

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
VIRGINIA STANDARD SUPPLEMENT
ANIMAL TRAILS AND WALKWAYS

(Ft.)

CODE 575

DEFINITION

A travel facility, livestock trail, or walkway to: provide a stabilized area for access across a stream for livestock; provide movement through difficult or ecologically sensitive terrain; improve grazing distribution and access to forage and water; stabilize high use lanes between paddocks or pastures.

PURPOSES

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

- ◆ provide or improve access to forage, water, and/or shelter for animals and equipment
- ◆ improve grazing efficiency and distribution
- ◆ control livestock to allow for proper grazing use and implementation of planned grazing systems
- ◆ reduce livestock concentrations
- ◆ divert travel away from ecologically sensitive and/or erosive sites
- ◆ stabilize high use lanes between paddocks, pastures, and livestock facilities (i.e., milking parlors)
- ◆ provide a controlled crossing and limited access to streams and ponds by livestock
- ◆ control bank and streambed erosion, reduce sediment, and enhance water quality

- ◆ maintain or improve wildlife habitat, forest riparian buffer, and streambank stabilization

CONDITIONS WHERE THIS PRACTICE APPLIES

On grazing lands where animal movement between paddocks, pastures and to and from livestock facilities (i.e., milking parlors) is creating an unstable and erosive site or the movement of animals is impeded or restricted by such conditions as steep/rough terrain, rock outcrops, woodlands, wetlands, or pastures susceptible to overflow by water.

CRITERIA

A. General Criteria for Trails and Walkways and Stream Crossings for All the Purposes Stated Above

The environmental evaluation will be completed (Form VA EE-1). If wetlands are involved, complete the wetland determination and the proposed design. The landowner then obtains any required permits. Revise the plan as required and proceed with construction of the design process. Any notification of the Corps of Engineers per "Notification" is the responsibility of the permit holder, the landowner. In addition, fill will not be placed in any wetlands without the appropriate agency approval or permit.

Trails and walkways shall be constructed wide enough to accommodate movement of livestock and, if desired, access by the operator with machinery. Construction shall be in such a manner that accelerated erosion will not occur. Where necessary, diversions, reverse slopes, and/or water bars with a stable outlet will be provided. Trails or walkways seeded or planted to

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

vegetative cover (for lanes used on a less frequent basis, i.e., once a week or less) will be protected from livestock until plant material is fully established and capable of withstanding grazing and/or trampling.

When necessary, drainage measures will be installed to prevent interference with natural water movement.

Stream crossings shall be designed to serve the planned land use with the expected livestock and vehicular traffic. Pastures shall be inventoried to determine livestock travel patterns. Construction will be done in such a way as to control bank and streambed erosion, reduce sediment, enhance water quality, and maintain or improve wildlife habitat.

PLANNING CONSIDERATIONS

- ◆ Other practices that facilitate grazing distribution shall be installed.
- ◆ Potential erosion problems created by construction of a stock trail or walkway must be resolved and in keeping with local erosion and sediment control program requirements.
- ◆ **Water quantity** - consider the following:
 1. effects of grading on runoff and surface storage.
 2. effects of the amount and timing of infiltration.
 3. impacts of impervious trail or walkway on increased surface runoff.
- ◆ **Water quality** - consider the following:
 1. effects on erosion and the movement of sediment and soluble and sediment attached substances carried by runoff.
 2. effects caused by the construction process and the amounts of vegetation re-established on the site.
 3. effects on wetlands, streams, wildlife habitats, and riparian buffers.

B. Design Criteria for Animal Trails and Walkways

1. Location

- a) The route shall be jointly selected and marked by the landowner, operator, or their authorized agent and conservation planner.

- b) The location shall be such that it enables livestock relatively easy access to otherwise inaccessible areas of forage and water supplies.
- c) Where practical, trails and walkways should be located a minimum of 25 feet from watercourses on level areas to provide an adequate filter strip.

2. Width

- a) The width shall be determined by the equipment necessary to construct the trail and meet the objective. Where possible, construction should leave the major part of the trail on solid undisturbed base.
- b) Minimum widths of trails for cattle shall be 8 feet; for sheep, 3 feet; for equipment, 12 feet.

