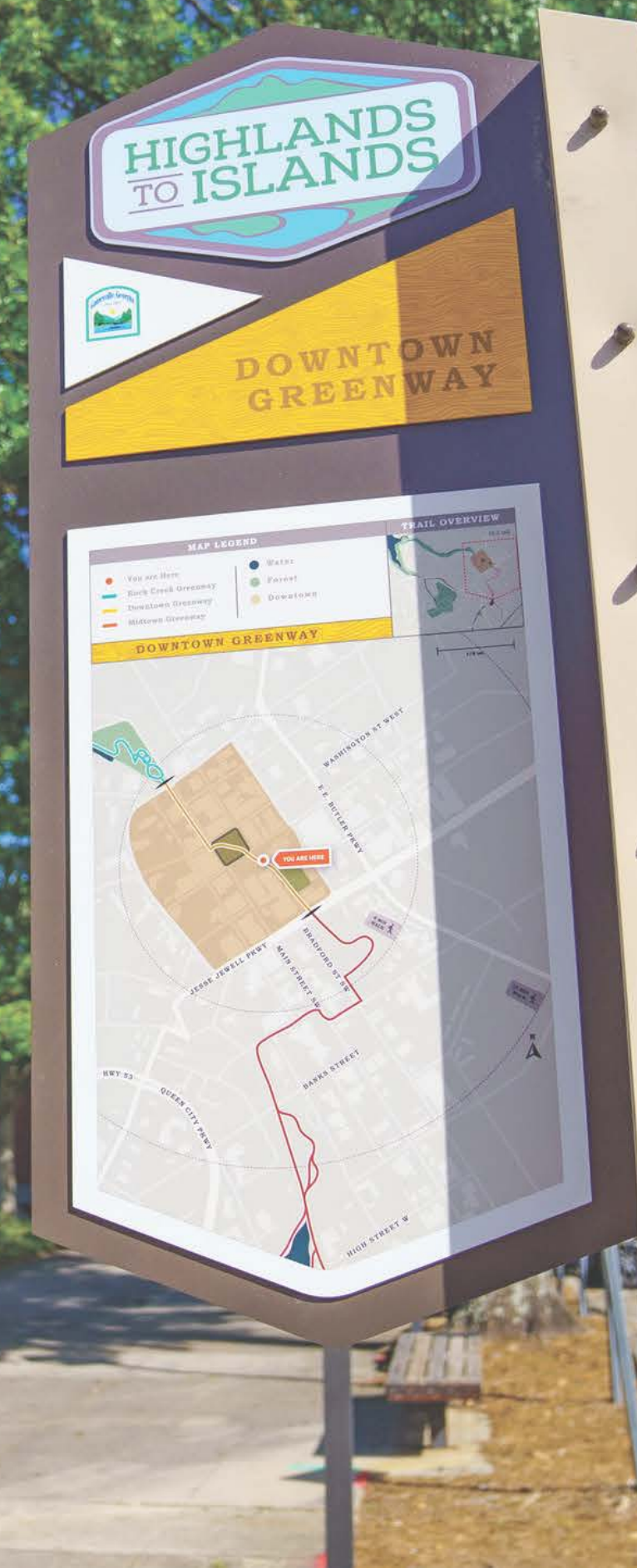


Gainesville-Hall Metropolitan Planning Organization
Highlands to Islands

TRAIL AMENITIES AND FURNISHINGS DESIGN GUIDE



Prepared for:



GAINESVILLE-HALL
Metropolitan Planning Organization

Prepared by:



July 2022

Wayfinding Signage on Highlands to Islands Trail (Cover)
Source:Imgbuilds



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A Resolution by the Gainesville-Hall Metropolitan Planning Organization Policy Committee Adopting the Highlands to Islands Design Guide

WHEREAS, the Gainesville-Hall Metropolitan Planning Organization is the designated Metropolitan Planning Organization for transportation planning within the Gainesville Metropolitan Area Boundary which includes all of Hall County and a portion of Jackson County following the 2010 Census; and

WHEREAS, the Infrastructure Investment and Jobs Act (IIJA) Act requires the Metropolitan Planning Organization to increase accessibility and mobility options available;

WHEREAS, the IIJA Act furthermore directs GHMPO to enhance the integration and connectivity of the transportation system, across and between modes;

WHEREAS, the Highlands to Islands Design Guide provides guidance on developing for the aesthetic cohesion of the expanding Highlands to Islands Trail Network;

NOW, THERE, BE IT RESOLVED that the Gainesville-Hall Metropolitan Planning Organization adopts the Highlands to Islands Design Guide.

A motion was made by PC member Jeff Stowe and seconded by PC member Richard Higgins and approved this the 9th Day of August, 2022.

Mayor Lamar Scroggs, Chair
GHMPO Policy Committee

Lamar Scroggs

Subscribed and sworn to me this the 9th Day of August, 2022

[Signature]

Notary Public

My Commission expires 1-22-2024

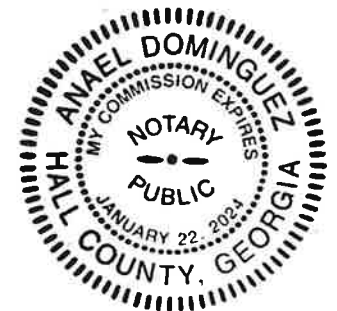


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1 | Overview

PURPOSE AND USE

In 2019, the Gainesville and South Hall Trail Study was completed by the Gainesville-Hall Metropolitan Planning Organization (GHMPO). The previous installations of trail segments throughout the county, including the Chicopee Trail segment that was installed in 2016, served as a catalyst to develop the study. The results of the study provided the GHMPO with a recommended trail network that would create off-street trail loops connecting key destinations in South Hall County and Gainesville: University of North Georgia, Flat Creek, Lee Gilmer Airport, downtown Oakwood, downtown Flowery Branch, the Falcons Training Camp, Cherokee Bluffs Park, Hall County Government Center and various schools. The network is referred to as the Highlands to Islands Trail.

This Design Guide provides tools, references, and standards that can be used to enhance the trail experience for all visitors of the Highlands to Islands trail network or generations to come. The Design Guide is primarily intended for city and county staff, local elected officials, developers, consultants, and trail organizations involved in the implementation of the Highlands to Islands Trail system.

HIGHLANDS TO ISLANDS BRAND

OVERVIEW

Trail amenities are important to the experience of the Highlands to Islands Trail system. Just as the logo has become symbolic of the trail, amenities become the breadcrumbs of recognizable forms, patterns, texture, color, and rhythm that contribute to a consistent brand expression of safety, comfort, legibility, and community pride. Since the Highlands to Islands Trail traverses a range of landscapes, it is essential to provide a pattern of experiences that reflect the local color and context of natural, suburban, and urban settings within Gainesville and Hall County. This Design Guide will build upon existing trail amenities, wayfinding, and character of built trails creating a recognizable fit and finish for the trails as they are built out over time.





2 | Trail System Analysis

THE HIGHLANDS TO ISLANDS TRAIL NETWORK

The development of the Highlands to Islands Trail began long before the South Hall Trail Study was completed in 2019. The 2019 study provided a formalized approach to trail routing and alignment, with identification of short and long term priority projects. The feasibility study was a collaborative planning process led by the Gainesville-Hall Metropolitan Planning Organization, Hall County, Gainesville, Oakwood, and Flowery Branch. It analyzed the community's existing conditions and provided alignment alternatives, a preferred alternative, and an implementation plan.

The ultimate trail system will be a 35 mile multi-use path connecting the municipalities in Hall County. Trails that have already been completed are Rock Creek Greenway, Downtown Gainesville Trail, Midland Greenway, Chicopee Trail, Atlanta Highway Tunnel Trail, Lanier Islands Parkway Sidepath, Friendship Road Sidepath, Braselton Life Path. There are 5.6 miles of trail in the process of development and 30 miles of trail planned for future development.



EXISTING TRAILS

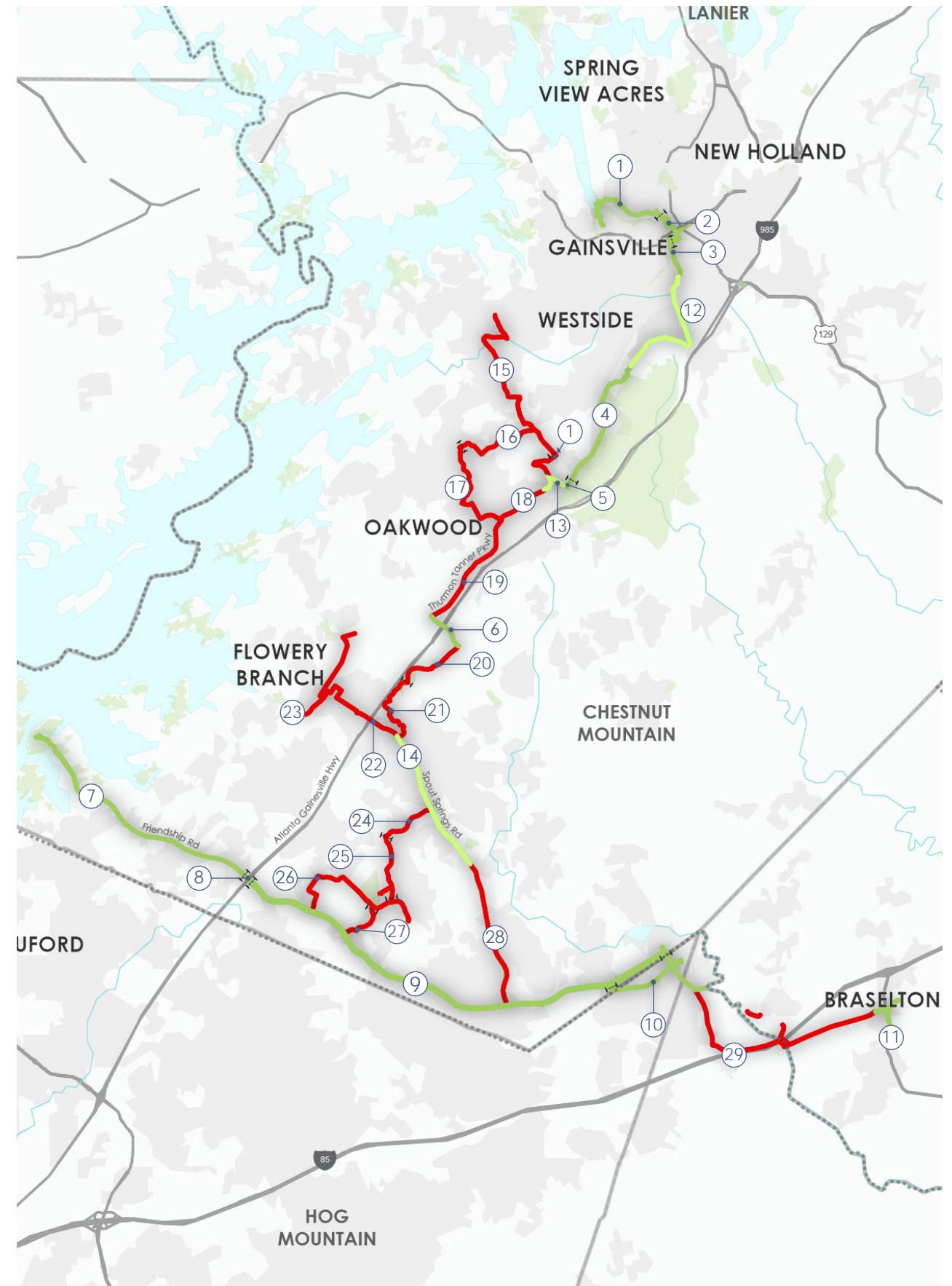
- ① Rock Creek Greenway 1.91 mi
- ② Downtown Gainesville Trail .96 mi
- ③ Midland Greenway .69mi
- ④ Chicopee Trail 2.42 mi
- ⑤ Atlanta Highway Tunnel Trail .18mi
- ⑥ Exit 14 Path .69 mi
- ⑦ Lanier Islands Pkwy Sidepath 4.58 mi
- ⑧ Exit 8 Path .14 mi
- ⑨ Friendship Road Sidepath 15.92 mi
- ⑩ Braselton Life Path 2.23 mi
- ⑪ Downtown Braselton Trail 1.35 mi

