

Trails for All People



Guidance for Accessibility and Inclusive Design



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Edition of September 13, 2021

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Find this manual online at [WeConservePA.org](https://www.WeConservePA.org)



Financial support for this publication comes from the Colcom Foundation and the Community Conservation Partnerships Program, Environmental Stewardship Fund, under the administration of the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation.



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DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

Colcom Foundation

The first edition of this manual was entitled *Universal Access Trails and Shared Use Paths: Design, Management, Ethical, and Legal Considerations* and was published in 2014 by WeConservePA (then known as the Pennsylvania Land Trust Association). The latest version of the manual and related resources are posted at WeConservePA.org and are available free of charge to the public thanks to the generosity of WeConservePA's supporters.

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Preface

There are, it is often said by the more ecumenical prophets, many paths up the mountain. So long as it helps a person navigate the world and seek out what is good, a path, by definition, has value.

— Robert Moor, *On Trails: An Exploration*

When we started down the path to create the first edition of this manual,¹ the subject of accessible trail design and management was unfamiliar or amorphous to most trail managers, planners, and users. Trail projects often lacked consideration for people with disabilities or approached the subject haphazardly. We endeavored in the 2014 publication to provide a constructive review of the then new United State Access Board Architectural Barriers Act (ABA) Outdoor Developed Areas Accessibility Guidelines, which apply to federal agencies and lands, and went on to recommend the application of these rules as non-binding best management practices (BMPs) to other, non-federal hiking and pedestrian trail projects. We examined and recommended as BMPs the proposed federal accessibility regulations for shared use paths (such as rail-trails). We also addressed other accessibility matters related to the Americans with Disabilities Act (ADA).

As we deliver this new edition, the United States moves into its fourth decade with the ADA. As our respective organizations have emphasized through the years, this landmark accessibility law is important not just for the equal opportunity for people with disabilities that it promotes through legal mandate but for the basic attention that it calls to the needs of those with disabilities, both physical and cognitive—needs that often can be reasonably addressed in a pending trail project with some forethought. As we did in the 2014 edition, we call on readers to make use of relevant federal accessibility standards as voluntary guidelines even when those standards are not binding on the trail builder. Whether legally mandatory or not, the pursuit of accessible design to better meet the needs of people with disabilities is a good and sensible undertaking.

COVID-19 has brought suffering and death to far too many people. It has also triggered a greater appreciation for the outdoors: trail usage doubled and tripled in the early months of the pandemic and now, 18 months into the pandemic, use of many trails is still far greater than it was prior to 2020. The universal human need for a connection to greenspace and nature is deeper than ever. Richard Louv, author of *Last Child in the Woods*, points out that:

Ironically, the 2020 coronavirus pandemic, as tragic as it is, has dramatically increased, and is adding a greater sense of urgency to the movement to connect children, families and communities to nature.²

It is no small matter to broaden the communities that are connecting to nature. When speaking of communities, we need to recognize that our own sense of community may be vastly different than another person's. Trail advocates can do much better in engaging with people coming from different communities than their own in the planning and design of trails—engagements that could lead to more people enjoying and supporting trails and connecting with nature. Trails can be created that provide a shared sense of place for people of many different walks of life. This edition includes a preliminary exploration of inclusive planning and design to encourage advocates to engage and partner with communities other than their own in planning trails.

Our hope is that you will agree that in planning, building, and managing trails, we all should see past what we presently know and the technical specifications at our fingertips to open ourselves to trail planning and design that engages and seeks to serve all people. If this new edition can assist more people navigate the world and seek out what is good, our diverse paths will have shared values.

Travel well,

Larry Knutson
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One.

Introduction

Content

This manual explores best management practices (**BMPs**) for pursuing the inclusive planning, design, construction, and management of **pedestrian trails** that are usable by all people, including people with disabilities, *to the greatest extent possible* within the constraints presented by the terrain and the intended trail experience for users. It follows the principles that everyone should have access to trail opportunities and that the planning and design of trails should account for the great variation in abilities, cultural backgrounds, and other facets of the human condition.

While the manual addresses requirements of the law, it primarily focuses on helping people create trails that are as welcoming as possible for any particular set of circumstances. The BMPs contained within derive from federal regulations that are mandatory for federal units of government and those working on their behalf but not for private organizations working independently of the federal government.

Although the bulk of the manual focuses on pedestrian trails, it does additionally address accessibility BMPs applicable to **shared use paths** (such as rail-trails) intended for pedestrian use but not exclusively so. These BMPs derive from *proposed* federal regulations, which will—if and when finalized—be mandatory for all government entities but not for private organizations.

Also discussed are trail heads and related facilities as well as the federal accessibility rules applicable to the pedestrian routes that connect parking lots, shared use paths, and other accessible facilities to each other.

Improving trail accessibility for people for people of various abilities and disabilities was the motivating force behind the first edition of this manual and continues to be for this new edition. This new edition additionally calls on trail planners and builders to consciously engage with communities other than their own—to explore and work with people unlike themselves—to create trails that are optimized to provide a shared sense of place for people of many walks of life.

This manual, which was first published in 2014 and substantially revised for a new edition in 2021, shares practical and emerging ideas for developing policies and implementing practices in support of accessibility. In summary, the manual also:

- Gives planning guidance for creating trails, covering the concepts and principles of accessibility, sustainability, universal design, and inclusivity in order to meet the diverse needs of different user communities in an equitable manner (Chapter 2);
- Explores physical specifications for trail accessibility (Chapters 3 and 4);
- Addresses trail signage as a key aspect of trail development (Chapter 5);
- Introduces trail management and maintenance practices (Chapter 6);
- Reviews accessibility laws and regulations and identifies which entities are legally bound by them (Chapter 7);
- Looks at the use of federal accessibility guidelines as BMPs specifically for pedestrian trails, including the identification of conditions where their use as BMPs would not be appropriate (Chapter 8);
- Reviews the pending rules for shared use paths which, until finalized, should be viewed as BMPs (Chapter 9);
- Identifies rules and BMPs relating to other types of pedestrian routes as well as trailheads and trail amenities (Chapter 10);
- Presents several case studies highlighting projects that incorporate universal design principles and accessible design standards (Chapter 11);
- Provides a glossary addressing commonly encountered terms, bewildering jargon, and abbreviations (Glossary); and
- Recommends additional resources for trail and shared use path planning, design, construction, and maintenance (Resources).

There are many types of non-motorized, land-based recreational trails and shared use paths, including pedestrian, mountain biking, equestrian, multi-use trails, and cross-country skiing designed for a wide range of user types. The manual **Pennsylvania Trail Design and Development Principles: Guidelines for Sustainable, Non-Motorized Trails**³ provides extensive guidance and detailed information about the characteristics of the various types of trails and paths and is referenced extensively in the following chapters. This and other publications available from numerous state governments and private organizations provide useful and regionally relevant resources to readers.

Terminology of Trails, Paths, and Routes

People typically use the generic word *trail* in describing a wide variety of paths over which one might travel. Federal regulators, in contrast, have assigned a narrow meaning to *trail* for regulatory purposes and have introduced other terms with very specific meanings. This manual, in order to be consistent with federal regulations and other publications, generally uses this federal terminology, which can be summarized as follows:

- **Trail** — “a route designed, designated, or constructed for recreational **pedestrian use** or provided as a pedestrian alternative to vehicular routes within a transportation system.”^{4 5} This is the type of route most of us think of as a “hiking trail.” The literature sometimes refers to this as a “hiker/pedestrian trail.”
- **Shared use path** — a route providing an off-road means of transportation and recreation for **multiple types of users**, such as pedestrians and bicyclists. Shared use paths are different than trails from a regulatory, user, and construction perspective. They are typically located on an exclusive right-of-way, with no fixed objects in the pathway and minimal crossflow by motor vehicles. Portions of a shared use path may be within the road right-of-way but physically separated from the roadway by a barrier or landscaping. Some shared use paths provide very rural experiences while others pass through the heart of urban areas. Rail-trails are a primary example of a shared use path. On these types of paths, pedestrians share space with bicyclists, equestrians, or in-line skaters.⁶
- **Accessible route** — a route connecting an accessible facility (e.g., a parking spot) to other accessible facilities (e.g., an accessible trail). The term is used in the context of regulations governing the work of non-federal entities.
- **Outdoor Recreation Access Route (“ORAR”)** — a continuous, unobstructed path that connects elements, spaces, or facilities within a site, such as picnic areas, campgrounds, trailheads, and viewing areas. The term comes from regulations that are applicable only to federal entities.



Distinguishing one type of pathway from another—sometimes a challenging exercise—is necessary for determining which accessibility guidelines are applicable.

This manual sometimes uses the word trail in its generic sense rather than the particular hiker/pedestrian trail sense to avoid repeated use of the cumbersome string of terms “trail, shared use path, accessible route, or ORAR.” Context—and sometimes a note at the beginning of a chapter—should enable the reader to distinguish the generic use from the hiker/pedestrian one.

Regulations and Best Management Practices

While the primary focus of this manual is on pedestrian-only trails, a broader range of facilities used by pedestrians are addressed in various chapters. The table closing out this introduction provides a brief overview of the various types of facilities used by pedestrians and federal accessibility regulations applicable to them. It identifies the circumstances in which the regulations are legally enforceable and those for which the regulations are recommended by this manual to serve as BMPs—voluntary guidelines. It places the rules and BMPs for these different types of facilities in perspective on one page.

Chapter 7 offers an expansive explanation of the content contained in the table.

Pedestrian Trail Accessibility Guidelines

Chapters 3 through 6 and Chapter 8 focus on **pedestrian-only trails**.

In 2013, the U.S. Access Board⁷ issued the “**Outdoor Developed Areas Accessibility Guidelines**”⁸ and in 2014 published its own guide, “Outdoor Developed Areas: A Summary of Accessibility Standards.”⁹ This manual refers to these regulations as the “**Outdoor Guidelines**”; the literature also refers to them as “**ODAAG**.”

This manual recommends that non-federal entities that seek accessible design guidelines for a trail project use Chapter 1017 “Hiker and Pedestrian Trails” of the Outdoor Guidelines as best management practices in the planning, design, construction, and management of that trail.

The Outdoor Guidelines are legally binding only on:

- federal land management agencies (such as the Fish and Wildlife Service, the Army Corps of Engineers, and the National Park Service); and
- non-federal private or public entities building trails on federal land or on behalf of federal agencies.¹⁰

The Outdoor Guidelines are NOT binding on non-federal organizations or agencies simply because a project uses federal grant funds.

These guidelines are not applicable to trails primarily designed for use by equestrians, mountain bicyclists, snowmobile users, or off-highway vehicle users, even if pedestrians may use the same trails.¹¹

In the future, the U.S. Access Board plans to develop outdoor recreation area standards specifically for state and local governments and private and non-profit organizations. Until standards are developed, which could be years from now, the U.S. Department of Justice is not *requiring* private organizations and non-federal government entities to make their hiker/pedestrian trails accessible.¹² Until binding regulations are developed, the new Outdoor Guidelines provide an excellent roadmap for private entities and local government agencies that want to design and build hiker/pedestrian trails that offer accessibility.

Accessibility Guidelines for Shared Use Paths and Other Facilities

Chapters 9 and 10 address accessibility guidelines for **shared use paths** and other types of **pedestrian routes** respectively.

Although many aspects of **trailhead** and **trail amenity** design (e.g., gates, parking spots) are addressed by the 2010 ADA Design Standards, Chapters 1011 through 1015 of the Outdoor Guidelines provide non-federal entities with BMPs for components that are not covered by ADA regulations. Chapter 10 focuses attention on trailhead and amenity accessibility.

Other Power-Driven Mobility Devices

All trails and shared use paths—indeed, any areas open to pedestrians—that are owned or operated by a public or private entity covered by the Americans with Disabilities Act are subject to federal regulations on Other Power-Driven Mobility Devices (**OPDMDs**). The manual only touches on these regulations, which are addressed at length in the WeConservePA guide [*Other Power-Driven Mobility Devices on Trails and Areas Open to Pedestrians: Creating and Implementing Policies for Accessibility and Compliance with the Americans with Disabilities Act.*](#)

Overview of Guidelines for Routes, Paths, Trails, and Amenities

Which guidelines apply?				
	Facility	Guidelines	Regulatory Requirement or Recommended BMP?	Issuing Agency
Routes	<p>Accessible Routes</p> <p>All buildings and certain recreational amenities: administrative offices, residences, crew quarters, visitor centers, entrance stations, parking lots.</p> <p>Components such as: restrooms, work stations, doors, operating controls.</p> <p>Recreation facilities such as: boating and fishing facilities and playground surfaces and equipment (ASTM).</p>	2010 ADA Standards for Accessible Design	Required for all non-federal (Title II and III) entities. (The ABA Accessibility Standards are required on federal lands.)	U.S. Department of Justice
	<p>Shared Use Paths</p> <p>Shared use paths located on either public or private land.</p>	PROW Guidelines (Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way)	Pending requirement for all federal and other governmental entities (i.e., Title II). Recommended as BMPs for all.	U.S. Access Board
	<p>Trails</p> <p>New or altered trails that are designed for hiker or pedestrian use AND that connect either directly to a trailhead OR to another trail that substantially meets the requirements of the Outdoor Guidelines.</p>	2013 Outdoor Developed Areas Accessibility Guidelines (ODAAG Chapter 1017)	Required for federal agencies and lands. Otherwise, a recommended BMP.	
	<p>Outdoor Recreation Access Routes (ORARs)</p> <p>Routes on federal lands that connect outdoor elements, spaces, or facilities within a site.</p>	2013 Outdoor Developed Areas Accessibility Guidelines (ODAAG Chapter 1016)	Required for federal agencies and lands. NOT recommended for others; instead use the standards for Accessible Routes as BMPs.	
Amenities	<p>Outdoor Recreation Facilities</p> <p>Parking spaces within camping units, picnic units and pull-up spaces at dump stations, tent pads and tent platforms, camp shelters, viewing areas, and other outdoor constructed features.</p>	2013 Outdoor Developed Areas Accessibility Guidelines (ODAAG Chapter 1011 -1015)	Required for federal agencies and lands. Otherwise, a recommended BMP.	

Two.

Planning the Trail

Of the different possible outdoor activities to promote physical fitness, hiking is perhaps the most versatile and the most accessible to people with I/DD [intellectual and developmental disabilities]. Hiking is a natural extension of walking. It is one of the first skills we acquire, one of the most essential activities of daily life, and one of the few forms of recreation that requires no equipment.

Peter Doehring¹³

Accessibility

As the population ages and health issues and disabilities increase, a growing number of people will face limits to their outdoor recreational activities. However, these limits do not mean a reduction in the interest in nature, wildlife, physical exercise, and recreation; the limits do mean an increased challenge to those designing and providing trail experiences to the public. A person with a disability desires the same experiences, opportunities, and freedoms enjoyed by others.

Percentage of Adults with Select Functional Disabilities

Type of disability	U.S.	PA
Mobility: Serious difficulty walking or climbing stairs	12.9%	12.1%
Cognition: Serious difficulty concentrating, remembering, or making decisions	11.4%	11.5%
Independent living: Difficulty doing errands alone, such as visiting a doctor's office or shopping	7.0%	7.0%
Hearing: Deafness or serious difficulty hearing	5.6%	4.9%
Vision: Blind or serious difficulty seeing, even when wearing glasses	4.7%	3.0%
Self-care: Difficulty dressing or bathing	3.8%	3.7%
<i>2017 Behavioral Risk Factor Surveillance System¹⁴</i>		

Accessibility sometimes refers to the characteristic that products, services, and facilities can be independently used by people with a variety of disabilities. Accessibility as a design concern has a long history, but public awareness about accessibility increased with the passage of legislation such as the Americans with Disabilities Act (ADA), which mandated that public facilities and services be fully accessible to people with disabilities. An example of an accessible design for

trails is not allowing trail tread obstacles that exceed two inches in height. This provides a more safe and enjoyable experience for both people using wheelchairs, as well as people with sight and cognitive disabilities.

Paying explicit attention to accessibility issues during trail planning efforts increases the probability that the needs of people with disabilities can be accommodated in a project (and depending on circumstances, ensures compliance with the law).

When thinking about planning a new, expanded, or realigned trail, some initial considerations include (but are not limited to) the following:



- Would making the trail accessible detrimentally and unduly impact the views, interesting or challenging terrain, biodiversity, or other features that are desired for the trail-user experience?
 - If yes, what if any level of detriment is acceptable to make the trail experience available to more people?
- Put another way, would making a trail more accessible to some make it less enjoyable to others? What are the tradeoffs? Is there a sweet spot in balancing access with the desired trail features?
- How much additional energy and money would it take to construct **and maintain** a trail that would be accessible to more people? Does the organization have the capacity to bear the additional expense? Are there new financial resources that can be tapped to provide this accessibility?
- If the trail were to be made accessible, how much more accessible would it be?
- Are there other trail uses that may cause conflict (e.g., a high level of dog walking or bicycle usage)?

Crafting Policies to Address Accessibility

Organizations should consider ways to improve upon the accessibility of their trails and other facilities beyond what the law requires. Although trails and shared use paths are not currently covered by the ADA, this manual recommends that entities incorporate the Outdoor Guidelines and PROW Guidelines as BMPs into park master plans, trail network plans, transportation plans, etc. One reason is that future rulemaking by the U.S. Access Board likely will require shared use paths and non-federal trails to have a large degree of accessibility. The most compelling reason is that **it is the right thing to do.**

For instance, although the Greater Albuquerque Recreational Trails Committee recognized that there are not yet binding regulations governing shared use paths, it voted to set a goal of making 1/3 of all shared use paths in the community accessible. Recently, it started its auditing process to determine which paths to select for accessibility improvements; decide how to prioritize the paths; inventory the specific accessibility improvements needed; and develop cost estimates.¹⁵

Organizations should set a goal of applying the BMPs to all new and altered trails they develop. As explained elsewhere in this publication, this means that certain new or altered trails will be able to be made accessible—in full or in part—and some will not (because of challenging terrain, high construction costs, or other “conditions for departure”). The same should be considered in regard to shared use paths.

An organization could also determine as a policy matter that it should take every opportunity to make *existing* trails or shared use paths more accessible even if no alterations are planned. For example, if during routine trail maintenance staff needs to cut an opening through a downed tree across the trail, staff could be directed as a matter of policy to make the opening wide enough for a wheelchair (32 inches) or the category of OPDMD allowed on that trail.

More generally, organizations may want to refer to a study conducted by the National Center on Accessibility that details practices in the field of parks and recreation accessibility management that exceed the minimum standards set forth by the ADA and other disability-related legislation.¹⁶ The study defined best practices in accessibility as “those common, identifiable procedures, attitudes and behaviors, which exceed the minimum standard represented in the practice and delivery of accessible recreation programs and facilities.” The study identified the BMPs as:

1. Provision of accessible information to patrons, in alternative formats, recognizing persons with visual, hearing, or cognitive impairments.
2. Practices that exceed the minimum standards/guidelines for accessibility established by the Americans with Disabilities Act Accessibility Guidelines.
3. An established set of policies which facilitate and promote inclusive and accessible programs, and facilities, in the delivery of recreation and leisure services.
4. Establishment of an ongoing, periodic training program for agency personnel and volunteers regarding accessible and inclusive concepts and practices for people with disabilities.
5. Establishment of an Accessibility Advisory Board (or similar group) which includes persons with disabilities.
6. Demonstrated support by administrators regarding accessible recreation programs.
7. Delivery of integrated recreation programs and activities for persons with and without disabilities if applicable, feasible, or desirable.

8. Marketing materials and program brochures that are accessibility-oriented for the promotion of inclusion of persons with disabilities.
9. Recruiting staff and volunteers with disabilities to develop and deliver public programs.
10. An organizational culture and attitude where recreation staff recognizes and promotes the rights of all persons to access fulfilling and enjoyable recreation activities, regardless of ability or disability.
11. Expenditures related to the purchase of adapted equipment, services, and/or accessibility improvement projects in the financial planning and budgeting process.
12. Public programming that reflects the diversity of communities to include people with disabilities.¹⁷

Progressive Access

Dr. Peter Doehring¹⁸ has developed a Progressive Access pedestrian trail rating system that makes finer distinctions between different levels of difficulty, especially for beginning hikers. “Progressive Access extends existing standards for accessibility to capture increasing levels of difficulty in ways that are meaningful and useful to hikers, hiking partners, and hiking planners.¹⁹

Progressive Access recognizes that no single set of standards will be appropriate for all hikers. Hikers vary significantly with respect to the kinds of physical, cognitive, and social difficulties they have, and so a hiking planner will have to set goals for each hiker individually. Progressive Access offers guidelines regarding which dimensions to consider, and the points at which a different kind of hike presents a meaningful increase in difficulty level.

The way in which Progressive Access can assist hike planners and hikers, can

also benefit trail planners and managers. By establishing a baseline for an “easy” trail that fully meets accessibility BMPs, one can then develop trails, through inclusive design (discussed below), that increase challenges for a wider range of users, including those with physical and cognitive disabilities.

The Federal Highway Administration notes that because:



people are naturally most comfortable with their own needs, designers should attempt to create a connection between themselves and intended users of the facilities they create. If done successfully, this understanding will result in more accessible facilities and higher quality experiences on trails.

Sustainability

All trails—whether designed for pedestrians only or for multiple types of use—ought to share a common goal: to provide recreational opportunities to the present generation without compromising the ability of future generations to meet their own needs. This is the principle of *sustainability*.²⁰ Regarding trail planning, construction, and management, sustainability may be thought of as including at least four factors:²¹



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The four sustainability factors can be envisioned as a pie. Each section may be weighted differently during trail design depending on organizational capacity, environmental sensitivity, desired materials and availability, budget, current and projected site use, and any number of other factors that vary depending on the site and even across different trails within the same site. Together all of these factors must be considered and prioritized to ensure the project can be designed, built, used, and maintained sustainably.

- **Physical Sustainability** — Designing trails to retain their structure and form over years of use and under human and natural forces. The more a trail is utilized, the more it is susceptible to wear and tear.; thus, a trail should be designed with anticipated usage in mind to ensure that it remains physically stable with appropriate maintenance and management. A trail should also be designed with careful respect for how water flows over and through the land as poorly executed water management can make for unpleasant trail user experiences or swiftly destroy a trail altogether.
- **Ecological Sustainability** — Minimizing the ecological impacts of trails and protecting sensitive natural resources. For example, trails should be designed to avoid destroying forest cover adjacent to streams and destabilizing stream banks.
- **Economic Sustainability** — The organization responsible for the trail should have the capacity to ensure the continued care of the trail over its life cycle. Developing and committing to a long-term maintenance strategy is a critical aspect of a successful trail program.

- **User Sustainability** — Trail-user sustainability refers to the understanding that a trail user has regarding their impact on the land, their influence on other users' enjoyment of the trails, and their ability to co-exist with different types of trail users and groups.²²

Universal Design

7 Principles

Universal design, as defined by the [Center for Universal Design](#) at North Carolina University, “is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.” The Center’s [7 Principles of Universal Design](#)²³ can be constructively applied to planning, constructing, and managing trails. These principles, together with their associated guidelines, are as follows:

PRINCIPLE ONE: Equitable Use — The design is useful and marketable to any group of users.

- Provide the same means of use for all users: identical whenever possible; equivalent when not.
- Avoid segregating or stigmatizing any users.
- Provisions for privacy, security, and safety should be equally available to all users.

PRINCIPLE TWO: Flexibility in Use — The design accommodates a wide range of individual preferences and abilities.

- Provide choice in methods of use.
- Accommodate right- or left-handed access and use.
- Facilitate the user’s accuracy and precision.
- Provide adaptability to the user’s pace.

PRINCIPLE THREE: Simple and Intuitive Use — Use of the design is easy to understand, regardless of the user’s experience, knowledge, language skills, or current concentration level.

- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.
- Provide effective prompting for sequential actions.
- Provide timely feedback during and after task completion.



PRINCIPLE FOUR: Perceptible Information — The design communicates necessary information effectively to the user, regardless of ambient conditions or the user’s sensory abilities.

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- Provide adequate contrast between essential information and its surroundings.
- Maximize “legibility” of essential information in all sensory modalities.
- Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
- Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

PRINCIPLE FIVE: Tolerance for Error — The design minimizes hazards and the adverse consequences of accidental or unintended actions.

- Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
- Provide warnings of hazards and errors.
- Provide fail safe features.
- Discourage unconscious action in tasks that require vigilance.

PRINCIPLE SIX: Low Physical Effort — The design can be used efficiently and comfortably and with a minimum of fatigue.

- Allow user to maintain a neutral body position.
- Use reasonable operating forces.
- Minimize repetitive actions.
- Minimize sustained physical effort.

PRINCIPLE SEVEN: Size and Space for Approach and Use — Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user’s body size, posture, or mobility.

- Provide a clear line of sight to important elements for any seated or standing user.
- Make reach to all components comfortable for any seated or standing user.
- Accommodate variations in hand and grip size.
- Provide adequate space for the use of assistive devices or personal assistance.

Universal Design, Accessibility, and Sustainability Go Hand-In-Hand

Universal design is consistent with creating accessible trails and doing so sustainably. Examples include:

- **Paths that traverse along the side slope** — Trails should traverse side slopes instead of travelling down the fall line. The result is far less susceptibility to erosion and a more accessible path of travel.