3. Cross Slopes

The cross slope of the trail or walkway will not vary more than 6 inches in elevation for each 4 feet of width. This cross slope may be toward the inside or outside of the trail or walkway as the drainage situation dictates. For constructed lanes, 3% cross slope is recommended.

4. Slopes

Maximum grade along the trail shall be 15%. For frequently used constructed (gravel, armor) trails, 8% maximum slope is strongly recommended.

5. Drainage

- a) Adequate drainage provisions shall be installed. Such structures shall be designed to meet appropriate NRCS standards and specifications as shown in Appendices A and C.
 - 1) water bars made of earth, rock, logs or troughs to divert water off trails and walkways may be installed diagonally across trails to prevent erosion. Intervals shall be as follows:
 - 10% grade: 75 foot interval
 - 15% grade: 50 foot interval
 - 2) broad based drainage dips may be used for drainage of stock trails and walkways. Broad based dips are a

dip and reverse slope in the trail or walkway surface with an outslope in the dip to provide natural cross drainage. The purpose of the dip is to prevent build up of excess surface runoff and subsequent erosion. Do not use on trails or walkways greater than 10% slope. Install during initial construction of trail or walkway. See Appendix C for design criteria.

- b) Provisions should be made at the upper end of a trail or walkway system to divert runoff from entering the system. Also, a barrier or short section of fence may be needed to discourage animals from deserting the trail or walkway and moving down the hill at a particular point.
- c) When trails or walkways must cross existing channels or gullies, erosion resistant material should be used. Where culverts are necessary in such situations, they must be located on the original water grade making sure they drain directly into the original channel.
- d) All erosion control devices will be installed in their proper sequence, either before, during, or after the construction of trails and walkways and prior to any use. Such erosion control devices must be properly maintained.

6. Angle of Turns

Turns will be located where the least erosion will occur by runoff from the higher portions of the trail. Angle of turns may not exceed 135 degrees outside angle (45 degrees inside angle).

7. Construction

Construction of trails and walkways will be accomplished with a minimum of disturbance of soil and vegetation. Excessive erosion during construction will be avoided. In so far as possible, trails and walkways shall be in harmony with the natural beauty of the landscape.

8. Vegetation Protection Against Erosion

Adapted grasses will be seeded in accordance with specifications for Critical Area Planting Conservation Practice Standard (342). Vegetated areas will be protected from livestock until properly established to provide the erosion control for which such plantings are intended.

9. Surface Treatment

Bare soil will not hold up under heavy and continuous livestock traffic and is not acceptable. Alternatives may include gravel over geotextile, lime surface layer over a stone or shale base, concrete, etc. (See Appendices).

C. Design Criteria for Stream Crossings

1. Site Selection

Stream crossings shall be designed to serve the planned land use with the expected livestock and vehicular traffic. Before installing a crossing, the pasture(s) shall be inventoried to determine present livestock travel patterns. Placement of a crossing in a wetland, if unavoidable, shall be installed according to all relevant federal, state, and local laws, regulations, and restrictions.

2. Permits

Any deviation from the specifications contained in this standard may require an individual local-state-federal joint permit. If stream crossings are installed according to this standard and conditions one and two below apply, a general permit (on file at the state office) allows construction and no further permits are required. However, landowners are responsible for all permits, if required, by federal, state, or local agencies.

CONDITIONS

- a) Flow is less than 5 cubic feet per second (cfs) or the watershed area is less than five square miles. If flow and watershed area are greater, further permitting requirements must be investigated.
- b) The Virginia Department of Game and Inland Fisheries (VDGIF) should be notified of the proposed work and site location for all designated trout waters. If a site visit is requested by VDGIF, this visit will be conducted prior to construction.

3. Type

The crossing may be either ramp or culvert(s). Culverts should be considered in narrow channels greater than 3.0 feet in depth where continuous use by livestock is anticipated. The use of pipe material other than corrugated metal pipe,

reinforced concrete pipe, or plastic pipe must be approved by a staff engineer.

4. Capacity

When ramps are used, the cross sectional area of the crossing shall be equal to or greater than the natural cross sectional area so as not to constrict flow. The bottom of the ramp shall have a level section equal to the bottom width of the channel but not less than four feet. The side slopes on the entrance and exit ramps shall be 8:1 or flatter. The armor material shall be stable when passing bank full flow.