TRAILS IN DEVELOPMENT

- ⑫ Gainesville Airport Trail 2.50 mi
- ⑬ UNG Connector Trail .55 mi
- ⑭ Spout Springs Sidepath (Phase I) 2.51 mi

PLANNED TRAILS

- ⑮ Cascade Woods Trail 2.82 mi
- ⑯ Mundy Mill Trail 2.11 mi
- ⑰ Oakwood Spur Trail 1.96 mi
- ⑱ UNG Campus Trail .49 mi
- ⑲ Thurmon Tanner Trail 2.62 mi
- ⑳ Hog Mountain Sports Complex Trail 1.20
- ㉑ Stonebridge Village Path 1.46 mi
- ㉒ Phil Niekro Spur Trail .80 mi
- ㉓ Flowery Branch Downtown Spur Trail 2.98 mi
- ㉔ Capitola Farms Path .96 mi
- ㉕ Bragg Road Path 1.41 mi
- ㉖ Blackjack Road Trail 2.79 mi
- ㉗ Swansey Road Trail .80 mi
- ㉘ Spout Springs Sidepath (Phase II) 2.51 mi
- ㉙ Braselton Connector Trail 4.62 mi



CURRENT TRAIL STANDARDS

AMENITIES

Existing trails have a combination of seating, trash receptacles, and wayfinding along various stretches of the trail network. More amenities are provided for users in major existing trailhead, park, and access point locations.

EXISTING TRAIL UPGRADES

The Gainesville portions of the Highlands to Islands network have provided a foundation of amenities. There are a few specific locations that would benefit from the addition of amenities and improvements that will strengthen this connectivity. These improvements include:

Ivey Terrace Park

- Provide seating, trash receptacles, and bike parking.
- Provide wayfinding signage.

Friendship Rd Sidepath

- Provide waysides along the trail that include seating, trash receptacles, water fountains, and bike parking.
- Provide appropriate wayfinding signage.
- Provide pedestrian lighting along trail.
- Provide shade trees for protection from weather elements.
- Recommend pedestrian hybrid beacon (PHB) midblock crossing at key pedestrian locations (i.e., Friendship Elementary School and Buford Family Community Center).

Chicopee Trail

- Provide waysides along the trail that include seating, trash receptacles, water fountains, and bike parking.
- Provide appropriate wayfinding signage

TRAILHEAD/ACCESS POINT IMPROVEMENTS

Ivey Terrace Park

- Provide appropriate amenities and furnishings.
- Provide appropriate wayfinding signage.

Wilshire Trails Park

- Provide bike racks throughout the park.

Longwood Park

- Provide bike racks.



Existing seating and trash receptacle at Midland Greenway Park
Source: Tricia Terrell (GHMPO)



Existing sidepath on Friendship Rd
Source: Google

HIGHLANDS TO ISLANDS DESIGN TYPOLOGY

VISUAL PREFERENCE SURVEY

During the work sessions with GHMPO staff and partners, a visual preference survey was conducted to understand the overall style that the committee preferred for the proposed trail amenities. The amenities that were surveyed included seating, trash receptacles, bollards, lighting, bike parking, fencing and handrails, and drinking fountains. The results of the survey showed that the committee's preferred style ranged between the modern and classic style furnishings. The images on the right were the furnishings that scored the highest each category. These results will provide further guidance on the trail amenities recommended in this guide.

All products recommended for the Highlands to Islands Trail System have been selected to compliment the existing amenities and features currently implemented along the trails. These recommendations are not to interfere with existing standards developed by participating municipalities.

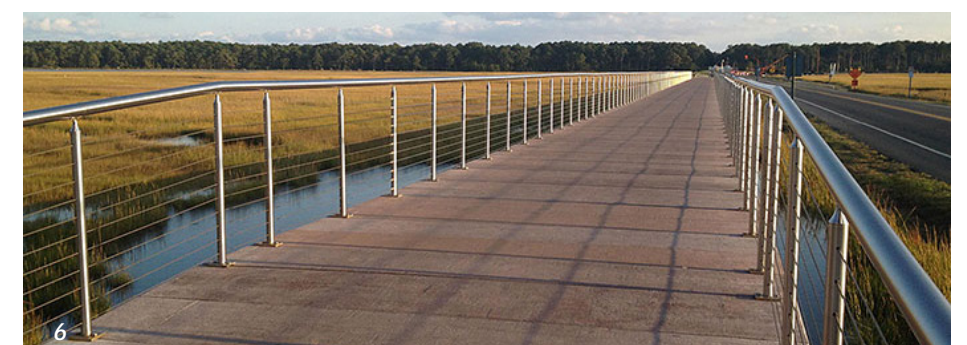
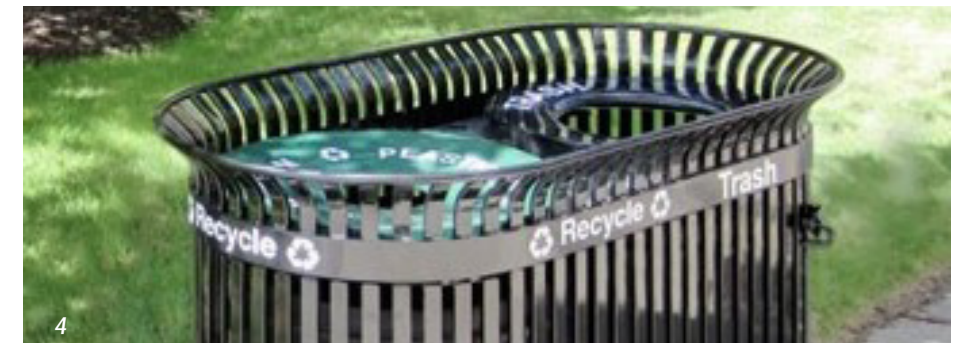
DISCLAIMER

The products and examples with their respective design features included in the following section should be understood as recommendations to guide the municipalities where possible. Most municipalities use these standards as a benchmark. In some cases municipalities will be required to accept an "approved equal" for the furnishings, depending on the funding source for trail construction.

Image Sources:

- | | |
|--|---|
| 1- Dash Bench Forms + Surfaces | 5- Concrete bollards Archiproducts |
| 2- Circle Rack Site Scapes | 6- Steel cable railing Trex |
| 3- Alcott Area Light Landscape Forms | 7- Water bottle refill station Block Island |
| 4- Steel trash receptacle | |

PREFERRED AMENITY STYLES



HIGHLANDS TO ISLANDS DESIGN TYPOLOGY

MULTI-USE PATH DESIGN PRACTICES

Multi-use paths can provide a desirable facility, particularly for recreation, for users of all skill levels. Their separation from traffic is especially valued by users who do not feel comfortable recreating on or directly adjacent to roadways. Multi-use paths should generally provide directional travel opportunities not provided by existing roadways.

TYPICAL APPLICATION

- In abandoned rail corridors (commonly referred to as Rails-to-Trails or Rail-Trails).
- In active rail corridors, trails can be built adjacent to active railroads (referred to as Rails-with-Trails).
- In utility corridors, such as power line and sewer corridors.
- In waterway corridors, such as along canals, drainage ditches, creeks and beaches.
- Within roadway right-of-way.

DESIGN FEATURES

- 12 feet is the recommended width for multi-use paths. A separate track (5' minimum) can be provided for pedestrian use. 10 feet is the recommended width for low traffic paths.
- 8 feet is the minimum width allowed for a two-way bicycle path and is allowed for neighborhood access ways or places with limited space and for limited lengths.
- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.
- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.
- Use of bollards should be avoided when possible. If bollards are used at intersections and access points, they should be colored brightly and/or supplemented with reflective materials to be visible at night.



MULTI-USE PATH IN RIPARIAN CORRIDORS

Riparian and waterway corridors often offer excellent multi-use path development and gap closure opportunities. These corridors include canals, drainage ditches, creeks, and beaches and offer excellent transportation and recreation opportunities for trail users of all ages and skills.

TYPICAL APPLICATION

Along riparian and waterway corridors.

DESIGN FEATURES

- Any access point to the path should be well-defined with appropriate signage designating the pathway as a multi-use facility and prohibiting unauthorized motor vehicles.
- Public access to the multi-use path may be prohibited during the following events:
 - Extreme storm events or other utility maintenance activities.
 - Inclement weather or the prediction of storm conditions.
- Setbacks from waterways and waterbodies should follow local state, county or jurisdictional ordinance.



MULTI-USE PATH IN UTILITY CORRIDORS

Utility corridors often offer space for multi-use path and trail development. Utility corridors typically include power line and sewer corridors. These corridors offer excellent transportation and recreation opportunities for trail users of all ages and skills.

Utility providers benefit from this arrangement by having uninterrupted, easily accessible route to their utility service. Individual utility providers may have their own policies and guidelines about buffer requirements.

TYPICAL APPLICATION

- Along underground utilities such as water, sewer, natural gas, or buried electric or communications lines.
- Along above-ground utility corridors such as telephone, cable, or overhead electric.

DESIGN FEATURES

- Multi-use paths in utility corridors should meet or exceed general design practice and the conditions of the utility providers, if within a utility easement. If additional width allows, wider paths, and landscaping are desirable.
- Any access point to the path should be well-defined with appropriate signage designating the pathway as a multi-use facility and prohibiting motor vehicles.
- Coordination with the underlying property owner is also required for trails within utility corridors, and may require additional right-of-way negotiation.



SIDEPATH

A sidepath is a bi-directional multi-use path located immediately adjacent and parallel to a roadway. Sidepaths can offer a direct route for trail users where traffic speeds and/or volumes are too high to share the roadway.

TYPICAL APPLICATION

Although paths in independent rights-of-way are preferred, sidepaths may be considered where one or more of the following conditions exist:

- Along collector roadways with a posted speed between 30-40 mph
- To provide continuity between existing segments of multi-use paths in independent rights-of-ways
- For use near schools and neighborhoods, where increased separation from motor vehicles is desired

DESIGN FEATURES

- Standard Tread Width: The preferred minimum width is 12'.
- Roadway Separation: The preferred minimum separation width is 6.5 ft. Minimum separation distance is 5 ft.
- Sight Lines: It is important to keep approaches to intersections and major driveways clear of obstructions such as parked vehicles, shrubs, and signs on public or private property.