- **Sustainable grades** — Reducing running (linear) grades of trails decreases erosion as well as creating greater access for a broader range of users.
- **Erosion resistance** — Firm and stable trail tread surfaces (as opposed to loose granular or soft soil surfaces) offer more sustainability as well as greater range of access for users.
- **Out-sloped tread** — This practice encourages sheet flow of runoff at low velocities, away from the trail, rather than down the trail. Drier, firmer trail treads provide comfortable, stable experiences for all people.
- **Frequent linear grade reversals** — This minimizes erosion by slowing the velocity of water (and the materials it carries) along the trail, thereby increasing sustainability of the trail's tread surface. Because linear grade reversals are meant to be gradual, they can easily accommodate the Outdoor Guidelines' trail design parameters for accessibility.
- **Positive user experiences** — Trail structures incorporated into the trail to protect natural resources (for example, boardwalks over wetlands) can also provide more inclusive access to a wider range of users, who would prefer to navigate over wet areas rather than through them.
- **Lower maintenance needs** — One example is the use of rolling grade dips and grade reversals rather than water bars and check dams to control water and limit erosion of the trail tread. The former requires little if any maintenance, whereas the latter require ongoing maintenance. In addition, many more people can navigate rolling grade dips and grade reversals as stepping over or around them is not necessary.



of achieving community buy-in is not always clear, however. As planners seek to build new or improved public spaces, it is important to consider all the potential effects these new spaces could have on the surrounding communities.²⁵

For trail designers, even in the context of good-faith efforts to involve or include a broad range of users and stakeholders in planning efforts, implicit bias can impact actions, alienating stakeholders when their input is critical. **It is easy to say “everyone is welcome here” but it is significantly more difficult to put that into practice** and ensure that the process is truly accessible, safe, and designed to provide the desired experience for all.



Gender, race, and ethnicity are some of the obvious facets of identity to be conscious of when seeking diversity in trail stakeholder groups to provide input for trail projects. However, the work of being more inclusionary goes well beyond one planning process. It includes the structure, make up, and attitudes within the organization or organizations²⁶ leading the trail effort. The work of including diverse groups and creating truly welcoming environments not just on the trail but within an organizational culture starts with how an organization interacts in all settings with individuals of varying ethnic, racial, and socioeconomic backgrounds.

Launching an Inclusionary Planning Process

To start, consider the core goals of your work and focus on those that you share with stakeholders. Find the common ground and go from there. Remember that including diverse voices in trail design is not the end goal; rather, the end goal is creating a trail or trail system that is successful, enjoyable, safe, and welcoming for all.

The *Inclusionary Trail Planning Toolkit* observes that:

Traditional planning events often cater to people who have the time and resources to attend community events and to those who have a predisposed awareness of new capital projects due to their profession or other networks. Planners and advocates can make informed decisions based on community context in order to challenge this status quo and foster an accessible and inclusive planning process.²⁷



To go beyond shallow and insincere community engagement efforts and undertake an inclusionary design process, it is important to **maintain an open mind when defining who**

your stakeholders are. While traditional trail user groups, like outdoor-focused youth organizations and special interest groups (such as mountain bikers), are perennial participants in traditional outreach efforts, stakeholders can be anyone who is impacted by the trail or might possibly use the trail. In this way, the inclusionary design process serves not just to gather feedback, but to make new connections and forge meaningful partnerships in your community. Possible stakeholders can include neighboring landowners and businesses, religious and youth groups, healthcare providers, community care providers and shelters, educational organizations, arts and cultural organizations, informal recreational groups, and many more. Just because a given group does not currently utilize trails, or opposes your trail efforts, does not make their feedback irrelevant. For example, a neighbor who opposes a trail development may have strong concerns about overflow parking. This is valid criticism that can be addressed through the design process.

Similarly, organizations seeking diverse input must **be receptive to the feedback**, no matter how unflattering, counterintuitive, or disagreeable it may seem. It is easy to dismiss criticism or differing opinions and focus on seeking only positive feedback or feedback that conforms to organizational assumptions.

This should go without saying, but it is also important to **include stakeholders at the earliest opportunity**. Community outreach that only serves to inform about plans that are already finalized does nothing to incorporate feedback and at worst can be perceived as an exclusionary process lacking in transparency.

In order to proceed with an inclusionary design process that meaningfully includes input from a diverse group of stakeholders, it is important to select the tools that best suit the various stakeholder communities, meets them where they are, and treats the process not as an extractive endeavor, but as a two-way exchange and opportunity for relationship-building. [International Association of Public Participation](#) (IAP2) offers that an intentional community engagement plan should inform, consult, involve, collaborate, and empower. Examples of tools that might be used in a well-rounded participatory design process (which are adapted from the IAP2 Public Participation Spectrum, 2014, and City of Durham, 2018) include:

- **Inform:** To provide stakeholders with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions. Community engagement is a two-way exchange and cannot be solely extractive.
- Fact Sheets
- Websites
- Open Houses
- **Consult:** To obtain public feedback on analysis, alternatives and/or decisions. In addition to informing the public, consulting goes a step farther to listen to and acknowledge concerns and aspirations and provide feedback on how public input influenced the decision.
- Public comment periods

- Focus groups
- Surveys
- Public meetings
- **Involve:** To work directly with stakeholders throughout the process to ensure that concerns and aspirations are consistently understood and considered. Concerns and aspirations should be directly reflected in the alternatives developed and provide feedback on how received input influenced the decision.
- Workshops
- Walkshops^{28 29}
- Deliberate polling
- **Collaborate:** To partner with stakeholders in each aspect of the decision including the development of alternatives and the identification of the preferred solution. Beyond gathering information, look to stakeholders for advice and innovation in formulating solutions and incorporate those recommendations into the decisions to the maximum extent possible.
- Advisory committees
- Consensus-building
- Participatory decision-making
- **Empower:** To place final decision making in the hands of the stakeholders. Implementation must reflect the desires of the stakeholders.
- Citizen-juries
- Ballots and voting
- Delegated decisions



While an understanding of the rationale and methods of inclusive design is important for organizations and land managers undertaking trail projects, those wishing for greater success in being inclusionary in the planning process are well advised to work with an experienced professional. It is the trail planner and designer's responsibility to weave together experiential qualities of a site with user needs through the manipulation of physical and technical variables to create a successful, inclusive, and accessible trail.

Intersection of Accessibility, Sustainability, Universal Design, and Inclusivity

Considerations for inclusive trail planning and universal design entail questions such as:

- How can universal design principles be utilized to incorporate accessible design standards for people with disabilities, as well as address the widest range of potential trail users?

- Would making a trail accessible to users with disabilities make it more or less sustainable; create more or less impact on flora or fauna in the area?
- Does the trail provide views, interesting terrain, shade and light zones, to a wide range of users and capabilities? How might universal design principles result in a better design addressing these assets?
- Does the trail create a loop or a connection to another trail, thus offering future experiences, including progressive access challenges, to return users?
- What are the comparative social, environmental, and financial factors between creating a universally designed trail versus less inclusive trail design?

All trails should have a purpose that underlies their design: The user experience. Simply meeting technical design guidelines and standards, be they required by law or suggested as BMPs, does not create an engaging trail experience.

Utilizing a Unified Process for Trail Management, Planning, Design, Construction, and Maintenance

Trail planning and design professionals know that a comprehensive trail plan is essential to developing a trail that will withstand the rigors of weather and intended user traffic for many years.

Each Trail is Unique

Trail plans should consider each trail as unique. For example, one plan could envision a hiking trail in a suburban park setting that needs to accommodate thousands of users on a single day, including people using accessibility devices. Because of that trail's designed use, its width may need to be much greater than hiking trails in other areas and should be constructed with a highly stable tread surface resistant to high-volume user demands.³⁰

By comparison, an accessible hiking trail that provides a secluded journey to a scenic overlook, undertaken by less than 100 people per day, would be narrower and may feature a compacted aggregate surface that provides occasional turnouts for resting and passage.

The goal of effective trail planning and design is to clearly take into consideration who will be using the trail in the near and long term, as well as the estimated frequency of usage, safety considerations, and major obstacles (which may require structures such as bridges). For example, the use of OPDMDs on a hiking trail could potentially increase tread surface wear if such devices had not been projected into the initial planning process. To meet the above goal, the trail plan and design should include clear objectives regarding both construction and materials that will meet such use in the long and short term.

Trail Fundamentals

Chapter 5 of the *Pennsylvania Trail Design and Development Principles* recommends that land managers establish **trail management objectives** during the trail planning process. The Trail Management Objectives (“**TMOs**”) process developed by the U.S. Forest Service in 2006, although technically applying only to its own lands, are recommended as BMPs for entities building sustainable trails on non-federal land. TMOs synthesize the management intention of a proposed or existing trail, providing a means of recording basic information for future trail planning, management, and reporting.

The cornerstones of TMOs are known as the *Trail Fundamentals*,³¹ five concepts that are the cornerstones of solid trail management. Trail Fundamentals provide an excellent approach to undertaking any trail’s plan, design, construction, management, and ongoing maintenance. Whether for pedestrian trails, or equestrian, mountain biking, or other trail uses, these BMPs provide a modern, integrated means to consistently determine, record, and communicate the intended design and management guidelines for sustainable trails.

The **five fundamentals** for any type of user trail are:

- **Trail Type** — A category that reflects the predominant trail surface and general mode of travel accommodated by a trail.
- **Trail Class** — Trail classes apply to all types of trails—equestrian, OHV, biking, hiking, and others. Trail classes broadly organize trails by desired management characteristics and level of development. Trail classes take into account what user preferences are for a particular trail, its setting, protection of sensitive resources, and the land manager’s trail management intent. Trail classifications range from Class 1 trails, which appear little different from a deer path and may disappear intermittently, to Class 5 trails, which are wide paths—frequently paved—associated with highly developed environments.³²
- **Managed Use** — A mode of travel that is *actively* managed and appropriate on a trail, based on its design and management.
- **Designed Use** — The designed use of a trail that requires the most demanding design, construction, and maintenance parameters and that, in conjunction with the applicable trail class, determines which design parameters will apply to the trail.
- **Design Parameters** — Technical guidelines for the survey, design, construction, maintenance, and assessment of a trail, based on its designed use and trail class.



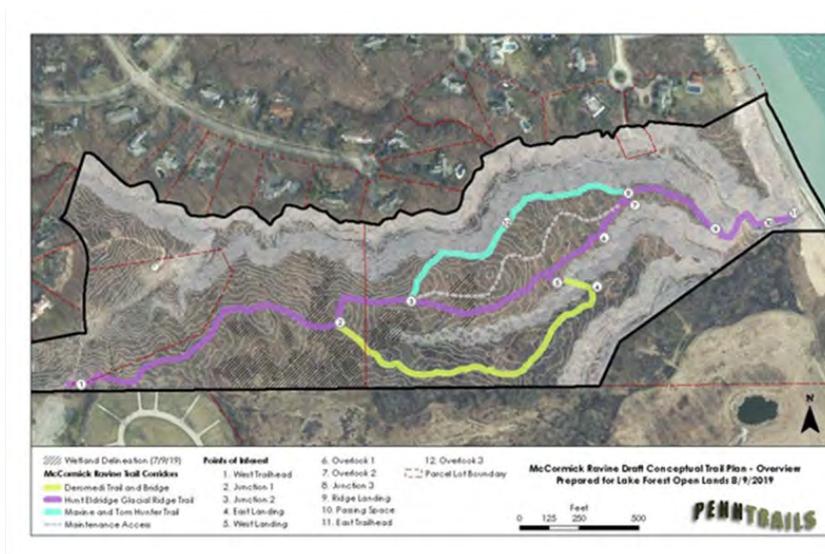
Photo courtesy of Penn Trails

Together, these five fundamentals help planners objectively site trails in the appropriate areas with the most sustainable use and design parameters determined, thereby delivering better performance, more public satisfaction, and less maintenance over the long term.

The U.S. Forest Service has been at the forefront of developing and utilizing trail design parameters for several decades. This included developing their own *Trail Accessibility Guidelines* (“FSTAG”)³³ and *Outdoor Recreational Access Guidelines* (“FSORAG”).³⁴

McCormick Ravine - Hunt Eldridge Glacial Ridge Trail Recommended Managed Use and Design Parameters		
Designed Use		Design Parameters
Pedestrian-Only Trail		
Design Tread	Tread Width	72"
	Structures (min. width)	72"
Design Surface	Type	<ul style="list-style-type: none"> Aggregate bed, non-woven geotextile layer, Universal Access tread Uniform, firm, and stable for universal access Constructed surfaces such as decking meet ADA 2010 Design Standards
	Protrusions	No protrusions in tread material > 1"
	Obstacles	No obstacles extending into path of travel, including trees, signage, and utilities
Design	Target Linear Grade	5% or less
Grade	Short Pitch Maximum	8.33% Universal Access BMP
	Maximum Pitch Density	50% of the trail
Design Cross	Target Cross Slope	2%
	Maximum Cross Slope	3%
Design Clearing	Height	8 Feet
	Width	8-10 Feet
	Shoulder Clearance	24 Inches
Design Turn	Radius	Per formal design standards

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Three.

Trail Surface, Grade, and Structures

Tread Surface: Where the User Meets the Trail

Surface, along with grade, is the structural component of a trail most critical to providing opportunities to a wide range of users, including people with disabilities. Substantial attention should be devoted to creating well-shaped, durable, firm, and stable surfaces that are aesthetically compatible with the setting and the intended recreational experience:

- A firm and stable surface ensures that users with disabilities do not expend unnecessary energy that could be used enjoying the trail;
- A well-shaped and durable surface reduces maintenance burdens; and
- The surface materials, if chosen with care, can enhance accessibility and please the eye.

Considerations for Different Tread Surfaces

Trail Surface Material	Relationship to Managed Use and Designed Use	Relationship to Design Parameters and Construction Practices
Stone aggregate; rock.	Native material; more natural aesthetic; useful in more remote or steep terrain; easier to shape.	Smaller project footprint; higher tolerance for protrusions and obstructions; can be done by hand and with smaller equipment; specific construction techniques required to provide compact and uniform surface.
Wood; concrete; asphalt; recycled material; chemically modified soil or sand.	Lower profile terrain; useful in environmental settings such as wetlands; good durability in urban settings and heavy use areas.	Larger project footprint; tighter tolerances for protrusions and obstructions; conventional construction techniques and equipment.

Trail Tread Surfaces

When selecting trail tread³⁵ material for a specific project, include the following questions as part of your community engagement with various user groups and land managers:

- **Who are the primary user groups?** A trail should provide specific benefits for the users for whom it is managed.
- What is the goal of the trail experience for those user groups? A trail should have at least one specific purpose.
- **What are your budget and maintenance parameters?** Look at a five-year period after completion of the trail project; create an annual budget and maintenance cycle.

The traffic volume and flow, along with geological, environmental, and typical weather conditions all factor into deciding what the most appropriate surface material will be for a chosen trail and the individual segments that comprise it.³⁶

Aggregate Materials for Tread Surfaces

Limestone, which is widely available in Pennsylvania, provides an excellent natural aggregate material for constructing trail treads. In a study sponsored by the U.S. Access Board, the National Center on Accessibility assessed the firmness and stability of 11 different types of natural aggregate and treated soil surfaces over a four-year period to determine their



effectiveness after exposure to the elements, freeze and thaw cycles, and other factors.

Researchers concluded that “a trail composed of an all-aggregate material, when constructed to specified parameters, could be maintained with little or no maintenance as a firm and stable surface.”³⁷

When considering natural aggregate surface materials, the following provide firm surfaces that also provide great stability:

- Crushed rock (rather than uncrushed gravel);
- Rock with broken faces (rather than rounded rocks);
- A rock mixture containing a full spectrum of sieve sizes (rather than a single size);
- Hard rock (rather than soft rock that breaks down easily);
- Rock that passes through a ½” (13 mm.) screen;
- Rock material that has been compacted into 3-inch to 4-inch (75 to 100 mm.) layers (not thicker layers);
- Material that is moist, but not too wet, before it is compacted (rather than material that is compacted when it is dry); and

- Material that is compacted with a vibrating plate compactor, roller, or by hand tamping (rather than material that is laid loose and compacted by use).³⁸

3/8 Minus Aggregate Stone Mixture	
Aggregate Sieve Size	Aggregate Percent Passing
3/8"	100%
#4	90 – 100%
#8	55 – 80%
#16	40 – 70%
#30	25 - 50%
#200	6 - 15%

Source: American Trails “Building Crusher Fines Trails,” Lois Bachensky, USDA Forest Service.³⁹

With the above factors in mind, the following two tables provide examples of specific stone aggregate mixtures (sieves) that achieve desirable firmness and stability. “The rock must be crushed into irregular and angular particles to allow interlocking into a tight matrix. The more angular the particles, the better. Rounded particles like pea gravel or decomposed granite never mechanically lock together. The crushed rock must have adequate fines and some natural binders in order to cement the particles together after the fines are moistened, compacted, and allowed to dry.”⁴⁰

A 3/8” Minus aggregate stone mixture, available from many quarries, has typically been utilized by designers seeking to meet accessible guidelines for trails. Used throughout the United States, it provides what many users describe as a pleasant tread surface to walk or wheel upon.⁴¹

Trail Surface Aggregate (“TSA”)	
Aggregate Sieve Size	Aggregate Percent Passing
1/2"	100%
3/8"	96-100%
#4	75-90%
#8	55-75%
#16	35-50%
#200	12-20%

Source: The Center for Dirt and Gravel Road Studies, Larson Transportation Institute, Penn State University.⁴²

In Pennsylvania, The Center for Dirt and Gravel Roads developed a specific Trail Surface Aggregate (TSA). The TSA mixture achieves very high densities to withstand heavy traffic and erosion. It can be quite hard, which is useful when constructing shared-use paths that call for a stone aggregate tread to handle other uses in addition to pedestrians.

Quality control of materials is vital to a project’s successful outcome. When using aggregate, visit the local quarry that will be used for the project. Select the material on-site and take time to test it first before applying it to the whole project.

Regardless of the surface material(s) chosen for a particular project, the finished tread needs to be properly shaped, compacted, and set to ensure a firm and stable surface. Grade and cross slope can potentially change after settlement occurs, especially with natural surface trails. In the case of other surfaces, obstructions (such as gaps between boards) may develop when the materials cure. It is best to establish a post-construction review and base it upon the materials used, typical seasons, and weather patterns, as well as projected use. Such monitoring also helps in establishing the ongoing maintenance process.

Determining *how hard* the surface needs to be is an important question. For instance, while asphalt provides a firm, stable, and slip resistant surface, it may not be appropriate for the designed and designed use. The design parameters for tread depth, width, and firmness should inform the proper material selected for construction of a given route's surface.



American Trails noted the following about tread surfaces:

[I]f the answer to both of the following questions is yes, the surface is probably firm and stable:

- Could a person ride a narrow-tired bicycle across the surface easily without making ruts?
- Could a folding stroller with small, narrow plastic wheels containing a three-year-old be pushed easily across the surface without making ruts?

Firm and stable surfaces on trails prevent assistive devices from sinking into the surface, which would make movement difficult for a person using crutches, a cane, a wheelchair, or other assistive device. In the accessibility guidelines, the standard assistive device is the wheelchair because its dimensions, multiple moving surface contact points, and four wheels often are difficult to accommodate. If a person using a wheelchair can use an area, most other people also can use that area.⁴³

Grade: Determining the Path of Travel

Running slope and *cross slope* will dictate a great deal in regard to (1) where a trail or shared use path should be located and (2) the scale of construction needed to provide grade and cross slope that meet accessibility regulations or BMPs. For trails, multiple options are possible. (However, grade parameters for shared use paths are more stringent. Grade parameters for accessible routes, specified in the 2010 ADA Design Standards, are also more stringent than those permitted for ORARs.)



Structures on Trails – Universal Design and Accessibility Guidelines

Steep or wet terrain⁴⁴ does not necessarily eliminate the potential for an accessible trail. The use of various structures may enable a trail traversing this terrain to meet the Outdoor Guidelines.

Constructed Features on Trails Providing Accessibility

Constructed Feature	Relationship to Grade, Cross Slope, and Tread
Surface	Defines the user's path of travel (see the table "Considerations for Different Tread Surfaces")
Full bench trail construction	Controls grade and cross slope; solid foundation for firm and stable surface
Boardwalk and bridges	Firm and stable surface; defines path of travel; controls grade and cross slope
Retaining wall	Controls grade and cross slope; holds surface material
Ramp	Controls grade and cross slope; holds surface material
Climbing and switchback turns	Controls grade and cross slope
Turnpike	Controls cross slope; holds surface material

Should the impacts on the land or the costs associated with constructing structures that would meet accessibility guidelines exceed what an organization believes is practicable for a specific project, this may be a “condition for departure” from the regulations/BMPs for the particular trail segment or possibly the entire trail. (See Chapter 8’s “When Exceptions to Trail Regulations/BMPs Are Warranted.” Note that for *accessible routes* the binding 2010 ADA Design Standards may *require* built structures and components such as bridges, boardwalks, or ramps.)



Four.

Technical Specifications for Trail Accessibility

The Outdoor Guidelines establish minimum accessibility requirements both for “technical specifications” and “scoping” for federal trails and outdoor facilities/elements associated with federal trails. This manual recommends these as BMPs for non-federal entities. (See Chapter 7 for a more concise description of entities and circumstances for which the federal regulations do and do not apply.) **Technical specifications** describe what accessible spaces and elements should look like, including slope, width, signage, etc. Interestingly, as previously noted, many of the technical accessibility requirements parallel best practices for building *sustainable* trails. **Scoping provisions** specify *how many* of a particular element are required. For instance, if an agency constructs a new park, scoping provisions dictate how many picnic tables in the park are required to be accessible.

Trails that are fully compliant with the Outdoor Guidelines are ones that meet all of the minimum technical standards explained below. Keep in mind that in certain situations exceptions to these standards may be warranted for particular trail segments or even for entire trails.

Appendix A contains a detailed flowchart entitled “Planning and Designing Trails for Access: Implementation Guide,” which illustrates how the previously discussed evaluation process works in tandem with the technical specifications discussed below.



Summary of Specifications for a Trail Meeting Accessibility Standards

Technical specifications for a stone aggregate trail that complies with the Outdoor Guidelines can be summarized as follows:

- Tread Surface: Clear, firm and stable with a minimum width of 36”
 - Tread Obstacles: 2” high maximum
 - Cross Slope: 5% maximum
 - Running Grade must meet one or more of the following:
 - 5% or less for any distance
 - Up to 8.33% for 200’ maximum
 - Up to 10% for 30’ maximum
 - Up to 12.5% for 10’ maximum
 - For all running grades above 5%, a resting interval must be provided at both ends of the grade. Resting intervals and passing spaces may overlap
 - No more than 30% of the total trail length may exceed a running grade of 8.33%
 - Passing Spaces: 60” width, provided at least every 1000’ where trail width is less than 60” wide, with a maximum 5% cross slope
 - Signage must provide the following:
 - Length of the trail or trail segment
 - Surface type
 - Typical and minimum tread width
 - Typical and maximum running grade
 - Typical and maximum cross slope
-

Grade⁴⁵

Grade, also known as linear grade, running grade, or running slope, is a key element in the design and construction of trails that comply with the Outdoor Guidelines.

It is important from the start to establish and verify accurate grades in the field. Don't assume that contour maps and design drawings will provide error-free data. Flagging, for the corridor and the trail, as well as staking (when vertical control of grade or associated structures is needed), are critical to

setting grades for both full bench construction and trail structures to be built according to specification. Take the time to check and re-check flags before setting stakes, including grade marks.

The maximum allowable grade (see the white line in the "Trail Linear Grade Guidelines" illustration) for a trail that provides accessibility is shown in the table. No more than 30% of the trail's entire linear grade may exceed 8.33%.⁴⁶

Cross Slope⁴⁷

Cross slope refers to the **slope perpendicular to the direction of travel**.

Sustainable trail construction practices always take cross slope into account. Per the Outdoor Guidelines, the maximum cross slope for trails surfaced with concrete, asphalt, or board is 2%. For all other surfaces, the maximum cross slope is 5%.

TRAIL LINEAR GRADE (RUNNING SLOPE) GUIDELINES

From	To	Maximum Distance
0%	5%	Any distance
5.0%	8.33%	200 feet
8.33%	10%	30 feet
10%	12%	10 feet



**CROSS SLOPE MAY NOT EXCEED 5%
ON OTHER SURFACES SUCH AS STONE AGGREGATE**



Photo courtesy Penn Trails LLC

While a 5% cross slope may be advisable in some locations, such as areas with frequent rain and high sheet flow, it is important to remember that the trade-off for using the steepest allowable cross slope is that users may feel off-kilter and find it more strenuous.

Surfacing⁴⁸

The surface of an accessible trail should be firm and stable.

A **firm surface** is one that resists deformation by indentations. This refers to the surface penetration that occurs when force is applied (for example, when stepped on). Surface firmness should be evaluated (and documented) for the main seasons for which the surface will be in use, under typically occurring weather conditions.

A **stable surface** is one that is not permanently affected by normal weather conditions and can sustain typical wear and tear from expected activities between planned maintenance visits.

Depending on the intended use of the trail, surfaces could be permeable or some degree of impermeable.⁴⁹ For more information on surfacing for trails see the section on “Tread Surface: Where the User Meets the Trail” in this manual, as well as relevant sections of the *Pennsylvania Trail Design and Development Principles*.

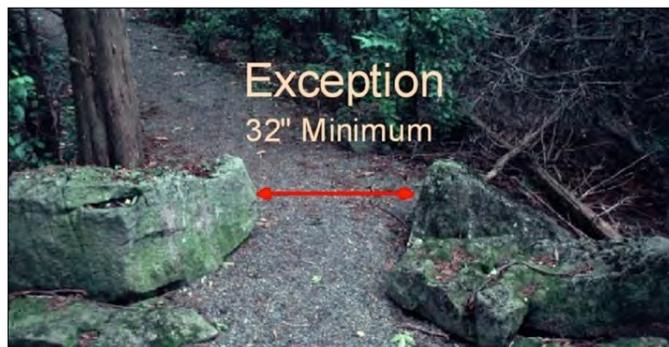
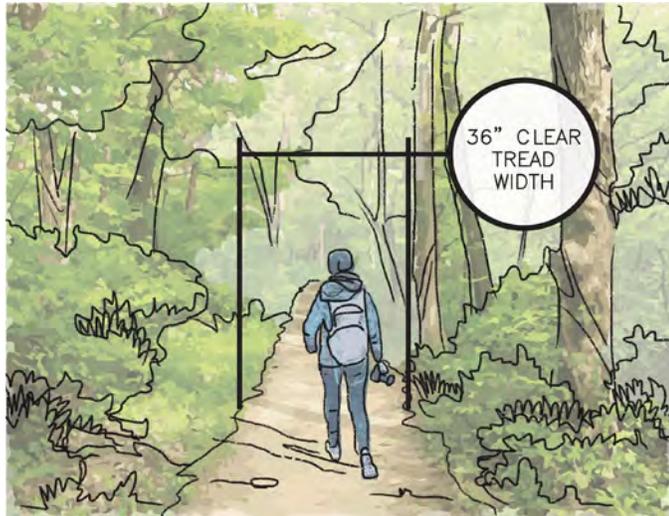
Clear Tread Width⁵⁰

Tread width refers to the **designed and constructed trail surface on which a person travels**. The clear tread width of an accessible trail should be a minimum of 36 inches.

