



## NATURAL RESOURCES CONSERVATION SERVICE

### CONSERVATION PRACTICE STANDARD

### STRUCTURE FOR WATER CONTROL

**Code 587**

**(No.)**

#### DEFINITION

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation, or measures water.

#### PURPOSE

Apply this practice as a component of a water management system to control the stage, discharge, distribution, delivery, or direction of water flow.

#### CONDITIONS WHERE PRACTICE APPLIES

This practice applies to a permanent structure needed as an integral part of a water control system to serve one or more of the following functions:

- Convey water from one elevation to a lower elevation within, to, or from a water conveyance system such as a ditch, channel, canal, or pipeline. Typical structures include drops, chutes, turnouts, surface water inlets, head gates, pump boxes, and stilling basins.
- Control the elevation of water in drainage or irrigation ditches. Typical structures include checks, flashboard risers, and check dams.
- Control the division or measurement of irrigation water. Typical structures include division boxes and water measurement devices.
- Keep trash, debris or weed seeds from entering pipelines. Typical structures include trash racks and debris screens.
- Control the direction of channel flow resulting from tides and high water or backflow from flooding. Typical structures include tide and water management gates.
- Control the water table level, remove surface or subsurface water from adjoining land, flood land for frost protection, or manage water levels for wildlife or recreation. Typical structures include water level control structures, flashboard risers, pipe drop inlets, and box inlets.
- Convey water over, under, or along a ditch, canal, road, railroad, or other barriers. Typical structures include bridges, culverts, flumes, inverted siphons, and long span pipes.
- Modify water flow to provide habitat for fish, wildlife, and other aquatic animals. Typical structures include chutes, cold water release structures, and flashboard risers.
- Provide silt management in ditches or canals. Typical structures include sluice gates and sediment traps.
- Supplement a resource management system on land where organic waste or commercial fertilizer is applied.
- Create, restore, or enhance wetland hydrology.

#### CRITERIA

All structures designed under this standard must comply with applicable Federal, Tribal, State, and local laws, rules, and regulations. Obtain all required permits before construction begins.

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State office](#) or visit the [Field Office Technical Guide](#). USDA is an equal opportunity provider, employer, and lender.

Seed or sod the exposed surfaces of earthen embankments, earth spillways, borrow areas, and other areas disturbed during construction in accordance with the criteria in Critical Area Planting (342).

Fence the structure, if needed, to protect the vegetation.

Structures must not have an adverse effect on septic filter fields.

The capacity of the water control structure(s) must be consistent with the level of protection desired and equal to or more than the capacity of other related components of the overall plan. Related components such as earth embankments, dikes, diversions, irrigation canals, etc., must meet the criteria of the applicable standard.

Where manufactured structures are used, the manufacturer must provide the hydraulic design.

The water level upstream of water control structures must not be raised on adjacent landowners unless authorized through a written easement, permit, or equivalent legal document.

### **Additional Criteria for Structures Designed for Wetland Restoration, Enhancement, or Creation**

Where water control structures are provided for wetland water level control, protect existing drains downstream of the site by flow control devices. Inflow will be limited to the capacity originally apportioned to the drain.

Materials must meet the requirements for Underground Outlet (620) for fill heights over the conduit of 10 feet or less. Materials for all other conditions must meet Pond (378) requirements.

If needed to prevent clogging of the conduit, install an appropriate trash guard at the inlet or riser.

Install animal guards on conduit outlets of 10 inches in diameter or smaller.

Use a drainage diaphragm or anti-seep collars for seepage control if the conduit:

- Has a smooth exterior and is larger than 8 inches in diameter.
- Has a corrugated exterior and is larger than 12 inches in diameter.
- Is installed at a depth of 5 feet or more below management pool level.

Drainage diaphragms and anti-seep collars must meet the requirements in Pond (378).

### **Safety**

Design measures necessary to prevent serious injury or loss of life in accordance with requirements of Title 210, National Engineering Manual (NEM), Part 503, Safety.

### **Cultural Resources**

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

## **CONSIDERATIONS**

Consider the following items when planning, designing, and installing this practice:

- Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
- Potential for a change in the rate of plant growth and transpiration because of changes in the volume of soil water.
- Effects on downstream flows or aquifers that would affect other water uses or users.
- Effects on the field water table to ensure that it will provide a suitable rooting depth for the anticipated crop.
- Potential use for irrigation management to conserve water.
- Effect of construction on aquatic life.

- Effects on stream system channel morphology and stability as it relates to erosion and the movement of sediment, solutes, and sediment-attached substances carried by runoff.
- Effects on the movement of dissolved substances below the root zone and to ground water.
- Effects of field water table on salt content in the root zone.
- Short term and construction-related effects of this practice on the quality of downstream water.
- Effects of water level control on the temperatures of downstream waters and their effects on aquatic and wildlife communities.
- Effects on wetlands or water-related wildlife habitats.
- Effects on the turbidity of downstream water resources.
- If watercourse fisheries are important, special precautions or design features may be needed to facilitate continuation of fish migrations.

## PLANS AND SPECIFICATIONS

Prepare plans and specifications that describe the requirements for applying the practice according to this standard. As a minimum, include:

- A plan view of the layout of the structure for water control.
- Typical profiles and cross sections of the structure for water control.
- Structural drawings adequate to describe the construction requirements.
- Requirements for vegetative establishment and mulching, as needed.
- Safety features.

The following list of Construction Specifications is intended as a guide to selecting the appropriate specifications for each specific project. The list includes most, but may not contain all, of the specifications that are needed for a specific project:

- IA-1 Site Preparation
- IA-5 Pollution Control
- IA-6 Seeding and Mulching for Protective Cover
- IA-21 Excavation
- IA-23 Earthfill
- IA-31 Concrete
- IA-45 Plastic (PVC, PE) Pipe
- IA-46 Tile Drains for Land Drainage
- IA-95 Geotextile

## OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for the operator.

As a minimum, include the following items in the operation and maintenance plan:

- Periodic inspections of all structures, earthen embankments, spillways, and other significant appurtenances.
- Prompt removal of trash from pipe inlets and trash racks.
- Prompt repair or replacement of damaged components.
- Prompt removal of sediment when it reaches predetermined storage elevations.
- Periodic removal of trees, brush, and undesirable species.
- Periodic inspection of safety components and immediate repair if necessary.
- Maintenance of vegetative protection and immediate seeding of bare areas as needed.
- Describe water level management and timing when applicable.

## REFERENCES

USDA NRCS. National Engineering Handbook (NEH), Part 636, Structural Engineering. Washington, DC.

USDA NRCS. NEH, Part 650, Engineering Field Handbook. Washington, DC.

USDA NRCS. National Engineering Manual. Washington, DC.