3 | Design Guidelines

OVERVIEW

The following section contains guidance for trail infrastructure features and methods with notes for appropriate use in varying contexts that are consistent with a standard approved by GHMPO staff and municipal partners. During construction documentation, design judgment should be used in assessing the most suitable materials for each application. All trail infrastructure and associated amenities should be designed to accommodate surrounding land use and standards set forth by the Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO), local regulations, current best practices, and Americans with Disabilities Act (ADA) standards.

DISCLAIMER

The dimensions included in the following section should be understood as recommendations to guide the municipalities where possible. Most municipalities use these standards as a benchmark. In some cases municipalities will be required to accept an "approved equal" for the furnishings, depending on the funding source for trail construction.



People on the Midland Greenway
Source: Gainesville Park and Recreation

GENERAL TRAIL CONSTRUCTION

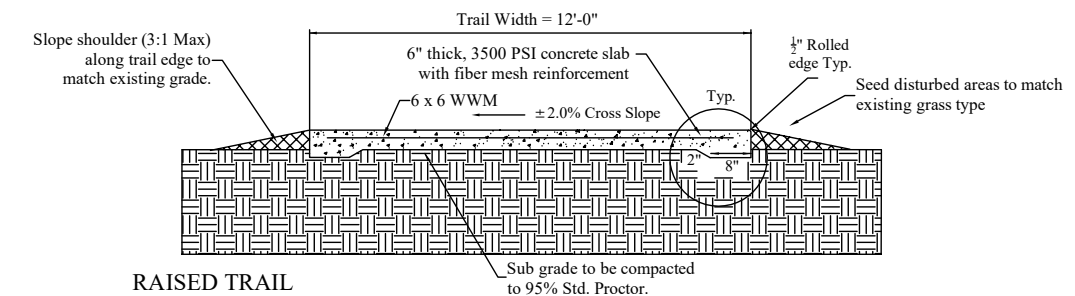
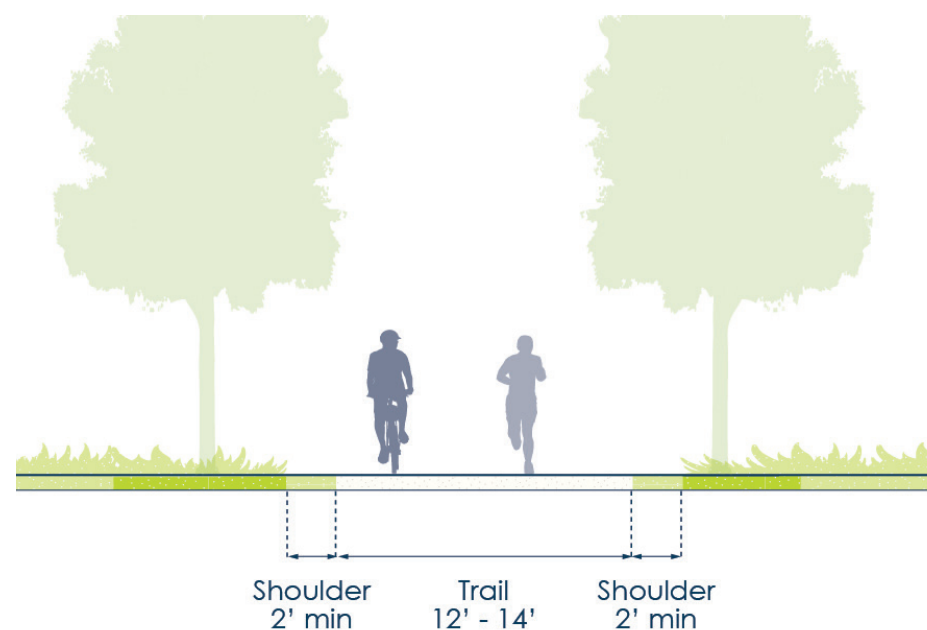
DESCRIPTION

All Highlands to Islands trails shall be paved (concrete unless otherwise indicated) multi-use paths that accommodate pedestrians, bicyclists, skates, wheelchairs and other non-motorized uses.

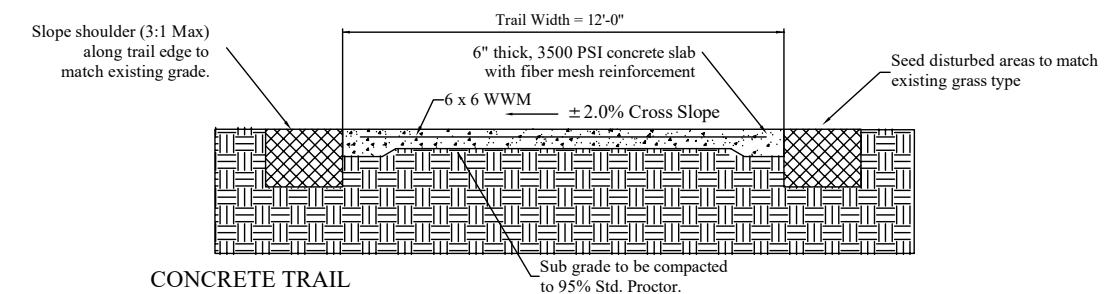
GUIDELINES

- A 12'-wide path (14'-wide in high volume areas) is the minimum for Highlands to Islands trails.
- A 36" minimum clear zone, 5' preferred, on either side of the path including a minimum 2' shoulder.
- 8'-6" is the minimum overhead clearance (10' preferred).
- Provide a minimum of 8'-0" horizontal clearance along shoulders, where appropriate.
- The general design speed for Highlands to Islands trails is 20 MPH, and therefore a minimum radius of 100' is preferred. Where design speeds are slower or there is limited ROW, smaller radii may be considered.
- Superelevation of 1.5% to 2% should be provided on most curves.
- Use 6" minimum depth 4000 psi concrete.
- Provide sawcut joints at intervals equal to width of trail (tooled to a depth of 1" with a width of 1/4").
- Where trail abuts existing buildings, use isolation joints.
- All Highlands to Islands trail layout and alignment conforms to AASHTO guidelines.
- Class 5A aggregate compacted base depth varies depending on soil conditions.
- Minimum 1.5% cross slope for drainage and construction.

- Grades and superelevations conform to ADA standards for trails.
- Provide positive drainage to prevent water build-up on trail.
- Pavement markings per ADA standards.
- Trim hazardous overhanging branches and deadwood.
- A centerline pavement stripe may be required in certain situations such as high traffic areas, around tight curves or other appropriate site-specific applications.
- For streetside trails, provide a groomed meandering buffer zone between trail and curb where feasible (10' to 50' or more wide with mowed grass).
- Where ROW is constrained, provide a minimum 5' buffer (beauty strip) between road edge/back of curb and trail per AASHTO.
- Electrical and other utility lines in or adjacent to the trail should be buried or appropriately screened.
- Promote good visibility of the trail and lines of sight.



RAISED TRAIL



CONCRETE TRAIL

NOTES:

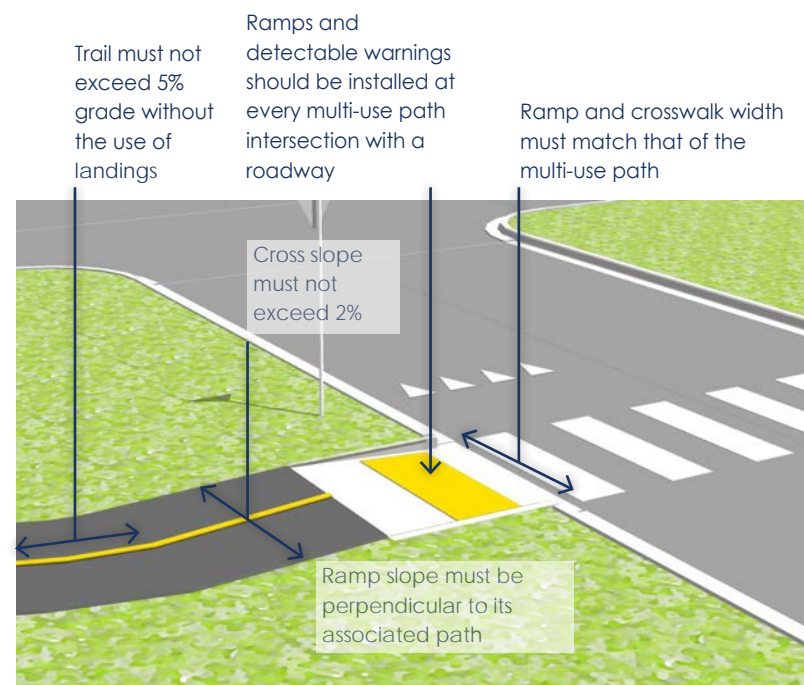
1. Trail width may vary due to field conditions but no smaller than 10'-0".
2. Concrete trail to be scored in squares 6' x 6' scored joints to be sawed.
3. Place expansion joint every 48'. Expansion joints should be placed between all rigid fixed objects and the new concrete trail.
4. The contractor shall insure the concrete trail section does not exceed the 2.0% cross slope. (ADA Requirements). If existing grade in field dictates a steeper cross slope, then the lower side of trail section shall match the existing grade and the shoulders shall be transitioned (3:1 Max) to maintain 2% max. cross slope requirement across trail section.

UNIVERSAL ACCESS ON SIDEPATHS

SIGNS AND MARKINGS

Signs for roadway users may not be visible for contraflow sidepath users. Provide signs and wayfinding in both directions along a sidepath. Similar to multi-use paths, sidepath users typically keep right except to pass. A centerline stripe may help clarify the direction of travel and organize traffic, but is not required.

Any multi-use path funded by GDOT or in the public right-of-way is considered to serve a transportation purpose and is required to be accessible in accordance with the United States Access Board ADA Accessibility Guidelines. Sidepaths are multi-use paths and therefore need to meet ADA requirements to ensure that all paths, street crossings, signals, and other facilities for pedestrian circulation and use are readily accessible, usable, and pleasant for pedestrians with disabilities. Consult with the local ADA Unit early in the project to clarify requirements.



ELEMENTS OF UNIVERSAL ACCESS



WIDTH AND CROSS SLOPE

The path's running slope must be less than 5% without use of landings. Design with a 4.5% running slope target is recommended to account for variation in construction tolerances. Where the path is contained within a street or highway border, its grade shall not exceed the general grade established for the adjacent street or highway.

The path cross slope must not exceed 2%. Design with a 1.5% cross slope target is recommended to account for variation in construction tolerances. The path must provide a 5' minimum clear width to serve as an accessible pedestrian access route. A minimum clear width of 4 feet is acceptable if passing spaces are provided every 200 feet. Most multi-use paths designed for bicycle access will meet this requirement (PROWAG 2011).

The path surface should be solid, free of obstacles and tripping hazards. Path edge vegetation/screening, and signage should be maintained and located so as not to present obstacles for visually impaired path users.



MATERIALS

The path surface must be firm, stable surfaces, and are generally limited to hard surfaces such as concrete, asphalt, composite wood, or compacted gravel. Some surface materials must be periodically maintained to meet accessibility requirements.