However, a clear tread width of 32 inches is allowed for a maximum length of 24 inches where the 36-inch minimum cannot be achieved.



A natural tread consisting of a properly compacted limestone aggregate provides an excellent sustainable surface that can be easily repaired and maintained.



Resting Intervals⁵¹

Accessible trails should contain a place—a resting interval—for persons to be able to stop and rest after traversing a segment that is steeper than 5% in grade. The resting interval should be at least 60 inches long and, if contained within the trail tread, as wide as the widest trail segment leading into the resting space. If provided adjacent to the trail tread, the resting interval's width should be at least 36.”



Resting intervals are required at the top and bottom of each trail segment that exceeds 5% in grade. The Outdoor Guidelines permit Resting Intervals and Passing Spaces to overlap.

Passing Spaces⁵²

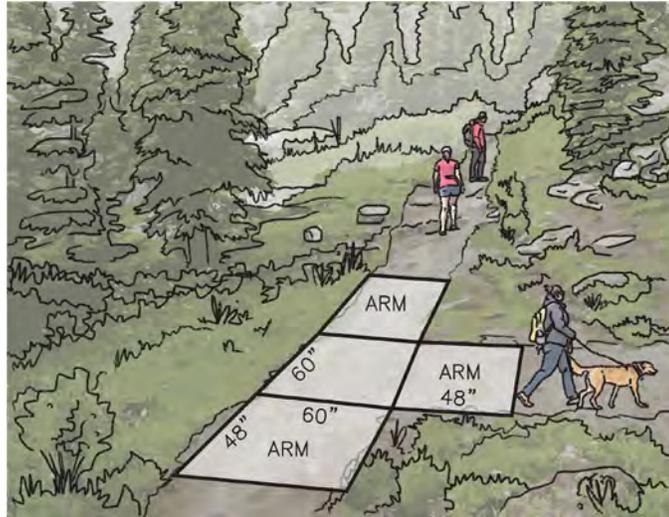
A 60” clear tread width would allow people to pass each other easily on a trail, including people who use accessibility devices. However, a trail’s design parameters might not provide for this tread width throughout the entire length. In that case, a passing space of at least a 60 inches x 60 inches dimension, needs to be provided at intervals of no more than 1,000 feet. In addition,



where the full length of a trail does not meet all of the Trail Accessibility Guidelines, a passing space should be located at the end of the trail segment that fully complies with the guidelines. This enables a person who uses a mobility device to turn and exit the trail.

Passing spaces and resting intervals are permitted to overlap. Alternatively, a T-intersection of two trails can provide an acceptable passing space.

Example of a T-Shaped intersection that provides both a passing space (at least 60 inches by 60 inches) and a resting area (at least 60 inches in length). Note that the base and the arms of the T-shaped intersection extend 48 inches beyond the intersection. Where the passing space is the intersection of two trails, the intersection should be as flat as possible.



Tread Obstacles⁵³

Natural features such as tree roots and rocks within a natural (e.g., soil, aggregate) trail tread can create tread obstacles. Tread obstacles on a trail and its related resting spaces should not exceed two inches in height, measured vertically to the highest point.

The vertical alignment of joints in concrete, asphalt, or board surfaces can be tread obstacles. Where the surface is made of boards, concrete, or asphalt, tread obstacles cannot exceed ½ inch in height measured vertically to the highest point.



For both types of trails, tread obstacles should be separated by a distance of 48 inches minimum when possible, so that persons using wheelchairs can maneuver around the obstacles.

Protruding Objects⁵⁴

Protruding objects can be hazardous for individuals who are blind or have low vision. The Outdoor Guidelines require constructed elements—such as signs or post-mounted objects—to comply with section 307 of the ABA Accessibility Guidelines.⁵⁵ Specifically, objects with leading edges more than 27 inches and not more than 80 inches above the ground must not protrude more than four inches into the trail treadway. For example, when a cane is used and

the constructed element is in the detectable range, it gives a person sufficient time to detect the element with the cane before there is body contact. Constructed elements mounted below 27 inches are allowed to protrude any amount so long as they don't reduce the clear trail width.

While natural elements, such as tree branches, do not need to comply with section 307 of the ABA Accessibility Guidelines regarding protruding objects, entities should maintain the vertical clearance along the trail tread, resting intervals, and passing spaces free from natural elements for 80 inches high minimum above the ground.



If vertical clearance is not possible (for instance as with a naturally occurring, overhanging rock formation protruding into the trail treadway, as shown in the illustration), a cane-detectible barrier to warn visually impaired trail users could be warranted.

Openings in Trail Surfaces⁵⁶

A boardwalk can provide a low-impact means to cross a wetland area as well as a firm and stable surface.

The Outdoor Guidelines provide specific criteria for openings and objects on structures so that they do not present obstacles to pedestrians using accessibility devices.

Openings that run perpendicular to the direction of travel must be no greater than $\frac{1}{2}$ inch wide. Openings in the trail surface that run parallel to the primary direction of travel cannot exceed $\frac{1}{4}$ inch.



In certain instances, a $\frac{3}{4}$ inch opening is permitted where openings of $\frac{1}{2}$ inch or less cannot be provided due to the exceptions noted earlier in this chapter.

Five.

Trail Signage and Accessibility

Signage is Crucial

The planning and design of trail signage is crucial to the user experience. From rugged backcountry hiking trails to multiuse urban trails, users use signage to navigate their way and obtain information about the trail and the surroundings.

At the most basic form, rock cairns or crude blazes designate the path of travel for trail users on a remote wilderness trail. While subtle, these clues not only assist with navigation and prevent trail users from becoming disoriented, they may also protect sensitive wilderness environments from damage caused by social paths or wandering hikers.

Aside from the navigational aspects of wayfinding on the trail, signage may communicate information on accessibility, etiquette, and rules. It may interpret environmental or cultural features of the trail corridor. Signage may help trail users make decisions and create a sense of place and cohesive experience through unified design. Signage may also reinforce the trail organization's identity and values. A highly developed trail with strongly defined tread and structures that by design communicate the path of travel may have little need for navigational signage but may instead feature sophisticated signage to provide other information.

The National Park Service points out that “signs are probably the quickest and easiest way to leave the trail user with a positive impression.”⁵⁷

Applying Universal Design Principles

As with the trail design itself, it is important not just to consider the majority user group when selecting appropriate signage, but to prioritize considerations for the user groups with the greatest needs and limitations. Applying universal design principles to signage ensures that the signage is accessible to the widest variety of users. Signage and wayfinding that does not take into account users with cognitive challenges, vision loss and colorblindness, reading comprehension challenges, and physical disabilities—among other conditions—creates a barrier for users that can lead to discomfort, disorientation, injury, and an overall feeling of exclusion from trails and outdoor recreation experiences. Emphasizing inclusive design from the beginning ensures that all users feel not just welcome, but also seen and accommodated on the trail.

Effective communication requires consideration for the audience. Who is using your trail? This can help determine the formality of the wayfinding and signage improvements, as well as

the level of technical information to provide. Notions of the hiking and trail community consisting only of rugged outdoorspeople who seek excursions into the unknown are outdated and harmful. These ideas alienate those who would otherwise be avid trail users and likely supporters of conservation efforts. This does not mean that users with disabilities do not seek to be challenged, or do not seek wilderness or rugged opportunities; it simply means that these types of opportunities need to be well-defined. Likewise, consider what wayfinding is truly necessary in order to best assist with navigation. If the trail is well-defined and maintained, blazes may be unnecessary and navigational signage at trailheads and junctions may suffice. In the spirit of creating truly inclusive hiking trails, it is important to provide adequate information so that users can assess if the provided trail experience will fulfill their desires, expectations, and abilities.

Enhancing User Experience

A myriad of information can be conveyed via signage. It is important to include signage in the planning process to avoid issues like over-signage and over-blazing. The goal is to provide just the right amount of information to assist users in navigating and understanding the site in a meaningful way without contributing to visual clutter. After all, most users seek out trails to enjoy an outdoor experience, and excessive signage and blazing can add to confusion and detract from the experience.

Content Consideration

Wayfinding

Wayfinding signage can be in the form of a visual map, or in the form of directional decision signs, confirmation signs, and turn signs. Visual maps are capable of communicating rich and detailed information, but it is important to remember that reading maps is challenging for some people, and that it is easy to overload maps with too much information, which can add to confusion and reduce the legibility of the map. For both maps and directional signage, consider the hierarchy of the information you are seeking to communicate; what is most and least important to convey and does their relative emphasis match the priority? For maps, ensure that the information is presented in a way that is easy to read. For example, contours may provide valuable topographic information but might the utilization of shading to indicate topography better serve more users? Should prominent destinations be indicated with larger lettering?

Trail Characteristics and Access Information

Signs, maps, and other trail guide products can provide potential users with the information needed to determine which trails can best meet their desired experiences and abilities. According to the *Pennsylvania Trail Design and Development Principles*:

Signs identifying trails and trail segments that have been officially assessed and designated as accessible to persons with disabilities should be placed at the trailhead and at all designated access points. Display the official symbol designating that the trail or trail segment is accessible, include the total distance of that trail or trail segment that is compliant, and the distance to the location of the first point of exception to those accessibility standards. Use marker posts to display accessibility information at access points without trailhead signs. Decals are readily available to attaché marker points. The size of the trailhead sign should be such that both text and graphics are easily readable. The minimum size should be 12 inches by 18 inches. Background colors, margins, and sizes of text and images are subject to change.⁵⁸



The Outdoor Guidelines require the inclusion of the following five items in a new trail information sign at a trailhead. This is information that most people would appreciate knowing *regardless* of ability:

- Length of the trail or trail segment;
- Trail surface type;
- Typical and minimum tread width;
- Typical and maximum running slope (grade); and
- Typical and maximum cross slope.

In addition, some narrative regarding the trail destination or significant features can aid users in determining if they wish to proceed or in selecting a particular trail within a larger trail system. If your trail is part of a larger network, a difficulty rating system can assist users in determining if the trail is within their capabilities or would represent a welcome or unwelcome challenge. More information about developing a user-friendly difficulty rating system can be found at [ASD Roadmaps](#)' webpage, "[Existing trail ratings systems](#)."

To convey the above information, a system of symbols and trail signage layouts has been developed to convey Trail Access Information ("TAI") in attractive and easy-to-use formats. Providing the information in multiple formats, such as large print or audio, will benefit people of all abilities. Supplemental trail information formats are described at the end of this chapter.

Emergency Access

As part of an emergency access plan for rugged backcountry recreational areas or trails that cross municipal boundaries or have multiple access points, consider the incorporation of landmarks, mapping, and mile markers as part of emergency wayfinding and to assist users in communicating the location of incidents to emergency response personnel.

The City of Plano, Texas implemented a sophisticated trail marker system on City parks trails. The system includes markers every 1/3 of a mile with unique location identification numbers indicating the section of trail and specific location within each trail section.⁵⁹



An example of an unobtrusive emergency trail marker

Etiquette and Regulations

Signage communicating etiquette and regulations is best used to reinforce desired behavior and uses in a positive tone—avoiding negative language except for the most undesired uses and activities. For example: “No Littering” can be rephrased as “Leave No Trace” or “Help Keep our Trail Clean!”

On multi-use trails, signage can help manage conflicts between users traveling at different speeds or using the trail in different ways. For example, a trail principally for mountain biking but also open to hikers should have signage indicating that hikers must yield to mountain bikers.

Including information about who to contact in cases of emergency or to report trail issues is also recommended.

Education and Interpretation

Education and interpretation can be key elements of the trail experience, helping to define place and inform trail users about details of the surrounding land and environment. (The U.S. National Parks Service has developed a comprehensive guide to interpretive exhibits, [Wayside Exhibits: A Guide to Developing Outdoor Interpretive Exhibits](#).) Consider the following in developing signage:

- Ensure that graphics and captions can stand alone as educational elements as some users will only look at graphics or are unable to read English.



Paint markings on the ground can be creatively used instead of signage to communicate etiquette. Social distancing asterisk is one such example of a visual cue that eliminates the need for written signage. Image from the [Asterisk*](#), an open-source, social-distancing toolkit.

- Resist the urge to crowd signs with information. Information should serve a greater theme present within the trail or trail system, and layouts should be composed of 1/3 graphics, 1/3 text, and 1/3 white space.⁶⁰
- Consider the reading level of your audience and avoid the use of jargon.
- Interpretive signs commonly feature information about ecology, biology, and history of a site. When considering historical content, consider ensuring that interpretation is done so in a sensitive and inclusive way, and whether an acknowledgement of the indigenous history of a site is appropriate. (The [Native Governance Center](#) offers [recommendations](#) for those considering land acknowledgement.)

Brand Identity and Placemaking

Consistent use of signage and wayfinding standards helps to meet user expectations and create a signage system that is intuitive and predictable. Even so, it is easy for confusion to exist about the ownership, use, and regulations applicable to a given trail.; the adoption of consistent, clear branding can bring some clarity and help a site stand out and reinforce the definition of place.

Physical Considerations

Materials

In terms of materials, it is important to consider the goals of your signage and wayfinding plan. Materials like metal and synthetic polymers may be durable and long-lasting, but if content needs to change over time, a kiosk with a protected bulletin board may be a better option. Some questions to consider when choosing what materials to use for various types of content:

- How often will this content change?
- Is there a budget for long term maintenance or replacement of signage?
- Does the organization have the capacity and training to maintain painted blazes adequately?
- What environmental conditions could impact the longevity of the signage?
- How can vandalism be prevented or mitigated in terms of placement of signage or selection of materials that can be cleaned, repaired, or replaced?

Placement

Keep in mind that trail users are generally moving as they encounter signage and place the various types of signage accordingly. Complex wayfinding signage or interpretive signage with detailed information is best placed (sparingly) in areas where users would naturally pause. Avoid placing complex information in locations that will likely interrupt the rhythm of movement and create conflicts between moving and stationary users.

Accessibility Considerations

Low Vision

As one expert notes:

[O]utdoor structures have a major effect on participation in physical activity among people with vision loss. Structures such as gyms, fitness centers, outdoor trails, parks, and swimming pools often have poor signage, lack detail on how to use the equipment or participate in a program, or provide poorly delineated access routes to and from the facility or program. These issues can have a major effect on whether or not a person with vision loss chooses to be physically active.”⁶¹

Colorblindness

According to the National Institutes of Health, colorblindness affects approximately one in twelve men and one in two hundred women in populations with Northern European ancestry.⁶² This means that for every 1,000 trail users, about 40 are colorblind. Problematic color combinations create barriers to use, so trail signage should be designed with color-blind friendly color schemes.⁶³ Qualities to consider in a color scheme include:

- color selection;
- color placement; and
- contrast.

Most graphic design software programs include functions to simulate the appearance of a given design for individuals with both red-green and blue-yellow colorblindness. This is an excellent way to help determine if a proposed color scheme will communicate effectively to a colorblind audience.

Multilingual or Reading Disability

In many places, providing signs only in a single primary language is likely to exclude a large group of users and potential users. Consider whether it is appropriate to provide a secondary language on signs or print maps in multiple languages.

Heavy reliance on written communication may not just exclude non-English speakers but may also exclude users with reading or cognitive disabilities. For this reason, consider using symbols in addition to words to communicate information of high importance within your trail or trail system. Symbols and icons can be used to indicate appropriate uses, dangerous or sensitive areas, locations of trailheads, restrooms, and parking.



Pointers for Signage and Related Materials

Trailhead

Trailhead signs should be placed and organized so that users can quickly differentiate between navigational and interpretive information. They should be scaled for the particular situation. Ensure that fonts are legible from an appropriate distance depending on the approach and context. Avoid decorative fonts that may be difficult to read. Always left-justify body text for ease of reading.



Examples of trailhead kiosks⁶⁴

Blazes

The appropriateness of blazes greatly depends on the character and complexity of the trail system. For example, a site with a single loop trail, designed to meet accessibility standards, is by its nature obvious and well-maintained and likely does not need blazes. If several similar

trails are present, navigational cues at the trailhead and at any junctions are likely sufficient. Even on trails that are more rugged, proper maintenance of the trail tread and removal of encroaching vegetation is often enough to ensure that the trailway is easy to follow. If many social trails are present, blazes may be appropriate, but also consider better defining the desired trail alignment through physical cues and avoiding trail alignments that would cause users to create social trails in the first place, such as soggy or wet areas of trail, obstacles like fallen logs or uneven trail tread, or deteriorating slopes.



Examples of blazing issues: left—excessive blazing; right—frequent maintenance required

Reassurance Markers

The U.S. Forest Service advises to place reassurance markers—small plastic, metal, or wood signs intended to reassure visitors that they are on the trail—carefully:

They should be clearly visible from any point where the trail could be lost. This is a judgment call, often controversial, based on the challenge level served by the trail and the conditions along it. Higher challenge trails need fewer markers; lower challenge trails may need more.⁶⁵

Cairns

Cairns—a large pile of rocks typically three-feet high and two or more wide—are used in open areas where low visibility or snow cover makes it difficult to follow the tread or where the tread is rocky and indistinct. Two or three stones piled one on top of the other—sometimes called rock ducks—are no substitute for cairns and should be scattered at every opportunity.”⁶⁶ Cairns can be easily confused with informal stone piles made by users, do not provide meaningful wayfinding in more highly developed trail environments, and should not be used on trails designed to meet accessibility standards.

Related Materials

Maps

- For maps placed along a trail, look at orienting them to best match the user perspective. While this will often result in compass North being oriented to the side or even downwards, matching the map orientation to the user orientation is easier for users to read and understand.

Distance Markers

- Can be useful for trail users tracking distance travelled and can also be used for emergency response. (Check with local emergency personnel to determine if distance markers should be used.)

TAI (Trail Access Information) Strip

*A trail map summarizing TAI with symbols and measurement numbers formatted as a slim strip that can be attached to trail posts and located at trailheads or trail intersections.*⁶⁷

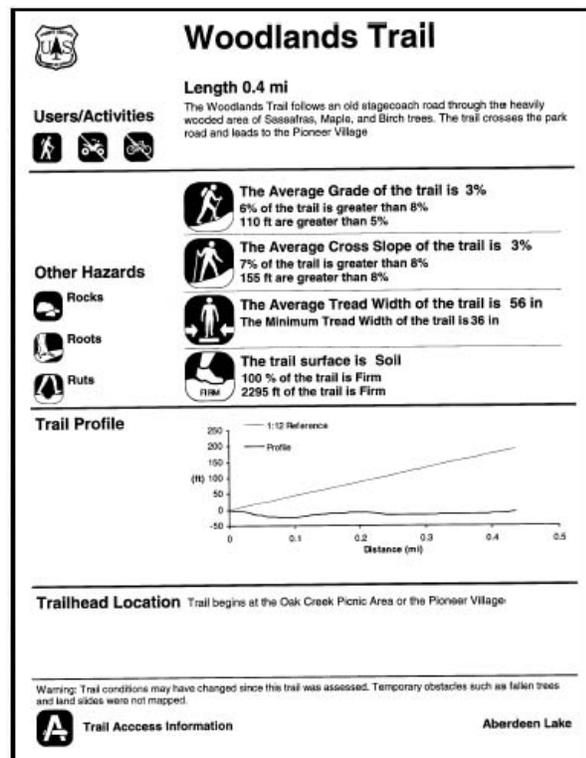
Trail Information Sheets

A trailhead map containing text, grade profiles with surface information, a top view map with symbols showing the location of major obstacles, and other critical information.

- Best utilized within complex trail systems with many trails of varying difficulty and character.

Web and Social Media Information

- Critical to update regularly with closure or other important information.
- A permanent website should be maintained in addition to social media pages (or direct website users to social media for updates).



Example of a trail information sheet

Audio Descriptions

A short audible narrative with descriptions of trail conditions and details about the trail environment.

- May benefit individuals with vision impairments or who have limitations reading English.
- Especially useful for heavily used trails or as part of information distributed as part of an app or website.

- Can be utilized to inform users in areas where significant risks exist.

Pocket Map

A trail map featuring trail description, TAI, and a grade profile that folds up to fit into a pocket.

- Best used for a complex trail system on a single site.
- Can provide additional interpretive information in a form that is easier to update over time than a stationary kiosk or signage.

Guidebook

A trail manual containing TAI, interpretive information, scenic photographs, directions to the trailhead, and other information about trails within a given recreational area.

- Best used to provide information relating to multiple properties, sites, or systems.
- Can provide additional interpretive information in a form that is easier to update over time than a stationary kiosk or signage.

Computerized Kiosk

An interactive, accessible computer display at a visitor center providing trail selection tools, TAI, and visual and audio descriptions of images at selected destinations.

- Guidelines for making kiosks accessible to people with mobility and vision impairments are available through the U.S. Access Board.
- A computerized kiosk is likely inappropriate in all but the most heavily used and developed contexts.

Trail managers are encouraged to consider other information and details for their trails that may be useful to users to know before they set out on a particular trail. The *Pennsylvania Trail Design and Development Principles* (pages 133-141) provides much information with regard to required and or recommended trail and shared use path signage and markings. This includes good graphic examples of common warning and regulatory signs, as well as blazing and markers, use of colors, and construction elements.

Context Drives Specifications

Due to the myriad of contexts in which trails exist, it is impossible to dictate a blanket set of technical guidelines for all types of trail signage and wayfinding. One set of specifications that works successfully for a given project may cause confusion and alienate users in another. This is why it is important to carefully consider the context of the project, including the site, the goals, and most importantly the users, for any trail project.

The following examples illustrate context considerations around wayfinding and signage:

- *An open meadow with a one-mile universal access loop trail with an aggregate tread surface and connections to a broader rugged trail system; primarily used by inexperienced hikers and*

families, and sometimes used by more experienced hikers to access the rugged trail system.

While the loop itself is a highly developed and wide aggregate trail, and the trail length and nature of the loop layout make wayfinding tools such as blazes and distance markers unnecessary, the trail connections to the rugged trail system are important to communicate to users. A kiosk at the trailhead containing a detailed and legible map, ownership information, rules and regulations, emergency contact and trail maintenance information is sufficient. Additional directional signage at trail junctions allows user access to the broader trail system.

- *A complex trail system with 20 miles of trails of varying character and levels of development ranging from rugged and challenging trails to moderate-width aggregate-surface trails with some trails following existing roads. Trails intersect each other often, and users access the site from multiple trailheads. Most trails are pedestrian-only, but some allow mountain bikes. Users vary from casual inexperienced hikers and families to experienced hikers and bikers, with many non-English speaking users visiting from a nearby urban area.* Given the complexity of the trail system, a signage and wayfinding system including detailed kiosks and trailheads, distance markers, blazes, and directional and permitted use signage at trail junctions would be the typical level of wayfinding and signage development to assist users. However, given the diverse user-base, providing multi-lingual pocket maps and ensuring that kiosk information is provided in applicable languages and includes icons where possible to communicate appropriate uses would best accommodate the widest range of users.

Six.

Management and Maintenance for Continued Access

Continued Attention to the Design Parameters

Building a trail (the term is used in this chapter to include shared use paths as well) that takes into account the regulations and BMPs identified in this manual is only the first step in providing people with an enjoyable recreational opportunity. Next comes the care for the trail informed by a management and maintenance plan to deliver that care.

The chapter on contemporary trails management and maintenance in *Pennsylvania Trail Design and Development Principles* states that:

A management plan is an important component to ensure a positive user experience and to effectively manage the potential risk associated with a trail. Those responsible for managing a trail should adopt a trail management plan before a trail is opened.... [DCNR encourages] all trail managers to develop a management plan by adopting policies and procedures in a written document. A management plan establishes expectations for the operations, maintenance and security of the trail.⁶⁸

The plan will help ensure that the trail-managing entity has prepared to have the work force, materials, and finances necessary to properly maintain the trail.

Ad hoc maintenance decisions and actions can unintentionally and swiftly damage design elements of the trail intended to optimize accessibility and enjoyment of the trail. Care should be taken to adhere to the original design parameters of the trail in all maintenance activities to ensure the trails continues to deliver the intended experience. A previously developed plan that addresses maintenance issues along with information about the original tread materials, grades, structures, natural features, and constructed amenities should be easily available to avoid departures from the original design parameters.

For example, seasonal maintenance of natural surface hiking trails that have *not* been built to meet accessibility BMPs often consists of filling ruts and eroded areas or removing obstructions along the trail. Simply filling the ruts and repairing the erosion with the proper soils is all that is required. Removing the obstructions, such as downed tree limbs, is an easy matter of cutting up the material and removing the bulk to outside the trail corridor. *In contrast*, for a trail that has been designed and constructed to the recommended accessibility BMPs, such filling needs to include careful establishment of the proper grade and cross-slope,

as well as firm and stable surface that contains no obstructions or protrusions that exceed the tread surface design parameters.

Trail Condition Assessments

Any entity that manages trails needs to establish a clear program and schedule of monitoring (and maintaining) its trails. Chapter 5 of the *Pennsylvania Trail Design and Development Principles* provides guidance on establishing trail assessment processes and procedures. A trail assessment involves direct in-person observation and inventory of a trail's condition. This inventory should include a detailed review of the signs and amenities provided within the trail corridor. It is helpful to include GPS and photo records, especially when describing the locations and conditions of structures and amenities. This inventory is then evaluated against the trail's managed and designed use parameters to produce a detailed report.

An assessment covers a trail's "productivity factors," which should be derived from the trail's original design and use parameters. Productivity factors are the physical factors influencing the trail and its compliance with the trail BMPs. These include:

- linear grade;
- cross slope;
- width;
- surface; and
- obstructions and protrusions.

