

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

STRUCTURE FOR WATER CONTROL

(No.)

CODE 587

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

The practice may be applied as a management 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 wherever a permanent structure is 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 designed to operate under open channel conditions. Typical structures: 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: checks, flashboard risers and check dams.
- Control the division or measurement of irrigation water. Typical structures: division boxes and water measurement devices.

- Keep trash, debris or weed seeds from entering pipelines. Typical structure: debris screen.
- Control the direction of channel flow resulting from tides and high water or back-flow from flooding. Typical structures: 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: 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: bridges, culverts, flumes, inverted siphons and long span pipes.
- Modify water flow to provide habitat for fish, wildlife and other aquatic animals. Typical structures: chutes, cold water release structures and flashboard risers Provide silt management in ditches or canals. Typical structure: sluice.
- Supplement a resource management system on land where organic waste or commercial fertilizer is applied.
- Create, restore or enhance wetland hydrology.

CRITERIA

Federal, State and Local Laws and Permits

**NRCS, NHCP
April, 2010**

**NRCS, WV
August, 2010**

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#) or visit the [Field Office Technical Guide](#) (FOTG). **Note: Bold italics is information added or changes made to the National Conservation Standard by WV.**

Design and construction activities shall comply with all federal, state, and local laws, rules, and regulations governing activities in or along streams and pollution abatement, health, utility and safety activities.

The owner or operator is responsible for securing all required permits or approvals and for performing all planned work 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 when obstruction removal is performed within the boundaries of a stream or floodplain or if burning is required:

1. ***US Army Corps of Engineers (USACE)***
2. ***WV Department of Environmental Protection (Air, Land, Water and Waste, Permitting, other)***
3. ***Division of Natural Resources Office of Land and Streams***
4. ***US Fish and Wildlife Service***
5. ***WV Division of Forestry***
6. ***Local, state and county ordinances***

All required permits shall be approved before construction implementation.

General Criteria Applicable to All Purposes

Vegetation complying with Critical Area Planting standard (code 342) shall be established on all disturbed earth surfaces. Where soil, climate or site specific conditions preclude establishing permanent vegetation, other protective means such as mulches or gravels, shall be used.

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

Structures shall not be installed that have an adverse effect on septic filter fields.

The water level upstream of water control structures shall not be raised on adjacent landowners without their permission.

Site Investigation

Adequate investigation shall be made to insure that:

1. ***The structure site is stable and when the planned work of improvement is installed will perform as intended.***
2. ***Develop a design incorporating features which will accomplish the purpose intended giving consideration to adjacent land uses and improvements.***
3. ***Water supply is available and adequate.***

Reservoir Areas

For areas where wetlands may be impacted or disturbed, reference CPS Wetland Enhancement (659), Wetland Creation (658), Wetland Wildlife Habitat Management (644) or Wetland Restoration (657) for guidance. Consult with the specialists, such as the NRCS State Biologist, concerning construction in a wetland or wildlife area, and planned reservoir depth, size and shapes are determined.

Hydrology

Peak flow and volume determination shall be determined using Win TR55 for watersheds less than 2,000 acres or other approved NRCS methods.

Hydraulics

The design capacity of structures shall be based upon established NRCS methods. The minimum spillway capacities, for permanent, manmade structures, shall be in accordance with those contained in the standard for Grade Stabilization Structure (410).

Permanent mechanical spillways shall be used when flow is expected frequently or will occur for a duration of several days or more. Earthen spillways may be used where it is demonstrated vegetation can be established and maintained. Natural rock spillways may be designed when it is durable under exposure to varying water temperatures and flow extremes. Bio-engineered structures such as the Gabion-Brush Low Flow Pooling Structure or Log Weir Brush Low Flow

Pooling Structure may be installed for wetland restoration or enhancement when the ponded depth behind the structure does not exceed 2.8 feet and stable velocities.

Structural

The structural design and quality of material shall have a life expectancy consistent with the design frequency but in no case less than 10 years (unless it is a shallow (<=2.8') bio-engineered structure designed for a limited lifespan). The structural design shall be based upon the local site conditions.

Variable crest spillways (stop logs in inlets or control boxes) shall be considered in the design whenever practical to permit regulation of water levels. The high crest of mechanical spillways shall be at least 0.5 foot below the crest of the earth spillway.

Earth Embankment

The design and construction of earth embankments associated with this practice shall conform with practice standard Pond (378), Dike (356) or earthen Dam (402).

Other

The State Conservation Engineer shall be consulted for the criteria applied to the design of structures where guidelines are not established.

CONSIDERATIONS

When planning, designing, and installing this practice, the following items should be considered:

- 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.
- Existence of cultural resources in the project area and any project impacts on such resources.
- Conservation and stabilization of archeological, historic, structural and traditional cultural properties when appropriate.

Design alternatives presented to the client should address economics, ecological concerns and acceptable level of risk for design criteria as it relates to hazards to life or property.

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, quantities, dimensions, materials, and hydraulic and structural requirements for the individual structure. Provisions must be made for necessary maintenance. Care must be used to protect the surrounding visual resources. If watercourse fisheries are important, special

precautions or design features may be needed to facilitate continuation of fish migrations.

OPERATION AND MAINTENANCE

An operation and management plan shall be provided to and reviewed with the land manager. The plan shall be site specific and include but not be limited to the following: Structures will be checked and necessary maintenance, including removal of debris, shall be performed after major storms and at least semi-annually. Water level management and timing shall be adequately described wherever applicable.

REFERENCES

The construction of structures for water control designed by the requirements of the standard for Pond (378) shall be controlled by the requirements of Standard 378.

Construction of structures for grade stabilization structures of by the requirements of TR-60 shall be controlled by the appropriate specifications from the National Engineering Handbook, Section 20.

All construction shall be done so that sediment, water, and air pollution; and erosion shall be minimized and held within

legal limits.

WV5-Engineering Field Handbook, Appendix A- Quick Reference Design and Construction Support Data for Conservation Practices

NRCS National Engineering Policy
<http://policy.nrcs.usda.gov/>

WV e-FOTG Section IV- Practice Standards and Scope of Work such as WV Conservation Grade Stabilization Structure (410), Subsurface Drain (606), Open Channel (582),etc. found at
<http://www.nrcs.usda.gov/technical/efotg/>
(click on WV from the US map)

NRCS National and State Utility Safety Policy (NEM Part 503-Safety, Subpart A - Engineering Activities Affecting Utilities 503.00 through 503.06)

National Engineering Handbook (NEH) Title 210 – Section 5 – Hydraulics, Part 630 Hydraulics, Part 630 Hydrology Part 650 Engineering Field Handbook

NEH-20 or WV “700” Series Specifications

Title 190- Ecological Sciences; Part 601- National Cultural Resources