TRAILHEADS

Trailhead signage should provide accessibility information, such as path gradient/profile, distances, tread conditions, location of drinking fountains, and rest stops. At trailheads there should be at least one accessible parking area per every 25 vehicle spaces.

Trail amenities, drinking fountains, and pedestrian-actuated push buttons should be placed no higher than 4' off the ground.



SEATING/PICNIC AREAS

US Access Board Guidelines provide guidance on outdoor facilities. Provide a firm, stable area next to benches to allow a resting spot for people using wheelchairs. Design of picnic tables should allow space for a wheelchair to pull up to the table.



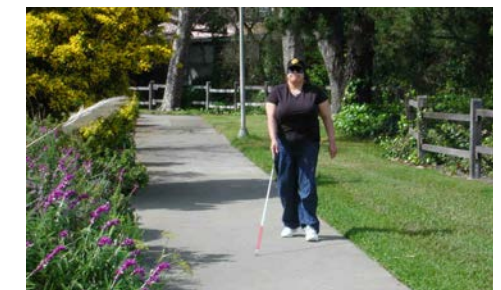
GATES AND BOLLARDS

Gates and other openings should be at least 36" wide. Any gate hardware should be 34-48" from the ground, and only require one hand and 5 lb or less of pressure.



DRAINAGE

Paths should always use materials and be constructed such that they are well-draining and dry as much as possible (Source: National Trails Training Partnership). Avoid creating low spots and keep a consistent cross-slope between 1 and 1.5% to shed water from the path surface



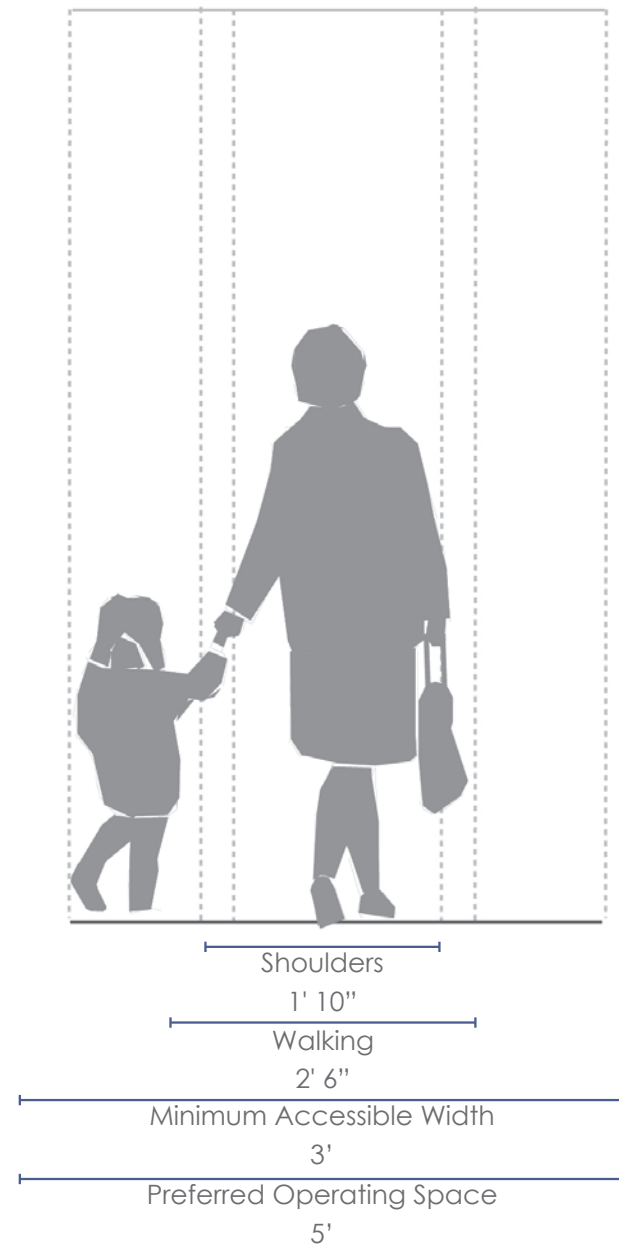
COMMUNITY ENGAGEMENT

Commit to an inclusive process, engaging accessibility partners at every stage of planning and design. Allow for disabled path users to test out the completed path.

TRAIL USERS

PEDESTRIANS

Pedestrians have a variety of characteristics and the transportation network should accommodate a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing. The table below summarizes common pedestrian characteristics for various age groups.

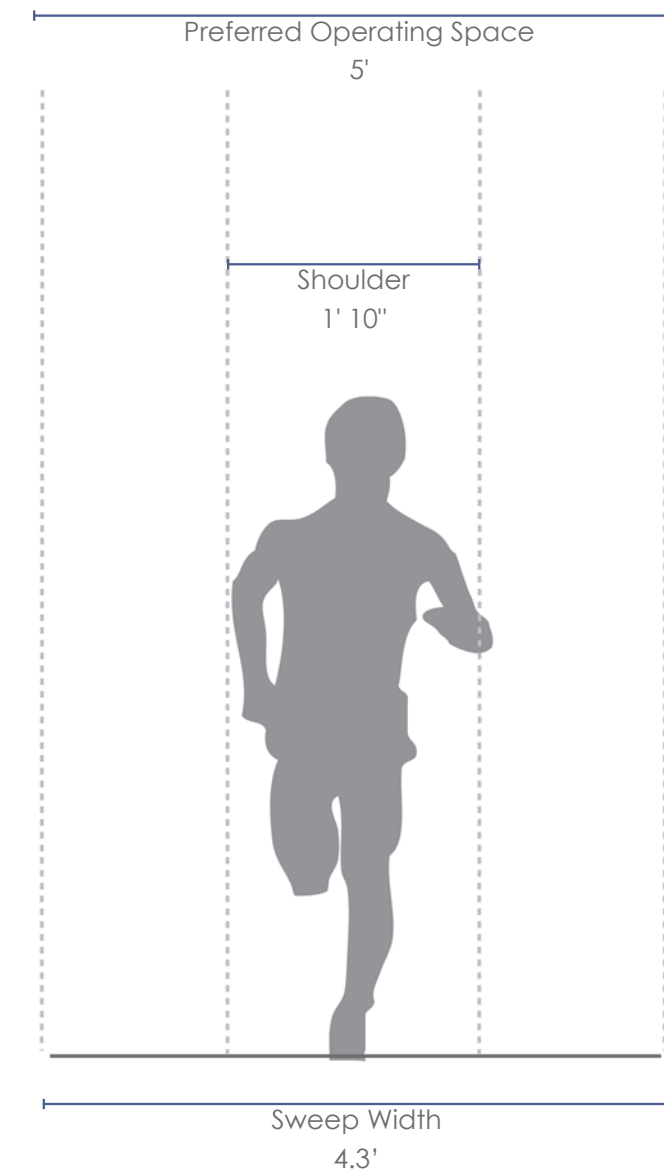


AGE	CHARACTERISTICS
0-4	Learning to walk Requires constant adult supervision Developing peripheral vision and depth perception
5-8	Increasing independence, but still requires supervision Poor depth perception
9-13	Susceptible to "darting out" in roadways Insufficient judgment Sense of invulnerability
14-18	Improved awareness of traffic environment Insufficient judgment
19-40	Active, aware of traffic environment
41-65	Slowing of reflexes
65+	Difficulty crossing street Vision loss Difficulty hearing vehicles approaching from behind

RUNNERS

Running is an important recreation and fitness activity commonly performed on multi-use paths. Runners can change their speed and direction frequently. If high volumes are expected, controlled interaction or separation of different types of users should be considered.

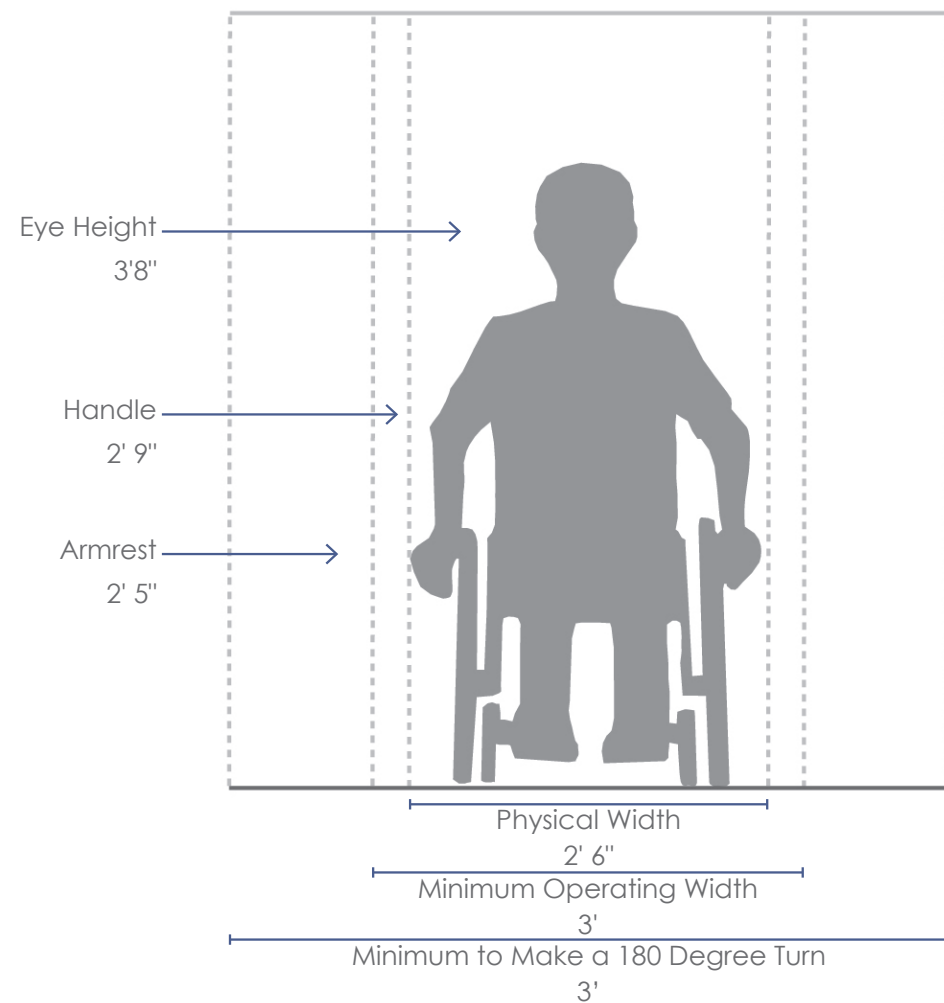
In areas of high use by joggers and runners, the Highlands to Islands trail system can accommodate these users by incorporating a second treadway comprised of a softer material. This enhances the path's level of service by separating user groups and enhancing user comfort on the multi-use path.



WHEELCHAIR USERS

People traveling in wheelchairs have specific needs. For example, maneuvering around a turn requires additional space for wheelchair devices. Providing adequate space for 180 degree turns at appropriate locations is an important element of accessible design.