Well-executed trail assessments result in objective and reliable data that provides the necessary information to create the specific work tasks for the trail's maintenance and management. The assessment and associated work tasks in turn inform the estimates for materials, resources, equipment, tools, expertise, and labor that are needed.

Trail Maintenance

Trails can become victim to poor maintenance very quickly. As stated succinctly in the *Pennsylvania Trail Design and Development Principles*:

[T]rail degradation will occur quickly without an effective maintenance program, no matter how well you plan, design, and construct a trail.⁶⁹

Normal wear and tear (such as tread cupping), wildlife impacts, vegetation growth, storm events, and unauthorized uses all create trail maintenance issues. **Trail grade, cross slope, and surface are the three most critical performance factors for a trail that meets accessibility guidelines, and they are also the most susceptible to problems** that may arise due to use and weather. Berming, entrenchment, sloughing, and erosion can have a great impact on an accessible trail unless planned maintenance addresses potential issues. Trails designed with sustainability considerations will require less maintenance but that does not mean no maintenance.

Chapter 5⁷⁰ of the *Pennsylvania Trail Design and Development Principles* includes a host of resources related to managing and maintaining trails. This includes the importance of establishing a maintenance schedule or cycle. That schedule should be based upon the specific environment where the trail is situated, with frequency determined by weather, hydrological activity, plant growth, and the degree of seasonal use of trails.

With regard to trails and shared use paths, the maintenance schedule should minimally cover the following categories for both the trail corridor and trail itself:

- **Corridor Perimeter and Overhead Clearance.** Remove obstacles and protrusions by clearing the defined corridor of material that creates barriers to accessibility, such as encroaching brush or grasses, debris from downed trees, and broken tree limbs.

- **Trail Tread.** Maintain a firm and stable surface, using the same materials as the trail was originally designed to incorporate. When maintaining and repairing surfaces, make sure to remove or reduce protrusions and obstructions, smoothing surface indentations and



- erosion that alter original design parameters.
- **Tread Grade, Cross Slope, and Width.** Check and maintain the originally designed grade and cross slope, making sure that any maintenance or repairs to the particular segment in question are correct, and do not alter segments before or after that area. For instance, if the grade is arbitrarily altered in a particular segment, it may appear to be okay for that area of the trail. However, taken within the whole of the trail, it could alter the overall grade average intended by the original design and construction.
- **Drainage.** Drainage maintenance includes dips, swales, and culverts. Removing debris, such as leaves, is an easy task. However, left undone, one season of leaf fall can lead to clogged drainage, poor sheet flow of water from the tread surface, and thus obstructions and erosion on the trail tread. Clean and repair scuppers on bridges and boardwalks, fencing, railings, and transition points between structures and trail. This is a matter of making sure that both poor drainage, as well as buildup of debris on trail surfaces, is kept to a minimum.



Managing Public Use of a Trail

Managing public use of a trail that meets accessibility guidelines is no different than managing any other trail. The bottom line is that every trail should be managed and maintained for the use(s) which it was planned and designed. Again, Chapter 5 of the *Pennsylvania Trail Design and Development Principles* devotes itself to the many management considerations and techniques that providers of trails and shared use paths should familiarize themselves with, including:

- trail management objectives (TMOs);
- user safety;
- managing natural and cultural resources;
- managing the physical corridor;
- programming;
- user conflicts;
- volunteers;
- policies;
- maintenance; and
- training.

Seven.

Federal Laws and Their Applicability

Federal regulations regarding accessibility and outdoor recreation are promulgated under two separate statutes, the Americans with Disabilities Act (“**ADA**”)⁷¹ and the Architectural Barriers Act (“**ABA**”).⁷²

The Americans with Disabilities Act

The Americans with Disabilities Act is a broad federal civil rights law that largely prohibits discrimination based on disability. The law defines *disability* as “...a physical or mental impairment that substantially limits a major life activity.”⁷³

The ADA has broad application. It has five main sections, referred to as “titles,” of which the relevant ones for this manual are:

- **Title II**—covering services and programs of state and local governments (such as public transportation, recreation programs, courts, buildings, and employment.); and
- **Title III**—covering “public accommodations.”

Title II and III entities are bound by the ADA statute itself and by regulations that the U.S. Department of Justice issues interpreting the ADA—like the 2010 ADA Design Standards and the OPDMD rule. (Federal agencies and facilities, on the other hand, are covered by a different law: the ABA.)

Applicability to Public Agencies (Title II)

Title II addresses government entities other than the federal government.⁷⁴ This includes, among others, school districts, townships, boroughs, cities, counties, and states. For instance, county and municipal park and recreation departments and their programs fall under Title II of the ADA. Title II reads in part:

No qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of services, programs, or activities of a public entity....⁷⁵

The requirement that a public entity make its programs accessible to people with disabilities is termed “program access.”⁷⁶

Applicability to Private Organizations (Title III)

Title III of the ADA provides that:

[N]o individual may be discriminated against on the basis of disability with regards to the full and equal enjoyment of the ... facilities ... of any place of public accommodation by any person who owns, leases (or leases to), or operates a place of public accommodation.⁷⁷

A *place of public accommodation* means a facility operated by a private entity whose operations affect commerce and fall within particular categories *including most places of recreation*, transportation, education, dining, commerce, and lodging. For example, trails open to the public that a nonprofit trail group or land trust manages on private land would constitute a place of public accommodation. In contrast, private land upon which hunters are allowed to enter generally would not be considered a place of public accommodation.

2010 ADA Design Standards

To provide guidance on how entities should make improvements to comply with the ADA, the U.S. Department of Justice has issued a number of regulations, including those identified in Chapter 1 as the 2010 ADA Design Standards.⁷⁸ The 2010 ADA Design Standards, which are binding on entities covered by Title II and Title III, are minimum accessibility standards for buildings and other structures. As of March 15, 2012, compliance with these regulations was required for new construction and alterations.

The 2010 ADA Design Standards contain technical specifications for building and site elements such as parking, accessible routes, ramps, stairs, elevators, entrances, drinking fountains, and bathrooms. It also specifies how many accessibility features must be incorporated in each facility (these are called “scoping” requirements).⁷⁹

The 2010 ADA Design Standards include scoping and technical specifications for a number of recreation-related amenities including: **play fields and courts; fishing piers; boat slips; drinking fountains; play areas; swimming pools; and fixed picnic tables.** (See generally, 2010 ADA Design Standards, Chapter 10, Recreation Facilities.⁸⁰) These regulations also require Title II and Title III entities to provide **accessible parking and an accessible route to connect users to accessible recreation-related facilities that are subject to the 2010 ADA Design Standards.** (See generally 2010 ADA Design Standards, Chapter 4, Accessible Routes.⁸¹)

The 2010 ADA Design Standards provide guidance on how certain developed recreation facilities should be made accessible but do not address trails or shared use paths. Many of the technical standards appropriate for elements in developed areas would be inappropriate if applied to outdoor elements in parks and other natural settings. For instance, if grade and width requirements for accessible routes in the built environment were imposed on hiking trails, few would be able to qualify as accessible. In addition, the strict design requirements required of accessible routes might damage the very natural resources a trail was intended to highlight.

A thorough review of the requirements for facilities and elements covered by the 2010 ADA Design Standards is outside the scope of this manual. To the extent of any conflict between the 2010 ADA Design Standards and the Outdoor Guidelines (which are discussed in this manual as BMPs), the binding 2010 ADA Design Standards would govern.

OPDMD Regulations

State and local government entities and private organizations are subject to regulations governing the use of **Other Power-Driven Mobility Devices (OPDMDs)** on land considered a place of public accommodation. The U.S. Department of Justice issued these regulations pursuant to Title II and III of the ADA effective in March 2011.

The OPDMD regulations greatly expand the types of vehicular devices potentially allowed on trails. **Unless organizations create policies governing the use of OPDMDs on trails and other areas open to the public for pedestrian use, all such vehicles must be allowed without restriction.** This rule applies both to government agencies and private organizations. As addressed in detail in the WeConservePA guide [*Other Power-Driven Mobility Devices on Trails and Areas Open to Pedestrians: Creating and Implementing Policies for Accessibility and Compliance with the Americans with Disabilities Act*](#), to prohibit certain or all types of OPDMDs on a trail, an organization must create a written policy on OPDMD use that establishes adequate reasons for banning or limiting the vehicles based on certain factors and inform the public in advance about its OPDMD policy.

Architectural Barriers Act and the Outdoor Guidelines

The U.S. Access Board in 2013 issued separate accessibility regulations for hiker/pedestrian trails, identified in Chapter 1 as the Outdoor Guidelines.⁸²

The **Outdoor Guidelines were promulgated under the ABA**—the law governing accessibility of *federal* facilities. (This law is separate and distinct from the ADA.)

Consequently, the Outdoor Guidelines are binding only on:

- Federal land management agencies (such as the Fish and Wildlife Service, the Army Corps of Engineers, and the National Park Service)⁸³; and
- Non-federal private or public entities building trails on federal land or on behalf of federal agencies.

The Outdoor Guidelines are not binding on organizations simply because they use federal funds or grants.

Future Extension of Trail Regulations to Non-Federal Entities

In the future, the U.S. Access Board plans to develop outdoor recreation area standards specifically for Title II and Title III entities. Once those federal regulations are developed and adopted, trails on public lands owned by Title II entities (i.e., local and state governments) will

be subject to those future regulations via the ADA requirement that a Title II entity's services and programs be accessible.⁸⁴ Additionally, to the extent that the general public is permitted onto trails owned, operated, or leased by *private entities* such as trail groups and land trusts, those trails would be deemed “places of public accommodation” under the jurisdiction of Title III of the ADA and would be subject to future ADA regulations governing trails and outdoor recreation areas.⁸⁵

When trail accessibility standards are developed and then incorporated into the ADA—which could be years from now—Title II and III entities will be bound by those regulations. **Until then, the Department of Justice is not *requiring* private organizations and local governments to make their pedestrian/hiker trails accessible.**⁸⁶ **However, while the Outdoor Guidelines are not binding on non-federal entities, they nonetheless provide an excellent roadmap—and the BMPs—for private entities and local governments that want to design and build sustainable, accessible hiker/pedestrian trails.** This publication recommends that organizations and government agencies utilize these BMPs as their own guidelines for providing accessibility on trails.

Regulations Proposed for Shared Use Paths

The Outdoor Guidelines don't address shared use paths. According to many current pathway design manuals and guidelines, the current general authority for designing and building shared use paths is the *AASHTO Guide*. In addition, the U.S. Access Board is developing accessibility standards for shared use paths—the PROW Guidelines introduced in Chapter 1. If and when finalized, the **guidelines will be binding on all federal and non-federal governmental entities but not private entities.** The regulations will apply whether the path is located on public or private land.

Other Rules

A review of all state, county, and local municipal laws that may touch on accessibility issues is outside the scope of this manual. The *Pennsylvania Trail Design and Development Principles* look at many regulatory requirements.⁸⁷ In addition, trail and shared use path builders should be aware that:

- If boardwalks or other stream crossing structures are necessary in wetland areas for accessibility purposes, in Pennsylvania a permit from the Department of Environmental Protection is required. Trail planners and builders executing work in other states should determine early on what wetland and waterway permits may be required.
- In Pennsylvania, PNDI (Pennsylvania Natural Diversity Index) environmental review and conservation planning are both used during permitting for construction to screen for locations of (and potential impacts on) threatened, endangered, and special concern species as well as their habitats; both tools, which are accessible at

- [Pennsylvania Conservation Explorer](#), produce reports used for planning and/or permitting. The conservation planning tool queries locations of natural heritage areas and protected lands. The PNDI environmental review tool assesses project footprints against species locations and recommends conservation measures and other actions that may be needed to fulfill the requirements of a permit. Any PNDI sites identified by the tool should be discussed with the appropriate state or federal agency.
- County Conservation Districts require Erosion and Sedimentation Pollution Control Plans and implementation of those plans for projects that exceed a certain amount of earth disturbance.
 - Although to the best of the authors' knowledge there currently are no separate, state-issued accessibility regulations relating to hiker/pedestrian trails, shared use paths, or related amenities, the state Uniform Construction Code⁸⁸ (which has been adopted by most Pennsylvania municipalities) contains general construction standards for facilities, which might apply to amenities provided along trails and shared use paths (e.g., restrooms, shelters).

In addition, government funders often attach strings to their grants that require trails, shared use paths, and related amenities to be built to stricter accessibility standards than regulations would require or BMPs would suggest



Eight.

Accessibility Guidelines for Trails

This chapter builds on Chapter 5’s introduction to trail regulations and BMPs, looking closely at the technical accessibility provisions for trails⁸⁹ that are contained in Chapter 1017 of the Outdoor Guidelines. Trail designers and contractors often refer informally to Chapter 1017 as the “**Trail Accessibility Guidelines.**”⁹⁰ These technical specifications and scoping requirements are discussed in detail below. (Information on shared use paths is found in the next chapter.)

Which Trails Are Covered by the Outdoor Guidelines as BMPs?

The first order of business for trail providers is to determine whether the Outdoor Guidelines regarding grade, surfacing, resting intervals, etc., even apply to a particular trail.

The Outdoor Guidelines only apply to federal agencies (and to trails on federal land), but even on federal land the Outdoor Guidelines only apply when the trail meets threshold criteria described below. State and local government agencies and private organizations that are using the Outdoor Guidelines as voluntary BMPs for their trails should consider these criteria in determining whether to apply the accessibility guidelines. Note that while a trail may not meet the threshold criteria, an entity may choose to apply the BMP, in whole or in part, anyway.

The Outdoor Guidelines apply only if the following three threshold criteria are met:

- The trail is new or altered.
 - “Altering” means changing the design, function or purpose of the trail OR changing the overall grade, width, or surface of an existing trail OR significantly re-routing an existing trail.⁹¹ The Outdoor Guidelines note that routine or periodic maintenance activities performed to return an existing trail to the condition to which the trail was originally designed do not trigger the accessible trail guidelines. (The Glossary provides a detailed explanation of routine and periodic maintenance.)
 - Where practicable and feasible, resource managers should consider improving accessibility on trails through trail maintenance and repair activities. Every time a trail is maintained or repaired, the opportunity to improve access may be present.⁹²
- The trail has a designed use of pedestrian-only.
 - The trail’s primary designed use must be for pedestrians only. Trails whose primary design is for other uses, such as equestrian or mountain biking, would inherently be designed for *those* uses and would not be subject to the Outdoor Guidelines.

- The trail connects to a trailhead or to another trail that substantially meets the requirements of the Outdoor Guidelines. (This threshold criterion prevents the construction of “trails to nowhere.”)

Assuming that a trail being built on federal land meets the three threshold criteria discussed above, the Outdoor Guidelines generally would be applicable. Likewise, if a non-federal trail meets the three tests outlined above, it would be appropriate to apply the Outdoor Guidelines as BMPs.

When Exceptions to Trail Regulations/BMPs Are Warranted

The Outdoor Guidelines provide four possible exceptions (called “**conditions for departure**”) to compliance with the technical trail accessibility standards:

- Compliance is not practicable due to terrain;
- Compliance cannot be accomplished with prevailing construction practices;
- Compliance would fundamentally alter the function or purpose of the facility or setting; or
- Compliance is limited or precluded by other law.

For non-federal entities, the conditions for departure provide a good screening process to determine how and why a particular trail’s design might deviate from some or all of the technical standards suggested within this manual as BMPs.

The conditions for departure essentially reflect that the planning and design of pedestrian trails should “seek to maximize accessibility while recognizing and protecting the unique characteristics of the natural setting of each trail.”⁹³ Accomplishing this balance between a trail’s users and the trail’s natural environment means that one must weigh the specific geological, topographical, environmental, and other project-specific issues in determining what the maximum accessibility may be for a specific trail or segment of trail. In some instances, this analysis will result in trail segments being built that in part (but do not fully) meet the Trail Accessibility Guidelines in order to provide accessibility to some portion of the population with disabilities. In other instances, the extent of conditions hostile to accessibility is so great that it does not make sense to apply the Technical Accessibility Guidelines to any portion of a trail.

Each of the conditions for departure is discussed below. Trail planners should note that Advisory 1019.1 in the Outdoor Guidelines cautions that entities should **consider all design options before using the exceptions**. (Section numbers at the end of each heading refer to the Outdoor Guidelines.)

1. Compliance is not practicable due to terrain (§1019.2.1)

This exception allows hiking trails to be developed in settings where existing physical (geological, hydrologic, environmental) conditions may prevent them from being made

accessible.⁹⁴ The U.S. Access Board gave insight into this exception in its comments to an earlier draft of the Outdoor Guidelines:

For example, complying with the technical provisions, particularly running slope, in areas of steep terrain may require extensive cuts or fills that would be difficult to construct and maintain, or cause drainage and erosion problems. Also, in order to construct a trail on some steep slopes, the trail may become significantly longer causing a much greater impact on the environment. Certain soils are highly susceptible to erosion. Other soils expand and contract along with water content. If compliance requires techniques that conflict with the natural drainage or existing soil, the trail would be difficult, if not impossible to maintain....

The term “not feasible” [*ed. note*: the final draft of the Outdoor Guidelines uses instead the phrase “not practicable”] is used in this situation to specify what is “reasonably do-able”. It does not refer to the technical feasibility or possibility of full compliance with the technical provisions. For example, it may be feasible to provide a trail with a 1:20 slope or less up a 1,500-foot-tall mountain using heavy construction equipment, but the trail would be at least 5.8 miles long (rather than two miles long under a traditional back-country layout), and may cause inappropriate environmental and visual impacts. The intent of this conditional departure is to recognize that the effort and resources required to comply would not be disproportionately high relative to the level of access created. Although technically feasible, the effort and resources required are not “reasonable.”⁹⁵

2. Compliance cannot be accomplished because of prevailing construction practices (§1019.2.2)

All trail projects involve a variety of funding, labor, materials, resources, and environmental factors. This second exception to compliance with the technical trail standards recognizes that “prevailing construction practices” can vary a great deal from one project to another, depending upon the entity seeking to plan and construct a new trail. Generally speaking, prevailing construction practices are those local methods typically used for construction or maintenance of a trail. Those methods are largely determined by the reality of what resources are available to a particular entity. This condition for departure helps land managers determine if they are undertaking a project that goes well beyond their available labor, equipment, and monetary resources. As always, it is important to carefully review all options before determining whether this exception should apply.

Many projects involve the use of volunteers and in-kind resources to plan, design, and construct trails. Using in-kind or volunteer resources may free up financial resources for equipment, materials, or professional construction for other project components. For example, an accessible boardwalk requires a great deal of skill and expertise to design and construct. A professional contractor could potentially take the plan, design, and construction up to the point where the decking is ready to be put on. Then, if local labor and construction

practices can provide volunteers able to complete the decking installation, the accessible boardwalk can be completed with use of both professional and volunteer resources.

The U.S. Access Board noted the following (about an earlier version of this condition of departure):

This condition may also apply where construction methods for particularly difficult terrain or an obstacle would require the use of equipment other than that typically used throughout the length of the trail. One example is requiring the use of a bulldozer to remove a rock outcropping when hand tools are commonly used.... For example, if the prevailing construction practices would not include the importation of a new surface material and the natural surface material could not be made firm and stable, the trail may not be able to comply with that specific provision....⁹⁶

Trail construction practices vary greatly, from the use of volunteer labor and hand tools to professional construction with heavy, mechanized equipment. For alterations to an existing trail, the “prevailing construction practices” are defined as the methods typically used for construction or maintenance of the trail. For new trails, it is recognized that the land manager determines the construction practices to be used on each trail. However, the “choice” of construction practices are primarily determined by the available resources (e.g. machinery, skilled operators, finances) and the environmental conditions (e.g., soil type and depth, vegetation, natural slope). The intent of this conditional departure is to ensure that compliance with the technical provisions does not require the use of construction practices which are above and beyond the skills and resources of the trail building organization. It is not intended to automatically exempt organizations from the technical provisions simply because of a particular construction practice, (e.g. the use of hand tools or to suggest that hand tools should be used to avoid compliance) when more expedient methods and resources are available.⁹⁷

3. Compliance would fundamentally alter the function or purpose of the facility or setting (§1019.2.3)

The Outdoor Guidelines (and thus the BMPs) do not require alterations that fundamentally impact the character and setting of a site simply to comply with accessibility guidelines. A trail ought to provide accessibility if it can accomplish this while also meeting an entity’s managed and designed use criteria for that particular site. If the accessibility improvements would greatly alter the physical or recreational setting, the trail would not be consistent with the applicable land management plan. For example, even though the site topography of a wilderness area may allow for design of a trail that meets the Outdoor Guidelines, this level of development could be contrary to providing users with the wilderness experience for which the trail is managed.

The U.S. Access Board committee report (in an earlier draft of the Outdoor Guidelines) illustrates this exception:⁹⁸

Examples include a trail intended to provide a rugged experience such as a cross country training trail with a steep grade or a challenge course with abrupt and severe changes in level. If these types of trails were flattened out or otherwise constructed to comply with the technical provisions for accessible trails, they would not provide the intended and desired level of challenge and difficulty to users.

Trails that traverse over boulders and rocky outcrops, are another example. The purpose of such a trail is to provide people with the opportunity to climb the rocks. To remove the obstacles along the way or reroute the trail around the rocks would destroy the purpose of the trail. The “nature of the setting” may also be compromised by actions such as widening for the construction of an imported surface on a trail in a remote location or removing ground vegetation in meadows or alpine areas.⁹⁹

4. Compliance is precluded by other law (§1019.2.4)

Every trail planning process should include a review of federal, state, and local laws that may impact the type of trail design and construction permitted within a given site. For instance, accessible-compliant trail alignments may negatively impact historic sites or rare, threatened, or endangered plants or animals protected by local, state, or federal laws such as the:

- Endangered Species Act (16 U.S.C. §§ 1531 et seq.);
- National Environmental Policy Act (42 U.S.C. §§ 4321 et seq.);
- National Historic Preservation Act (16 U.S.C. §§ 470 et seq.);
- Wilderness Act (16 U.S.C. §§ 1131 et seq.); or
- Other federal, state, or local law, the purpose of which is to preserve threatened or endangered species; the environment; or archaeological, cultural, historical, or other significant natural features.

If the Trail Accessibility Guidelines require construction methods, materials, or locations that are prohibited by particular laws and regulations, this would be a reason to depart from the BMPs. For example, if it were determined that a threatened or endangered species might be negatively impacted by a trail’s location, this could justify this condition for departure.¹⁰⁰

When a Trail Cannot Be Made Fully Accessible

A primary accessible design goal for sustainable pedestrian trails “is to **maximize accessibility without changing the setting.**”¹⁰¹ In cases where the land management entity decides that a trail project contains one or more conditions for departure, it should still apply the Trail Accessibility Guidelines to the extent practicable. The Outdoor Guidelines provide that:

When an entity determines that a condition [of departure] in [section] 1019 does not permit full compliance with a specific [technical accessibility] provision in [section] 1017 on a portion of a trail, the portion of the trail shall comply with the provision to the extent practicable.¹⁰²

The regulations further explain that:

On outdoor recreation access routes, trails, and beach access routes, **the exceptions apply only on the portion of the route where the condition applies.** The outdoor recreation access route, trail, or beach access route is required to fully comply with the provisions in [sections] 1016, 1017, and 1018, as applicable, at all other portions of the route where the conditions do not apply.¹⁰³

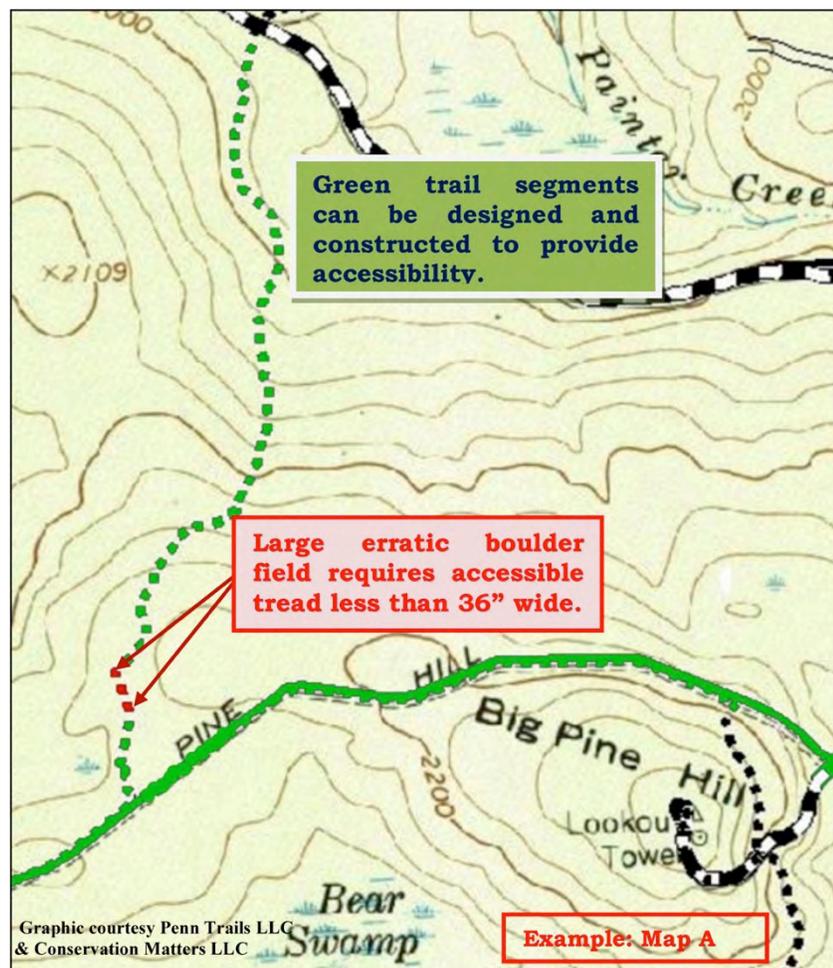
In practice, this means that the conditions for departure should be applied on a case-by-case basis to determine where it is impractical to require a trail segment (or an entire trail, as noted below) to comply with all of the recommended BMPs. Where one or more of the conditions for departure limit the accessibility of the trail, deviation from the standards is permitted up to the point where the condition is no longer applicable (e.g., the narrow ledge that can accommodate only a 29" tread widens again to 36" or more).