5. Stone Armored/Riprap

When the computed stream flow velocity at bank full flow is equal to or less than 6.0 feet/second, crushed stone, 50% of which is between 2 inches and 4 inches minimum diameter, placed over a filter cloth may be used. The minimum armor thickness shall be 6.0 inches. Stone sized for stability must be determined for stream velocities exceeding 6.0 feet/second.

6. Culvert

When culverts are used, design shall provide protection for over flow or designed to pass the existing channel capacity, whichever is greater. If the drainage area is 50 acres or less, a minimum of one 24" culvert shall be installed with both upstream and downstream inverts submerged a minimum of six inches to provide for the movement of aquatic species. If the drainage area is over 50 acres, or there are concerns about stability, contact a staff engineer for design assistance and approval.

The minimum length for culverts shall be twenty (20) feet. The pipe shall extend two feet beyond the toe of the slope on both ends. Any metal culvert shall be at least 16 gauge. All culverts shall have a minimum cover over the pipe of 12 inches. Riprap protection shall be provided downstream of the pipe outlet.

7. Concrete Ramp Structures

Concrete shall be 3,000 psi, type 1A low acid cement, with 6" x 6", 10 gauge wire mesh reinforcement. A concrete cutoff wall, a minimum of 18 inches deep, shall be provided at each side of the crossing. Four (4) inches of gravel shall be placed as a base for the 5 inch concrete slab. Gravel shall meet the gradation of VA aggregate

size no. 56 (1" maximum size). Particular attention should be taken to dewater the site, prevent erosion, and prevent concrete toxicity to aquatic species.

8. Width

The width of the crossing shall be at least eight (8) feet. When the crossing is also to be utilized as an access road for maintenance equipment and other vehicles, the minimum width shall be twelve (12) feet.

9. Protection

Crossings shall be protected to the extent that over flows will not result in erosion down stream of the structure. This may include a riprap apron below the concrete ford crossings, and outlet protection below pipe crossings.

The downstream slope of the fill shall be protected from erosion during periods of high flows. Fill side slopes shall be 2 horizontal to 1 vertical or flatter.

10. Fencing

Site conditions will determine the extent and permanence of the fencing required for proper control of livestock entering the crossing. Fencing shall meet NRCS Conservation Practice Standard, Fence (382). When fences cross the stream, they shall be designed to be unaffected by water level and floating debris.

11. Movement of Aquatic Species

The design, construction, and maintenance of the crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body.

12. Erosion Protection

If soil and climatic conditions permit, a protective cover of vegetation shall be established on all disturbed earth surfaces. In areas where vegetation may not survive, non-vegetative means such as mulches, gravel, or linings may be used. Refer to Critical Area Planting Conservation Practice Standard (342).

If not fenced off, slopes adjacent to ramps shall be protected with stone riprap. The riprap shall be sized to be stable when bank full flow occurs and large enough to discourage cattle from using it as a travel way.

Work from the stream bank as much as practical and minimize in-stream disturbance.

13. Maintenance

Stream crossings shall be inspected periodically to check for cattle use and material durability. After each storm flow, the crossing should be checked for restrictions, trash accumulation, damage to fence, and usage. Any necessary repairs should be completed immediately.

14. Dredging

Dredging, below the plane of the ordinary high water mark, shall not exceed 25 cubic yards.

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VIRGINIA ESTABLISHMENT SPECIFICATIONS

A. Plans and Specifications

Each trail, walkway, and streamcrossing shall have a site-specific design based on the criteria in this standard that describes the requirements for applying the practice to achieve the intended purpose.

Specifications for component practices needed to successfully implement animal trails, walkways, and stream crossings are to be followed and are located under the following conservation practice standard headings:

Critical Area Planting - 342
Diversion - 362
Fence - 382
Riparian Forest Buffer - 391A
Filter Strip - 393
Heavy Use Area Protection - 561
Use Exclusion - 472
Mulching - 484
Prescribed Grazing - 528A
Open Channel - 582
Structure for Water Control - 587
Geotextile, NRCS Construction Specification 95
Material Specification: Geotextile, 592

B. Layout

The trail and/or walkway route, including the location of both ends, all turns, control points, location of necessary drainage controls, and other structures shall be marked and referenced.

