

USDA
NATURAL RESOURCES
CONSERVATION SERVICE

MARYLAND CONSERVATION
PRACTICE STANDARD

SPRING DEVELOPMENT

CODE 574
(Reported by No.)

DEFINITION

Utilizing springs and seeps to provide water for a conservation need.

PURPOSES

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

1. Improve the distribution of water.
2. Increase the quantity and quality of water for livestock, wildlife, or other uses.
3. Obtain water for irrigation if water is available in a suitable quantity and quality.

**CONDITIONS WHERE PRACTICE
APPLIES**

Improvements shall be confined to springs or seepage areas that can furnish a dependable supply of suitable water during the planned period or periods of use.

CONSIDERATIONS

Considerations when determining the suitability of a site for development shall include the need and feasibility of protection from contaminants, and potential damage to cultural resource areas, wetlands, woody cover,

and existing wildlife habitat.

The need for protection from flooding, sedimentation, and contamination shall be considered in determining the suitability of a site for development.

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

Water Quantity

1. Effects on components of the water budget.
2. Effects on downstream flows or aquifers that affect other water uses or users.

Water Quality

1. Effects on erosion and movement of sediment, pathogens, and soluble and sediment attached substances carried by runoff.
2. Effects on the visual quality of onsite and downstream water resources.
3. Effects on wetlands and water-related wildlife habitats.

CRITERIA

Design

Spring developments shall be planned, designed, and constructed in compliance with Federal, State, and Local laws and regulations. Water for potable uses shall meet the requirements of the state health department for materials and installation. Permits may be required for the installation of these systems. Contact the Permits Division of the local county government for regulations and permit requirements.

Impacts to existing wetland functions shall be assessed. USDA wetland conservation provisions apply. The practice must comply with NRCS wetland technical assistance policy contained in GM 190, Part 410.26.

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

Fracture and Tubular Springs - Where water issues from fractures, the individual openings shall be cleaned and enlarged as needed to provide an increase in flow. The water from these individual openings shall be collected and conveyed to spring box or central sump by means of a subsurface drain, perforated pipe or gravel filled trench.

When collection methods are used, they shall be constructed at a distance vertically below the elevation of the opening to permit free discharge from the spring.

Where water issues from a single opening, such as a solution channel in a soluble rock formation, the opening shall be cleaned as needed. A collection system is not required; however when used, locate the spring box to allow free discharge and do not pond water over the spring opening.

Perched or Contact Springs - Perched or contact springs occur where an impermeable layer outcrops beneath a water-bearing permeable layer. These springs shall be developed by intercepting and collecting the flow from the water-bearing formation. Collection trenches are used for developing these types of springs.

Artesian Springs - Artesian springs shall be developed by removing obstructions, cleaning or enlarging joints or fractures, or by lowering the outlet elevation. Sumps and spring boxes shall be located so as to minimize ponding over the spring outlet.

Collection Systems - When a collecting trench is used along the outcrop of the water-bearing formation, it shall be excavated into the impervious layer.

An impervious cutoff wall of well-tamped clay, masonry, concrete or other impervious material shall be constructed along the downstream side of the trench where needed to insure the flow enters the collection system.

The collection system shall consist of subsurface drain tubing or perforated pipe not less than 4 inches in diameter. A crushed rock or gravel backfill should be placed 12

inches minimum depth over the drain in the collection trench. If needed place filter cloth on top of gravel to prevent contamination by sediment. Pipe for the collection system shall meet the criteria in Maryland conservation practice standard, Subsurface Drain, code 606.

Spring Boxes - Spring boxes, where needed, shall be durable and have a tight, removable cover. All materials shall have a life expectancy that meets or exceeds the planned life of the installation.

The spring box shall be constructed of reinforced concrete, steel, fiberglass, plastic or other equally durable material. All designs shall meet industry standards for the material being used.

Galvanized steel tanks shall have a minimum thickness of 20 gage. Plastic and fiberglass structures shall be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight. Concrete structures shall be constructed from a concrete mix producing a minimum compressive strength of 3,000 psi at 28 days.

Commercially produced facilities meeting the criteria above are acceptable.

Spring boxes shall have a minimum cross sectional area opening of 3 square feet. The floor of the spring box shall be not less than 6 inches below the invert of the collection line. The spring box top shall extend to a height of 6 inches minimum above the ground line.

Gravel - Crushed rock or gravel shall be compliant with gradations and quality found in the Maryland State Highway Administration, Standard Specifications for Construction and Materials, Section 901.

Outlets - An overflow pipe from a spring box shall be placed at least 6 inches above the floor of the box to allow the box to collect sediment. Measures required to protect the development from damage by freezing, flooding, contamination and livestock shall

be included in the design, along with seeding requirement for disturbed areas.