For example, Map A shows that for a particular segment of the trail, geological features limit implementation of the BMP for recommended trail width. However, at the point at which it is feasible to once again meet the BMP for minimum width, this can and should be done.

Many trails will not be fully accessible because they cannot comply with all of the trail BMPs along the entire length of the trail, due to one of the conditions for departure.

Even a trail with non-compliant segments can still provide a large degree of access to many people with disabilities. Some people with disabilities enjoy the challenge of a trail that is not entirely compliant with all of the BMPs for trails. According to the U.S. Forest Service:

Although accessible design is based on wheelchair dimensions, clear space, maneuvering room, and reach ranges, only 7 percent of people with disabilities use wheelchairs and 2.1 percent of



people with mobility impairments use crutches, canes, walkers, or other assistive device. The majority of people with mobility impairments do not use a mobility device but are limited in the distance or grade they can walk without difficulty. They may be able to get around or over an obstacle without too much difficulty. Although steep terrain may be difficult, it may be manageable for a limited distance.¹⁰⁴

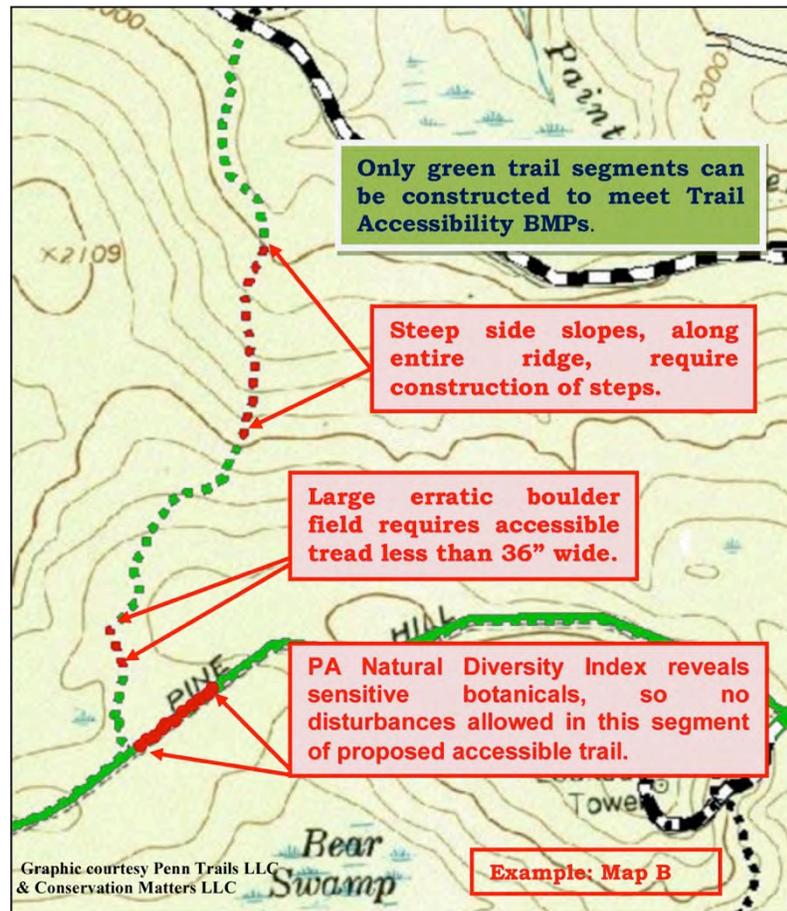
In some cases, deviations from the recommended standards are so numerous or substantial that it is “impracticable” for *any* portion to be made accessible. The Outdoor Guidelines provide that:

After applying Exception 1 [requiring technical compliance to the extent “practicable”], when an entity determines that it is impracticable for the entire trail to comply with [the technical trail specifications of section] 1017, the trail shall not be required to comply with 1017.¹⁰⁵

The example illustrated in Map B shows a trail assessment where the magnitude of exceptions makes it impracticable for the *entire* trail to comply with the BMPs. The entity would likely determine that the trail would not be designed for accessibility standards.

In short, it is recommended that trail providers:

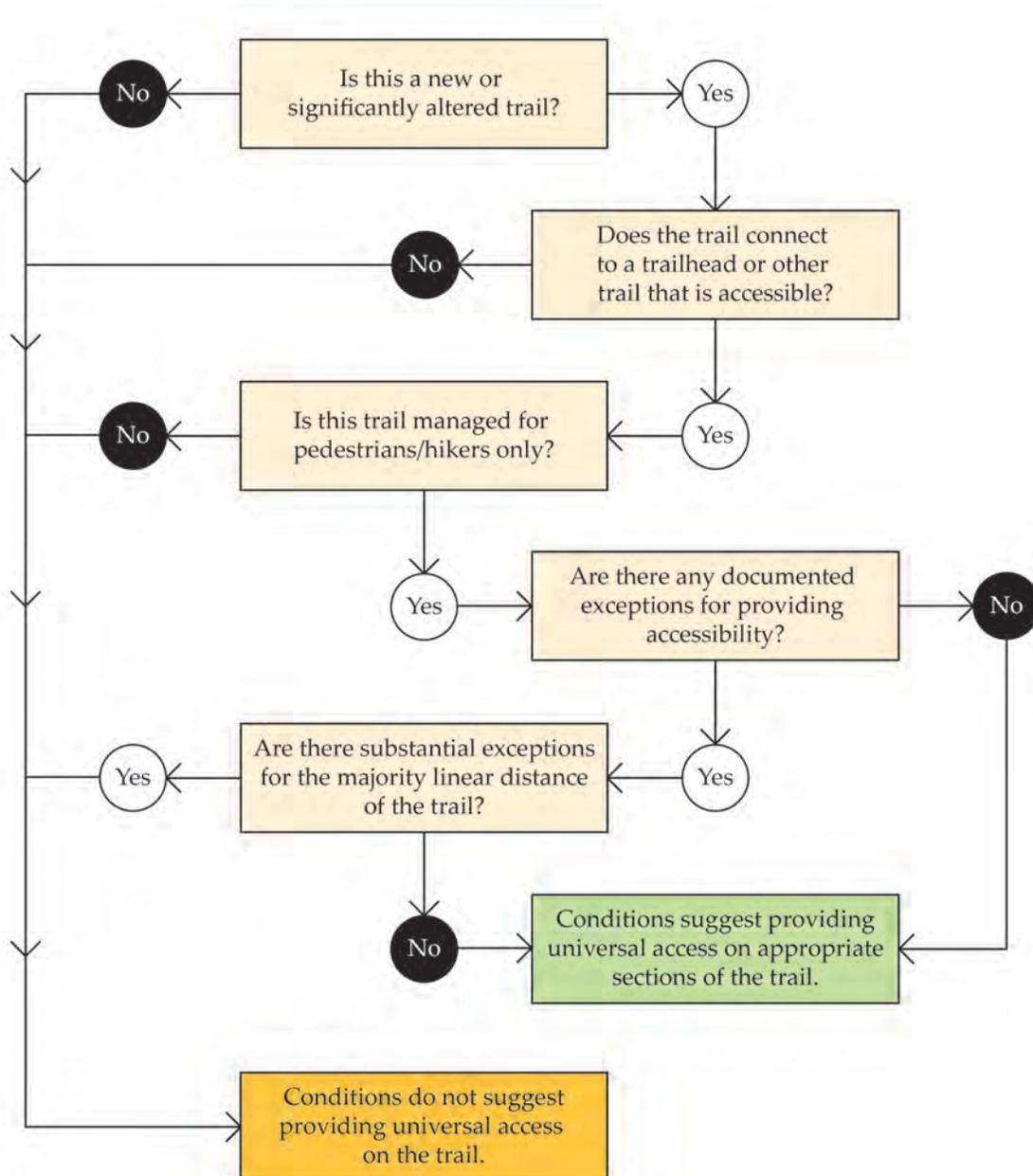
- **FIRST** apply the conditions for departure and determine what portions of a trail cannot fully comply with the technical provisions and to what extent the trail still can comply with the technical provisions to the maximum extent feasible.¹⁰⁶
- **SECOND**, *if necessary*, evaluate the entire trail and **determine whether it is impracticable for the trail in its entirety to comply** with the Trail Accessibility Guidelines. This determination should take into account which portions of the trail



can and cannot fully comply with the technical provisions and the extent of compliance where full compliance cannot be achieved.

- **Document the basis for the determination** and keep this documentation together with the trail's construction records. (The regulations do not require any particular format for substantiating the trail's non-compliance.¹⁰⁷)

Below is a simple chart illustrating this analysis:



Nine.

Accessibility Guidelines for Shared Use Paths

This chapter introduces the proposed regulations for shared use paths that will be applicable to all governmental entities. These PROW Guidelines serve as useful BMPs for private entities and, until made mandatory as regulations, serve as BMPs for governmental entities as well.

This manual recommends that governmental and non-governmental entities alike use the PROW Guidelines as BMPs for their shared use path projects.

Shared-use paths provide a transportation function. All newly constructed shared-use paths should be built to provide access for people with disabilities. In addition, existing shared-use paths should be improved to enhance access whenever possible. If improvements to existing facilities cannot be made immediately, it is recommended that information, including signage, be provided at all path entrances. This information should clearly convey objective information to trail users, including data about grade, cross slope, surface, and width.¹⁰⁸

Shared use paths follow a different set of guidelines and suggested practices. The generally recognized authority for designing and constructing shared use paths has for several years been the *Guide for the Planning, Design, and Operation of Bicycle Facilities* (the “**AASHTO Guide**”)¹⁰⁹ published by the American Association of State Highway Transportation Officials (**AASHTO**).

Shared use paths provide a means of off-road transportation and recreation for various users, including pedestrians, bicyclists, skaters, and others, including people with disabilities.



2' MIN.
GRADED
AREA

10' MIN. WIDTH
SHARED USE PATH

2' MIN.
GRADED
AREA



The U.S. Access Board is developing accessibility standards for shared use paths. When finalized, the guidelines will be binding on all federal and non-federal governmental entities. The Access Board notes that the *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way* (the “PROW Guidelines”)¹¹⁰ are consistent with the design criteria for shared used paths in the *AASHTO Guide*.

How a Shared Use Path Is Different than Other Routes

The PROW Guidelines define a shared use path as:

[A] multi-use path designed primarily for use by bicyclists and pedestrians, including pedestrians with disabilities, for transportation and recreation purposes. Shared use paths are physically separated from motor vehicle traffic by an open space or barrier, and are either within the highway right-of-way or within an independent right-of-way.¹¹¹

The *AASHTO Guide* notes that the primary factor that distinguishes shared use paths and sidewalks is the intended user. The Federal Highway Administration (FHWA) states that “for most shared-use paths, bicyclists are the primary user group. Cyclists include tandem, recumbent, and hand-powered three-wheelers. Road racing wheelchairs may use shared-use paths, reaching speeds of over 30 mph on downhill sections, and should have the same rights and privileges as cyclists. In many cases, the design requirements for bicyclists are similar, if not

more stringent, than the design requirements for pedestrians with disabilities. For example, people who use wheelchairs can travel over small changes in level. However, because bicyclists are often traveling at faster speeds, smooth surfaces are needed. Although people with vision impairments can identify an edge protection in a trail environment if it is more than 76 mm (3 inches) high, an edge protection lower than a 1.065-meter (42-inch) railing can be dangerous for a bicyclist.”¹¹²

The updated 2017 FHWA report still points to, the majority of the accessibility recommendations for shared-use paths as based on the 1999 AASHTO Guide for the Development of Bicycle Facilities (AASHTO, 1999). However, in their update, the underscore that additional issues, such as protruding objects (that are not addressed in the AASHTO bicycle facility guide) and thus included in the 2017 report.¹¹³ Thus, their recommendations for grade are based on the work by the Regulatory Negotiation Committee for Outdoor Developed Areas because the maximum grades identified for bicyclists in the AASHTO bicycle facility guide do not provide access to many people with mobility impairments.

Shared use paths differ from hiker/pedestrian trails mostly in that they are intended to accommodate a wider range of users.¹¹⁴ Thus, there are different safety issues to consider by virtue of their mixed-user traffic.

Passing slower users in the same direction and two-way traffic flow are two primary safety issues, particularly where there is a high volume of pathway users.¹¹⁵ The updated (2017) FHWA Designing Sidewalks and Trails for Access



Photo courtesy U.S. Access Board

Part II of II: Best Practices Design Guide, provides excellent discussion and design guidance for Shared-use Paths.¹¹⁶

Proposed Accessibility Rules for Shared Use Paths

During the 2013 rulemaking on public rights-of-way, trails, and other outdoor developed areas, comments



10 feet is the *recommended* minimum width for a shared use path.

from the public urged the U.S. Access Board to address access to shared use paths separately from sidewalks and trails. In response, the U.S. Access Board is supplementing the draft PROW Guidelines¹¹⁷ to cover shared use paths. The PROW Guidelines—which broadly address access to sidewalks, streets, and other pedestrian facilities—provide requirements for “pedestrian access routes” (a term referring to the portion of the public right-of-way that serves as an accessible route), including specifications for route width, grade, cross slope, surfaces, and other features. The U.S. Access Board proposes to apply these and other relevant requirements to shared use paths as well. The PROW Guidelines also contain provisions tailored specifically to shared use paths, including provisions that:

- Require the full width of a shared use path to comply with the proposed technical provisions for the grade, cross slope, and surface of pedestrian access routes;
- Permit compliance with the proposed technical provisions for the grade of pedestrian access routes to the extent practicable where physical constraints or regulatory constraints prevent full compliance;
- Prohibit objects from overhanging or protruding into any portion of a shared use path at or below eight feet measured from the finished surface; and
- Require the width of curb ramps and blended transitions in shared use paths to be equal to the width of the shared use path.¹¹⁸

Shared use paths likely will be subject to grade requirements similar to those that govern public rights-of-way, which are much stricter than those imposed on trails. The U.S. Access Board has proposed that exceptions to the strict grade requirements for shared use paths be permitted only in the following situations:

- **Physical Constraints.** Where compliance with the grade requirements is not practicable due to existing terrain or infrastructure, right-of-way availability, a notable natural feature, or similar existing physical constraints, compliance is required to the extent practicable.
- **Regulatory Constraints.** Where compliance with the grade requirements is precluded by federal, state, or local laws the purpose of which is to preserve threatened or endangered species; the environment; or archaeological, cultural, historical, or significant natural features, compliance is required to the extent practicable.¹¹⁹

When the final shared use path guidelines are issued, it is probable they will require that once the constraint that precludes compliance is no longer applicable, the remainder of the shared use path must follow the accessibility requirements regarding linear grade and cross slope.



Comparing PROW to AASHTO Guidelines

According to the U.S. Access Board, the proposed guidelines for shared use paths are “consistent with the design criteria for shared used paths” in the *AASHTO Guide*.¹²⁰ The U.S. Access Board notes on its website that the proposed guidelines are “not expected to increase the cost of constructing shared use paths for state and local government jurisdictions that use the *AASHTO Guide*.”¹²¹ The following table provides a side-by-side comparison (from the U.S. Access Board website) of the existing AASHTO shared use path guidelines and the draft U.S. Access Board provisions specifically relating to shared use paths.¹²²

Comparison of PROW and AASHTO Guidelines

PROW	AASHTO
<p>Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way</p> <p>Proposed Technical Provisions Applicable to Shared Use Paths</p>	<p>AASHTO Guide for the Development of Bicycle Facilities (2012)</p> <p>Chapter 5: Design of Shared Use Paths</p>
Width and Clearance	
<p><u>R302.3.2 Shared Use Paths:</u> A pedestrian access route shall be provided for the full width of a shared use path.</p>	<p><u>5.2.1 (Width and Clearance):</u> The minimum paved width for a two-directional shared use path is 10 ft (3.0 m). . . . In very rare circumstances, a reduced width of 8 ft (2.4 m) may be used Wider pathways, 11 to 14 ft (3.4 to 4.2 m) are recommended in locations that are anticipated to serve a high percentage of pedestrians (30 percent or more of the total pathway volume) and higher user volumes (more than 300 total users in the peak hour).</p>
Grade	
<p><u>R302.5 Grade:</u> The grade of pedestrian access routes shall comply with R302.5.</p> <p><u>R302.5.1 Within Street or Highway Right-of-Way:</u> Except as provided in R302.5.3, where pedestrian access routes are contained within a street or highway right-of-way, the grade of pedestrian access routes shall not exceed the general grade established for the adjacent street or highway.</p> <p><u>R302.5.2 Not Within Street or Highway Right-of-Way:</u> Where pedestrian access routes are not contained within a street or highway right-of-way, the grade of pedestrian access routes shall be 5 percent maximum.</p> <p><u>R302.5.3 Within Pedestrian Street Crossings:</u> Where pedestrian access routes are contained within a pedestrian street crossing, the grade of pedestrian access routes shall be 5 percent maximum.</p> <p><u>R302.5.4 Physical Constraints:</u> Where compliance with R302.5.1 or R302.5.2 is not practicable due to existing terrain or infrastructure, right-of-way availability, a notable natural feature, or similar existing physical constraints, compliance is required to the extent practicable.</p> <p><u>R302.5.5 Regulatory Constraints:</u> Where compliance with 302.5.1 or 302.5.2 is precluded by federal, state, or local laws the purpose of which is to preserve threatened or endangered species; the environment; or archaeological, cultural, historical, or significant natural features, compliance is required to the extent practicable.</p>	<p><u>5.2.7 Grade:</u> The maximum grade of a shared use path adjacent to a roadway should be 5 percent, but the grade should generally match the grade of the adjacent roadway. Where a shared use path runs along a roadway with a grade that exceeds 5 percent, the sidepath grade may exceed 5 percent but must be less than or equal to the roadway grade. Grades on shared use paths in independent rights-of-way should be kept to a minimum. Grades steeper than 5 percent are undesirable because the ascents are difficult for many path users, and the descents can cause some users to exceed the speeds at which they are competent or comfortable. . . . Grades on paths in independent rights-of-way should also be limited to 5 percent maximum.</p>
Cross Slope	
<p><u>R302.6 Cross Slope:</u> Except as provided in R302.6.1 and R302.6.2, the cross slope of pedestrian access routes shall be 2 percent maximum. <u>R302.6.1 Pedestrian Street Crossings Without Yield or Stop Control:</u> Where pedestrian access routes are contained within pedestrian street crossings without yield or stop control, the cross slope of the pedestrian access route shall be 5</p>	<p><u>5.2.5 Cross Slope:</u> As described in the previous section, 1 percent cross slopes are recommended on shared use paths, to better accommodate people with disabilities and to provide enough slope to convey surface drainage in most situations.</p>

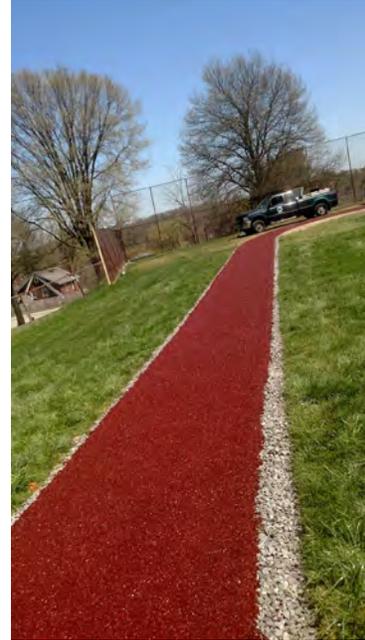
<p>percent maximum. <u>R302.6.2 Midblock Pedestrian Street Crossings</u>: Where pedestrian access routes are contained within midblock pedestrian street crossings, the cross slope of the pedestrian access route shall be permitted to equal the street or highway grade.</p>	
<p>Surface and Structure</p>	
<p><u>R302.7 Surfaces</u>: The surfaces of pedestrian access routes and elements and spaces required to comply with R302.7 that connect to pedestrian access routes shall be firm, stable, and slip resistant and shall comply with R302.7. <u>R302.7.1 Vertical Alignment</u>: Vertical alignment shall be generally planar within pedestrian access routes (including curb ramp runs, blended transitions, turning spaces, and gutter areas within pedestrian access routes) and surfaces at other elements and spaces required to comply with R302.7 that connect to pedestrian access routes. Grade breaks shall be flush. Where pedestrian access routes cross rails at grade, the pedestrian access route surface shall be level and flush with the top of rail at the outer edges of the rails, and the surface between the rails shall be aligned with the top of rail.</p> <p><u>R302.7.2 Vertical Surface Discontinuities</u>: Vertical surface discontinuities shall be 13 mm (0.5 in) maximum. Vertical surface discontinuities between 6.4 mm (0.25 in) and 13 mm (0.5 in) shall be beveled with a slope not steeper than 50 percent. The bevel shall be applied across the entire vertical surface discontinuity.</p> <p><u>R302.7.3 Horizontal Openings</u>: Horizontal openings in gratings and joints shall not permit passage of a sphere more than 13 mm (0.5 in) in diameter. Elongated openings in gratings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.</p> <p><u>R302.7.4 Flangeway Gaps</u>: Flangeway gaps at pedestrian at-grade rail crossings shall be 64 mm (2.5 in) maximum on non-freight rail track and 75 mm (3 in) maximum on freight rail track.</p>	<p><u>5.2.9 Surface Structure</u>: Hard, all-weather pavement surfaces are generally preferred over those of crushed aggregate, sand, clay, or stabilized earth. . . . Unpaved surfaces may be appropriate on rural paths, where the intended use of the path is primarily recreational, or as a temporary measure to open a path before funding is available for paving. Unpaved pathways should be constructed of materials that are firm and stable. . . . It is important to construct and maintain a smooth riding surface on shared use paths. . . . Utility covers (i.e., manholes) and bicycle-compatible drainage grates should be flush with the surface of the pavement on all sides. . . . Railroad crossings should be smooth and should be designed at an angle between 60 and 90 degrees to the direction of travel to minimize the possibility of falls.</p>
<p>Vertical Clearance</p>	
<p><u>R210.3 Shared Use Paths</u>: Objects shall not overhang or protrude into any portion of a shared use path at or below 2.4 m (8.0 ft) measured from the finish surface</p>	<p><u>5.2.1 Width and Clearance</u>: The desirable vertical clearance to obstructions is 10 ft (3.0 m). Fixed objects should not be permitted to protrude within the vertical or horizontal clearance of a shared use path. The recommended minimum vertical clearance that can be used in constrained areas is 8 ft (2.4 m).</p>
<p>Intersection and Transitions</p>	
<p><u>R304.5.1.2 Shared Use Paths</u>: In shared use paths, the width of curb ramps runs and blended transitions shall be equal to the width of the shared use path.</p> <p><u>R305.1.4 Size</u>: Detectable warning surfaces shall extend 610 mm (2.0 ft) minimum in the direction of pedestrian travel. At curb ramps and blended transitions, detectable warning surfaces shall extend the full width of the ramp run (excluding any flared sides).</p>	<p><u>5.3.5 Other Intersection Treatments</u>: The opening of a shared use path at the roadway should be at least the same width as the shared use path itself. If a curb ramp is provided, the ramp should be the full width of the path, not including any flared sides if utilized. . . . Detectable warnings should be placed across the full width of the ramp.</p>

Shared Use Path Tread Surfaces

The PROW Guidelines for shared use paths require a surface that is firm, stable, *and—unlike trails—also slip resistant*:

A firm, stable, and slip resistant surface is necessary for persons with disabilities using wheeled mobility devices. Bicyclists with narrow-tired bicycles and in-line skaters also need a hard, durable surface. Shared use paths typically are comprised of asphalt or concrete and these surfaces are generally accessible for people with disabilities. These surfaces perform well in inclement weather and require minimal maintenance. Unpaved surfaces that are firm, stable, and slip resistant may be used; however, they may erode over time requiring regular maintenance.¹²³

The proposed shared use path regulations do not *require* a paved surface. Many users, such as runners and equestrians, may actually prefer *unpaved* surfaces. Shared use path planners and designers should consider various user desires, accessibility requirements, construction material costs, surface longevity, and long-term maintenance costs when deciding which specific surface type is most appropriate for their project.



Monitor Regulatory Status

Entities planning shared use paths should check the regulatory status of the PROW Guidelines before finalizing their designs.

When adopted, the PROW Guidelines will apply to all government agencies and to all shared use paths that they build or operate, whether located on public or private land.¹²⁴

Non-government entities may continue to use them as

BMPs to the extent they do not conflict with ADA regulations.

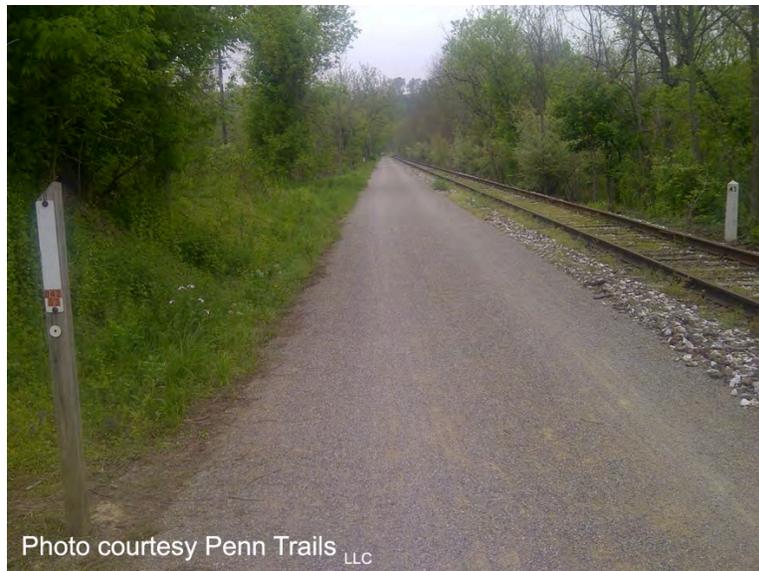


Photo courtesy Penn Trails LLC

2010 ADA Design Standards Apply to Structures

Note that, as with trails, the 2010 ADA Design Standards apply to structures, facilities, and amenities provided along the shared use path.



