Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

TRAILS AND WALKWAYS

CODE 575

(ft)

DEFINITION

A constructed path with a vegetated, earthen, gravel, paved, or other hard surface to facilitate the movement of animals, people, or off-road vehicles.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Provide or improve animal access to forage, water, working/handling facilities, or shelter
- Protect ecologically sensitive, erosive, or potentially erosive sites
- Provide pedestrian or off-road vehicle access for agricultural, construction, or maintenance operations
- Provide trails or walkways for recreational activities or access to recreation sites

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all lands where management of animal, human, or off-road vehicle movement is needed. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard (CPS) Access Road (Code 560) for the construction of roads.

CRITERIA

General Criteria Applicable to All Purposes

Plan, design, and construct the trail or walkway to comply with all Federal, State, and local laws and regulations. Notify landowner and/or contractor of their responsibility to locate all buried utilities in the project area, including drainage tile and other structural measures. The landowner is required to obtain all necessary permits for project installation prior to construction.

Design the trail or walkway to accommodate the planned use and site constraints. Include measures to minimize erosion and adverse onsite and offsite impacts to areas such as riparian zones, stream channels, streambanks, and wildlife habitat (e.g., fragmentation or restriction of wildlife movement).

Clearing

Design clearing widths and heights to accommodate the safe use of the trail or walkway. Use NRCS Technical Note (TN) (Title 210), Landscape Architecture (LAN) 4, “Trail and Walkway Design Aid” for guidance, as needed.

Grades

Design trail or walkway grades to safely accommodate the planned use and to reduce the potential for erosion.Design the cross-slope (the surface perpendicular to the direction of travel) or crown of the trail or walkway to allow water to drain off without creating erosion.

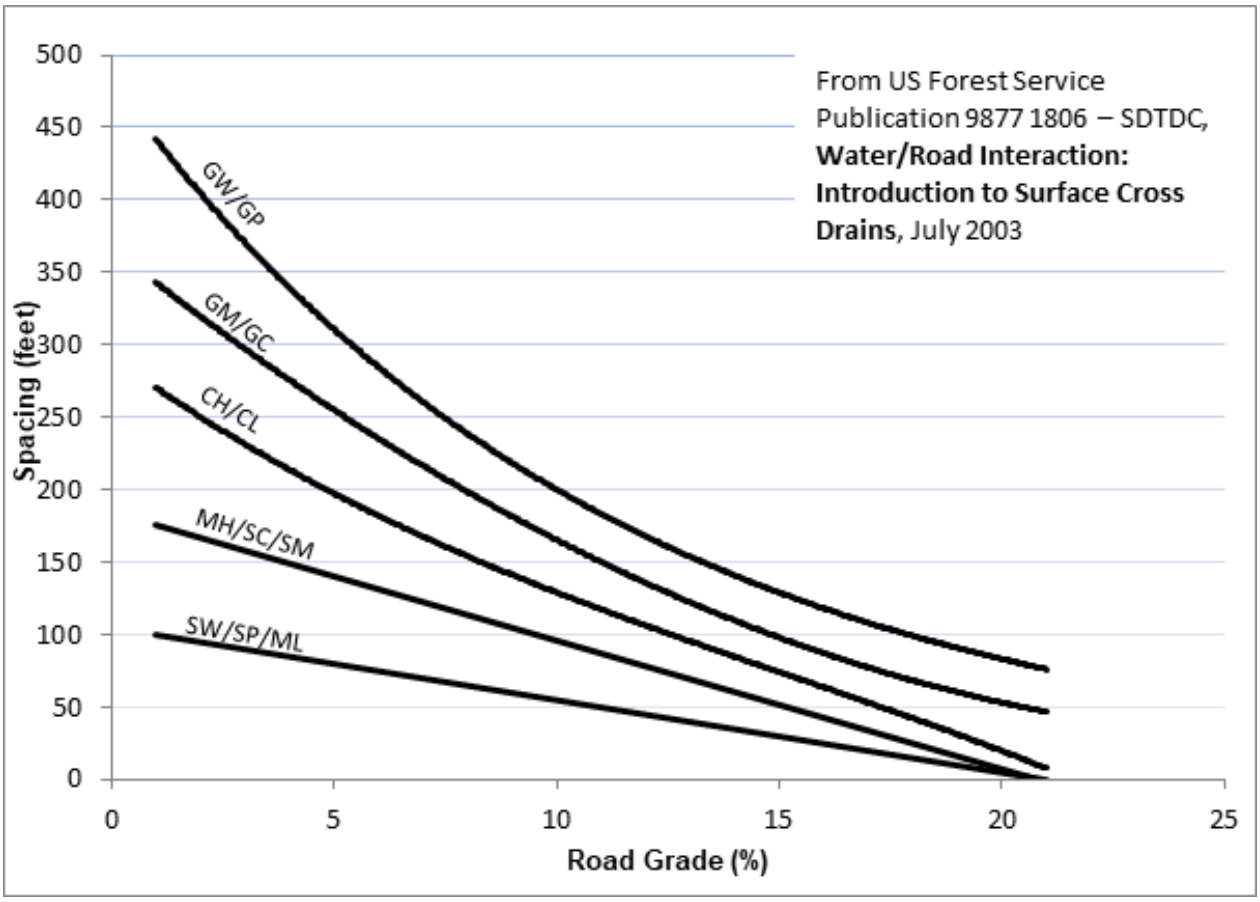
Side slopes
Design all cuts and fills to have stable slopes that are no steeper than 2 horizontal to 1 vertical. For short lengths, rock areas, or very steep hillsides, steeper slopes may be permitted if soil conditions allow and special stabilization measures are installed.

