NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

TRAILS AND WALKWAYS

(Feet)

CODE 575

DEFINITION

A trail is a constructed path with a vegetated or earthen surface. A walkway is a constructed path with an artificial surface. A trail/walkway is used to facilitate the movement of animals, people, or off-road vehicles.

PURPOSES

A trail/walkway is used to accomplish one or more of the following purposes:

- Provide or improve animal access to forage, water, working/handling facilities, or shelter.
- Facilitate improved grazing efficiency and distribution.
- Protect ecologically sensitive, erosive, or potentially erosive sites.
- Provide pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations.

Provide trails/walkways for recreational activities or access to recreation sites.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all lands where management of animal or human movement is needed.

The practice applies to a trail/walkway constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use Indiana (IN) Field Office Technical Guide (FOTG) Standard (560) Access Road.

CRITERIA

General Criteria Applicable to All Purposes

Use of this standard requires compliance with all applicable federal, state, and local laws and regulations.

Design the trail/walkway to accommodate the planned use and site constraints. Minimize erosion and adverse on-site and off-site impacts to areas such as riparian zones, stream channels, streambanks, or wildlife habitat (e.g. fragmentation or restriction of wildlife movement).

Clearing. Design clearing widths and heights to accommodate the safe use of the trail/walkway. Use NRCS Trails and Walkways Design Aid, 210-VI-LAN-04 (NTWDA), for guidance, as needed.

Grades. Design trail/walkway grades to safely accommodate the planned use and to reduce the potential for erosion from runoff. Walkway grades will not exceed 10 percent except for short lengths as unavoidable.

Design the cross-slope (the surface perpendicular to the direction of travel) or crown of the trail/walkway to allow water to drain off without creating erosion.

Side slopes. Design all cuts and fills to have stable slopes that are a minimum of 2 horizontal to 1 vertical. For short lengths, rock areas, or very steep hillsides, steeper slopes may be permitted if soil conditions warrant 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/walkway.

Water Control. Divert concentrated water flows away from the trail or walkway by installing surface or subsurface drainage measures such as IN FOTG Standard (606) Subsurface Drain or (362) Diversion, as needed. Surface cross drains, such as broad-based or rolling dips, may be used to control and direct water flow off the trail/walkway surface. Use the chart in IN FOTG Standard (560) Access Road for maximum spacing requirements. Protect the outlets of drainage measures to limit erosion.

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/walkway where runoff will flow directly from the trail/walkway into a stream or body of water. To the extent possible, place the trail/walkway along the contour and avoid placement perpendicular to the contour.

Where a trail/walkway crosses a stream, use IN FOTG Standard (578) Stream Crossing. If a drainage feature is typically dry, use IN FOTG Standard (587) Structure for Water Control. 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 IN FOTG Standard (578) *Stream Crossing*.

Design 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 AASHTO *Guide Specification for Design of Pedestrian Bridges* for design or State guidelines, 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 (psf).

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, protect the vegetation from traffic until it is fully established and capable of withstanding the expected traffic. Establish a vegetative surface in accordance with the criteria in IN FOTG Standard (561) Heavy Use Area Protection.

Where an all-weather surface is needed, refer to the criteria in IN FOTG Standard (561) Heavy Use Area Protection. Select a surface material for the walkway that is appropriate for the intended use and frequency.

When selecting the surface material for a walkway used by animals, consider the sensitivity of the animals' feet.

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 IN FOTG Standard (342) Critical Area Planting 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.

If soil, shade, or climatic conditions prevent establishment of vegetation, use the criteria in IN FOTG Standard (484) Mulching for erosion control.

Safety and Use Control. Incorporate use control and the safety of the users into the design of the trail/walkway. Where needed, install directional and warning signs, handrails, gates, fencing, and other safety devices. 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

Construct the trail/walkway wide enough to accommodate the movement of the animals and access by the operator for management and maintenance. Minimum width for animal trails will be four (4) feet wide.

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

Where fencing is needed to keep animals confined to the trail or walkway, use IN FOTG Standard (382) Fence.