C. Structural Backfill

Backfill material shall be of the type and quality conforming to that specified for the adjoining fill material. The fill will be placed in 4-inch horizontal layers and compacted by hand tampers or other appropriate compaction equipment. The fill needs to be placed around all spaces under and adjacent to any pipes or culverts necessary in the project.

Under no circumstances shall equipment be driven over a pipe unless there is compacted fill of at least 12 inches over the pipe.

D. Pipe Conduits

Corrugated metal, reinforced concrete, and plastic pipe all meeting listed specifications may be used. Any other pipe requires staff engineer approval. Where culverts or pipes are required in the construction of a walkway or animal trail/streamcrossing, the following shall be adhered to:

1. Corrugated Metal Pipe

- a) materials - (steel pipe) - This pipe and its appurtenances shall be galvanized and shall conform to the requirements of AASHTO Specification M-218 Type A with watertight coupling bands.
- b) materials - (aluminum pipe) - this pipe and its appurtenances shall conform to the requirements of AASHTO Specification N-196 or M-211 with watertight coupling bands or flanges. Coupling bands must be composed of the same material as the pipe.

- c) materials - (aluminum coated steel pipe) - this pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-274-791. Coupling bands must be composed of the same material as the pipe.
- d) bedding - the pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy, or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.
- e) Other details (bands, flanges, gaskets, etc.) shall be as shown on the drawings.
- f) Backfilling shall conform to the structural backfill specification as shown above.

2. Reinforced Concrete Pipe

- a) materials - reinforced concrete pipe shall have a rubber gasket joint and shall equal or exceed ASTM Specification C 76.
- b) laying pipe - bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. The bedding shall be placed and compacted so that all spaces under the pipe are filled. The pipe shall be placed and all joints sealed for the entire line. Care shall be exercised to prevent any deviation from the original line and grade of the pipe.
- c) backfilling shall conform to the structural backfill specifications as shown above.

3. Plastic Pipe

- a) ADS N-12, Hancor Hi-Q are acceptable for use, meeting specifications:
AASHTO M294
ASTM D3350
ASTM D2321
- b) Installation shall be according to manufacturer's recommendations.
- c) Watertight couplings shall be used.
- d) Other plastic pipes need to be approved by the staff engineer.

E. Rock Riprap/Crushed Stone

All rocks shall be dense, sound, and free from cracks, seams, and other defects conducive to accelerated weathering. The rock fragments shall be angular to subround in shape. The least dimension of an individual rock fragment shall not be less than one-third the greatest dimension of the fragment. The rock shall be delivered and placed in a manner that will ensure material in place is reasonably homogeneous with the larger stones uniformly distributed and firmly in contact one to another. The smaller stones shall fill the voids between the larger stones.

F. Geomembrane

Geomembrane, filter fabric, or geotextile used as an underliner shall have a minimum tensile strength of 120 lbs., puncture strength of 90 lbs., permeability coefficient of 0.2 cm/sec and accelerated weathering strength retained of 70 percent.

G. Care of Water During Construction

All work on permanent structures shall be carried out in areas free of water. The contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. The contractor will also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free of water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction to the flow of water and so as to not interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and performance of all constructed operations. During the placement and compaction of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation. Such locations may require draining the water to sumps from which water shall be pumped.

H. Bank Stabilization

Stabilization activities shall be limited to the minimum required to stabilize the structure and to provide erosion protection. Fill shall not be placed in special aquatic sites such as wetlands or in such a way as to impair surface water flow into or out of such a site.

I. Erosion and Sediment Control

All borrow areas shall be graded to provide proper drainage and left in a slightly condition. All exposed surfaces of the embankment, spoil and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing, and mulching (if required) in accordance with the Critical Area Planting Conservation Practice Standard (342).

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures to be employed during the construction process.

J. Vegetative Establishment

See Critical Area Planting Conservation Practice Standard (342).

K. Operations and Maintenance

Operations will consist of periodic grading or shaping on trails and walkways to maintain design dimensions. Maintenance will consist of repair that may be needed following major storm events that interfere with the normal operation of the practice.