The outlet pipe must have positive grade away from the spring box or collection system unless vent pipe(s) are added to prevent air locks.

The outlet pipe shall have minimum 1¼ inch diameter. In lieu of site-specific spring flow and pipe vent calculations, the outlet pipe shall have the following minimum size based on line grades.

1. 1¼ inches inside diameter for line grades greater than 1.0 percent.
2. 1½ inches inside diameter for line grades greater than or equal to 0.5 percent but less than or equal to 1.0 percent.
3. 2 inches inside diameter for line grades less than 0.5 percent.
4. Avoid slopes less than 0.2 percent.

When used to supply water to a watering facility the outlet pipe material requirements shall extend past the watering facility a minimum of 20 feet. When watering facilities are applied in series, the outlet pipe material requirements shall extend a minimum of 20 feet past the lowest watering facility. Minimum outlet pipe material and strength requirements shall equal those found in the Maryland conservation practice standard, Pipeline, code 516.

Vegetation

The Maryland conservation practice standard, Critical Area Planting, code 342 shall be used to determine the appropriate grass species to be established based on site conditions and use. Plants listed on the Maryland noxious weed list shall not be planted.

SPECIFICATIONS

Plans and specifications for installing spring developments shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

All loose rock, sediment, logs, trees, and vegetation that obstruct the free discharge of the spring shall be removed and disposed of so that it will not endanger the spring development.

Materials shall meet the requirements of this standard and those in the plans or in the specifications for the job. All appurtenant structures, including trash and animal guards, shall be installed promptly, and protected during installation.

OPERATION AND MAINTENANCE

An O & M plan specific to the type of spring development shall be provided to the landowner. The plan shall include, but be limited to, the following provisions:

1. Inspect collection and storage devices, valves, outlets and pipelines at least bi-annually. Make repairs as needed.
2. Check for debris, algae, sludge or other materials in the system, which may restrict the inflow or outflow system and remove.
3. Prepare guidance for winter weather operation, such as cleaning and discontinuing use, or providing for frost-free use.
4. Protect from damage due to livestock and farm equipment. Maintain fences and other devices used for this purpose.
5. Check for leaks and repair immediately.
6. Check valves, automatic water level devices, and overflow pipes for proper operation.
7. Chemical may be added to the system for algae and other water quality issues when in accordance with local rules and regulations
8. Maintain vegetative cover around the system. Mow at least yearly. Provide weed control as needed. Reseed, lime, and fertilize area as needed.

DESIGN AND CHECK DATA REQUIREMENTS

Field Data and Survey Notes

The following is a list of the minimum data needed:

1. System plan sketch
2. Profile along centerline of proposed pipe from source to outlet.
3. Special control or field feature that must be considered in design.

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see chapter 5 of the EFH, Part 650. The following is a list of the minimum required design data:

1. Plan view including all system components and construction specifications.
2. Profile of system included on plans.
3. Determine slope of pipeline and difference in elevation between source or collection box inlet and tank overflow, record on plan.
4. Complete pipeline design using methods described in chapters 12, 14 or 15 from the EFH, Part 650, as applicable.
5. Dimensions and type of cutoff wall, if applicable shown on plans.
6. Select type and dimensions for spring box and show on plans.
7. Show type and size of pipeline system on profile on plans.
8. Size and type of stabilization treatment around facility.
9. Job Class on plan.
10. Quantities Estimate.

11. Planting plan. This must meet the criteria, specifications, and documentation requirements of the Maryland conservation practice standard, Critical Area Planting, code 342.

12. Written Operation and Maintenance Plan

Construction Check Data/As-builts

Record on survey note paper, SCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted on plans in red. The following is a list of minimum data needed for As-builts:

1. Documentation of site visits on CPA-6. The documentation shall include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom.
2. Elevations of control features.
3. Dimensions of pipelines, spring box, collection system, trough and other components.
4. Statement on seeding and fencing.
5. Final quantities and documentation for quantity changes. Materials certification.
6. Sign and date checknotes and plans by someone with appropriate approval authority. Include statement that practice meets or exceeds plans and NRCS practice Standards.

REFERENCES

1. American Concrete Institute, Building Code Requirement for Structural Concrete, ACI 318, Farmington Hills, Michigan
2. American Concrete Institute, *Building Code Requirement for Masonry Structures*, ACI 530, Farmington Hills, Michigan
3. American Institute of Steel Construction, *Manual of Steel Construction*,
4. American Society for Testing and Materials, *ASTM Standards*, Philadelphia, Pennsylvania.
5. Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, Baltimore, Maryland, October 1993.
6. USDA, Natural Resources Conservation Service, Maryland Field Office Technical Guide, Section IV, Standards and Specifications.
7. USDA, Natural Resources Conservation Service, *National Engineering Handbook*, Part 650.