

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SPRING DEVELOPMENT

(No.)

CODE 574

DEFINITION

Collection of water from springs or seeps to provide water for a conservation need.

PURPOSE

Improve the quantity and/or quality of water for livestock, wildlife or other agricultural uses.

CONDITIONS WHERE PRACTICE APPLIES

In areas where a spring or seep will provide a dependable supply of suitable water for the planned use.

CRITERIA

General Criteria Applicable to All Purposes

An investigation of site conditions shall be made, including:

- a. Soil borings
- b. Water quality for the intended purpose
- c. Water quantity for the intended purpose
- d. Suitability of the spring location for the intended purpose
- e. An assessment to determine existing ecological functions and potential losses from the spring development
- f. An assessment of the cultural resource associated with the spring.

Develop springs by removing obstructions to the flow, collecting the water flow and storing the water, if flow from the spring is not sufficient to meet the peak demand of the intended use.

Obstruction Removal. Remove obstructions to spring flow such as fine-grained sediments, rock, slope-wash materials and vegetation to allow the spring to flow freely. Design the development of the spring to prevent obstructions from reoccurring.

Collection System. The type of collection system used for the spring development is dependent upon the type of spring and site geology. Design the collection system to collect sufficient water for the intended purpose of the spring. Collection systems generally consist of a restrictive barrier that forces water to collect in a perforated pipe that flows to an outlet. Include measures in the collection system to prevent sediment from entering the system and/or provisions to trap and remove sediment that does enter the system.

Spring Boxes. Include a spring box to allow sediment to settle out of the spring flow. Locate the spring box to allow water to flow by gravity from the spring to the spring box. Construct the spring box of a durable material such as concrete, plastic, galvanized steel, or naturally rot resistant wood. Spring boxes located below the cutoff wall shall be watertight and have an impervious bottom. Spring boxes located above the cutoff wall shall have a permeable bottom and/or porous walls to allow water to enter.

The spring box shall be of sufficient size to provide for the storage of sediment and any required storage of water. The cross-sectional area of the spring box shall be large enough to allow access for periodic cleaning. Provide the spring box with a tight fitting cover to prevent

trash and surface runoff from entering. To prevent freezing, bury the spring box in the soil.

Outlet. The spring development shall have an outlet pipe that carries the water to its intended use. Design the outlet pipe according to Virginia Conservation Practice Standard *Pipeline (Code 516)*. The outlet pipe shall be a minimum of 6 inches off the floor to allow for sediment collection.

Pump. A pump will be needed if gravity will not carry water from the spring to where the water will be used. Base the type and size of the pump upon available power sources and the water delivery needs. Virginia Conservation Practice Standard *Pumping Plant (Code 533)* shall be used.

Overflow. When flow from the spring, whether intermittent or continuous, will exceed the capacity of the collection system, an overflow is required. Size the overflow to carry the maximum flow expected from the spring during periods of wet weather. Manage the overflow so that it does not create a resource problem.

General. Design the spring development so that it is protected from damage by freezing, flooding, livestock, excess sediment, vehicular traffic and water quality contamination.

Follow Virginia Conservation Practice Standard *Watering Facility (Code 614)* to design facilities to provide access for livestock and wildlife to water from the developed spring.

Regrade areas disturbed by construction of the spring development to keep surface flow out of the spring. Revegetate disturbed areas as soon as possible after construction.

Construction operations will be carried out in such a manner that erosion and air and water pollution will be minimized.

Environmental Concerns. The policy on threatened and endangered species of plants and animals will be used to determine if listed species are present and if contact with the Virginia Division of Natural Heritage and/or Virginia Department of Game and Inland Fisheries is required.

Impacts to existing wetland functions shall be assessed. USDA wetland conservation provisions apply. The practice must comply with NRCS wetland technical assistance policy. Note specifically that the conditions indicated in the "Wetland Supplement to the Environmental Evaluation, Part 2, Situation II, Spring Development" must be met to provide technical assistance whenever any size wetland is present. The use of this supplement, in coordination with the appropriate NRCS wetland team, constitutes approval by the Virginia Wetland Memorandum of Agreement (MOA) agencies for a state Categorical Minimal Effect exemption. Otherwise, a Clean Water Act permit determination by the Corps of Engineers is required.

CONSIDERATIONS

A shutoff valve and vent system on the spring outlet pipe should be considered for winter shutdown, flow control and maintenance.

Native vegetation adapted to wet conditions should be considered on wet sites as an alternative to introduced grasses to stabilize areas after construction.

Consider how other conservation practices properly applied on the spring recharge area may increase infiltration of precipitation in order to conserve the spring's flows.

