

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**STRUCTURE FOR WATER CONTROL**

**(No.)  
CODE 587**

**DEFINITION**

A structure in an irrigation, drainage, or other water management systems that conveys water, controls the direction or rate of flow, or maintains a desired water surface elevation.

**PURPOSE**

This practice may be applied as a part of a conservation management system to support one or more of the following purposes:

- To control the stage, discharge, distribution, or direction of water in open channels or water use areas.
- To provide for water quality control.
- To protect fish and wildlife and other natural resources.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies wherever a permanent structure is needed as an integral part of irrigation, drainage, or other water-control system to serve one or more of the following functions:

1. To convey water from one elevation to a lower elevation within, to, or from a ditch, channel, or canal. Typical structures: drops, chutes, turnouts, surface water inlets, head gates, pump boxes, and stilling basins.
2. To control the elevation of water in drainage or irrigation ditches. Typical structure: flashboard risers.
3. To control the division or measurement of irrigation water. Typical structures: division boxes and water measurement devices.

4. To keep trash, debris, or weed seeds from entering pipelines. Typical structure: debris screens.
5. To control the direction of channel flow resulting from tides and high water or backflow from flooding. Typical structure: tide and drainage gates.
6. To control the level of a water table or to remove surface or subsurface water from adjoining land or to manage water levels for wildlife or recreation. Typical structures: water level control structures, pipe drop inlets, and box inlets.
7. To provide water control for recreation or similar purposes.
8. To convey water over, under, or along a ditch, canal road, railroad, or other barriers. Typical structures: bridges, culverts, flumes, inverted siphons.
9. To modify water flow to provide habitat for fish, wildlife, and other aquatic animals. Typical structures: deflectors, chutes, cold water release, or structures to make pools and riffles.

**CRITERIA**

All planned work shall comply with all Federal, state, and local laws and regulations.

Water control structures shall be designed and constructed in conformance with provisions contained in the National Engineering Handbook (NEH) Part 650, Engineering Field Handbook for Conservation Practices, Chapter 6 - Structures, Chapter 14 - Water Management (Drainage), and Chapter 15 - Irrigation. Detailed information and criteria about water control structures are contained in the National Engineering Handbook Part 623, Section 15 - Irrigation, Chapter 3; and Part 624, Section 16 - Drainage, Chapter 6.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Structures shall be designed on an individual job basis to meet site conditions and functional requirements. They shall be part of an approved engineering plan for irrigation, drainage, wildlife, recreation, channel improvement, or similar purposes.

Structures must not create unstable conditions upstream or downstream. Water control structures installed in an open channel shall be designed to discharge the channel design flow at the designed channel hydraulic gradeline. Additional capacity needed under flood conditions shall be provided by "island" type installation. Provisions must be made for safe reentry of bypassed flow as necessary.

Where conduits are used, the diameter shall be based on design capacity but shall not be less than 6 inches in diameter. The length of the pipe shall be determined by the width and side slopes of the required embankment or roadway over the pipe and shall extend a minimum of two feet beyond the toe of the designed fill except where headwalls are used.

**Materials.** Structures installed under this standard shall be constructed of durable material with a life expectancy equal to the planned life of the structure.

**Protection.** A protective cover of vegetation shall be established on all disturbed earth surfaces. Where necessary, temporary vegetation will be used until permanent vegetation can be established. Vegetative measures including seedbed preparation, seeding, fertilizing, and mulching shall comply with NRCS conservation practice standard, Critical Area Planting, Code 342.

The structure can be fenced, if necessary to protect the vegetation.

Where needed to protect the outlet from erosion, it shall be protected with riprap or other means.

## CONSIDERATIONS

Structures located in areas used for livestock or in urban areas should be fenced as necessary to control access and exclude traffic to prevent damage to the structure from vandalism, as well as preventing serious injury to trespassers.

Where conditions preclude or make it difficult to establish vegetative cover, consider using non-vegetative coverings such as gravel, geoweb,

gabions, interlocking blocks or other type of protection.

Water control structures with detention storage may affect the volume and rates of runoff, evaporation, deep percolation and ground water recharge.

Water control structures may trap sediment and sediment attached substances carried by runoff. Consideration should be given to the amount of sediment that will be deposited and allowances made for removal.

In highly visible public areas and those associated with recreation, careful considerations should be given to landscape resources. Landforms, structural materials, water elements, and plant materials should visually and functionally complement their surroundings. Excavated material and cut slopes should be shaped to blend with the natural topography. Shorelines can be shaped and islands created to add visual interest and valuable wildlife habitat. Exposed concrete surfaces may be formed to add texture or finished to reduce reflection and to alter color contrast. Site selection can be used to reduce adverse impacts or create desirable focal points.

Where structures are used in irrigation or drainage of crops, consideration should be given to the structure's effect on the water table to ensure that a suitable rooting depth for the crop will be maintained.

Structures for water control can increase the application efficiency of subirrigation systems.

If watercourse fisheries are important, special precautions or design features may be needed to ensure continuation of fish migrations.

Structures for water control may have short term construction-related effects on the quality of downstream water.

## PLANS AND SPECIFICATIONS

Plans and specifications for installing structures for water control shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plan shall specify the location, grades, dimensions, materials, and hydraulic and structural requirements for the individual structure.

## **OPERATION AND MAINTENANCE**

Operation and maintenance shall be in accordance with the requirements of this standard and in keeping in conformance with all local, state, and Federal laws and regulations. Structures for water control must be adequately maintained if their purposes are to be realized through the expected life. Special considerations shall be given for maintenance needs during the planning, design, and construction of the structure. An operation and maintenance plan shall be prepared for each structure site and provided to the landuser. The water control structure should be inspected periodically to ensure that the structure functions as planned.

Vegetation on all on all earthfills shall be inspected regularly. Mow when vegetative growth becomes excessive. Damaged vegetation shall be replaced in accordance with NRCS conservation practice standard, Critical Area Planting, Code 342.

Structures shall be inspected for deterioration and capacity. Any blockage of trash and debris that could affect flows through the structure shall be removed. Materials that have deteriorated, including rock used for outlet protection shall be replaced.

The structure shall be inspected for safety of people or animals using the area near the structure.

Periodically remove sediment that accumulates during the design life.

## **REFERENCES**

NRCS National Engineering Handbook

Part 623, Section 15, Irrigation

Part 624, Section 16, Drainage

Part 650-Engineering Field Handbook

Chapter 6, Structures

Chapter 14, Water Management (Drainage)

Chapter 15, Irrigation

NRCS Conservation Practice Standard

Critical Area Planting, Code 342