Ten.

Accessibility Guidelines for Other Pedestrian Routes and Trailheads

This chapter briefly reviews federal accessibility standards for a few other types of facilities including accessible routes, ORARs (Outdoor Recreation Access Routes), and trailheads.

Accessibility Guidelines for Accessible Routes and ORARs

In addition to trails and shared use paths, other types of pedestrian routes that can provide accessibility, as classified by federal regulations, include accessible routes and ORARs.¹²⁵

Accessible routes are the most developed, or “built,” routes for persons with disabilities.

The 2010 ADA Design Standards (and not the Outdoor Guidelines) provided scoping and technical specifications for this type of route. As per the ADA Design Standards, at least one accessible route must be created to provide access for built elements such as public parking spaces, passenger loading zones, and buildings.

A full discussion of accessible routes is outside the scope of this manual; for detailed information on scoping and technical specifications for accessible routes refer to Chapter 4 of the 2010 ADA Design Standards.¹²⁶ Government agencies may impose design requirements on grantees constructing accessible routes that are more stringent than the specifications in the 2010 ADA Design Standards.



If a structure or facility governed by the 2010 ADA Design Standards is within the path of travel, what might otherwise be viewed as a hiker/pedestrian trail might actually be classified as an accessible route that must meet the more stringent 2010 ADA Design Standards. For example, fishing piers are addressed by the 2010 ADA Design Standards. A route connecting a

fishing pier to another structure or route that falls within the 2010 ADA Design Standards, such as a parking lot, therefore would have to meet the more stringent standards governing accessible routes rather than utilizing BMPs for a trail or ORAR.¹²⁷

Likewise, in a state or county park, accessible routes are appropriate to connect elements within a specific picnic use area, such as from picnic tables to the public restroom and parking area. However, an accessible route would not be needed, or desired, for a trail that leads people on a recreational hike in the adjacent forest. That trail could utilize the Outdoor Guidelines for BMPs regarding technical specifications for accessibility.

ORARs are continuous, unobstructed pedestrian paths that connect elements in a picnic area, campground, or trailhead. They are subject to more stringent grade and other requirements than “trails,” thereby providing greater accessibility—but their design parameters are **less stringent than those governing accessible routes.** The concept of ORARs was developed for the Outdoor Guidelines,



which as noted above, applies only to federal entities or groups building trails on federal land on behalf of federal agencies. In many cases it would appear to make more sense from a design standpoint in outdoor recreation areas to build to the more flexible ORAR standards than to the highly developed accessible routes standards. But because non-federal entities are governed by the 2010 ADA Design Standards, the technically correct and thus “safest” approach is for non-federal agencies and organizations to follow the standards for accessible routes rather than use the ORARs as BMPs. (However, certain trail providers, such as the New York State Department of Environmental Conservation, have determined as a matter of policy to adopt the ORAR standards for outdoor recreation areas, at least until the U.S. Access Board adopts separate outdoor recreation area standards for non-federal entities.¹²⁸) Should a non-federal entity decide to use the technical specifications for ORARs rather than those for accessible routes, it should clearly document why it is doing so, maintaining those records for future reference.

Chapter 1016 of the Outdoor Guidelines sets out scoping and technical specifications for ORARs, including: grade; cross-slope; surfaces; clear tread width; resting intervals; passing spaces; tread obstacles; openings in surfaces; and protruding objects. This information is provided as an Appendix to this manual.

Regulations Versus Best Management Practices for Accessible Routes and ORARs

Accessible routes and ORARs each have their own set of regulations:

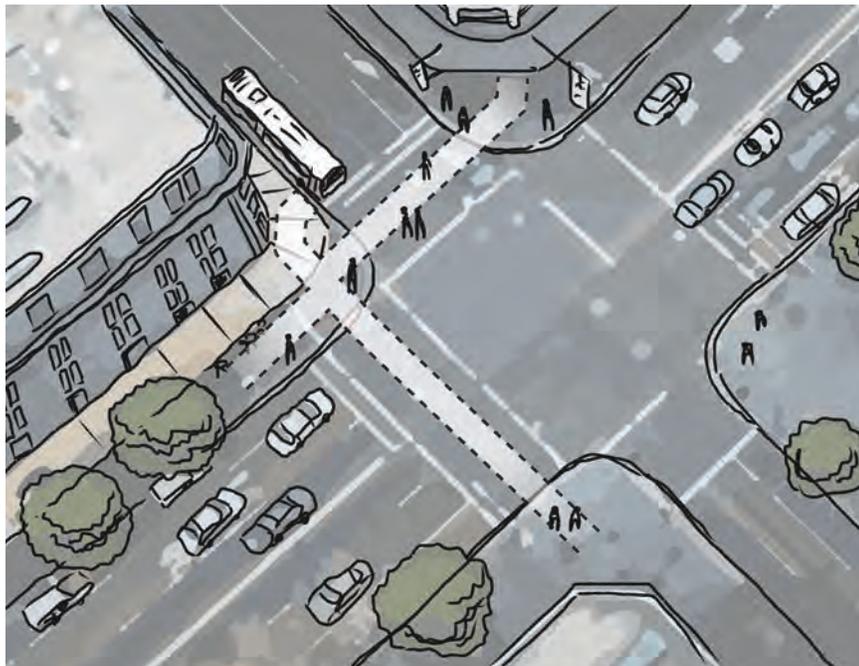
- The 2010 ADA Standards for Accessible Design (the “**2010 ADA Design Standards**”) cover **accessible routes**, both indoors and outdoors. These regulations

(which also govern a number of outdoor amenities) are legally binding on private organizations and non-federal government entities.

- Chapter 1016 “Outdoor Recreation Access Routes” of the Outdoor Guidelines sets forth the requirements for all federal agencies in regard to **ORARs**. Specifications for ORARs are provided in the Appendix.

Even if following the ORAR standards as BMPs would make more sense in some instances (because they—unlike the 2010 ADA Design Standards—were specifically designed to provide technical specifications for routes in outdoor settings), non-federal entities are advised to follow the binding 2010 ADA Design Standards.

Accessible routes connect accessible onsite features (e.g.: bus stop, parking) to the building entrance.



Accessibility Guidelines for Trailheads and Related Amenities

Trailheads are the public points of access to trails and shared use paths. They are developed sites, designed and constructed with the primary purpose of providing user amenities and staging for the trail or shared use path.

The following do NOT constitute trailheads:

- Junctions between trails where there is no other access; and
- Intersections where a trail crosses a road or users have developed an access point, but where no improvements have been provided beyond minimal signage for public safety.¹²⁹



Trailheads servicing trails or shared use paths may offer one or more of the following amenities:

- parking;
- information kiosk;
- passenger loading and unloading;
- bicycle racks;
- lighting;
- drinking water;
- toilets;
- benches;
- picnic shelters and tables;
- barriers, such as gates, fences, and buffers; and
- trash and recycling containers.

While it is beyond the scope of this manual to go into detail about the features mentioned above, trail and shared use path planners should note that the standards to follow regarding these amenities largely depends on whether the entity falls under the ADA or the ABA.

The binding 2010 ADA Design Standards govern many aspects of trailhead design and construction for non-federal entities. For instance, the 2010 ADA Design Standards provide requirements for the number and dimensions of parking spots and access isles, specifies maximum slope, and mandates that parking areas have a stable, firm, and slip resistant surface. The 2010 ADA Design Standards specify that a minimum of one accessible route must connect the accessible parking area to the accessible facilities. At least one accessible parking space must be provided for every 25 standard parking spaces. A good discussion of regulations governing accessible parking can be found at ADA Design Guide I: Restriping Parking Lots, <http://www.ada.gov/restripe/btm>, as well as in Chapter 5, General Site and Building Elements, of the 2010 ADA Design Standards.¹³⁰



The 2010 ADA Design Standards also provide specific requirements governing the design, construction, and quantities of other amenities frequently found at trailheads.¹³¹ Chapter 3: Building Blocks, of the 2010 ADA Design Standards, deals with a wide range of design and construction parameters related to surfaces, ramps, barriers, gates, turning spaces, protruding objects, and more. For example, the design and construction of a kiosk located at a trailhead would be informed by standards contained within that chapter of the 2010 ADA Design Standards.

Entities building trailheads also should consult Chapter 3 of the *Pennsylvania Trail Design and Development Principles* for design details relating to trailheads and associated amenities.

For federal entities, the Outdoor Guidelines come into play to the extent that the trailhead contains “outdoor constructed features.”¹³² These include picnic tables, fire rings, grills, fireplaces, wood stoves, trash and recycling receptacles, water hydrants, utility and sewage hookups, outdoor rinsing showers, benches, telescopes, and periscopes.¹³³ These facilities are subject to the applicable Outdoor Guidelines scoping and technical specifications *regardless of whether the trail itself is accessible*. When outdoor constructed features are provided at trailheads or along a trail, at least 20%—but not less than one of each feature—must be accessible. Technical specifications for these facilities are found in the Outdoor Guidelines, Chapter 10.11 through 10.15; their scoping requirements are contained both in the Outdoor Guidelines and in the ABA Chapter 2.¹³⁴

Eleven.

Case Studies

In addition to the case studies presented below, [WeConservePA](#) intends to post new and updated case studies [at its website](#) as they are produced over time.

Kings Gap Environmental Education Center

Location: 500 Kings Gap Road, Carlisle, PA 17013 (office)

Upper Irish Gap Trail

Status: Planning, design, and construction initiated in 2010 with projects ongoing as of 2021.

Pond Day Use Area—Watershed Trail

Status: Planning, design, and construction completed in 2016

Project Background

Kings Gap Environmental Education Center, managed by the Pennsylvania Department of Conservation and Natural Resources (DCNR), offers both public environmental education programs and superb panoramic views of the Cumberland Valley in southcentral PA. Its location on South Mountain offers a wide variety of terrain for hikers—steep mountainsides, lowland wetlands, extensive forest, and both the Irish Gap Creek and the Kings Gap Creek. These wetlands and creeks are important watershed sources for the Yellow Breeches Creek, a popular trout fishing destination.

Consisting of over 2,500 acres, Kings Gap’s extensive 25-mile hiking system is for pedestrians only. The trail system consists of 19 trails, with numerous junctions and intersections, allowing for many combinations of experiences and levels of challenge for every type of hiker.

Two of the trails are asphalt paved trails constructed sometime in the 1980s, long before any best management practices for accessible guidelines for trails were created. Each provides a remarkably accessible running grade and cross slope for people using wheelchairs. Given their popularity, the decision was made to pursue additional design and construction of trail to increase accessible options at Kings Gap.

This case study focuses on two of the trails, the Upper Irish Gap Trail and the Pond Day Use Area—Watershed Trail.

Upper Irish Gap Trail – Project Timeline

Upper Irish Gap Hollow Trail is the northern section of the planned 4,700+/- linear foot Upper and Lower Irish Gap Trail route. As of October 2020, projects on both Upper and

Lower Irish Gap Hollow Trails have completed approximately 60% of the total planned distance. An ongoing project, the Upper Irish Gap trail is a 1,000+/- foot (as of 2020) hiking trail that leads into Irish Gap Hollow. The trail follows the Irish Gap Creek for much of the thousand feet.

- 2011: DCNR's Bureau of State Parks, acquires 1,077-acre Irish Gap parcel from a private landowner and adds it to Kings Gap Environmental Education Center.
- 2012: Penn Trails ground-truths the entire parcel, then field acquires a 4,700+/- linear foot conceptual hiker-only trail that enters from both Irish Gap Hollow (Upper Irish Gap) and Pinebrook Drive (Lower Irish Gap), with trailhead and parking area planned for both ends of the route.
- 2013: Corridor clearing begins in Upper Irish Gap for the first 526 feet of trail. Penn Trails and Benchmark Trails (S.C.) execute corridor clearing and excavation, along with summer college interns, and upgrade the first 500 feet of trail tread to new ODAAG accessible trail standards with Penndot 2A Quartzite from the local Hemp Brothers quarry and with Mirafi 140N Geotextile as underlayment. Penn Trails designs trail and executes construction with Benchmark Trails, along with workforce



development labor via Arbor/Rescare Workforce Services job training program to construct tread.

- 2015: Following a 100-year flood event on Irish Gap Creek in 2014, repairs and upgrades are necessary including 8-inch headwall culverts and a 10-foot low elevation boardwalk added over the drainage area. Penn Trails designs and constructs boardwalks and culverts, along with workforce development labor provided by Arbor/Rescare Workforce Services job training program.
- 2019: A 30-foot, aluminum I-beam, ADA compliant pedestrian bridge is planned, designed, and constructed across Irish Gap Creek (with) An additional 150 feet of trail are upgraded with accessible trail BMP including new turnpike sections. The project involved Penn Trails, the PA Outdoor Corps, Kings Gap staff, and the Friends of Kings Gap.
- 2020: Additional BMP compliant wetland and waterway turnpike segments of Irish Gap Trail are constructed by the PA Outdoor Corp.



Managed Use & Design

The designed use for the Upper Irish Gap Trail section is pedestrian only and based upon universal design and accessible design BMPs as well as ADA-compliant boardwalk and bridge design. The Upper Irish Gap trail travels along the Class A Irish Gap Creek, in proximity to wetlands, and through mature second growth oak and pine forest. Abundant flora and fauna species are present throughout this natural area. The trail corridor is designed to provide

progressive access, with the easiest section (2015) starting at the parking lot, with running grades at 5% or less for 450+/- linear feet, on BMP-compliant aggregate tread. This section ends at the first encounter with the Irish Gap Creek, allowing diverse groups and individuals of all abilities to enjoy this scenic asset that stimulates all the senses. From that point, the trail enters pine forest along the creek, and continues another 500+/- feet with linear grades not over 8%. In the fall of 2019, a much anticipated 30-foot, ADA-compliant, pedestrian bridge was constructed over the Irish Gap Creek, linking to another 100 feet of BMP compliant trail that travels to a second creek crossing.



Project Outcomes and Challenges

The trail provides a passive, nature-based experience for diverse user groups and a wide range of individual experiences/capacities. The structures are ADA compliant and, especially with the turnpikes, fit the environment.

While the trail tread prior to the bridge varies, as of 2020, the ongoing project added some BMP-compliant tread and turnpike in that section. The plan for 2021 is to complete the BMP-compliant tread and turnpike, with a trail ramp to the bridge crossing. This would provide a nearly 900- foot trail, following the trail access standards (BMPs) contained in this manual and ODAAG. The bridge then provides a fully accessible viewing experience up and down the creek running under it.

Materials access and mobilization was a challenge as regards minimizing impact to the trail project site. Coordinating and scheduling the construction scope and progress was extremely

important in order that materials be moved through a roughly created corridor prior to trail tread and structures being established.

The trail bridge spanning the creek utilizes two 30-foot aluminum I-beams, specified in the engineering design. This allowed the bridge beams to be hauled into site by a gator ATV, and then placed by a crew of six onto the concrete and stone abutments. The abutments constructed of concrete, mixed on site and poured into Sonotubes. Excavation was achieved by a small excavator which was able, as was the ATV, to navigate the trail corridor.

For ongoing trail turnpike, boardwalk, and tread, the trail crew must carry in as much of the materials as possible, by hand. The aggregate and lumber are brought in by gator ATV and a powered wheelbarrow, which is invaluable for such projects.

Ongoing Maintenance and Management of the Trail

Since introducing the bridge crossing in 2019, the hiker traffic on this section of the Upper Irish Gap Trail has increased by an estimated three-fold. It is not unusual to find many people, especially on weekends, accessing the Irish Gap Hollow for hiking, dog walking, trail running, picnicking and general enjoyment of a growing placed-based experience.

Upkeep is primarily concerned with maintenance of the BMP compliant trail tread as needed to address the heavy use. This is a good example of how a BMP compliant trail tread is also a very physically sustainable asset. Along with removal of tree falls and natural debris, as is necessary with any type of trail, the structures and turnpikes require annual inspection, checking for material integrity, for repair or replacement. Like the trail itself, they are passive structures, meant to endure a backwoods environment.

The Irish Gap Creek runs year-round and can occasionally seek its banks in some sections during exceptional rain events. As everywhere, these exceptional weather events are on the increase and therefore future maintenance may require responding to heavy drainage activity under boardwalks and through culverts. Removal of storm debris from structures, as well as trails, is an important maintenance effort that can easily be executed by volunteers committed to stewardship of the Upper and Lower Irish Gap Trail.

Pond Day Use Area—Watershed Trail – Project Background

Project Background & Managed Use

The Watershed Trail, with an overall length of 1.9 miles, was one of the first trails established at Kings Gap in the late 1970s. Over several decades of hiking, as well as program use, the entire trail had fallen into very poor physical condition in many sections. Since 2000, Kings Gap staff, and the Friends of Kings Gap, have made much effort to remediate many of these sections.

With heavy erosion from ever stronger storm events, increased slope drainage into the trail corridor, and increased program area use and wider range of users, Kings Gap Manager Scott Hackenburg identified the need to redesign and reconstruct a 900-foot segment of the

Watershed Trail to sustainable alignment and accessible trail BMPs. The trail section can be utilized in connection with the largely BMP-compliant White Oak Trail (1,500+/- feet) via the adjacent parking area. The parking site contains two ADA-compliant parking spots as well as an ADA-compliant composting toilet facility. The trail section connects the larger trail system and provides a route to both a program education area and a pond along the Irish Gap Road.

In 2015, Penn Trails planned and designed 900 linear feet of realigned trail to meet BMPs for accessible trail standards, an ADA compliant boardwalk bridge, and BMP compliant program area. The project was constructed by the Kings Gap staff, who were trained by Penn Trails for the project.

In 2016, Penn Trails designed new boardwalk and approaches to replace old structure on the White Oaks Trail. The project was constructed by the Kings Gap staff, who were trained by Penn Trails for the project.

Project Outcomes and Challenges

This section of the Watershed Trail became the first PA DCNR State Park trail to be constructed to the November 2014 guidelines published in this manual.

The primary project challenges were to introduce sufficient drainage for water, around or under the trail, into the wetlands in proximity to the trail corridor. Much of the flowing and standing water was due to hydrostatic activity, whereby the water was seeping upward into the old trail corridor which consisted of dense clay under the microbial soil layer. Additional weather events created seasonal drainage into the trail corridor from upslope winter thaws as well as rain events.

The design solution was to introduce numerous culverts, installed in the sub-bed of the trail, on the native clay soil. An open aggregate limestone was used to layer between the culverts, which were drilled from the bottom to accept the water perking up from below. These then drained downslope toward to wetlands beyond. A fully BMP-compliant, 3/8-inch quartzite aggregate tread was installed on top of a 2-inch minus aggregate trail bed. This structure was laid upon a 4-oz, non-woven, permeable geotextile that allowed water to percolate under the trail while also “floating” the trail tread structure on top of the culverts and sub-bed.

In September 2020, during a Wetland and Wet Areas Trail Workshop hosted by WeConservePA and taught by Penn Trails, the trail, boardwalk, and program area were inspected by Penn Trails and the workshop participants. The group agreed that the tread wear was nominal except for one newly emerging rain drainage area. This scar on the trail tread was only about one foot square and six inches deep. This will need to be repaired by re-treading the surface and then addressing the uphill drainage source (outside the corridor) in the parking area.

After five years of heavy use and heavy weather events, the original 2015 aggregate trail tread was still BMP compliant, as were the linear grades and cross slopes. It was clear from

observation of the hill slope that the area was subject to a great deal of rain and runoff. Uphill swales were leaf choked, but the culverts were unobstructed and flowing as designed.



Ongoing Maintenance and Management of the Trail

For this type of trail tread, it is recommended that a new 3-inch layer of the BMP compliant trail aggregate be added and compacted per original design specs. Refinishing the tread is a normal maintenance activity, due to normal compaction and displacement that any type of trail surface is subject to over a long period of time. In such heavy broadleaf forests, annual removal of leaves from swales and culvert entries is important as well. Other trail maintenance includes, as with any other type of trail, removal of debris, limbs, and tree falls.

House Rock Preserve Universal Access Loop

Location: 370 House Rock Road,
Pequea, PA 17565

Length: 1-mile loop trail

Status: Construction to begin spring
2020

Project Background and Managed Use

The Lancaster County Conservancy (LCC) was founded in 1969 by a dedicated group of hunters, anglers, and naturalists with the goal of protecting and restoring natural lands and engaging the community within Lancaster County. LCC now protects natural and forested lands in four Pennsylvania counties. LCC conserves land by acquiring and stewarding it and through conservation easements, owning thousands of acres outright, and holding hundreds of acres in conservation easements. The majority of properties held by LCC are open to the public, and the maintenance of trails to allow sustainable access on these sites is a priority for LCC.



A cluster of properties held by LCC on the eastern bank of the Susquehanna River is traversed by the Conestoga Trail, a 14.3-mile trail that connects Pequea to the north with Holtwood to the south. House Rock Preserve provides public access to the Conestoga Trail via a parking lot off of House Rock Road and the John Goodno Trail. While the Conestoga Trail is rugged and traverses multiple ridges and valleys, House Rock Preserve is situated on the crest of a ridge and characterized by gently rolling meadow and scenic views of the Susquehanna River. The site is ideal for a universal access trail due to the gentle grades and convenient vehicle access. In 2018, LCC sought proposals for design for a 1-mile universal access loop trail at House Rock Preserve, and design began in 2020.

The project involved expansion of ADA accessible parking at an existing lot and a loop trail through the meadow area. During the conceptual design process, connections were envisioned to the Conestoga Trail (via an overlook on the western boundary of the property) and the John Goodno Trail, which also connects to the Conestoga Trail slightly farther to the south. While pedestrian use was the primary designed use, occasional trail use by maintenance vehicles was explored, and access for ADA hunting was also desired. Due to the ideal topography of the site, an alignment that met universal access guidelines was easy to design, while still taking advantage of the varying plant communities and environments present on the site. The proposed trail winds through the meadow, along the edge of the woods, past an experimental chestnut planting, through woods with a scenic view of the Susquehanna, and back upslope through the meadow to the parking lot. Because the site is anticipated to receive heavy use, a consistent tread width of eight feet was specified.

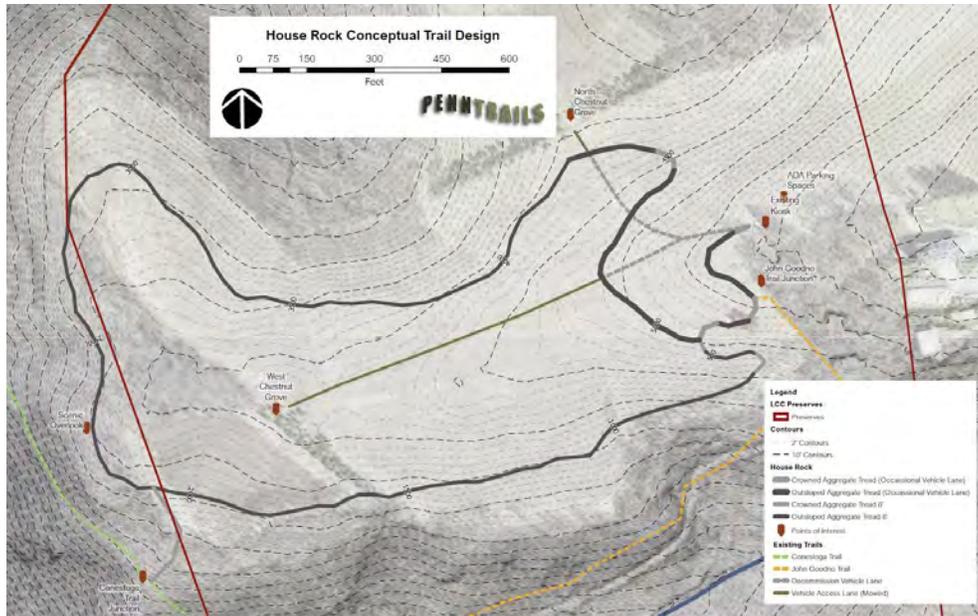


Panoramas illustrating the varying characters of the site, from open, rolling meadow to rugged forest overlooking the Susquehanna. Photographs courtesy Penn Trails LLC.

Project Challenges and Outcomes

The biggest challenge for the design was accommodating maintenance access without integrating it into the trail design itself. Two vehicle lanes existed on site, facilitating access to two groves of experimental chestnut plantings. During conceptual design, obliteration of the vehicle lanes was proposed, with the trail widened and armored to allow vehicle access along a portion of the trail. While this would have lengthened the distance traveled from the parking area for vehicles, it would have eliminated areas where vehicles would cross the pedestrian trail. Elimination of the vehicle paths would have made the universal access loop the only path of

travel on-site, preventing users from walking along the vehicle lanes as a shortcut to the parking lot. This option was not selected however, and vehicle crossings were added to the pedestrian trail and the existing vehicle lanes were kept on site to allow for maintenance access.



Ongoing Maintenance and Management of the Completed Trail

The following are the key maintenance items for the trail:

- **Corridor brushing:** While most of the site traverses open meadow, a portion of the trail winds through a wooded area. On all portions of the trail, cleaning the corridor of leaf fall and any meadow debris that might blow or fall onto the trail will maintain the trail tread condition.
- **Trail tread care:** Monitor for surface indentations and repair with same treads surface aggregate per design parameters. Avoid damaging tread surface during winter snow removal by setting snow blower or plough to two inches above the tread surface.
- **Monitoring and repairing vulnerable locations:** Checking and maintaining originally designed grade and cross slope and repair areas where concentrated flow begins to wash out tread material. Check vehicle crossing areas for damage and repair as necessary.