Where possible, avoid areas with geological conditions and soils that are subject to slides. When the area cannot be avoided, treat the area to prevent slides.

Turns
Design turning radii based on the intended use of the trail or walkway.

Water control
Divert concentrated water flows away from the trail or walkway by installing surface or subsurface drainage measures, such as NRCS CPSs Subsurface Drain (Code 606) or Diversion (Code 362), as needed. Surface cross drains, such as broad-based or rolling dips, may be used to control and direct water flow off the trail or walkway surface. Space drains according to soil type as shown in figure 1. Protect the outlets of drainage measures to limit erosion.

Figure 1. Minimum spacing for surface cross drains for trails or walkways with exposed soil, by soil type (Unified Classification System).



Avoid traversing wet soil areas whenever possible. If unavoidable, provide an all-weather surface or elevate the walkway above ponded water or wet soil areas.

Avoid locating the trail or walkway where runoff will flow directly from the trail or walkway into a stream or body of water. To the extent possible, place the trail or walkway along the contour and avoid placement perpendicular to the contour. Slope the trail away from waterways and expand the vegetative buffer zone to adequately mitigate nutrients entering waterways if the trail is used for livestock.

A geotextile or other approved underlayment shall be designed and installed on all gravel trails and walkways. The centerline of the walkway shall be crowned higher than the shoulder or the walkway shall be graded from one side to the other on a single uniform grade.

Where a trail or walkway crosses a stream, use NRCS CPS Stream Crossing (Code 578). If a drainage feature is typically dry, use NRCS CPS Structure for Water Control (Code 587) to design structures to safely carry runoff under the trail or walkway. At a minimum, design drainage culverts to carry the flow from the 2-year, 24-hour storm event. Use a larger storm event to design the drainage culvert where watershed conditions or anticipated usage warrant a larger structure.

Bridges and elevated walkways
Design bridges in accordance with NRCS CPS Stream Crossing (Code 578). Design elevated walkways in a manner that is consistent with sound engineering principles and adequate for the use and type of walkway. For elevated walkways, use the maximum loading anticipated during normal use plus a safety factor of at least 1.5. For elevated walkways that will only be used for pedestrian traffic, use the American Association of State Highway and Transportation Officials (AASHTO) “Guide Specifications for Design of Pedestrian Bridges” for design, or State building codes, whichever is more restrictive.

Design bridges and elevated walkways that will be used for horses or other large livestock for a uniformly applied load of not less than 200 pounds per square foot.

Surfacing
A trail can have a vegetated or unvegetated surface if the soil surface will support the intended use.

If a trail is planted to vegetative cover select vegetation that can withstand the intended use. Establish the vegetation in accordance with the criteria in NRCS CPS Critical Area Planting (Code 342). Protect it from traffic until it is fully established and capable of withstanding the expected use.

Where a hardened surface is needed, refer to NRCS CPS Heavy Use Area Protection (Code 561) for design criteria. Select a surface material for the walkway that is appropriate for the intended use and frequency. If concrete or bituminous material is used for the surface of the trail or walkway, texture the surface to avoid slippage during inclement conditions.

