ditch checks or other control structures are used to provide the necessary head, include the backwater effect in computing freeboard requirements.

The required water surface elevations above the field surfaces will vary with the type of takeout structure or device used and the amount of water delivered through each. Provide a minimum head of 4 inches.
Use energy dissipationdevices where erosion is anticipated at outlets.

Spoil
Dispose of spoil material resulting from the construction of irrigation field ditches using NRCS CPS Spoil Disposal (Code 572).

Related structures
Design and construct erosion control or water control structures, culverts, diversions, or other related structures needed to supplement the field ditch to meet the applicable NRCS conservation practice standards.

Vegetation
Establish vegetation or otherwise stabilize disturbed areas above the expected normal water elevation assoon as practical after construction. Vegetation established shall conform to NRCS CPS CriticalArea Planting (Code 342).

Cultural Resources
Evaluate the existence of cultural resources in the project area and any project impacts expected on such resources. Provide conservation and stabilization of archeological, historic, structural, and traditional cultural properties when appropriate.

CONSIDERATIONS

There are potential water quality impacts resulting from soluble and sediment-attached pollutants. These potential impacts can affect downstream flows or aquifers, which will affect other water users and aquatic life. The following items should be considered, where applicable:

- Construction of field ditches has the potential for uncovering or redistributing toxic material.
- Construction and operation of irrigation field ditches may affect wetlands or water-related wildlife habitats.
- Sediment carried in irrigation water for ditches constructed in soils that have the potential to crack may have a positive sealing effect.
- Consider the effects of water level control on the salinity of soils, groundwater, or downstream waters.
- Downstream flows or aquifers that would affect other water users or uses, including drinking water sources.
- Potential water quality impacts for soluble pollutants and attached sediment pollutants.
- Consider extent of damage associated with potential overtopping when designing freeboard.

PLANS AND SPECIFICATIONS

Describe the requirements for applying the practice to achieve its intended purpose(s). As a minimum, the plans and specifications shall include—

- Plan view and typical cross section of ditches.
- Embankment requirements.
- Channel grades.
- Appurtenant structural details.
- Location of the irrigation field ditches on the plan map.
- If applicable, provide information on recommended species of vegetative cover, establishment, and maintenance.
- Location of utilities and notification requirements.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for use by the landowner or operator. Provide specific instructions for operating and maintaining the irrigation field ditch to ensure proper function as designed.

Include—

- Performing prompt repair or replacement of damaged components.
- Removing any debris or foreign material from field ditches and other components that may obstruct or hinder system operation.
- Maintaining recommended vegetative cover on side slopes and in watercourses.
- Scheduling regular maintenance (mowing or other disturbance of vegetative cover on side slopes or in ditches) outside of the primary nesting season for local grass-nesting species.

REFERENCES

USDA NRCS. 2007. National Engineering Handbook (Title 210), Part 654, Chapter 8, Threshold Channel Design. Washington, D.C. https://directives.sc.egov.usda.gov/.