Appendix H: Planning and Design Best Practices

Best Practices

User Types

Riverside trails serve a variety of users, including bicyclists, pedestrians, and equestrians, all of whom have different characteristics and needs. Urban trails, also known as Class I facilities or multi-use paths, also serve users with mobility disabilities. Class I facilities are described in more detail in the Active Transportation portion of this Plan. Trails are not intended for use by off-highway vehicles (OHV).

PEDESTRIANS / RUNNERS / HIKERS

- Speed of Travel: 1 to 3 mph
- Comfortable on trails that are grade-separated from vehicles and fast active users. May use both paved and unpaved trails.

BICYCLISTS

- Speed of Travel: 6 (slow/child bicyclists) to 25 mph (experienced/fitness bicyclists)
- Road bicyclists prefer fewer crossings, paved separated paths, and room for fast users to pass slower users. Mountain bikers prefer natural surface trails.

EQUESTRIANS

- Speed of Travel: 3 to 8 mph (trot)
- Prefer a soft surface tread separated from people riding bicycles. In park areas, equestrian use can be compatible with people hiking.

Accessibility

Trails should be accessible to users of all ages and abilities, given environmental limitations. Wheelchair users and people pushing strollers can use unpaved trails if they are designed to American with Disabilities Act (ADA) standards and utilize firm surface material. In some cases, natural-surface trails or those with steep grades may not be accessible to users with mobility disabilities.

ADA Standards

The United States Access Board issued updated provisions to the 2004 ADA-ABA Accessibility Guidelines in 2014. These updated provisions, also referred to as the "Final Rule," include new provisions for accessibility standards for trails[1].

The trail accessibility standards are not included in the Department of Justice's (DOJ) 2010 ADA Standards for Accessible Design[2], which apply to sidewalks and other urban transportation routes.

Accessibility guidelines for trails apply to pedestrian-designated trails that connect to accessible trailheads or other trails. They do

1 *United States Access Board (2014): A Summary of Accessibility Standards for Federal Outdoor Developed Areas*

2 *https://www.ada.gov/2010ADAstandards_index.htm*

not apply to trails primarily designated for bicyclists or equestrians.

Accessible trails require a minimum width of 36 inches, the use of "firm and stable" surface materials, and grades of less than 5% (except in short segments with resting intervals) (Table 5-9). Other design standards are related to cross slopes, passing spaces, resting intervals, and tread obstacles.

In certain conditions where meeting these standards would be exceedingly difficult, such as in wilderness areas or areas with very steep slopes, trails are exempt from the requirements.

Connectivity

Trails that connect to other trails and major destinations create a network of recreation and transportation facilities that serve a greater number of users.

Amenities

Where there is sufficient right-of-way available at access points, amenity areas including seating, bottle filling stations and drinking fountains, interpretive signage, and shade structures should be considered.

Management & Maintenance

A strong management structure provides oversight and coordination for the trail. A well-developed maintenance plan ensures trails are adequately maintained to provide a comfortable experience for trail users.

Trail Corridor Width

Trail corridor widths typically range up to 12 feet, depending on the land context, available right-of-way, and anticipated use of the trail. Two-way shared-used paths should be at least 8 feet wide to adequately serve expected users. However, 10 to 12 feet is recommended in areas with higher concentrations of users. Sidepaths can be placed adjacent to trails to accommodate different user groups, and should be a minimum of 4 feet wide in areas with constrained right-of-way or low expected use. Trails in more rural or park areas can be as narrow as 4 feet in certain conditions.

Trail Grade

Natural surface trails should have a sustained gradient of less than 12%, though short segments of up to 15% to 20% may be acceptable in certain situations. Bike routes with grades steeper than 15% are often difficult to travel uphill. Urban trails should have a grade of less than 5% in order to serve users of all ages and abilities.

Fall-Line Orientation

For long-term sustainability, an unpaved trail should avoid a fall line orientation, which is a route that drops directly down the hillside. Fall-line trails follow the same

TABLE 5-11 : ADA STANDARDS: MAXIMUM RUNNING SLOPE & SEGMENT LENGTH

MINIMUM SLOPE	MAXIMUM SLOPE	MAXIMUM LENGTH OF TRAIL SEGMENT
1:20 (5%)	1:12 (8.33%)	200 feet
1:12 (8.33%)	1:10 (10%)	30 feet
1:10 (10%)	1:8 (12%)	10 feet

TABLE 5-12 : NATIONAL PARK SERVICE TRAIL SLOPE RECOMMENDATIONS

STANDARDS	RECREATION SETTING			
	URBAN	RURAL	SEMI-PRIMITIVE	PRIMITIVE
Maximum Sustained Slope (Hiking)	10%	10%	15%	Varies
Maximum Sustained Slope (Accessible Areas)	5%	8%	12%	Varies
Maximum Slope (Hiking)	15% for 100 feet	20% for 100 feet	30% for 100 feet	Varies
Maximum Slope (Accessible Areas)	8% for 30 feet	10% for 50 feet	10% for 50 feet	Varies
Maximum Cross Slope	3%	5%	8%	Varies

Source: National Park Service - Handbook for Trail Design and Construction and Maintenance - 2015

path that water flows, resulting in segments that are difficult, if not impossible, to drain. In general, trails should have a gradient no steeper than 1/2 the native side slope gradient. An exception to this rule is for hill climb trails, which are stabilized with hardened steps or stairs.

Trail Drainage

One of the most important considerations for sustainable unpaved trails is maintaining natural drainage patterns. Trails need to be drained by drain dips (reverse grade dips or rolling dips) installed at frequent (100 to 175 foot) spacings. The larger (deeper) the dip the longer the life expectancy. These dips prevent water from concentrating on trails, and also force water from them frequently, preventing concentrated flows that can erode the trail surface.