When selecting the surface material for a walkway used by animals, do not use sharp aggregates that might injure livestock or other wildlife.

Erosion control
Include provisions to control water and wind erosion during construction. Where possible, establish vegetation on disturbed areas as soon as practicable. Use the criteria in NRCS CPS Critical Area Planting (Code 342) or the NRCS State-approved seeding specification. Use vegetation adapted to the site. Give preference to native plant species where compatible with land use and existing plant species, including plants/species that provide pollinator habitat and forage.

If soil, shade, or climatic conditions prevent establishment of vegetation, use the criteria in NRCS CPS Mulching (Code 484) for erosion control.

Safety and use control
Incorporate use control and the safety of the users into the design of the trail or walkway. Where needed, install directional and warning signs, handrails, gates, fencing, and other safety devices. Refer to NRCS CPS Fence (Code 382) for fencing criteria. Provide protection from slides and falling rocks, as needed.

Additional Criteria Applicable to Provide or Improve Animal Access to Forage, Water, Working/Handling Facilities, or Shelter
When a trail or walkway is needed to facilitate animal distribution and movement or to allow better pasture utilization, use NRCS CPS Prescribed Grazing (Code 528) to plan the grazing system. Construct the trail or walkway wide enough to accommodate the movement of the animals and access by the operator for

management and maintenance. Keep widths to the minimum necessary for the efficient movement of animals and equipment to reduce opportunities for animal loafing on the trail or walkway.

A geotextile or other approved underlayment shall be designed and installed on all gravel trails and walkways. The centerline of the walkway shall be crowned higher than the shoulder or the walkway shall be graded from one side to the other on a single uniform grade.

When needed to facilitate movement of animals through a series of paddocks or pastures, design gate openings and trails or walkways for efficient flow of animals.

Where fencing is needed to keep animals confined to the trail or walkway, use NRCS CPS Fence (Code 382).

Additional Criteria Applicable to Pedestrian or Off-Road Vehicle Access for Agricultural, Construction, or Maintenance Operations, or Recreation

Base the design requirements on the type and class of trail or walkway described in NRCS 210-TN-LAN-04, “Trail and Walkway Design Aid.” When a trail or walkway will have multiple uses, design for the most restrictive criteria. When needed, use NRCS CPS Access Control (Code 472) to provide temporary or permanent exclusion from an area.

Width

Design the trail or walkway width to safely accommodate the intended use. The minimum width is determined by the type and class of trail. See the tables in appendix A in NRCS 210-TN-LAN-04 for design parameters.

Accessibility for recreation

The Americans with Disabilities Act of 1990 (ADA) requires outdoor recreation access routes and some hiker/pedestrian trails to be accessible to people with disabilities. Address accessibility requirements for new construction and when existing facilities are being altered. Compliance with the ADA outdoor recreation guidelines is not required where—

- Compliance would cause harm to cultural, historic, religious, or significant natural features.
- Compliance would substantially alter the nature of the setting.
- Compliance would require construction methods or materials that are prohibited by Federal, State, or local regulations.
- Compliance would not be feasible due to terrain or the prevailing construction practices.

Make an accessibility evaluation to determine the required level of accessibility for a trail/walkway design. Refer to NRCS 210-TN-LAN-04 for accessible trail design procedures.

CONSIDERATIONS

General Considerations

When planning this practice, consider the following, as applicable:

- The effect on areas of special scenic value.
- The location of the trail or walkway and its effect on water quality.
- Saving and maintaining key trees and other vegetation that have scenic value, provide shade, reduce erosion and runoff, provide habitat for fish, wildlife, and pollinators, or add to the visual quality of the area. Some selective cutting or trimming of trees or other vegetation may be necessary to provide and maintain scenic vistas at overlooks. At overlooks, keep tree removal or trimming to the minimum needed to provide an unobstructed view of the most salient features present.
- Contributions to food safety by channeling animals away from sensitive sites where pathogen transfer might occur.

- In areas that are vulnerable to wind erosion, or have frequent dry, loose surfaces that can easily create mechanically-generated particulate matter (i.e., dust), use of a surfacing material with a coarse texture for a walkway requiring nonvegetated surface treatment. Coarser materials will have larger particle sizes that are less easily entrained in the air and will minimize the potential for dust formation.
- An unvegetated trail can be a prime source of dust emissions resulting in a particulate matter resource concern. Utilize additional conservation practices, such as NRCS CPS Dust Control on Unpaved Roads and Surfaces (Code 373), to reduce the potential for generation and transport of particulate matter emissions, if warranted.