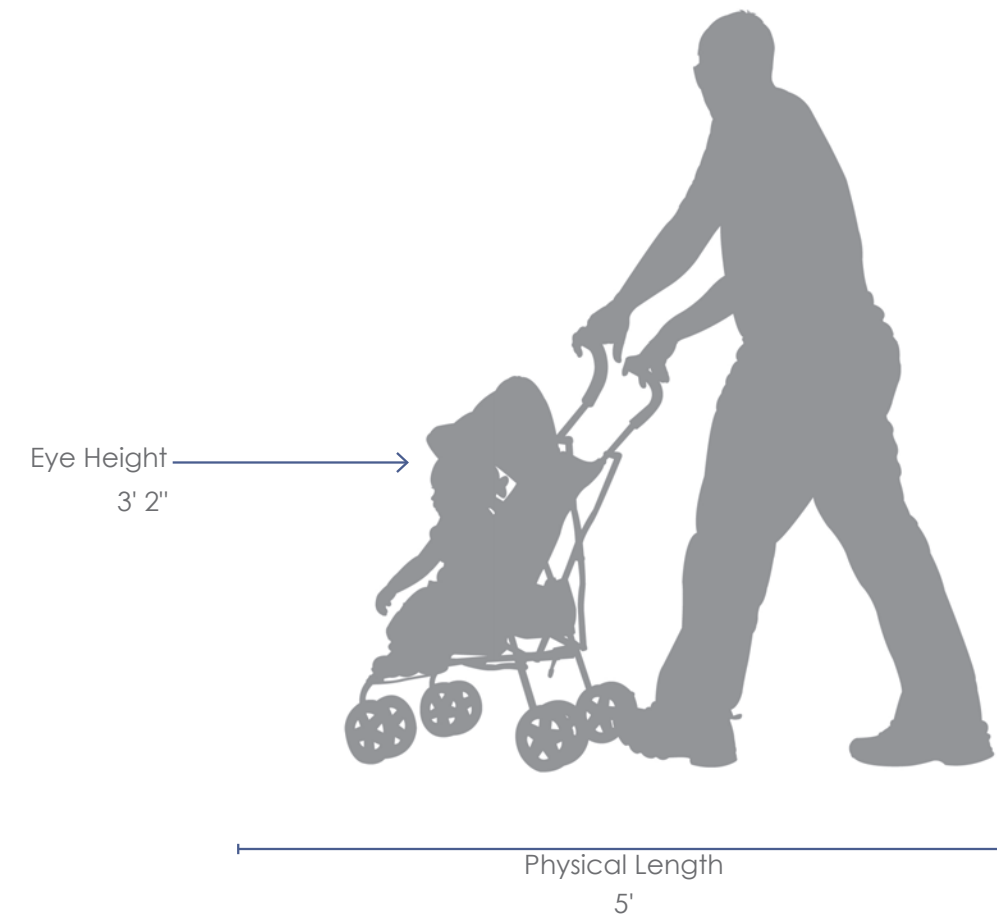
EFFECT ON MOBILITY	DESIGN SOLUTION
Difficulty propelling over uneven or soft surfaces	Firm, stable surfaces and structures, including ramps or beveled edges
Cross-slopes cause wheelchairs to veer downhill	Cross-slopes of less than two percent
Require wider path of travel	Sufficient width and maneuvering space



STROLLERS

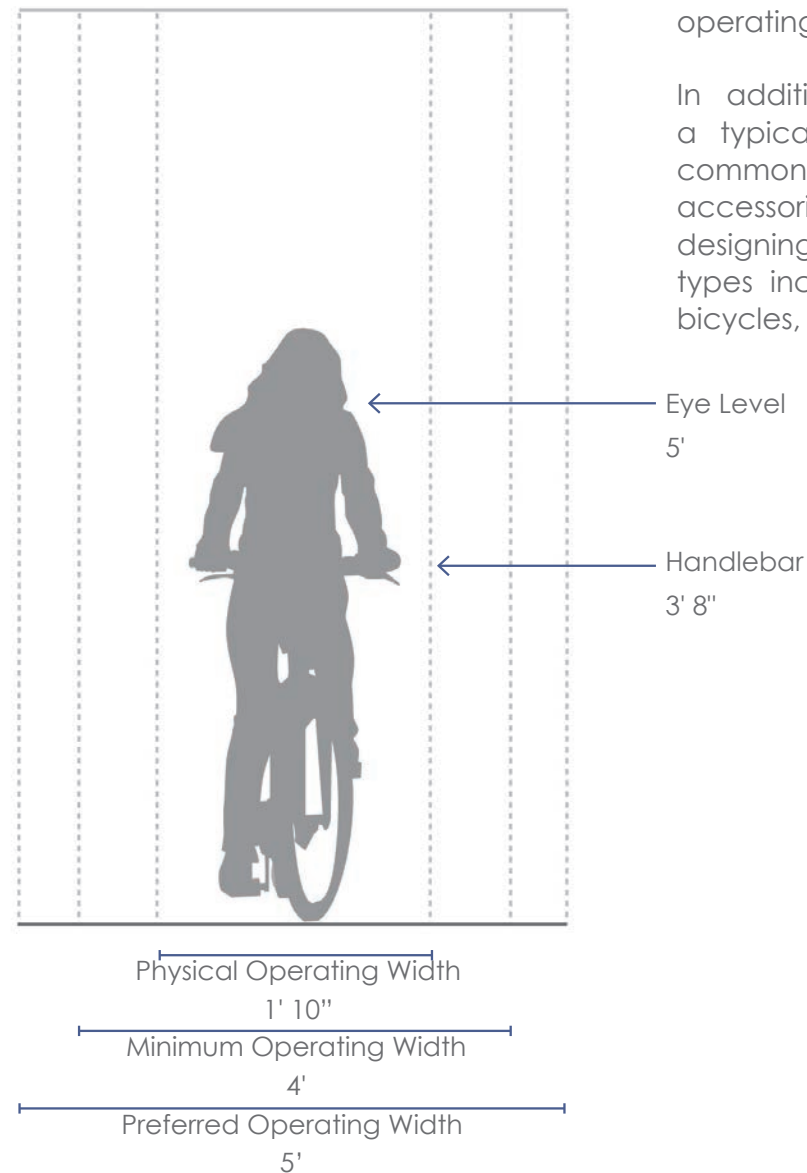
Strollers are wheeled devices pushed by pedestrians to transport babies or small children. Stroller models vary greatly in their design and capacity. Some strollers are designed to accommodate a single child, others can carry 3 or more. Design needs of strollers depend on the wheel size, geometry and ability of the adult who is pushing the stroller.

Strollers commonly have small pivoting front wheels for easy maneuverability, but these wheels may limit their use on unpaved surfaces or rough pavement. Curb ramps are valuable to these users. Lateral overturning is one main safety concern for stroller users.



BICYCLISTS

Similar to motor vehicles, people and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, and four feet should be considered the minimum operating width. Objects which may catch handlebars or be hit by a pedal should provide adequate shy distance while still maintaining the minimum operating width.



In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories.

POWERED MICROMOBILITY DEVICES

E-bicycles, e-scooters, e-skateboards and other powered micromobility devices are electric mobility devices operated along on-street facilities or multi-use pathways. With the growth of powered micromobility devices, there is now a spectrum of vehicles on the market. However, they are often more onerous to identify and manage. E-bikes often have the option to turn the electric assist feature on and off, making it difficult to distinguish when it is being used like a regular bike versus an e-bike. Design considerations for powered micromobility devices are detailed below.

Electric Micromobility Device Design Considerations

	E-BICYCLE	E-SCOOTER
SPEED	Up to 20 mph	15-20 mph
TYPICAL TRIP DISTANCE	5 mi	1-1.5 mi
VARIATIONS	Class I, II; Electric Tricycles; Electric Cargo Bikes; and Pedal-less E-bikes	Stand up e-scooters, e-skateboards, e-unicycles, e-balance boards
PARKING CONSIDERATIONS	Access to charging stations, on-street corrals, racks in furnishing zones	Access to charging stations, on-street corrals, e-scooter parking zones, racks in furnishing zones
SHARED MOBILITY CONSIDERATIONS	Access to shared mobility docking stations or designated lock-to racks or designated micromobility parking zones	Undesignated parking (in furnishing zone or similar area), scooter docking stations, or designated parking zones

GOLF CARTS ON MULTI-USE PATHS

Golf carts are only permitted on certain sections of the Highlands to Islands Trail system. Those sections currently include:

Braselton LifePath, City of Braselton

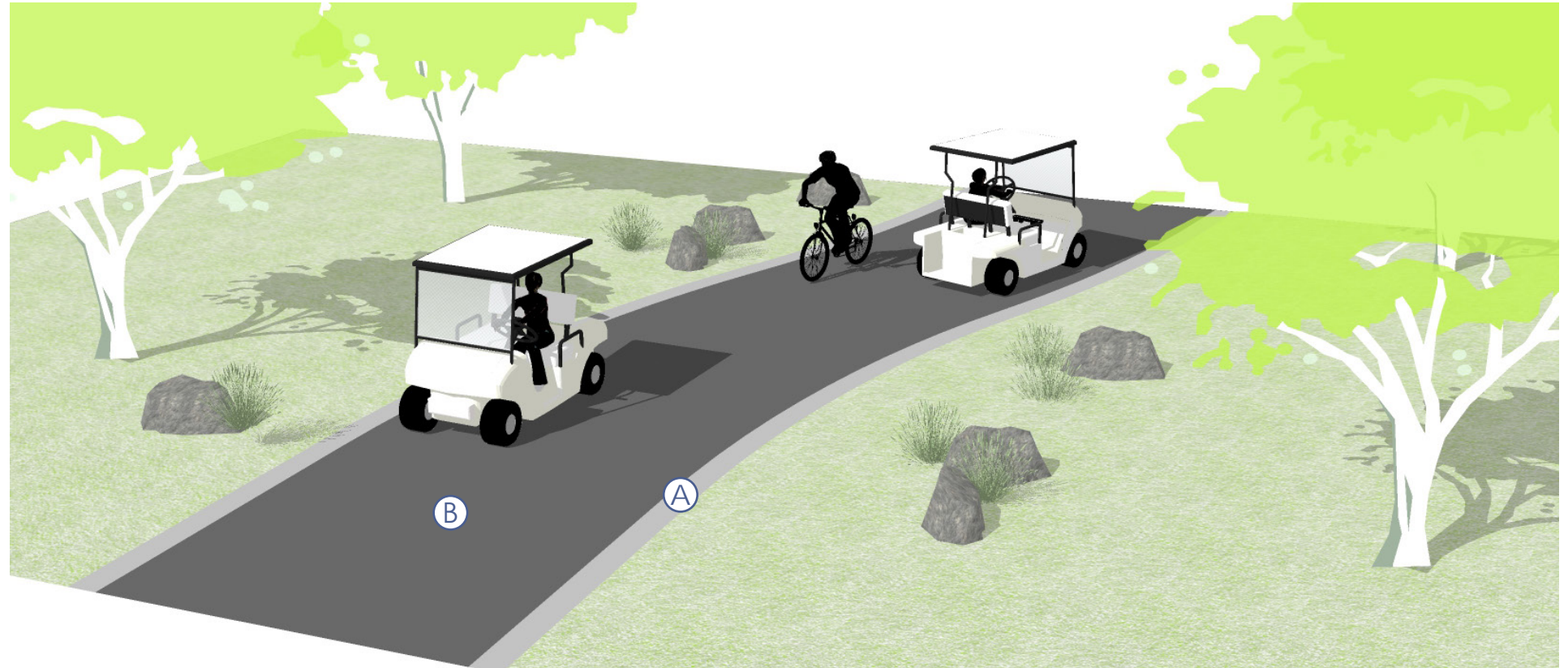
Additionally, the City of Flowery Branch has stated that they foresee residents utilizing certain sections of the trail via golf carts to access their downtown and retail centers. This portion of the trail is not yet built and the exact segments where golf carts will be permitted will be determined at a later date.