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SUPPORTING DATA AND DOCUMENTATION

A. Design Data - Animal Trails and Walkways

1. Completed environmental evaluation and subsequent requirements
2. Record all design data in an engineer field notebook, and/or on a plan or on a design sheet
3. Job identification and location sketch
4. Survey and plot profile, cross-section, and plan view
5. Grade or percent slope of trail or walkway; angle of turns
6. Subsurface treatment, if applicable
7. Types and quantities of materials
8. Location, extent, and specifications of fencing required
9. Specifications for establishing vegetation on disturbed areas and trail or walkway surfaces including protection from grazing animals until vegetative cover is established
10. Signature and title of person approving design
11. Date of approval

Check Data

Record the following as a minimum:

1. Dimensions (profile, cross-section, plan view)

2. Slopes and grades of constructed trails and/or walkways; angle of turns
3. Types and quantities of components installed
4. Adequacy of vegetation

NOTE: If seeded outside of recommended seeding dates, the **vegetation must have emerged and be adequate for the purpose.**

5. Record, sign, and date statement concerning adequacy of installation
6. Note any variations and justifications to original design

B. Design Data - Streamcrossing

NOTE: Regulatory agencies may request spot checks of stream crossings to insure permit conditions are being followed.

1. Completed environmental evaluation and subsequent requirements
2. Record all design data in an engineer field notebook, and/or on a plan or on a design sheet
3. Survey and plot profile along centerline of stream (50 feet in both directions)
4. Survey and plot cross section, perpendicular to flow, extending 25 feet beyond the top of each bank
5. Sketch of area to indicate stream meandering and limits of stream protection (if needed)

6. Soil investigation auger logs to determine any special construction needs
7. Determine drainage area and bank full velocity
8. For ramp crossings, design ramp to best fit the section, and meet the design criteria
9. Add construction sequence to include stream channel diversion and sediment control measures
10. Record seeding and stabilization requirements

NOTE: If seeded outside of recommended seeding dates, **the vegetation must have emerged and be adequate for the purpose.**

11. Document landowner/VDGIF contact concerning the proposed stream crossing. Record date, contact person, and outcome of the on-site visit, if one occurred
12. VDGIF comments and/or restrictions, i.e., limits on the time of installation

Check Data

1. Cross section of completed crossing
2. Elevation and dimensions of crossing, including cutoff walls if ramp type is used
3. Measurement of riprap apron and thickness
4. Statement on seeding and fencing

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REFERENCES

1. All Weather Surfaces for Livestock Travel Lanes, by Dr. Eldridge Collins, Jr., VPI and SU, Blacksburg, Virginia 24061-0303.
2. Constructing Mud Free Cow Lanes, Pequea-Mill Creek Information Series, College of Agricultural Sciences, Penn State University, University Park, Pennsylvania 16802
3. Woodlands of the Northeast, Erosion and Sediment Control Guides prepared by: USDA Soil Conservation Service, Northeast Technical Center, Broomall, PA and Forest Service, Northeastern Area State and Private Forestry, Upper Darby, Pennsylvania, 1977.

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APPROVED PRACTICE NARRATIVES

accordance with the standard, Animal Trails and Walkways, 575.

575 A1 ANIMAL TRAILS AND WALKWAYS: An animal trail and walkway will be completed for the purpose of allowing stable and safe access by animals and/or machinery to pastures and/or hay fields in order to improve management of those areas. Construction will be completed in accordance with the standard, Animal Trails and Walkways, 575.

575 A2 ANIMAL TRAILS AND WALKWAYS: A stream crossing will be completed for the purpose of allowing stable and safe access by animals and/or machinery to pastures and/or hay fields in order to improve management of those areas. Construction will be completed in accordance with the standard, Animal Trails and Walkways, 575.

575 A3 ANIMAL TRAILS AND WALKWAYS: A combination of animal trail and walkway and stream crossing will be completed for the purpose of allowing stable and safe access by animals and/or machinery to pastures and/or hay fields in order to improve management of those areas. Construction will be completed in accordance with the standard, Animal Trails and Walkways, 575.

575 A4 ANIMAL TRAILS AND WALKWAYS: A stream crossing will be completed for the purpose of allowing stable and safe access by machinery to crop fields in order to improve management of those areas. Construction will be completed in accordance with the standard, Animal Trails and Walkways, 575.

575 A5 ANIMAL TRAILS AND WALKWAYS: An animal trail and walkway will be completed for the purpose of providing stable and safe access by dairy animals to and from pastures and facilities. Construction will be completed in