Additional Considerations to Provide or Improve Animal Access to Forage, Water, Working/Handling Facilities, or Shelter

To facilitate maintenance of a walkway, consider putting the fence outside of the surface material.

Additional Considerations for Pedestrian and Off-Road Vehicle Access

A trail or walkway for agricultural access generally should not exceed a 15-percent grade, although short sections of 50 feet or less may be up to 50 percent. Break long, steep grades with the use of switchbacks. The grades of general-use pedestrian and equestrian trails or walkways should generally not exceed 10 percent. Grades for other uses may be steeper, such as cross-country skiing, which may be as steep as 50 percent for difficult trails. Hiking trails may be as steep as 20 percent.

If switchbacks are used, consider placing switchbacks where there are obstructions (e.g., rocks or dense vegetation) on the inside of the turns so the pedestrians and animals have a difficult time trying to cut across the switchbacks.

For a recreational trail that starts from a roadway, adequate parking for users may need to be provided as part of the design.

A trail or walkway for agricultural purposes may need to incorporate staging areas where equipment, supplies, or harvested crops can be stockpiled.

PLANS AND SPECIFICATIONS

Provide plans and specifications that describe the requirements for applying the practice to achieve its intended purpose. As a minimum, include—

- A plan view showing the location of the trail or walkway.
- Typical cross-sections for each reach of the trail or walkway showing the width, typical side slopes, and any surfacing needed.
- Profile for each reach.
- Details of water control structures and other appurtenances.
- Erosion protection measures.
- Material quantities.
- Construction specifications that describe in writing the details necessary for construction.
- Fencing, as needed.
- Safety features, as needed.
- Expected application types and amounts of dust suppressants, if needed.

OPERATION AND MAINTENANCE

Prepare a written operation and maintenance plan for each site. As a minimum include—

- A schedule for inspections at least annually and after significant runoff events. The inspections must include drainage structures, trail or walkway surfaces, vegetation, fencing, bridges and

elevated walkways, and safety features, as appropriate.

- For bridges and elevated walkways that are open or accessible to the public, conduct inspections in accordance with AASHTO “Guide Manual for Bridge Element Inspection.”

- Maintenance activities:
  - Removal of sediment from water control features.
  - Repair of eroded areas or damaged surface materials.
  - Grading and shaping of the trail or walkway to maintain design grades and dimensions.
  - Application of dust control measures, as needed. Include types, amounts, and frequency of application of dust suppressants.
  - Repair of safety or control features, as required.
  - Reseeding of areas where vegetation has been damaged or destroyed.
  - Periodic removal and management of manure accumulations, as needed.

For multiple adjacent vegetated animal trails, include a rotation plan to allow for recovery of vegetation and for improvement of traffic-supporting conditions.

REFERENCES

These references were current at the time the CPS was developed. Use more recent editions, if available.

American Association of State Highway and Transportation Officials. 2017. AASHTO Load and Resistance Factor Rating Bridge Design Specifications, 8th Edition. Washington, D.C.

American Association of State Highway and Transportation Officials. 2019. Guide Manual for Bridge Element Inspection, 2nd edition. Washington, D.C.

American Association of State Highway and Transportation Officials. 2002. Standard Specifications for Highway Bridges, 17th Edition. Washington, D.C.

American Association of State Highway and Transportation Officials. 2009. Guide Specification for Design of Pedestrian Bridges, 2nd Edition. Washington, D.C.

USDA Forest Service. 2007. Trail Construction and Maintenance Notebook. Washington, D.C.

USDA Forest Service. 2008. Trails Management Handbook. Washington, D.C.

USDA NRCS. 2003. National Range and Pasture Handbook (Title 190), Revision 1. Washington, D.C. https://directives.sc.egov.usda.gov/

USDA NRCS. 2009. Technical Note (TN) (Title 210), Landscape Architecture (LAN) 4, Trail and Walkway Design Aid. Washington, D.C. https://directives.sc.egov.usda.gov/

U.S. Department of Interior National Park Service. 1998. Handbook for Trail Design, Construction and Maintenance. Washington, D.C.

Wood, G. 2007. Recreational Horse Trails in Rural and Wildland Areas: Design, Construction and Maintenance. Clemson University. Clemson, SC.