Golf carts are not to be permitted on any other trails of the Highlands to Islands trail system.

Where golf cart use is permitted, the following guidance may be used.

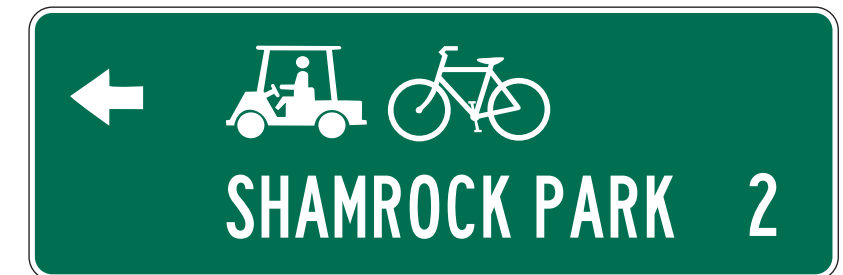
DESIGN FEATURES

- Preferred path width is 14', and minimum width is 12 ft (3.6 m). Twelve feet is the minimum width needed to allow two golf carts to pass each other, and also enables a bicyclist to pass another path user going the same direction, while another path user is approaching from the opposite direction. 14' is the preferred width for multi-use paths designed to facilitate golf carts, pedestrians, and bicyclists. Where pedestrian volumes are extremely high, a separate track 5 ft (1.5 m) sidewalk can be provided for separate use.
- A** A 2 ft (0.6 m) or greater shoulder on both sides of the path should be provided free of obstacles. An additional foot of lateral clearance, for a total of 3 ft (1.0 m), is required by the MUTCD for the installation of signage or other furnishings.
- B** Stable, slip-resistant path surface and ADA-accessible curb ramps with tactile warning strips for ADA-accessibility.
- Running slopes not to exceed 5%, unless following road grade per PROWAG.
 - Cross-slopes not to exceed 2%.
 - Standard clearance to overhead obstructions should be 10 ft (3.0 m).
 - Frequent access points from the local road network



SIGNAGE

- There are several types of signs that can help with trail navigation. The following examples are modified versions of standard MUTCD bicycle wayfinding signage that may be used in municipalities allowing golf cart access to the trails. Participating municipalities of the Highlands to Island Trail System may consider other custom wayfinding signage with branding to reflect community character.
- Confirmation signs indicate that golf cart users and bicyclists are on the right path to their destinations. They include destinations and distance/time, but not arrows.
- Signage should clearly indicate the boundaries of golf cart usage where trails are not permitted (please see signage section for reference).
- Turn signs indicate where a route turns from one street onto another street.
- Decision signs indicate the junction of two or more trail routes to access key destinations. The signs include destinations, arrows and distances. Travel times are optional.



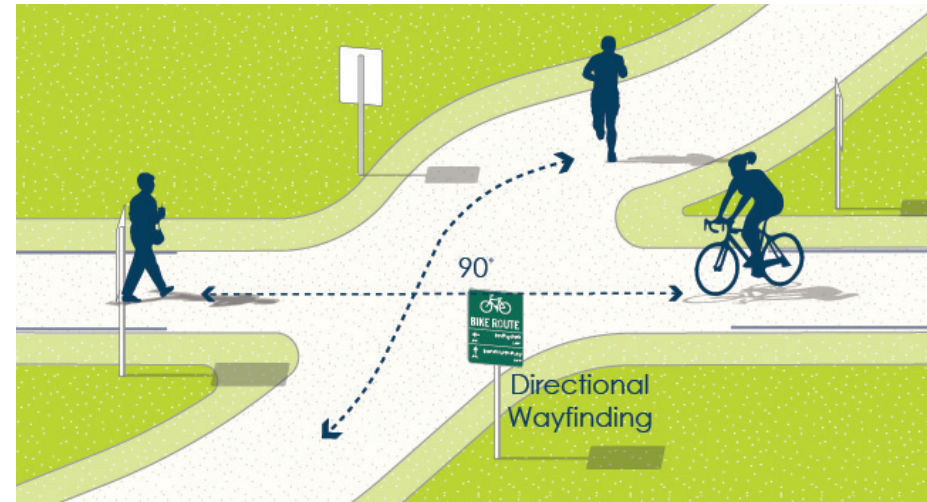
INTERSECTIONS WITH OTHER TRAILS

DESCRIPTION

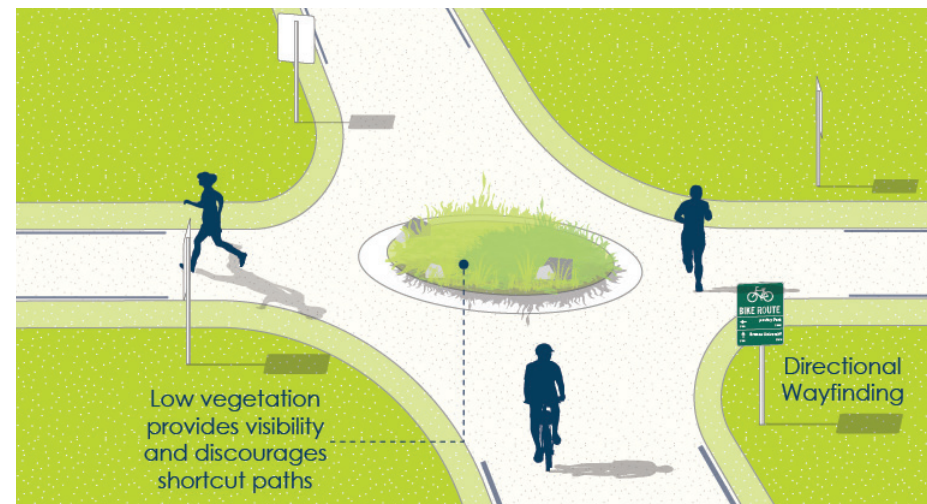
At the intersection of two trails, users should be aware that they are approaching an intersection and of the potential for encountering different user types from a variety of directions. This can be achieved through a combination of regulatory and wayfinding signage and unobstructed sight lines.

GUIDELINES

- Trails should be aligned to intersect at 90 degree angles when possible.
- Sight lines should be clear for all users.
- Consider off-setting the trail intersection and creating two three-way intersections rather than one four-way intersection.
- A traffic circle may be a viable design option to slow speeds and clarify expected operation.
- Include directional signage at intersections.
- If a traffic circle design is used, consider the use of landscaping with low growing (no more than 24 inches high) and minimally spreading native shrubs and groundcover that require little maintenance and provide clear sight lines.
- Other material can be used within traffic circles such as boulders and public art to discourage shortcut paths through the central island as long as clear sight lines under 36 inches are maintained.



Reorient angled crossings to approach at 90 degrees



Trail "traffic circle"



Trail at Sidewalk intersection

TRAIL SPURS

NEIGHBORHOOD ACCESSWAYS

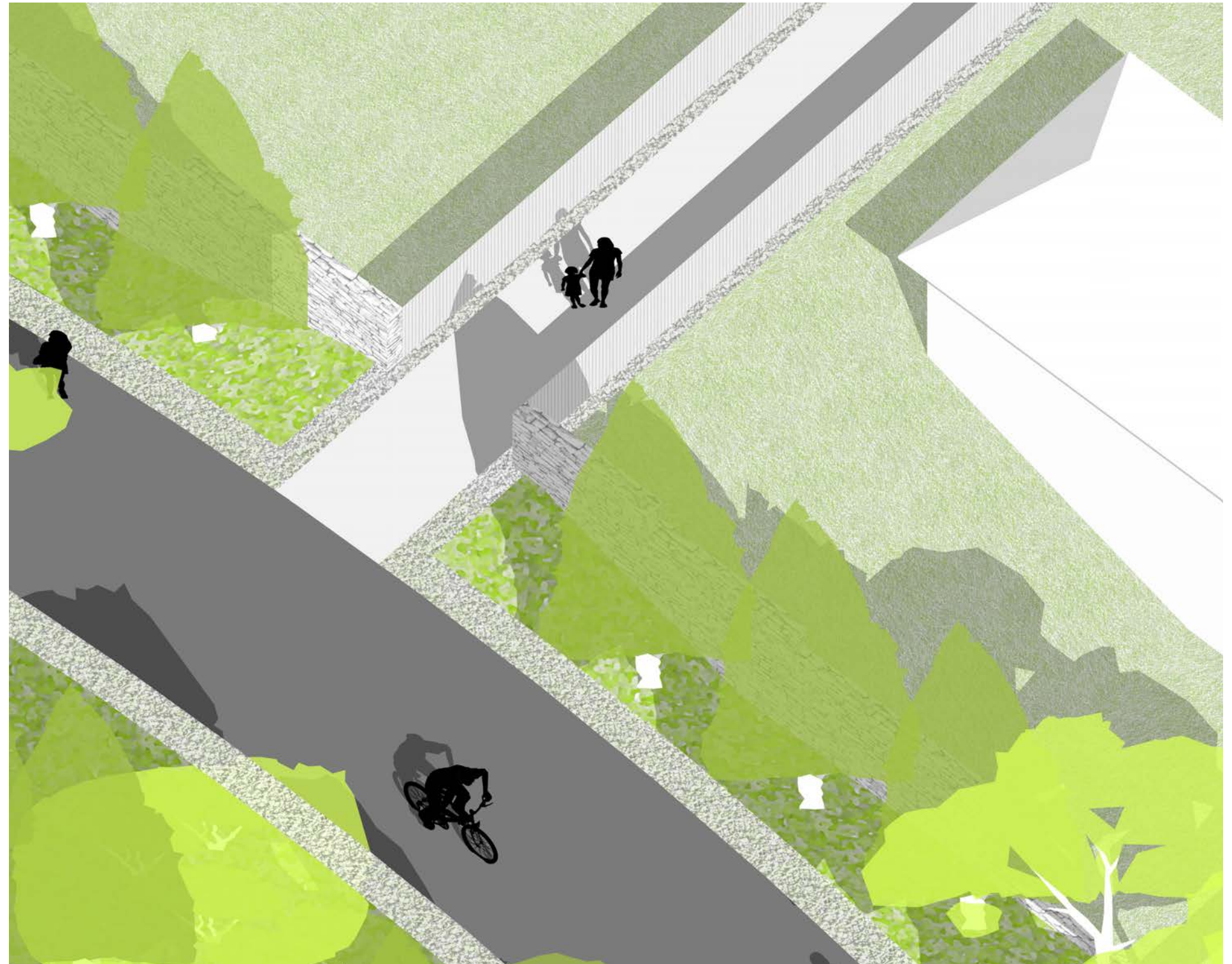
Neighborhood accessways provide residential areas with direct bicycle and pedestrian access to parks, trails, greenspaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own right-of-way and easements.

TYPICAL APPLICATION

- Neighborhood accessways should be designed into new subdivisions.
- For existing subdivisions, neighborhood and homeowner association groups are encouraged to identify locations where such connects would be desirable.

DESIGN FEATURES

- Neighborhood accessways should remain open to the public.
- Trail pavement shall be at least 8 feet wide to accommodate emergency and maintenance vehicles, meet ADA requirements and be considered suitable for multi-use.
- Trail widths should be designed to be less than 8 feet wide only when necessary to protect large mature native trees over 18" in caliper, wetlands or other ecologically sensitive areas.
- Access trails should slightly meander whenever possible.



NATURAL SURFACE SPURS AND CONNECTORS

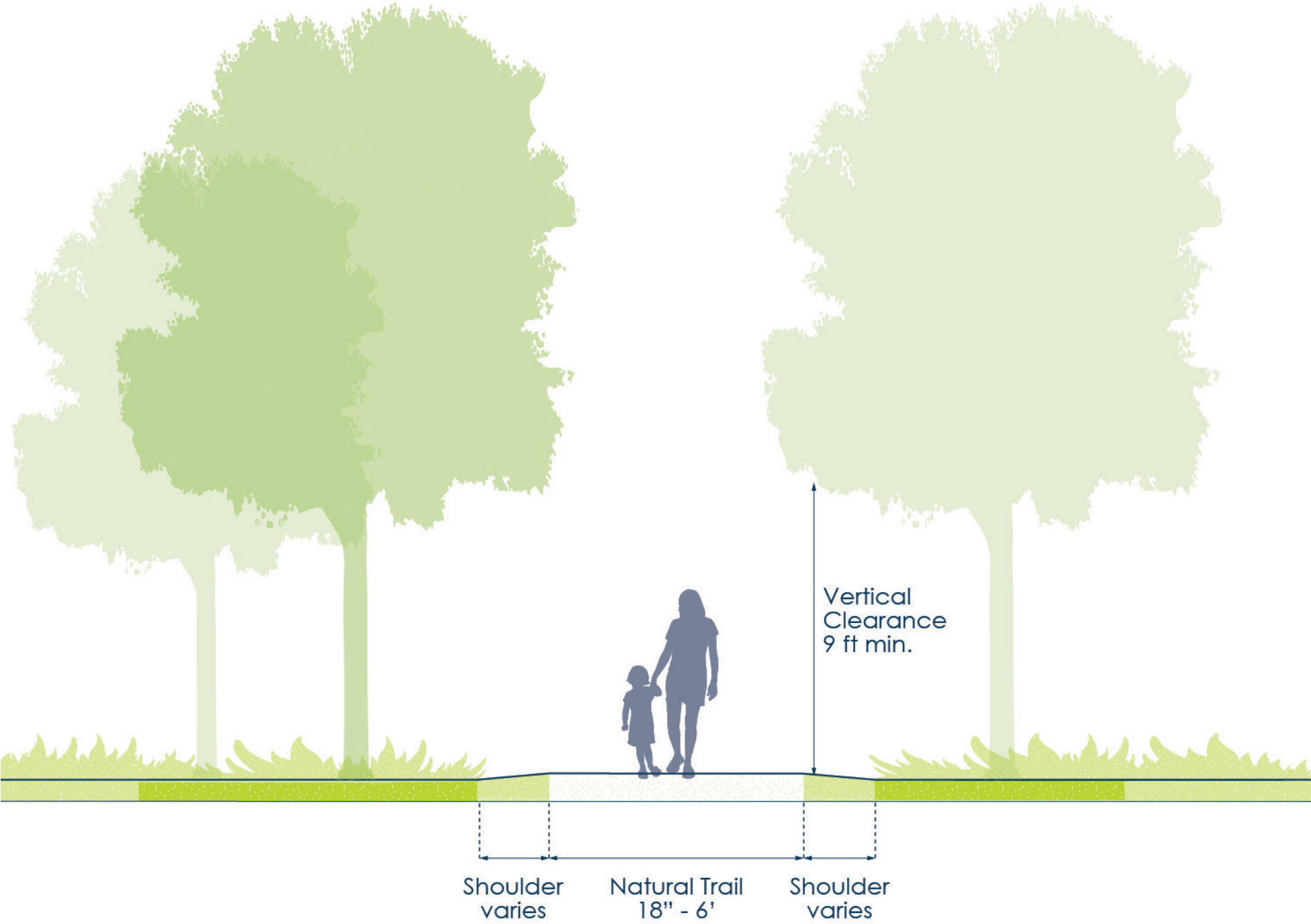
Sometimes referred to as footpaths or hiking trails, natural surface trails are used along corridors that are environmentally sensitive but can support bare earth, wood chips, or stone fines. Soft surface trails may be used as spur trails, or as parallel hiking trails to the primary greenway route.

TYPICAL APPLICATION

Natural surface trails are a low-impact solution and found in areas with limited development or where a more primitive experience is desired. These are not intended to be ADA compliant or accommodate all non-motorized uses.

DESIGN FEATURES

- Trails can vary in width from 18 inches to 6 feet or greater; vertical clearances should be maintained at nine-feet above grade.
- Base preparation varies from machine-worked surfaces to those worn only by usage.
- Trail surface can be made out of dirt, rock, soil, forest litter, or other natural materials. Some trails use crushed stone (crusher run) that contains about 4% fines by weight, and compacts with use.
- Provide positive drainage for trail tread without extensive removal of existing vegetation; maximum slope is 5% (typical).



TRAIL & ROADWAY INTERSECTIONS

DESCRIPTION

The specific type of treatment for Highlands to Islands Trail trail crossings may range from a simple marked crosswalk to full traffic signal or grade separated crossing.

The table below presents a high-level assessment of potential crossing treatment options for a variety of contexts. Enhanced treatments require additional site by site analysis and should be implemented based upon a safety engineering evaluation, and identified community need. The evaluation should consider the number of lanes, the presence or lack of a median, the distance from adjacent signalized intersections, the pedestrian volumes and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th-percentile speed, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting, and other appropriate factors.

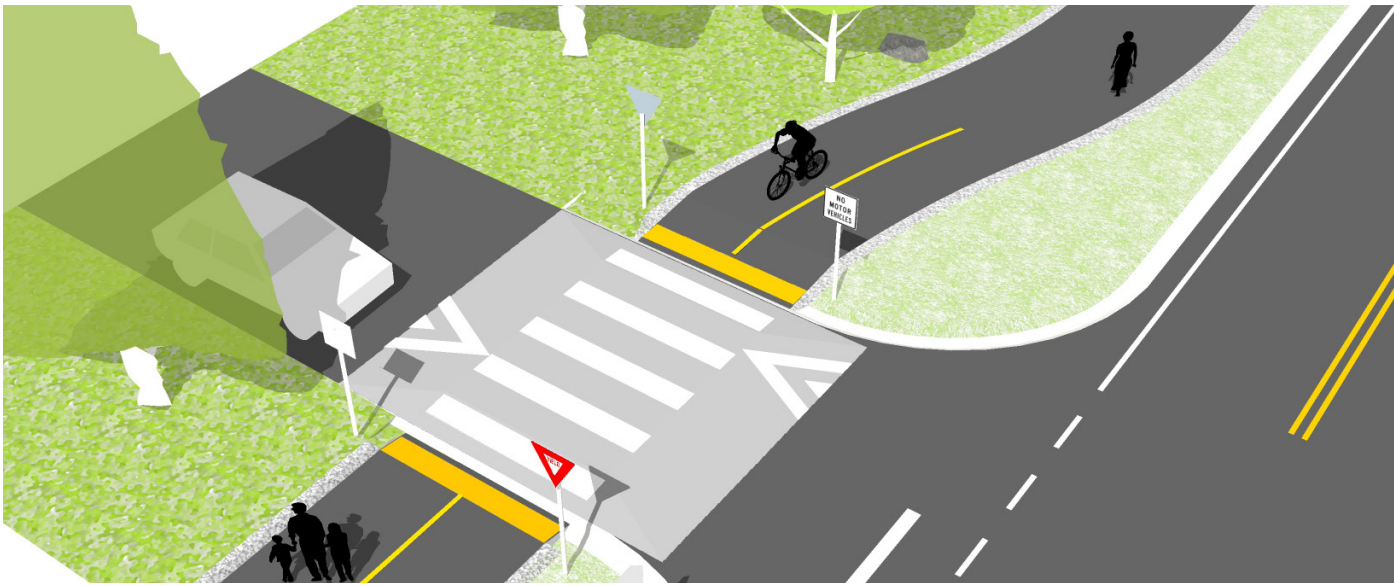
PEDESTRIAN CROSSING CONTEXTUAL GUIDANCE	Local Streets 15-25 mph		Collector Streets 25-30 mph			Arterial Streets 30-45 mph							
	2 lane	3 lane	2 lane	2 lane with median refuge	3 lane	2 lane	2 lane with median refuge	3 lane	4 lane	4 lane with median refuge	5 lane	6 lane	6 lane with median refuge
Marked and Signed Crosswalk*	✓	✓	EJ	EJ	X	EJ	EJ	X	X	X	X	X	X
Crosswalk	EJ	✓	✓	✓	✓	EJ	EJ	EJ	X	X	X	X	X
Raised Crosswalk	✓	✓	EJ	EJ	EJ	EJ	EJ	EJ	X	X	X	X	X
Rectangular Rapid Flashing Beacon Crossing	X	EJ	✓	✓	✓	✓	✓	✓	X	✓	X	X	X
Pedestrian Hybrid Beacon Crossing	X	X	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓	✓	✓
Grade Separated Crossing	X	X	EJ	EJ	EJ	X	EJ	EJ	✓	✓	✓	✓	✓

LEGEND	
Desirable	✓
Engineering Judgement	EJ
Not Recommended	X

*Note that all treatments shall include a marked crosswalk. The "Marked and Signed Crosswalk" line item indicates contexts where ONLY a marked and signed crosswalk is an appropriate treatment.

RAISED CROSSING

Raised crosswalks are a combination of a raised speed-table and a marking crosswalk to increase vehicular yielding rates. It is also used to highlight road user priority with its geometric design.



TYPICAL APPLICATION

Raised crosswalks may be used at mid-block or intersection crossings on local, collector and, in limited circumstances, arterial streets. They are also applicable on streets with speeds at or below 30 mph- 35 mph in locations with high pedestrian traffic and maximum traffic volumes of 3,500-4,000 vehicles per day.