Consider how diversion of water from spring developments affects stream flows in the watershed.

Aquatic habitat quality may be conserved when a spring is developed near surface waters, or on a floodplain, by incorporating a float valve that shuts off flow to the tank and returns overflow via a stable outlet to the same watershed where it was collected.

Springs may represent islands of unique habitat in the landscape, supporting plant and animal populations that only occur in an area of a high water table. Consider options for developing the spring or seep that preserve the conditions that support these unique habitats.

Springs are sources of water for fish and wildlife. Maintain fish and wildlife access to

water from the spring development where possible.

Brush removal, excavation, clean out and withdrawal of water are manipulations that may affect wildlife habitat and wetland functions and values. However, selective removal of undesirable brush and management for desirable native plants may reduce evaporative losses and conserve biodiversity.

PLANS AND SPECIFICATIONS

Plans and specifications shall provide details of planned location, materials and construction requirements for the installation of the practice to meet its intended purpose.

Record all required information in an engineer field book, on a plan sheet or design computation sheet, or in another appropriate location.

DESIGN DATA

1. Completed Environmental Evaluation (Form VA-EE-1) and subsequent requirements.
2. Soils investigation.
3. Survey and plot data: profile, cross-sections, topography, as needed.
4. Design computations, including purpose of practice and references used.
 - a. Record length, width, and depth of trench, if applicable.
 - b. Record the length, size, and kind of collector pipes and outlet pipes.
 - c. Specify the backfill material to be used as a filter in the collection system.
 - d. Record dimensions and type of spring box or sump to be used.
 - e. Include type, depth, and dimensions of cutoff wall.
 - f. Estimate the rate of spring flow in gallons per minute and convert to daily yield.
 - g. Record location, size, and relative locations of the spring box and watering trough.
 - h. Estimate the rate of water delivery required.

i. Indicate fencing need.

5. Plan view of site with existing and planned features, including dimensions, distances, etc.
6. Standard Cover Sheet (VA-SO-100A).
7. Materials and quantities needed. Identify borrow material and/or spoil area, as needed.
8. Vegetation and/or ground cover requirements.
9. Identification of needed Erosion & Sediment Control measures.
10. Supplemental practices required.
11. Virginia Conservation Practice Specifications (700 Series).
12. Operation and Maintenance Plan

CHECK DATA

1. As-built survey.
2. As-built plans including dimensions, types and quantities of materials installed, and variations from design. Include justification for variations.
3. Locations of appurtenant practices.
4. Adequacy of vegetation and/or ground cover.
5. Complete as-built section of Cover Sheet.

OPERATION AND MAINTENANCE

The O&M plan shall contain a schedule for the periodic monitoring of the following items:

- Sediment buildup in the spring box
- Clogging of outlet and overflow pipes
- Diversion of surface water from the collection area and spring box
- Erosion from overflow pipes
- Rodent damage

Any problems discovered shall be immediately repaired.

Operation and maintenance plans for ecologically sensitive sites shall include any

specific measures such as fencing, valve installation, and operation requirements needed to protect existing site habitat values.

REFERENCES

Groundwater & Wells, Fletcher Driscoll, Johnson Division.

Somers, A. B. et al. November 2000. The restoration & management of small wetlands of the Mountains & Piedmont in the Southeast. USDA, Natural Resources Conservation Service, Watershed Science Institute.

USDA-Natural Resources Conservation Service. Electronic Field Office Technical Guide (eFOTG), Section IV [Online]. Available at <http://www.nrcs.usda.gov/technical/eFOTG>.

USDA-Natural Resources Conservation Service. General Manual. Available at <http://policy.nrcs.usda.gov>.

USDA-Natural Resources Conservation Service. National Engineering Manual, Part 531 Geology 531.31.

USDA-Natural Resources Conservation Service. Springs and Wells. Chapter 12, March 1983. National Engineering Handbook - Part 650, Engineering Field Handbook.

USDA-Natural Resources Conservation Service. Virginia 700 Series Construction Specifications. [On-line]. Available at <http://www.nrcs.usda.gov/technical/eFOTG>.

USDA-Natural Resources Conservation Service. Virginia Engineering Design Note #574 – Spring Development [Online]. Available at <http://www.nrcs.usda.gov/technical/eFOTG>

USDA-Natural Resources Conservation Service. Virginia Standard Drawings [Online]. Available at http://www.va.nrcs.usda.gov/technical/standard_drawings.html.

Water Supply Paper 2220, Basic Groundwater Hydrology, US Geological Survey.

"The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400

Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer."