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 the following:

- Soil borings
- Water quality for the intended purpose
- Water quantity for the intended purpose
- Suitability of the spring location for the intended purpose
- A determination that the landowner has the appropriate water rights or permits to develop the spring
- An assessment to determine existing ecological functions and potential losses from the spring development
- A certified wetland determination - The requirement for wetland determination has been eliminated and the site is considered to meet the wetland criteria. However, the following design conditions must be met:
  - The tank should be removed from the wetland seep to the maximum extent allowed by design criteria and landform. When the tank is installed a minimum distance of 100 feet from the edge of the wetland seep and 50 feet from the edge of wet contiguous areas downstream from the wetland seep, no additional mitigation assessments or compensation activities will be required or implemented. Overflow discharge from the tank should be routed back to the original drainage flow-way.
  - If the tank will be installed less than 100 feet from the wetland seep and less than 50 feet from the edge of wet contiguous areas downstream from the wetland seep, a float valve or livestock exclusion from the seep area will be required.
  - For wetland seeps with very marginal water flow and where the technical person determines the wetland seep has sufficient water flow for spring development, a float valve will be required.
  - If the producer uses the spring development for over-winter water supply, the valve can be fixed open after first fall killing frost until frost-free date in spring.
- An assessment of the cultural resource associated with the spring

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. If flow from the spring is not sufficient to meet the peak demand

of the intended use, develop springs by removing obstructions to the flow, collecting the water flow, and storing the water.

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 include a restrictive barrier that forces water to collect in a slotted pipe or perforated pipe that flows to an outlet. The collection system shall include a cutoff wall constructed along the downstream side of the trench (if needed) to ensure that the flow enters the collection system. Construct the cutoff wall of plastic sheeting, compacted clay, masonry, concrete, or other impervious materials. The impervious wall will only extend as far as necessary to provide the flow required to meet the daily water requirements of the intended use during the highest water use period.

Subsurface drainage tubing or perforated pipe shall not be less than 4 inches in diameter or other suitable manufactured system. Include geotextile fabric, drain sock around the pipe, or sand-gravel filter in the collection system to prevent sediment from entering the system and/or provisions to trap and remove sediment that does enter the system. Include a spring box, if necessary, to allow sediment to settle out of the spring flow or to provide storage to meet peak demands on the water from the spring. 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.

The spring development shall have an outlet pipe that carries the water to its intended use. Design the outlet pipe according to Conservation Practice Standard 516, Pipeline. If the outlet is from a spring box, the outlet pipe shall be a minimum of 6 inches off the floor to allow for sediment collection. Spring boxes shall have a minimum cross-sectional area of 1.2 square feet (15-inch diameter pipe). Provide the spring box with a tight-fitting cover to prevent trash and surface runoff from entering. The floor shall be impervious. A “shoebox”-type access cover (a cover with an edge projection overhanging the sides) or manhole attachment (with gasket) is recommended for tightness. The floor may be omitted when the underlying material is stable and impervious. On installations where 3 or less collection lines are used, a minimum of a 4-inch diameter riser may be used in place of a spring box at the junction point of the collection lines. The riser should be capped and vented.

A flushing valve must be installed in the delivery line below the stock tank or point of water delivery. Usually the valve is located 30 to 40 feet below the inlet pipe entrance to the tank to allow for sediment storage in the line. Connect the overflow pipe from the tank to the drain line below the flushing valve. To prevent freezing, bury the spring box in the soil.

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.

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 water so that it does not create a resource problem.

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

Follow Conservation Practice Standard 614, Watering Facility, to design facilities to provide access for livestock and wildlife to water from the developed spring. The inflow pipe shall include a shutoff valve in the pipeline between the spring box and the watering facility for winter shutdown, flow control, and maintenance. The flush valve shall be installed beyond the downstream end of the watering facility.

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.

CONSIDERATIONS

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

Filter fabric can be used for the trench cutoff wall when the spring flow exceeds the flow requirements to the intended use.

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 the wetland and stream flows in the watershed.

Consider the opportunity to use filter fabric in lieu of an impervious barrier along the wall(s) of the collection trench. This option will minimize the disturbance to the wetland area that will be affected by the spring development.

Aquatic habitat quality may be conserved when a spring is developed near surface waters (or on a flood plain) by incorporating a float valve that shuts off flow to the tank and returns overflow via a stable outlet to the same wetland area 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.

OPERATION AND MAINTENANCE

The operation and maintenance (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
- The flush valve may be opened in conjunction with the shutoff valve to permit flushing of sediment from the line. This allows for flushing of the system after initial installation and on a periodic basis to clean out the pipeline. After the sediments have been flushed out of the system, the valve can be closed, and the tank can be filled.

Any problems discovered shall be immediately repaired.

REFERENCES

General Manual Title 190, Section KS410.26F(1)(i), Protection of Wetlands, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)

National Engineering Handbook Part 650, *Engineering Field Handbook*, Chapter 12, "Springs and Wells."

The Restoration and Management of Small Wetlands of the Mountains and Piedmont in the Southeast. Somers, A.B. et al. USDA NRCS, Watershed Science Institute. November 2000.

National Engineering Manual, Section 531.31, USDA NRCS.

Ground Water and Wells, Fletcher Driscoll, Johnson Division.

Water Supply Paper 2220, Basic Ground Water Hydrology, U.S. Geological Survey.