Switchbacks

To the extent feasible, trails should be laid out to avoid or minimize switchbacks as users often "cut" the switchback which can lead to erosion problems.

Steep Unstable Slopes

In more rural or park areas, trails should avoid crossing steep unstable slopes wherever possible to prevent erosion and to ease passage by visitors.

Swales and Valley Bottoms

In general, trails along valley and swale bottoms should be avoided as they can be difficult to drain and tend to be wet and subject to getting muddy and rutted.

Full Bench Construction

All new natural surface trails should be constructed using full bench construction, meaning cutting the full width of the tread into the hillside. The tread must be outsloped at least 5 percent. Full bench construction results in trails that are more durable and require less maintenance than those built using partial-bench construction.

Equestrian Facilities

Equestrian facilities may be part of shared-use paths that accommodate multiple modes or may be separated by a buffer. In areas with higher concentrations of users and along paved trails, a separated

Long, straight sections of steep trail can lead to long-term erosion issues

sidepath for horseback riding is preferable to minimize conflicts between user groups. These equestrian-only trails are also known as bridle trails or bridle paths, and should be separated by at least a 6-foot buffer in trail corridors with high concentrations of users. In areas with lower concentrations of users or with constrained right-of-way, a 2- to 3-foot buffer can be used.

In park areas with steep grades, steps should be designed to allow horses to comfortably navigate them. These steps should ideally be no higher than 12 inches tall.

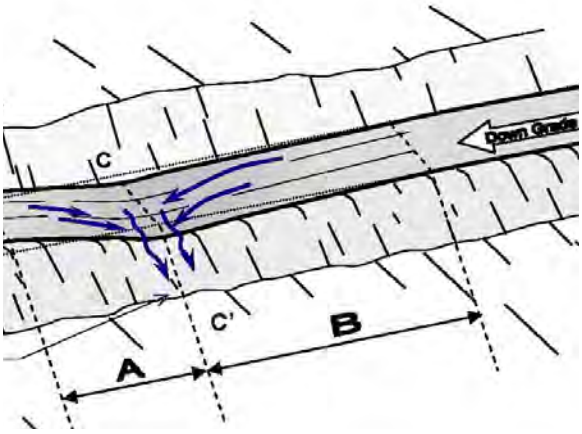
OHV Use Prevention

OHV use can significantly impact any trail. Potential strategies to prevent OHV use include avoiding alignments in close proximity to established OHV routes and areas where OHV use might be tempted to extend down the trail. Where unable to avoid OHV routes, physical barriers, trail width, and the spacing of drain dips can also be used. The proximity of potential switchbacks to established OHV trails may further encourage misuse of the proposed trail alignments and/or result in trail damage.

Safety

Trails should be designed with Crime Prevention Through Environmental Design principles, such as natural surveillance, territorial reinforcement, natural access control, and maintenance. Trails should have high visibility for legitimate users and keep unwanted behavior under observation.

In urban settings, low fencing, hardscape, landscaping, and topography should be used to separate private areas from public areas and control access. Trails should be separated from vehicles by curbs/hardscape, open-style fencing, and landscaping.



Drain dips can help alleviate drainage problems on steep trails

WAYFINDING

A comprehensive wayfinding system is important for making sure trails are safe, accessible, and well-used. Wayfinding provides users with a sense of direction and security, and alerts them of upcoming destinations and trail connections. Important aspects of wayfinding include:

- Improved awareness of trails;
- A greater sense of security and comfort;
- Enhanced environmental protections as trail users are notified to keep on the trail and out of sensitive areas; and
- Information to inform users of the intensity and length of the trail.

New wayfinding signage should be consistent with existing wayfinding systems in Riverside. Should a new signage design theme be desired, the City should undergo a comprehensive wayfinding design process to determine a design theme that will be standardized across multiple trails and properties. A wayfinding system should have a uniform design style, including graphics and icons, colors, fonts, materials, shapes, and proportions.

Accessible Signage Design

Wayfinding should be accessible to all trail users, regardless of language or cognitive ability. In areas with high concentrations of non-English speakers, consider implementing signs in multiple languages. Do not rely only on text; instead, utilize icons, graphics, and consistent colors. Follow ADA guidance for sign placement, offsets, and text sizes. Signs should include information about trail surface, slope, and distance.

Fonts & Text Hierarchy

Aside for fonts used for logos, a single sanserif font family should be used across an entire wayfinding system. A hierarchy of size and font properties such as bold font or italics should be used to communicate tiers of detail. Color

A minimal color palette should be used across all signs in a wayfinding system. As a general rule, maintain standard background, logo, and text colors.

Branding & Iconography

The City of Riverside could implement a branding scheme to create a strong identity for its trail system as a whole or for individual trails.

Types of Signage

There are several types of signage typically used in wayfinding systems. These include:

- Gateway/Monument Sign: Placed at major trail access points, gateway signs enhance the visibility of the trail.
- Direction Signs: Direction signs provide directional and distance information to

destinations, trail amenities, and other trails.

- Trailhead Kiosk: Placed at access points, trailhead kiosks are the first point of orientation for trail users.
- Confirmation Posts: Confirmation posts inform users they are on a designated trail and include, at minimum, an arrow indicating the intended direction of travel.
- Mile Marker: Mile markers allow trail users to track how far they have traveled. Mile markers are generally placed every 1/4 to 1/2 mile.
- Interpretive Signs. These signs provide educational, historical, or cultural content that informs, educates, and entertains the public.

FIGURE 5-46 TYPICAL NAVIGATIONAL SIGNAGE