Fallingwater Overlook and Nature Trail

Location: 1478 Mill Run Road, Mill Run, Pennsylvania 15464

Length: 480 feet

Status: Completed Spring 2013

Project Background and Managed Use

The Western Pennsylvania Conservancy (WPC) is a nonprofit organization dedicated to protecting the region's exceptional natural

places. Since its founding in 1932, WPC has conserved more than 233,000 acres in Western Pennsylvania, restored watersheds, and saved wildlife. WPC maintains and operates [Fallingwater](#), a unique house built over a waterfall on Bear Run. Frank Lloyd Wright designed and built the house for his clients, the Kaufmann family, between 1936 and 1939. A National Historic Landmark, it was voted the most important building of the 20th century in a poll conducted by the American Institute of Architects. The house and surrounding 1,543 acres were entrusted to the WPC by Edgar Kaufmann, Jr., in 1963. The surrounding Bear Run Nature Reserve has since been enlarged to over 5,000 acres. Open to the public, Fallingwater receives about 150,000 visitors per year.

Funded partially by a Environmental Stewardship Fund grant administered by the Pennsylvania Department of Conservation and Natural Resources, WPC envisioned an accessible trail to an overlook that affords a spectacular view of the house and adjacent water features. As part of a larger WPC Trail Master Plan, the primary goals of the project were to create a pedestrian trail that would:

- Foster a conservation ethic by allowing visitors to directly experience the natural world;
- Be sustainably maintained by WPC staff and volunteers in accordance with the trail accessibility BMPs; and
- Minimize recreational impact to ecologically sensitive areas.

Along with the Trail Master Plan, WPC developed detailed site plans and drawings for the accessible trail project.



Photo courtesy Penn Trails LLC

Project Designed Use and Design Parameters

The trail's most demanding designed use combined an aggregate surface trail that could sustainably handle up to 1,000 users per day, while also meeting the accessibility BMPs, and delivering an intimate nature trail experience as people travel to Fallingwater's scenic overlook. The trail was designed to meet the



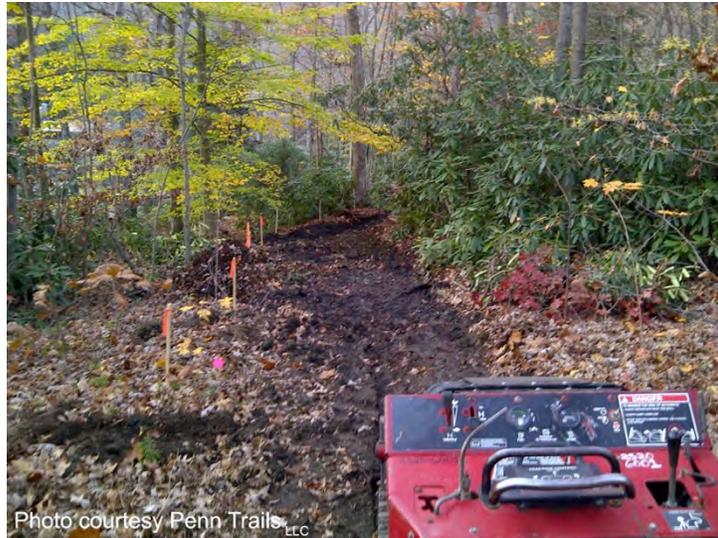
Outdoor Guidelines, with the caveat that field modifications might be necessary. That was an important factor during construction since the trail's most demanding design parameters related to determining its alignment as well as addressing existing grades and slopes.

With regard to alignment, the trail corridor winds through a hydrologically active, mature forest setting with large stands of rhododendron. Many trees, shrubs, and other plants were carefully identified as important not to remove or disturb. Corridor width was limited to cause as little disturbance as possible. Stipulations included that any machinery used in construction be restricted to a width equal to or narrower than the finished accessible trail tread. In addition, **parameters included a \$500 per incident penalty**, assessed to the contractor, should there be unnecessary nicks, scrapes, and de-barking that damaged trees.

With regard to grade and slope, a matter of only a few feet made a great difference as to whether the trail would meet accessibility guidelines or not. The planned alignment had to be modified several times in the field in order to provide a path of travel, from the trailhead to the scenic overlook, that met trail accessibility BMPs. Linear grade was carefully flagged and staked at short intervals to closely monitor grade and cross slope as the trail construction proceeded through each phase to final completion.

Project Challenges and Outcomes

The major project challenge was encountered during the construction phase. As is often the case in trail building, excavation can reveal features that are not readily apparent during the planning and design phases. Even with good ground-truthing of proposed trail corridors, it is not possible to determine everything that might be encountered just below the surface.



This was the case for this project, as excavation revealed a very active seep that ran across almost 50 linear feet of the newly created trail corridor. Unanticipated during the planning and design, the corridor alignment could not be changed without then causing the majority of the trail's desirable linear grade to fall outside of accessibility guidelines.

The challenge was met by using a previously unplanned structure: a French drain¹³⁵ created a way for the seep to drain under the trail itself and then continue down the hillside below the trail. Encapsulating clean 3-4" stone inside geotextile and then running it the 50-foot length of the seep created a clog-free structure that would not need maintenance as culvert pipes would have.

Ongoing Maintenance and Management of the Completed Trail

The following are the key maintenance items for the trail:

- **Corridor brushing:** keeping the defined corridor clear of encroaching understory tree branches and shrubs; removing debris such as leaf litter, broken branches, or material that exceeds ½" in obstruction height.
- **Trail tread care:** removing or reducing protrusions caused by wear and tear on the aggregate trail tread; smoothing surface indentations and erosion that alter original design parameters; monitoring for any new hydrologic activity, such as seeps or run-off from structures above the trail; checking and maintaining originally designed grade, cross slope, and resting areas.
- **Drainage:** monitoring area where the French drain is installed, debanking the downhill edge of trail tread and bottom of swales.

Glossary

The following definitions are utilized frequently in the planning, design, construction, and management of trails, shared use paths, and other routes. They are derived from several sources, including the [USDA Forest Service](#), the [United States Access Board](#), the [Federal Highways Recreational Trails Program](#), the [National Trails Training Partnership](#), and the [Pennsylvania Department of Conservation and Natural Resources](#).

AASHTO. American Association of State Highway Transportation Officials.

AASHTO Guide. AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities.

ABA. Architectural Barriers Act.

ABAAS. Architectural Barriers Act Accessibility Standards.

Accessible. Easily used or accessed by people with disabilities: adapted for use by people with disabilities.¹³⁶

Access Board. U.S. Architectural and Transportation Barriers Compliance Board.

Accessibility Evaluation Survey. Comparing each portion of a structure to the accessibility standards and recording compliance and deficiencies.

Accessible Design. Design in which the needs of people with disabilities are specifically considered and addressed. Accessibility sometimes refers to the characteristic that products, services, and facilities can be independently used by people with a variety of disabilities.

Accessible Facilities. Facilities that comply with the accessibility guidelines.

ADA. Americans with Disabilities Act.

ADAS. 2010 ADA Standards for Accessible Design.

Alteration (trail). A change in the original purpose, intent, function or design of a trail.

Alteration (recreation site, building, or facility). A change to a portion of a recreation site, building, or facility that is addressed by the accessibility guidelines and that affects the usability of the site, building, or facility.

BMP. Best management practice. As used in this manual, BMP usually refers to established or proposed federal rules that many entities are not required to adhere to but which the manual nevertheless recommends as good and desirable standards to follow.

Conditions for Departure. Specific circumstances found in natural environments that may make it difficult to comply with the accessibility guidelines.

Construction. Building a new trail, recreation site, or facility where there was none before.

Constructed Feature. A constructed element associated with a trail that provides support for trail users but is not a part of the trail tread. Examples include overnight shelters, toilets, fire rings, picnic tables, and tent pads.

Cross Slope. The percentage of rise to length when measuring the trail tread from edge to edge perpendicular to the direction of travel. *Typical Cross Slope* is normally encountered cross slope found along the length of a trail. Measurement intervals become more frequent as the trail class increases.

Disability. A medically definable condition that causes a limitation in one or more major life activities such as walking, seeing, hearing, speaking, breathing, thinking, and so forth.

Design Parameters. The designed use that controls the geometric design of a trail and determines the level to which it should be maintained.

Designed Use. The designed use of a trail that requires the most demanding design, construction, and maintenance parameters and that, in conjunction with the applicable trail class, determines which design parameters will apply to a trail. There is only one designed use of a trail.

Federal Trail Data Standards (FTDS). FTDS are applicable to all trails managed by federal entities. However, they can also be applied to trails managed by state or local governments and other entities. The FTDS enable trail managers and the public to use mutually understood terminology for recording, retrieving, and applying spatial and tabular information. This makes it easier for trail information to be accessed, exchanged, and used by more than one individual, agency, or group. The FTDS does take accessibility into account as part of the data collection and reporting process for trails.

Firm and Stable Surface. A surface that is not noticeably distorted or compressed and that doesn't shift during the passage of a device that simulates a person using a wheelchair.

FHWA. U.S. Department of Transportation Federal Highway Administration.

Full Bench (construction). Trail professionals almost always prefer *full-bench* construction. A full bench is constructed by cutting the full width of the tread into the hillside and casting the excavated soil as far from the trail as possible. Full-bench construction requires more excavation and leaves a larger backslope than partial-bench construction, but the trail bed will be more durable and require less maintenance. Full-bench construction should be used whenever possible.¹³⁷

Guardrail. A railing designed to protect people from accidentally falling off an edge where the immediate dropoff is over 30 inches.

Handrail. A narrow railing to be grasped with the hand for support.

Hiker/Pedestrian Trail. A trail that is designed, constructed, and maintained for hiker/pedestrian use (see *Design Parameters*) or that is actively managed for hiker/pedestrian use (see *Managed Use*).

Inclusive Design. The Inclusive Design Research Centre (IDRC), in Toronto, Canada defines as “Human-centered design [that] considers the full range of human diversity, including ability, language, culture, gender, age and other forms of human difference, as part of the design process.”

Limiting Factor. An extreme, uncorrectable environmental barrier that makes the trail beyond the barrier unreachable for many people with physical or cognitive limitations.

Maintenance. Routine or periodic repair of existing trails, recreation sites, or facilities. Maintenance doesn’t change the original purpose, intent, or function of a facility. Maintenance includes but isn’t limited to:

- Repairing or replacing deteriorated, damaged, or vandalized trails, facilities, or components, such as repainting, removing graffiti, and repairing or replacing components of facilities with new components similar to the original ones. Components can be sections of bridges or boardwalks, signs, fencing and railings, siding, windows, and roofing.
- Removing debris and vegetation, such as fallen trees or broken branches; clearing encroaching vegetation from trails, pathways, lawns, or landscaped areas; and removing rockslides.
- Maintaining trail tread and access routes, such as filling ruts, reshaping a trail bed, replacing or reshaping surfacing material, repairing washouts, installing riprap to retain cut and fill slopes, constructing retaining walls or cribbing to support trail tread, and repairing concrete or asphalt paving.
- Performing erosion control and drainage work, such as replacing or installing drainage dips or culverts and realigning sections of trail to reduce erosion or avoid boggy areas.¹³⁸

Managed Use. The managed use of a trail that requires the most demanding design, construction, and maintenance parameters and that, in conjunction with the applicable trail class, determines which design parameters will apply to a trail.

OPDMD. Other Power-Driven Mobility Device, which is defined in the 2011 U.S. Department of Justice regulations interpreting the ADA.

Outdoor Guidelines. The *Outdoor Developed Areas Accessibility Guidelines*, September 26, 2013, issued pursuant to the Architectural Barriers Act.

Outdoor Recreation Access Route (ORAR). A continuous, unobstructed path for pedestrian use that connects elements in a picnic area, in a campground, or at a trailhead. See Chapter 1016 of the Outdoor Guidelines.

Program Accessibility. Providing all people, including people with disabilities, the opportunity to participate in a program—an activity in which someone may participate or the reason someone visits an area.

Point of Deviation. The location on a trail where one or more technical provisions in the ADA Trail Accessibility Guidelines cannot be met due to the presence of a condition for departure enumerated therein.

Prominent Feature. A natural, cultural, or historic feature located along or adjacent to a trail that is determined by a trail designer or manager to have national, regional, or local distinction or significance. A prominent feature may be the focal point, main attraction, or destination of a trail, or it may simply be an interesting secondary feature. Examples include but are not limited to boulder outcrops, waterfalls, groupings of old or unique trees or other vegetation, vistas that may or may not be part of a developed overlook, and cultural or historic structures.

Provisions. Sections of accessibility guidelines and standards that explain what is required for specific situations and facilities (parking, picnic tables, trails, and so forth).

Protruding Object. An object, such as a tree, branch, or rock ledge, that extends into a trail from beside or above it.

PROW Guidelines. Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way; currently in draft form, these guidelines will be issued by the U.S. Access Board.

Public Right-of-Way. Public land acquired for or dedicated to transportation purposes, or other land where there is a legally established right for use by the public for transportation purposes.

Recreation Site. A discrete area that provides recreation opportunities, receives use, and requires a management investment to operate and/or maintain to standard.

Rotational Penetrometer. A precision surface-indenter measuring tool for evaluating the firmness and stability of ground and floor surfaces.

Scoping. The term used for the process of figuring out when, how much, and where the guidelines apply.

Scoping Requirement. Specification of where, when, and how much of a constructed feature must be accessible to comply with the ADA Trail Accessibility Guidelines.

Sieve. A sieve is a device for separating desired aggregate stone sizes from unwanted sizes. A *sieve analysis* is a procedure used to assess the *gradation* of the aggregate stone and the percentage of material that is retained or discarded. The stone sizes and gradation are critically important to the way the material will perform in use.

Setting. The term used to describe the natural surroundings of a trail or recreation area.

Shared Use Path.¹³⁹ A multi-use path designed primarily for use by bicyclists and pedestrians, including pedestrians with disabilities, for transportation and recreation purposes. Shared use paths are physically separated from motor vehicle traffic by an open space or barrier; they are located either within a highway right-of-way or within an independent right-of-way.¹⁴⁰

Slope Ratio. A ratio of vertical distance to horizontal distance—that is, rise divided by run.

Surface. For the purpose of this manual, Surface refers to the top layer of ground on a recreation site, accessible route, shared use path, or trail. With regard to trails, a surface that complies with accessible design BMPs is:

- **Firm.** Not noticeably distorted or compressed by the passage of a device that simulates a trail user in a wheelchair. Surface firmness should be determined and documented during the planning process for the seasons for which a trail is managed, under normally occurring weather conditions.
- **Stable.** Not permanently affected by normally occurring weather conditions and able to sustain normal wear and tear caused by the uses for which a trail is managed, between planned maintenance cycles.

TAI. Trail Access Information.

Technical Provision. State the specific numbers, conditions, and measurements that are required (percent that must comply, dimensions, reach ranges, grades, trail width, and so forth to meet accessibility guidelines).

Trail. A route that is designed, constructed, or designated for recreational pedestrian use (or provided as a pedestrian alternative to vehicular routes within a transportation system). A Trail is not an outdoor recreation access route (ORAR) nor a Shared-Use Path.

Trail Accessibility Guidelines. Chapter 1017 of the Outdoor Guidelines.

Trail Class. The prescribed scale of trail development, indicating the intended design and management standards for a trail.

Trail Constructed Feature. A Trail Constructed Feature is a constructed feature that functions as part of the trail tread. Examples include puncheon, trail bridges, boardwalks, waterbars, and switchbacks.

Trail Grade. The consistent vertical distance of ascent or descent of a trail expressed as a percentage of its length, commonly measured as a ratio of rise to length.

Trail Head. A site designed and developed to provide staging for trail use. The following do *not* constitute a trailhead:

- Junctions between trails where there is no other access.
- Intersections where a trail crosses a road or users have developed an access point, but no improvements have been provided beyond minimal signage for public safety.

Trail Segment. The portion of a trail being planned, evaluated, or constructed.

Trail Terminus. The beginning or ending point of a trail or trail segment, where a trail assessment or trail work begins or ends.

Tread (or Treadway). The surface portion of a trail upon which users travel, excluding backslope, ditch, and shoulder. Tread surfaces can consist of native soil material, aggregate, asphalt, concrete, recycled materials and native materials that are modified with soil stabilizers.

Tread Width. The visible trail surface measured perpendicular to the direction of travel.

- ***Clear Tread Width.*** The width of the usable trail tread and adjacent usable surface.
- ***Minimum Tread Width.*** The width of the usable part of the tread width at the narrowest point on a trail.
- ***Minimum Trail Width.*** The width of the trail tread and the adjacent usable surface at the narrowest point on a trail.

Universal Design. The Center for Universal Design at North Carolina State University provided the original definition: “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”

Wheelchair. A device, including one that is a battery-powered, that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area. A person whose disability requires use of a wheelchair or mobility device may use a wheelchair or mobility device that meets this definition anywhere foot travel is permitted.

Resources

Web Links

Access Board—main website: <http://www.access-board.gov/>

Access Board Guide for Outdoor Developed Areas—

<http://www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas/a-summary-of-accessibility-standards-for-federal-outdoor-developed-areas>

Accessibility Guidebook on Outdoor Recreation and Trails—

<http://www.fs.fed.us/recreation/programs/accessibility/pubs/htmlpubs/btm12232806/index.htm>

Accessibility Guidebook for Outfitters/Guides Operating on Public Lands—

<http://www.fs.fed.us/recreation/programs/accessibility/>

Accessibility Guidebook for Ski Areas Operating on Public Lands—

<http://www.fs.fed.us/recreation/programs/accessibility/>

ADAS Accessibility Checklist for Buildings and Facilities—<http://www.access-board.gov/ADAS/checklist/a16.html>

American Trails—<http://www.americantrails.org>

Americans with Disabilities Act (ADA)—<http://www.access-board.gov/about/laws/ADA.htm>

Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines—

<http://www.access-board.gov/ada-aba>

Architectural Barriers Act (ABA)—<http://www.access-board.gov/about/laws/ABA.htm>

Architectural Barriers Act Accessibility Standard (ABAAS)—<http://www.access-board.gov/ada-aba/>

Beneficial Designs—<http://www.beneficialdesigns.com/>

Designing Sidewalks and Trails for Access

Part 1, Review of Existing Guidelines and Practices—

<http://www.fhwa.dot.gov/environment/sidewalks/index.htm>

Part 2, Best Practices Design Guide—

<http://www.fhwa.dot.gov/environment/sidewalk2/index.htm>

Facilities Toolbox—<http://fsweb.mtdc.wo.fs.fed.us/toolbox/>

Federal Highway Administration/USDA Forest Service recreational trail publications and videos— <http://www.fhwa.dot.gov/environment/fspubs/index.htm>

Federal Trail Data Standards—<http://www.nps.gov/gis/trails/>

Forest Service National Trail Specifications—

<http://www.fs.fed.us/database/acad/dev/trails/trails.htm>

Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG)—

<http://www.fs.fed.us/recreation/programs/accessibility/>

Forest Service Trail Accessibility Guidelines (FSTAG)—

<http://www.fs.fed.us/recreation/programs/accessibility/>

Forest Service Trail Design Parameters—

http://www.fs.fed.us/r3/measures/Inventory/trails%20files/National_Design_Parameters_1_31_2005.doc

International Building Code (IBC)—<http://www.iccsafe.org/>

Professional Trail Builders Association—<http://www.trailbuilders.org/>

Public Rights-of-Way Accessibility Guidelines—<http://www.access-board.gov/prowac/>

Recreation Opportunity Spectrum (ROS)—<http://fswb.w.o.fs.fed.us/eng/facilities/recopp.htm>

Rehabilitation Act Section 504—<http://www.access-board.gov/enforcement/Rehab-Act-text/title5.htm>

Soil Stabilizers on Universally Accessible Trails—

http://www.fs.fed.us/eng/php/library_card.php?p_num=00231202 and
<http://www.fhwa.dot.gov/environment/fspubs/00231202/>

Trail Construction and Maintenance Notebook—

http://fswb.mtdc.w.o.fs.fed.us/php/library_card.php?p_num=04232825P and
<http://www.fhwa.dot.gov/environment/fspubs/00232839/>

Uniform Federal Accessibility Standards Accessibility Checklist—<http://www.access-board.gov/ufas/UFASchecklist.txt>

Universal Design Forest Service Policy, Forest Service Manual Section 2330.5—

http://www.fs.fed.us/im/directives/fsm/2300/id_2330-2005-2.doc

Universal Trail Assessment Process—

<http://www.beneficialdesigns.com/trails/utap.html#overview%20background>

Wetland Trail Design and Construction—

http://fswb.mtdc.w.o.fs.fed.us/php/library_card.php?p_num=01232833 and
<http://www.fhwa.dot.gov/environment/fspubs/01232833/>

Wilderness Access Decision Tool—

http://carhart.wilderness.net/docs/wild_access_decision_tool.pdf

Other Resources

Outdoor Developed Areas: A Summary of Accessibility Standards for Federal Outdoor Developed Areas. United States Access Board, May 2014

Birkby, Robert C., Peter Lucchetti, and Jenny Tempest. *Lightly on the Land: The SCA Trail Building and Maintenance Manual*. New York: Mountaineers Books, 2006.

Covington, G.A., Hannah, B. (1997). *Access by Design*. New York: International Thomson Publishing Inc.

Dimensions of Adult-Sized Wheelchairs, Information and Technical Assistance on the Americans with Disabilities Act. Dec. and Jan. 2009,

<http://www.ada.gov/descript/reg3a/figA3ds.htm>

“Fishing piers and platforms.” United States Access Board. 3 Dec. 2008, <http://www.access-board.gov/recreation/guides/fishing.htm>

McConnell, Robert L., and Daniel C. Abel. *Environmental Issues: An Introduction to Sustainability*. 3rd ed. Upper Saddle River: Prentice Hall, 2007.

Parker, Troy S. *Natural Surface Trails by Design*. Boulder: Natureshape, 2004.

“Ground and Floor Surfaces.” American Trails, 3 Dec. 2008,

<http://www.americantrails.org/resources/accessible/adasurfaceMtg.html>

“Trail Surfaces: What Do I Need to Know Now?” National Center on Accessibility. Access Today, Fall 2001—Special Volume, Issue 1, <http://www.indiana.edu/~nca/monographs/1trail-surfaces.shtml>

“Accessible Gates for Trails and Roads.” Groenier, James Scott, 2006 TandD Pub Number: 0623 2340, USDA Forest Service, Missoula Technology and Development Center

“Accessible Gate Latch.” Groenier, James Scott, 2006 TandD Pub Number: 0623 2331, USDA Forest Service, Missoula Technology and Development Center

“Inclusionary Trail Planning Toolkit: A guide to planning and programming equitable trail networks,”

Pennsylvania Environmental Council (PEC), April 2019

<https://pecpa.org/wp-content/uploads/Inclusive-Trail-Report.pdf>

U.S. Access Board

Voice (800) 872-2253

TTY (800) 993-2822

info@access-board.gov

<http://www.access-board.gov/outdoor/outdoor-rec-rpt.htm>

The Center for Universal Design, North Carolina State University

Telephone and TDD: (919) 515-3082, Info. Requests: (800) 647-6777

The National Center on Accessibility

Voice (812) 856-4422; TTY (812) 856-4421

nca@indiana.edu

<http://www.ncaonline.org>

Acknowledgments

Lina Berón Echavarría of WeConservePA for creating the cover illustration.

Kim Blocher for providing invaluable guidance and support.

Bill Botten of the Office of Technical and Information Services, U.S. Access Board, for providing his guidance, expertise, and comments.

Scott Hackenburg of Kings Gap Environmental Education Center for providing tireless support for more inclusive trails to meet the needs of diverse groups.

Hilary Hirtle of WeConservePA for proofreading the final draft.

Peter Jensen of Peter S. Jensen & Associates, LLC for his long-standing advocacy and leadership in advocating and constructing accessible trails.

Lynda Waggoner (now retired) and **Andrew Zadnik** of the Western Pennsylvania Conservancy for providing information and materials for the Fallingwater case study.

Janet Zeller for her advocacy, expertise, and energy in helping to create the Outdoor Developed Areas Accessibility Guidelines and for her review of the first edition of this manual.

The staff of the Pennsylvania Department of Conservation and Natural Resources, **Bureau of Recreation and Conservation**, for their support for creating and updating this guidance.

The members of the **Professional Trail Builders Association**, who have built and continue to create sustainable trails around the world.

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Sarah Walter coauthored this manual. She is a licensed landscape architect at Penn Trails, managing diverse trail planning projects from visioning to detail design. Sarah has broad experience in conservation planning working with private, public, and non-profit partners, including previously as Senior Planner & Agricultural Preservation Coordinator for Centre County Planning & Community Development Office, and the Executive Director for the Centre County Farmland Trust.



Endnotes

¹ The original edition was entitled *Universal Access Trails and Shared Use Paths: Design, Management, Ethical, and Legal Considerations* (WeConservePA, 2014).

² “‘Nature Deficit Disorder’ Is Really a Thing,” *The New York Times*, Meg St-Esprit McKivigan

June 23, 2020 <https://www.nytimes.com/2020/06/23/parenting/nature-health-benefits-coronavirus-outdoors.html>

³ Pennsylvania Department of Conservation and Natural Resources, 2013

⁴ The U.S. Access Board’s *Outdoor Developed Areas Accessibility Guidelines* and the *Pennsylvania Trail Design and Development Principles* utilize this definition of a trail.

⁵ The U.S. Access Board is not entirely consistent in its materials. Elsewhere it explains that a trail is designed for pedestrians and other users to “experience” the outdoors and may be used by a variety of users, but it is not designed for transportation purposes and does not connect elements, spaces, or facilities within a site. “Key Differences between Shared Use Paths, Trails, Sidewalks, and Accessible Routes,” U.S. Access Board, Advance Notice of Proposed Rulemaking, Shared Use Path Accessibility Guidelines, 36 CFR Chapter XI, March 28, 2011.

⁶ Federal Highway Administration and National Recreational Trails Advisory Committee. “Conflicts on Multiple Use Trails.” (2012): p. 8m. www.fhwa.dot.gov.

⁷ The full name of the U.S. Access Board is the U.S. Architectural & Transportation Barriers Compliance Board. It developed the proposed Outdoor Developed Areas Accessibility Guidelines (i.e., the Outdoor Guidelines) through regulatory negotiation, which was a process of face-to-face negotiations among representatives of interested groups, with the goal of arriving at a consensus that then went through a public comment period. The committee tasked with developing the proposed rule was called the Regulatory Negotiation Committee on Outdoor Developed Areas Accessibility Guidelines.