Additional Criteria to Facilitate Improved Grazing Efficiency and Distribution

When one of the purposes of a grazing plan is to improve animal distribution or to allow better

pasture utilization, a trail/walkway may be needed to facilitate animal movement. Use IN FOTG Standard (528) Prescribed Grazing to plan the grazing system.

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

Base the design requirements on the type and class of trail or walkway described in the NTWDA. When a trail/walkway will have multiple uses, design for the most restrictive criteria. When needed, use IN FOTG Standard (472) Access Control to provide temporary or permanent exclusion from an area.

Width. Design the trail/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 the NTWDA 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; or
- 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 the NTWDA for accessible trail design procedures.

Design Requirements

Design passage to accommodate present and reasonably anticipated changes in watershed conditions.

Design passage structures according to known swimming and leaping capabilities of target species or a similar species with comparable swimming abilities. Utilize hydraulic computations to document how designs satisfy the physiological requirements of target organisms.

Design passage structures to mimic channel geometry and morphology referenced from an adjacent reach or analog stream when the swimming and leaping abilities of target species are unknown, or when a project will benefit multiple aquatic organisms.

At a minimum, design and evaluate passage structures for hydraulic performance and structural integrity at the bankfull and 25-year peak flow events.

Design passage features to minimize or avoid energy deficits, physical stress, and harm to migratory organisms.

Design passage features to minimize or avoid excessive delays during migration periods.

Provide adequate attraction flow into a passage facility across the full range of discharge during which target species will move.

Use trashracks on culverts or fishways only if required or necessary. Ensure that trashracks are self-cleaning and/or easily maintained.

Select construction materials that are non-toxic and resistant to degradation.

Plan construction logistics, methods, and sequencing to minimize adverse effects to aquatic organisms, riparian areas, and instream habitat.

CONSIDERATIONS

General. When planning the trail/walkway, consider the effect on areas of special scenic value.

To protect water quality, consider the location of the trail/walkway relative to its use and purpose.

Contribute 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 a surfacing material with a coarse texture for a walkway requiring non-vegetated 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.

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

Pedestrian and Off-Road Vehicle Access. A trail/walkway for agricultural access generally should not exceed a 10% grade, although short sections of 50 feet or less may be up to 50%. Break long, steep grades by the use of switch backs. The grades of general use pedestrian and equestrian trail/walkway should generally not exceed 10%. Grades for other uses may be steeper, such as cross-country skiing, which may be as steep as 50% for difficult trails. Hiking trails may be as steep as 20%.

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

Consider saving and maintaining key trees and other vegetation that have scenic value, provide shade, reduce erosion and runoff, provide habitat for fish and wildlife, 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.

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/walkway.
- Typical cross-sections for each reach of the trail/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.
- Fencing, as needed.
- Safety features, as needed.

Expected application types, amounts, and frequency of dust suppressants, if needed.

OPERATION AND MAINTENANCE

Prepare a written Operation and Maintenance (O&M) plan for each site. As a minimum, the plan must include the following:

- A schedule for inspections at least annually and after significant runoff events. The inspections must include drainage structures, trail/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/walkway to maintain design grades and dimensions.
    - Application of dust control measures, as needed.
    - Repair of safety or control features, as required.
    - Re-seeding 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

United States Department of Agriculture, Forest Service. 2007. Trail Construction and Maintenance Notebook. Washington, DC.

USDA-NRCS. 2003. National Range and Pasture Handbook, Revision 1. Washington, DC.

Wood, Gene. 2007. Recreational horse trails in rural and wildland areas: design, construction and maintenance. Clemson University.

American Association of State Highway and Transportation Officials. 2010. AASHTO Load and Resistance Factor Rating Bridge Design Specifications, 5th Edition. Washington, DC.

American Association of State Highway and Transportation Officials. 2011. Guide Manual for Bridge Element Inspection. 1st edition. Washington, DC.

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

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

USDA - NRCS. 2009. LAN Architecture Note 4. Trails and Walkways Design Aid. Washington, DC.

USDA - FS. 1991. Trails Management Handbook. Washington, DC.