

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

IRRIGATION FIELD DITCH

(Feet)

Code 388



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

- 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 (cfs) or less in capacity and constructed of earth materials.

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

CRITERIA

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.

Water supplies and irrigation deliveries for the area served shall be sufficient for irrigation to be practical for the crops to be grown and the irrigation water application methods to be used.

Field ditches shall be constructed in soils that prevent excessive seepage losses and where shrinkage cracks will not endanger the ditch, or cause down gradient water quality problems. The sealing effect of sediment carried in the irrigation water may be considered.

Capacity requirements. Field ditches shall have adequate capacity to deliver:

1. The design peak consumptive use of the crop(s) to be grown in the field, with proper provisions for the expected field irrigation efficiency.
2. The largest irrigation stream required for the irrigation method(s) planned for the field.

The design capacity shall include additional flow required to compensate for the ditch seepage loss and to safely carry surface runoff from adjacent lands that must be transported to waterways or overflow points.

For capacity design, the value of Manning's "n" shall be selected according to the materials in which the ditch is constructed, the alignment and hydraulic radius, and the additional retardance due to vegetation.

Velocities. Field ditches shall be designed for flows that are non-erosive for the soil materials in which they are constructed. Local information on the velocity limit for specific soils shall be used if available. If such information is not available, the maximum design velocity shall not exceed those shown in NRCS National Engineering Handbook, Part 654, Figure 8-4, or other equivalent method, unless protective measures are implemented.

For checking designs to see that velocities do not exceed permissible values, a Manning's "n" no greater than 0.025 shall be used, and applicable criteria in Florida NRCS conservation practice standard Open Channel, Code 582 shall be followed.

Cross section. If control point elevations are estimated rather than computed from survey data, freeboard in field ditches shall be not less than 6 inches. If survey data is available, no freeboard is required. Side slopes shall be stable.

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

Table 1 – Ditch Side Slopes for Fill Sections

Height of fill to water surface on centerline of fill (feet)	Steepest allowable side-slope of fill (horizontal to vertical)
< 3	1½:1
3 - 6	2:1
> 6	2½:1

Water surface elevations. All field ditches shall be designed so that the 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 to be used to provide the necessary head, the backwater effect must be considered in computing freeboard requirements.

The required water surface elevation above the field surface will vary with the type of takeout structure or device used and the amount of water to be delivered through each. A minimum head of 4 inches shall be provided.

Spoil. Spoil material resulting from the construction of irrigation field ditches shall be disposed of according to Florida NRCS conservation practice standard Spoil Spreading, Code 572.

Related structures. Erosion control or water control structures, culverts, diversions, or other related structures needed to supplement the field ditch shall be designed and installed to meet NRCS standards for the particular structure and type of construction.

CONSIDERATIONS

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, other water users, or aquatic life.
- Potential water quality impacts for soluble pollutants and attached sediment pollutants.
- Potential for uncovering or redistributing toxic material.
- Impacts on cultural resources.
- Effects on wetlands or water-related wildlife habitats.
- Effects of water level control on salinity of soils, groundwater or downstream waters.
- Excavation safety during design and construction.
- Existence or non-existence of underground utilities prior to construction.
- Reduction of energy use and potential improvements to energy use efficiency.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing irrigation field ditches shall describe the

requirements for applying the practice to achieve its intended purposes. As a minimum, the plans shall include:

- Location of field ditches.
- Plan view and typical cross section of ditches.
- Grade of field ditch. Where needed, show profile of ditch.
- Spoil placement details.
- Vegetative requirements.

OPERATION AND MAINTENANCE

A site specific operation and maintenance (O&M) plan shall be prepared for use by the landowner or operator. The (O&M) plan shall provide specific instructions for operating and maintaining the irrigation field ditches to insure it functions properly. The (O&M) plan shall include the following provisions:

- Perform prompt repair or replacement of damaged components.
- Remove debris and foreign material that hinder system operation from field ditches and other components.
- Maintain recommended vegetative cover on all slopes and watercourses.
- Control undesirable vegetation on slopes, banks and in field ditches.

REFERENCES

- Florida NRCS Conservation Practice Standard, Open Channel, Code 582 Spoil Spreading, Code 572
- General Manual
 - Title 420-Part 401
 - Title 450-Part 401
 - Title 190-Parts 410.22 and 410.26
- National Cultural Resources Handbook
- National Environmental Compliance Handbook
- National Food Security Act Manual
- National Planning Procedures Handbook
 - Florida Supplements to Parts 600.1 and 600.6
- USDA-NRCS, National Engineering Handbook, Part 654, Stream Restoration Design, Chapter 8, Threshold Channel Design.