⁸ The guidelines added new sections to the ABA relating to the following recreation facilities constructed or altered by or on behalf of the federal government:

ABA Chapter 2: Scoping Requirements

F244 Camping Facilities

F245 Picnic Facilities

F246 Viewing Areas

F247 Trails

F248 Beach Access Routes

ABA Chapter 10: Recreation Facilities

1011 Outdoor Constructed Features

1012 Parking Spaces within Accessible Camping Units and Picnic Units and Pull-Up Spaces at Recreational Vehicle Dump Stations

1013 Tent Pads and Tent Platforms

1014 Camp Shelters

1015 Viewing Areas

ABA Chapter 1016: Outdoor Recreation Access Routes**ABA Chapter 1017: Trails****ABA Chapter 1018: Beach Access Routes****ABA Chapter 1019: Conditions for Exceptions**

⁹ A pdf copy of the ABA's May 2014 publication, that provides full informational guidance for Federal entity trails, camping and picnic facilities, viewing areas and beach access is available at <https://www.access-board.gov/attachments/article/1637/outdoor-guide.pdf>

¹⁰ The Outdoor Guidelines were issued pursuant to a statute governing only the accessibility of *federal* facilities (i.e., pursuant to the Architectural Barriers Act (the “**ABA**”) and *not* the Americans with Disabilities Act (“**ADA**”), which governs private organizations and state and local government agencies).

¹¹ Design and construction requirements for equestrians, mountain bikes, off-highway vehicles, and snowmobiles are based on the specific requirements of the intended mode of transportation. For the safety of trail users and to minimize conflicts between motorized and non-motorized recreation, pedestrians may not always be permitted on these trails. These non-pedestrian trails do not preclude use by persons with disabilities, assuming they are using the alternative means of transportation for which the trail is designed and constructed. By contrast, pedestrian trails need to consider the accessibility guidelines, because the intended use is by foot (or via OPDMD).

¹² ADA Information Line, U.S. Dept. of Justice, Disability Rights Section representative. Personal interview. 3 September 2013.

¹³ Doehring, Peter. “Hiking For Everyone.” 3/20/2020, <http://www.asdroadmap.org/hiking-for-everyone.html>

¹⁴ The Behavioral Risk Factor Surveillance System is a United States health survey that looks at behavioral risk factors. Begun in 1984, the BRFSS is run by Centers for Disease Control and Prevention and conducted by participating individual state health departments. 2017 Behavioral Risk Factor Surveillance System (BRFSS), <https://www.cdc.gov/ncbddd/disabilityandhealth/impacts/pennsylvania.html>

¹⁵ *City of Albuquerque*. <http://www.cabq.gov/parksandrecreation>.

¹⁶ Voight, Alison, et al. “Best Practices of Accessibility in Parks and Recreation: A Delphi Survey of National Experts in Accessibility.” *National Center on Accessibility*. (2008). <http://www.indiana.edu/~nca/>.

¹⁷ *Id.*

¹⁸ Peter Doehring is a psychologist specializing in the education and treatment of people with Autism Spectrum Disorder (ASD) and Intellectual and Developmental Disabilities (I/DD). He has led school-, hospital-, and university-based programs in the USA and Canada. His interest in those whose levels of disability would have previously resulted in institutionalization took on greater urgency when his daughter Margot was born with I/DD. Peter presents internationally and publishes books on research-based practices, programs, and policies on ASD. He has also served as board chair for the Land Conservancy for Southern Chester County.

¹⁹ Doehring, Peter. “*Access adventure progressively!*” 06/20/20. *ASD Roadmap*. <http://www.asdroadmap.org/beginner-hikers.html>

²⁰In 1987 the United Nations’ Brundtland Commission published the groundbreaking report, *Our Common Future*, which many agree introduced the concept of sustainable development into public discourse. A frequently quoted definition from that report says that: “[s]ustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

²¹ Three of these sustainability factors (Physical, Environmental, Ecological) were first illuminated in the Massachusetts Department of Conservation and Recreation’s *Trails Guidelines and Best Practices Manual* (2012), p. 2.

²² The term “trail user sustainability” seems to have first been utilized by Chris Herron, in his May 2012 Trailology blog. <https://trailology.blogspot.com/2012/05/welcome-to-trailology.html>

²³ <http://universaldesign.ie/What-is-Universal-Design/The-7-Principles/> retrieved on 8/25/2021.

²⁴ <https://rethinkoutside.org/our-shared-narrative/>

²⁵ Pennsylvania Environmental Council. "Inclusionary Trail Planning Toolkit." 9 April 2019. <https://pecpa.org/program-update/inclusionary-trail-planning/>

²⁶ Efforts to diversify community outreach efforts may be more successful if there are parallel efforts to foster trail organization diversity in terms of leadership, staff, and partner organizations as well. According to "[The State of Diversity in Environmental Organizations](#)" (Green 2.0, 2014), despite an increase of women and minorities working within environmental organizations over time, ethnic minorities are still significantly underrepresented on organizational staffs and in leadership roles, with membership and volunteer populations showing a similar disparity. While a trail-building group may or may not be considered an "environmental organization" for purposes of the report, it is likely that trail-building groups in general have similar diversity challenges.

²⁷ ²⁷ Pennsylvania Environmental Council. "Inclusionary Trail Planning Toolkit." 9 April 2019. <https://pecpa.org/program-update/inclusionary-trail-planning/>

²⁸ Walking workshops ("Walkshops") help communities to identify places that reflect community issues and that can be used as experiential learning environments to raise community awareness.

²⁹ The *Walking Workshops Guide* https://issuu.com/kofiboone/docs/cee_walkshop_handout_draft was developed in 2016 for the Community Environmental Empowerment (CEE), a collaboration with Communities In Partnership (CIP), Durham, NC. <https://communitiesinpartnership.org>

³⁰ The 2013 Boy Scout Jamboree in Beckley, WV, hosted roughly 30,000 Scouts and leaders, all of whom utilized the trail system, developed by Penn Trails design team, over a period of ten days. *The Register-Herald*, [Beckley, West Virginia] 25 July 2013.

³¹ USDA Forest Service. *Trail Fundamentals and Trail Management Objectives: Training Reference Package*. 1 May 2011 edition: pp. 1-5. <http://www.fs.fed.us>.

³² For a complete discussion of Trail Classes and the related Federal Trail Data Standards in which they are utilized, see <http://www.nps.gov/gis/trails/>

³³ *US Forest Service*. <http://www.fs.fed.us/recreation/programs/accessibility>.

³⁴ First published in 2006 and updated in 2013, they are nearly identical to the U.S. Access Board's Outdoor Guidelines.

³⁵ Trail tread is the surface of the trail that is traveled upon. It's where the shoe meets the trail.

³⁶ The U.S. Access Board has conducted several research projects using a [Rotational Pentrometer](#) to evaluate the firmness and stability of trail and play area surfaces. Additional information about these projects is available at <http://www.access-board.gov>. U.S. Access Board. "Outdoor Developed Areas: A summary of accessibility standards for Federal outdoor developed areas." May 2014: p.17.

³⁷ "Access Currents: January-February 2014." U.S. Access Board. <http://www.access-board.gov/news/access-currents-january-february-2014>.

³⁸ Zeller, Janet. "Surfaces for accessible trails." (2007). <http://www.americantrails.org/resources/accessible/USFSsurface.html>.

³⁹ *Id.*

⁴⁰ Bachensky, Lois. "Building Crusher Fines Trails: Finely crushed compacted rock is a popular trail surface improvement throughout America." *American Trails*, August 20, 2019. <https://www.americantrails.org/resources/building-crusher-fines-trails>

⁴¹ Note that, If the gradation of crusher fines does not meet the 6% passing the #200, clay fines may be added and mixed with the aggregate to do the job.

⁴² "Trail Surface Aggregate." *Penn State University* https://www.dirtandgravel.psu.edu/sites/default/files/Center/Trails/TSA_tech_bulletin_2014.pdf

⁴³ "Trail Surface Aggregate." *Penn State University* https://www.dirtandgravel.psu.edu/sites/default/files/Center/Trails/TSA_tech_bulletin_2014.pdf

nstruction, especially in wet areas, is provided in *Wetland Trail Design and Construction*, 2007 ed., USDA Forest Service, Technology and Development Program, Missoula, MT. <http://www.fhwa.dot.gov>.

⁴⁵ U.S. Access Board. Outdoor Guidelines § 1017.7.1. <http://www.access-board.gov>.

⁴⁶ *Id.*

⁴⁷ *Id.* at § 1017.7.2.

⁴⁸ *Id.* at § 1017.2.

⁴⁹ Readers wanting further information on trail surfacing should look at the 1999 report by The National Center for Accessibility, which conducted a two-year study on the effectiveness of surface treatments for creating trails accessible to people with mobility impairments. <http://www.ncaonline.org/resources/articles/trailstudy-1999.shtml>.

⁵⁰ Outdoor Guidelines § 1017.3.

⁵¹ *Id.* at §1017.8.

⁵² *Id.* at §1017.4.

⁵³ *Id.* at §1017.5.

⁵⁴ *Id.* at §1017.9.

⁵⁵ §307 of the ABA Accessibility Guidelines covers Protruding Objects: 307.1 General; 307.2 Protrusion Limits; 307.3 Post-Mounted Objects; 307.4 Vertical Clearance; 307.5 Required Clear Width.

⁵⁶ *Id.* at § 1017.6.

⁵⁷ National Park Service. Handbook for Trail Design, Construction and Maintenance, North Country National Scenic Trail. Chapter 7, “Signs,” p. 57. <http://www.nps.gov>.

⁵⁸ *Pennsylvania Trail Design and Development Principles*, p. 131.

⁵⁹ City of Plano, Texas, Emergency Trail Marker System FAQs <https://www.plano.gov/DocumentCenter/View/36019/Chisholm-Trail-Emergency-Trail-Markers-FAQs?bidId>. 22 April 2019.

⁶⁰ United State Forest Service Rocky Mountain Center for Design & Interpretation, “Interpretive Planning – Tool #4,” https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5167249.pdf.

⁶¹ Rimmer, James H. “Building Inclusive Physical Activity Communities for People with Vision Loss.” *Journal of Visual Impairment and Blindness*, Special Supp., vol. 100 (2009).

⁶² U.S. National Library of Medicine, “Color Vision Deficiency,” <https://ghr.nlm.nih.gov/condition/color-vision-deficiency#statistics>

⁶³ Lee, Heejin & Lee, Eunsil & Choi, Gyoung-sil. (2020). Wayfinding Signage for People with Color Blindness. *Journal of Interior Design*. 45. 10.1111/joid.12169.

⁶⁴ Virginia Department of Conservation and Recreation. “Virginia’s State Trails.” July 2018. <https://www.dcr.virginia.gov/recreational-planning/document/vop-app-08-trail-sign-plan.pdf>

⁶⁵ U.S. Forest Service, “Trail Construction and Maintenance Notebook,” <https://www.fs.fed.us/t-d/pubs/htmlpubs/htm07232806/page13.htm>

⁶⁶ U.S. Forest Service. “Trail Construction and Maintenance Notebook.” <https://www.fs.fed.us/t-d/pubs/htmlpubs/htm07232806/page13.htm>.

⁶⁷ Federal Highway Administration. *Designing Sidewalks and Trails for Access - Part II of II: Best Practices Design Guide, Section 13.5, Trail Access Information. Part II of II: Best Practices Design Guide - Sidewalk2 - Publications - Bicycle and Pedestrian Program - Environment - FHWA (dot.gov)*

⁶⁸ *Pennsylvania Trail Design and Development Principles*, p. 177.

⁶⁹ *Id.* at p. 202.

⁷⁰ *Id.* at pp.177-220.

⁷¹ 42 U.S.C. §§ 12101 et seq. (1990), as amended.

⁷² 42 U.S.C. §§ 4151 et seq. (1968), as amended.

⁷³ Disability is a medically definable condition that limits a major life activity such as walking, seeing, hearing, speaking, breathing, thinking, etc.

⁷⁴ Title II extends to all the activities of state and local governments whether or not they receive federal funds. (In this regard it differs from Section 504 of the Rehabilitation Act of 1973, which covers only programs receiving federal financial assistance.) Most buildings constructed or altered with federal funds also must comply with the ABA.

⁷⁵ 42 U.S.C. § 12132.

⁷⁶ Program access includes access to goods, services, activities or any other offering of a federal, state and local government. It requires entities to either modify their policies, practices and procedures, or provide auxiliary aids and services to ensure access for people with disabilities. “Programs” do not necessarily have to be structured or staffed; they could range from structured and staffed tennis lessons to an unstructured walk along a nature trail with wayside exhibits.

For more information see <http://www.ada.gov/taman2.html-II-3.1000>.

⁷⁷ 42 U.S.C. § 12182(a).

⁷⁸ See http://www.ada.gov/2010ADASTandards_index.htm. The 2010 ADA Standards for Accessible Design (which this manual terms the 2010 ADA Design Standards) were adopted in the final ADA rules for Title II (28 CFR part 35) and Title III (28 CFR part 36). The 2010 ADA Design Standards incorporate the 2004 ADA Accessibility Guidelines as well as the regulations contained in 28 CFR 35.151. For more information see <http://www.ada.gov>

⁷⁹ The 2010 ADA Design Standards also contain specific technical requirements for restaurants, medical care facilities, mercantile facilities, libraries, and lodging.

⁸⁰ 2010 ADA Design Standards, Chapter 10: Recreation Facilities. <http://www.access-board.gov>.

⁸¹ 2010 ADA Design Standards, Chapter 4: Accessible Routes. <http://www.access-board.gov>.

⁸² Draft guidelines were issued on October 19, 2009; the final Outdoor Guidelines were issued in September 2013. Note that the Outdoor Guidelines do not prescribe different levels of accessibility. A trail is either accessible or it is not. Trails that comply with the Outdoor Guidelines do so because they incorporate specific designed use criteria that provide accessibility.

⁸³ The U.S. Forest Service, however, will continue to follow FSTAG rather than the Outdoor Guidelines.

⁸⁴ The caveat to this is that Title II organizations need to provide programmatic access under the ADA; thus there is a legal argument to be made that if public trails are inaccessible, constituents are essentially being denied program access. The California State Parks system, for instance, was sued by a plaintiff under this theory in Tucker v. Calif. Dept. of Parks & Recreation, (U.S. Dist. Ct. N.D. Calif., 2005, Case No. C98-04935). The consent decree that settled the case required the state to identify barriers to trail accessibility and address the feasibility of removing some or all of those barriers. Pursuant to the settlement, the state adopted the Outdoor Guidelines as its official policy.

⁸⁵ Note that the line between public trails and private ones is not always crystal clear. In the case of Carolyn v. Orange Park Community Assoc. (4th Dist., 177 Cal. App. 4th 1090, 2009), for instance, the California Court of Appeals examined whether trails located on private land in the common area of Orange Park Community Association (“OPCA”) constituted a “public accommodation” subjecting OPCA to the ADA. The OPCA trails were used for hiking and horseback riding and connected to adjacent public trails, but OPCA didn’t specifically invite the general public onto its trails. On the other hand, the court found that OPCA did not charge non-members a fee to use the trails, did not discourage trespassers, and did not enforce property boundaries. In 2007, concerned about safety and damage to the trail, OPCA put up barriers at trail access points to discourage vehicles while still permitting horse and pedestrian use. A plaintiff with a mobility impairment sued because the barriers stopped him from using a horse-drawn carriage on the trail.

The court noted that although purely residential sections of a condominium development were not within the jurisdiction of the ADA, sections that were open to the public may constitute “public accommodations.” After examining a number of factors, the court determined that the trails were not “open” to the public--although they were *used* by the public--and that the OPCA trails therefore were not within the scope of the ADA. The court reasoned that although the public was not prohibited from walking on the trails, the OPCA did not encourage the public to use the trails in that it did not advertise nor receive any payment for the public’s use. The court concluded that OPCA’s failure to police the border between its trails and the adjoining public land was not sufficient to categorize the trails as a public accommodation.

⁸⁶ ADA Information Line, U.S. Dept. of Justice, Disability Rights Section representative. Personal interview. 3 September 2013.

⁸⁷ Pennsylvania Department of Conservation and Natural Resources. *Pennsylvania Trail Design and Development Principles*. (2013): pp. 15-17.

⁸⁸ The Pennsylvania Department of Labor & Industry provides information regarding the UCC at <http://www.portal.state.pa.us>.

⁸⁹ As noted above, a shared use path or a pedestrian route developed primarily to connect elements, spaces and facilities within a site is not a “trail”; these would fall within the designed use and design parameters for one of the other routes described in this publication. See ABA Chapter 1: F106.5 Defined Terms, 2013.

⁹⁰ These standards are recognized in the *Pennsylvania Trail Design and Development Principles* as the authority for accessible hiker/pedestrians trails.

⁹¹ U.S. Access Board. Outdoor Guidelines, F247.2 Existing Trails. “Where the original design, function, or purpose of an existing trail is changed and the altered portion of the trail directly connects to a trail head or another trail that substantially meets the requirements in 1017, the altered portion of the trail shall comply with 1017.” <http://www.access-board.gov>.

⁹² U.S. Access Board. www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas/background/committee-report/other-issues.

⁹³ Draft USDA FSTAG, May 22, 2006.

⁹⁴ In practical terms, although the Outdoor Guidelines do not specifically reference the five trail classes noted in this manual’s discussion of Trail Fundamentals, this exception means that Class 1 and 2 trails (and sometimes Class 3 trails) generally would be exempted from the accessibility guidelines and Class 4 and 5 trails may need to comply.

⁹⁵ U.S. Access Board. <http://www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas/background/committee-report/other-issues>.

⁹⁶ The first two conditions for departure were originally together in one exception in earlier drafts of the Outdoor Guidelines. This paragraph was excerpted from that version.

⁹⁷ *Id.*

⁹⁸ Note that the earlier draft of the Outdoor Guidelines had the word “substantially” in place of “fundamentally” in the wording of this conditional for departure; this word was changed to make this provision consistent with many other federal regulations that use the word “fundamentally.” The final, adopted Outdoor Guidelines also deleted/re-worded a proposed conditional exception: “Where compliance would cause substantial harm to cultural, historic, religious, or significant natural features or characteristics.”

⁹⁹ *Id.*

¹⁰⁰ Regarding conditions for departure, the U.S. Access Board committee noted that:

For example, Federally designated and some State designated Wilderness Areas prohibit use of mechanized equipment, limiting construction methods to hand tools. Imported materials may be prohibited in order to maintain the integrity of the natural ecosystem. Construction methods and materials employed in designated wetlands or coastal areas are strictly limited. For traditional, historic,

or other reasons, many trails are built using only the native soil for surfacing, which may not be firm and stable. Federal statutes such as the Wilderness Act and the Endangered Species Act, and the State and local statutes often impose restrictions to protect or address environmental concerns. Many aquatic features are protected under Federal or State laws. Some constructed water crossings, which would be required to provide accessibility, may not be permitted under certain laws or regulations.

<http://www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas/background/committee-report/other-issues>.

¹⁰¹ Pennsylvania Department of Conservation and Natural Resources. *Pennsylvania Trail Design and Development Principles*. (2013): p. 89.

¹⁰² U.S. Access Board. Outdoor Guidelines § 1017.1.

¹⁰³ *Id.* at Advisory 1019.1 (emphasis added).

¹⁰⁴ USDA Forest Service. *Accessibility Guidebook for Outdoor Recreation and Trails*. (2013): p. 88.

¹⁰⁵ U.S. Access Board. Outdoor Guidelines § 1017.1 Exception 2 (emphasis added). <http://www.access-board.gov>.

¹⁰⁶ U.S. Access Board. Outdoor Guidelines (“General Issues”):

Where a conditional exception applies to the technical provisions for a facility, the exception is to be applied on a provision-by-provision basis. For example, if a portion of trail can fully comply with the technical provision for clear tread width but cannot fully comply with the technical provision for running slope, the conditional exception permits the portion of the trail to comply with the technical provision for running slope to the maximum extent feasible. The phrase ‘to the maximum extent feasible’ means that the portion of the trail can depart from the technical provision for running slope to the extent necessary to address the condition. <http://www.access-board.gov>.

¹⁰⁷ Federal agencies must notify the U.S. Access Board when an agency determines that an entire trail should be exempted from compliance with the Outdoor Guidelines.

¹⁰⁸ Federal Highway Administration. *Designing Sidewalks and Trails for Access: Part II of II – Best Practices Design Guide*, updated 9/25/17

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/sidewalks214.cfm

¹⁰⁹ “American Association of State Highway Transportation Officials.” 4th Edition. (2012).

¹¹⁰ Architectural and Transportation Barriers Compliance Board. “Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way.” (2011) <http://www.access-board.gov>.

¹¹¹ See *Proposed Supplements to Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way*, R105.5 Defined Terms, <http://www.access-board.gov/guidelines-and-standards>.

¹¹² Federal Highway Administration. *Designing Sidewalks and Trails for Access: Part II of II – Best Practices Design Guide*, updated 9/25/17

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/sidewalks214.cfm

¹¹³ *Id.* https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/sidewalks214.cfm

¹¹⁴ See *Pennsylvania Trail Design and Development Principles*, p. 57.

¹¹⁵ Additionally, one source noted:

Another safety issue is visibility of the pathway corridor and other users during nighttime travel... Non-wheeled users may not be as visible as bicyclists. This issue can be addressed through education and outreach to raise runners’ and walkers’ awareness about the importance of wearing reflective clothing and/or carrying a headlamp/red blinking light; enforcing regulations requiring lights and reflectors; or illuminating the pathway.

What Are the Safety Issues for Shared use Paths? Pedestrian and Bicycle Information Center, <http://www.bicyclinginfo.org/faqs/answer.cfm?id=3920>.

¹¹⁶ Federal Highway Administration. *Designing Sidewalks and Trails for Access: Part II of II – Best Practices Design Guide*, updated 9/25/17

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/sidewalks214.cfm

¹¹⁷ See the U.S. Access Board’s Supplemental Notice of Proposed Rulemaking that includes specific provisions for shared use paths in the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way, 76 FR 44664 (July 26, 2011), 2. <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/shared-use-paths/supplemental-notice/proposed-supplements>.

¹¹⁸ *Id.*

¹¹⁹ See R302.5.4 Physical Constraints and R302.5.5 Regulatory Constraints in the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way Proposed Technical Provisions Applicable to Shared Use Paths; <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/shared-use-paths/supplemental-notice/proposed-supplements>.

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² The U.S. Access Board published its Supplemental Notice of Proposed Rulemaking (Federal Register, February 13, 2013) concerning Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way; Shared Use Paths. For the latest developments and background information, see <http://www.access-board.gov/guidelines-and-standards/>.

¹²³ “Advance Notice of Proposed Rulemaking; Shared Use Path Accessibility Guidelines.” US Access Board. <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/shared-use-paths/background/advance-notice>.

¹²⁴ The regulations state that “[i]n these situations, an easement or other legal means is used to establish a right for the public to use the portion of the land that the shared use path crosses for transportation purposes.” <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/shared-use-paths/supplemental-notice/proposed-supplements>.

¹²⁵ Another type of pedestrian route is the Beach Access Route, which falls under the Outdoor Guidelines, Chapter 1018. Standards for beach access routes do not legally apply to non-federal lands.

¹²⁶ <http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/ada-standards/chapter-4-accessible-routes>.

¹²⁷ Chapter 4 of the 2010 ADA Design Standards addresses the need for fully compliant accessible routes between certain recreation-related elements. It is important during the conceptual planning stages to identify which elements may be part of the future trail and determine if those elements will require a connector path that must comply with the 2010 ADA Design Standards or the Outdoor Guidelines.

¹²⁸ Fraser, Carole. Universal Access Coordinator, New York State Department of Environmental Conservation. Personal interview. 4 May 2014.

¹²⁹ See F247.1 General, <http://www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas/final-guidelines-for-outdoor-developed-areas/discussion-of-requirements?highlight=WyJ0cmFpbGhYXQ==>.

¹³⁰ See the 2010 ADA Design Standards, <http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/ada-standards>.

¹³¹ The PROW Guidelines also will govern certain aspects of amenities relating to shared use paths. For example, those regulations will require that gates/barriers be at least 32” wide to allow wheelchair access. See “#7 Gates and Barriers,” U.S. Access Board, Advance Notice of Proposed Rulemaking, Shared Use Path Accessibility Guidelines, 36 CFR Chapter XI, March 28, 2011.

¹³² Non-federal entities could use these standards as BMPs to the extent that standards for those amenities are not already provided by the ADA Standards.

¹³³ See Outdoor Guidelines, Chapter 2 (“Scoping Requirements”) and Chapter 10.11 through 10.15.

¹³⁴ Outdoor Guidelines, pp. 21-31 and Chapter 2, Scoping Requirements,
<http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/ada-aba-accessibility-guidelines-2004/aba-chapter-2-scoping-requirements>.

¹³⁵ An excellent resource on wetland trail design and construction can be found at
http://www.fhwa.dot.gov/environment/recreational_trails/publications/fs_publications/01232833/toc.cfm.

¹³⁶ <https://www.merriam-webster.com/dictionary/accessible>

¹³⁷ USDA Forest Service. *Trail Construction & Maintenance Notebook*. (2007): 0723-2806-MTDC.

¹³⁸ *USDA Forest Service Technology & Development Program. Accessibility Guidebook for Outdoor Recreation and Trails. Publication 2300–Recreation (August 2012): 1223–2806P–MTDC, p. 29.*

¹³⁹ Presenting the term as “shared-use path (with a hyphen) would be better grammar. Federal regulations skip the hyphen, thus creating an editing quandary.

¹⁴⁰ See *Proposed Supplements to Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way*, R105.5 Defined Terms, <http://www.access-board.gov/guidelines-and-standards>.

Appendices

Appendix A. Planning and Designing Trails for Access: Implementation Guide	A-1
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Appendix C. Accessibility Guidelines for ORARs	A-14

[If the three appendices are not included in what you are now reading, you can find them in the library at WeConservePA.org.]