DESIGN FEATURES

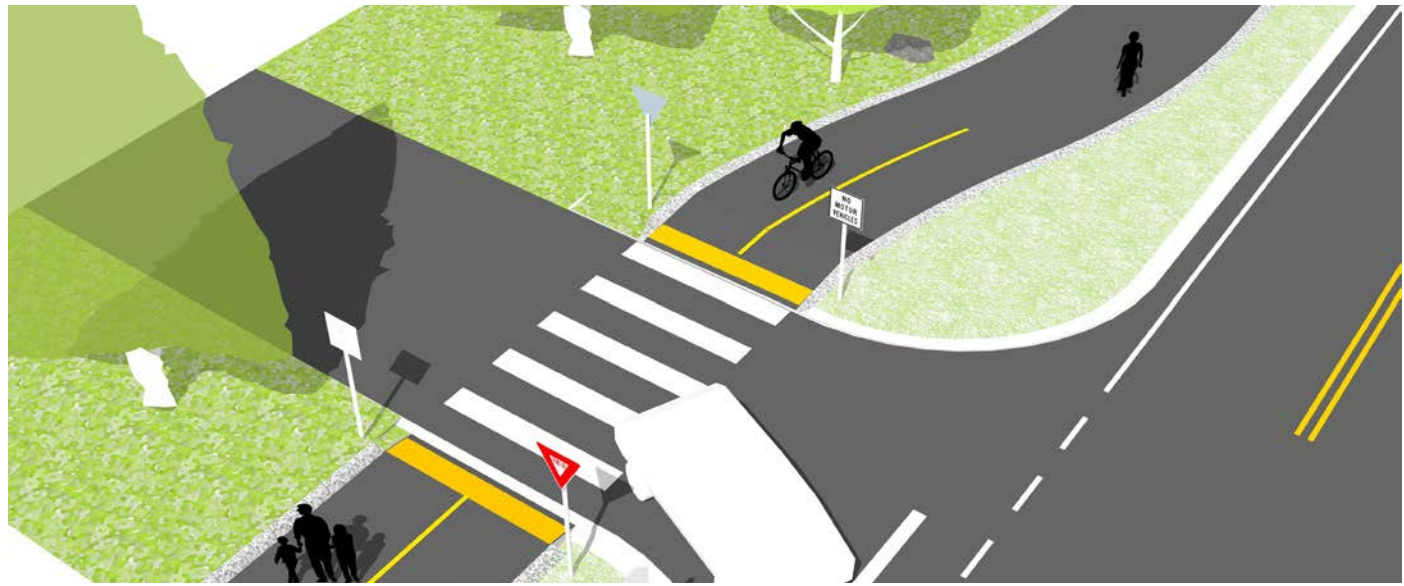
- Median island refuges should be paired with a Marked Crosswalk and Advanced Yield Line Crossing Treatment Package.
- Where parking lanes exist, curb extensions should be used to shorten crossing distance and position users in a visible location. Parking should be prohibited between the yield line and marked crosswalk.

MAINTENANCE

The raised crosswalk should have a smooth curve profile in order for snow plows to operate on the streets that they are applied on.

MARKED CROSSING

Markings must be used to create a legal crosswalk, when a multi-use path crosses a roadway at a midblock location. The most simple marked crossing type uses high visibility crosswalk markings with crossing warning signs.



TYPICAL APPLICATION

Marked and signed crosswalks are typically used where multi-use paths intersect with collector or minor arterial roadways. Midblock path crossings should not be placed within 250 feet of an existing signalized intersection. Align the path directly to the existing signalized intersection if it is the closest crossing available.

DESIGN FEATURES

- High visibility crosswalk markings.
- Bicycle/Pedestrian warning sign (W11-15) with downward arrow plaque (W16- 7P) at the crossing, on both sides. Bicycle and Pedestrian figures on the sign should always face toward the crosswalk.

- A Bicycle/Pedestrian warning sign (W11-15) with "ahead" plaque (W16-9) before the crossing.

MAINTENANCE

Maintaining marked crossings should be a high priority, because markings need to be visible to be effective. Thermoplastic or epoxy markings offer increased durability over conventional paint.

PEDESTRIAN HYBRID BEACON CROSSING

Pedestrian Hybrid Beacons (PHB), formerly known as High-Intensity Activated Crosswalks (HAWK) can be used to improve multi-use path crossings of major streets. A hybrid beacon consists of a signal head with two red lenses over a single yellow lens on the major street, and a pedestrian signal head for the crosswalk.

Hybrid beacons are only used at marked mid-block crossings or unsignalized intersections. They are activated with a pedestrian pushbutton at each end. If a median refuge island is used at the crossing, another pedestrian pushbutton can be located on the island to create a two-stage crossing.



TYPICAL APPLICATION

To improve multi-use path crossings of major streets in locations where side-street volumes do not support installation of a conventional traffic signal. Hybrid beacons may also be used at mid-block crossing locations.

DESIGN FEATURES

- Hybrid beacons may be installed without meeting traffic control signal warrants if roadway speed and volumes are excessive for comfortable user crossing.
- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance. Custom signage includes golf cart, bicycle, and pedestrian icons.

RECTANGULAR RAPID FLASHING BEACON CROSSING

Rectangular Rapid Flash Beacons (RRFB) are a type of active warning beacon used at unsignalized crossings. They are designed to increase motor vehicle yielding compliance at marked crosswalks.



TYPICAL APPLICATION

Guidance for marked/unsignalized crossings applies to RRFB crossings. RRFBs shall not be used at crosswalks controlled by YIELD signs, STOP signs, Pedestrian Hybrid Beacons (PHB's), or traffic control signals. RRFBs shall initiate operation based on user actuation and shall cease operation at a predetermined time after the user actuation or, with passive detection, after the user clears the crosswalk. Rectangular Rapid Flash Beacons (RRFB) dramatically increase compliance over conventional warning beacons.

DESIGN FEATURES

- RRFBs are typically activated by path users manually with a push button, or can be actuated automatically with passive detection systems.
- Use in conjunction with custom path warning signage showing golf cart user, pedestrian, and bicycle icons.
- Providing secondary installations of RRFBs on median islands improves conspicuity and creek yielding behavior.
- Optional: Median islands can be painted or raised concrete.
- An RRFB consists of two rectangular-shaped yellow indications, each with an LED-array-based light source.
- When actuated, the two yellow indications in each RRFB unit shall flash in a rapidly flashing sequence.

CREATIVE CROSSING

Creative crossings are artistic alternatives to standard crosswalk markings. Creative crossings use different colors and patterns to provide safe pedestrian crossing.



Creative crosswalk in Long Beach, CA
Source: Alta Planning + Design

TYPICAL APPLICATION

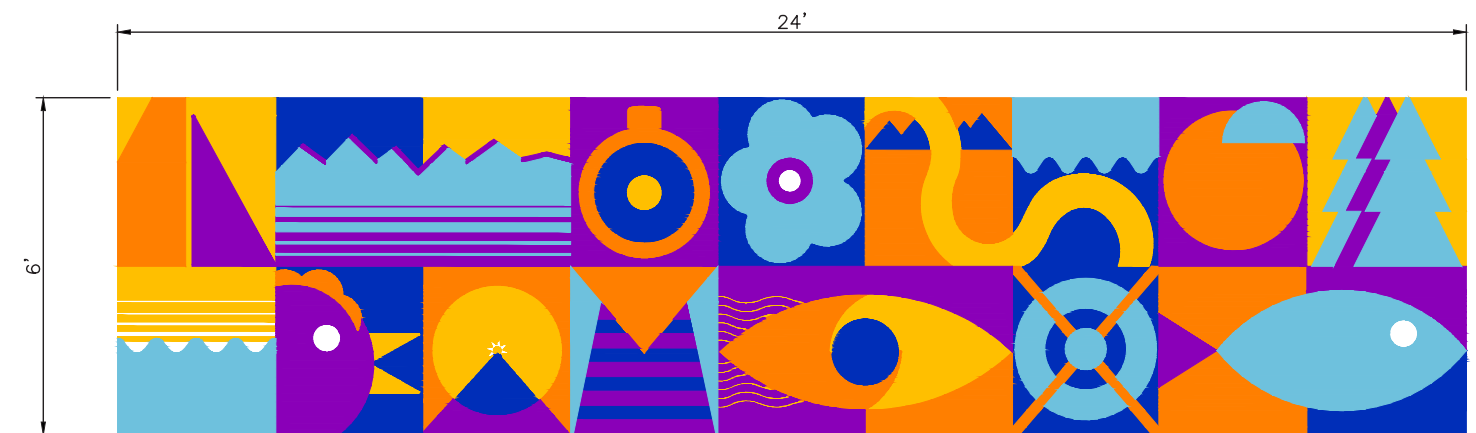
Creative crosswalks may only be implemented on local streets and with the support of the City or County Engineer.

- Recommend implementing in locations close to school crossings. (i.e. Incorporate school mascot design)
- Can utilize Highlands to Islands Trails logo and colors in crosswalks as a branding and wayfinding tool.

- Application of Colored Pavement, colors of crosswalks should generally be in the earth tone family
- In addition to the style of the crosswalk, painted bulbouts may be implemented to enhance pedestrian visibility and comfort at the crossing.

DESIGN FEATURES

- While there is a variety of options for designing these crosswalks, they must follow FHWA guidelines.



Gainesville crosswalk mural designed by Geveko Markings
Source: Geveko Markings and City of Gainesville

STREET UNDERPASSES AND OVERPASSES WITH RAMPS

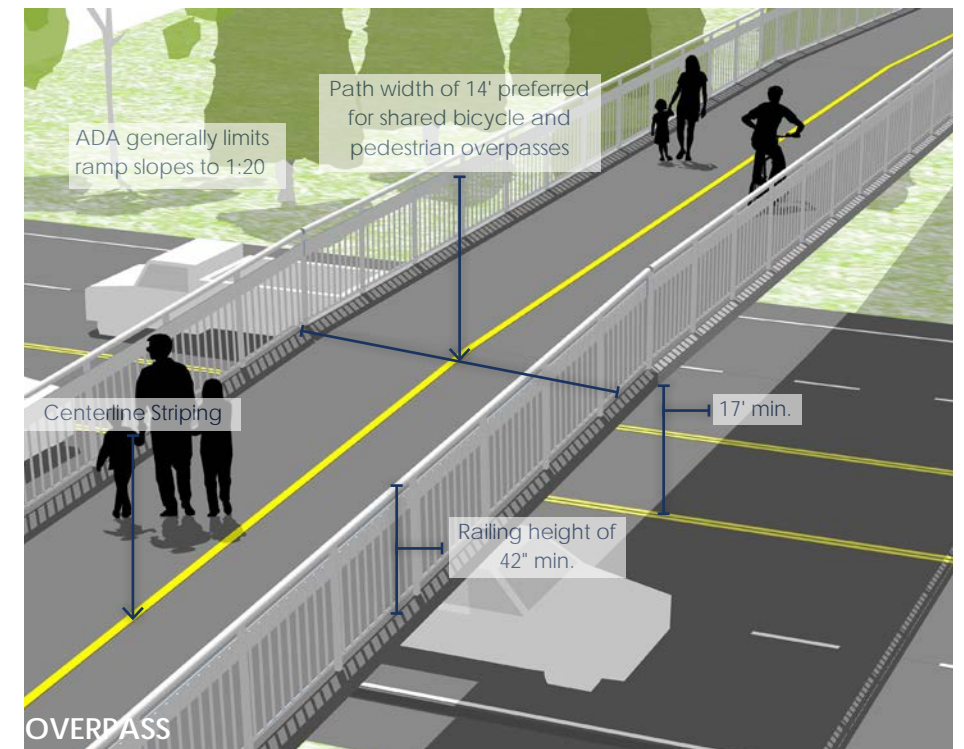
DESCRIPTION

Bicycle/pedestrian underpasses and overpasses with ramps provide critical non-motorized system links by joining areas separated by barriers such as railroads and highway corridors. In most cases, these structures are built in response to user demand for safe crossings where they previously did not exist.

GUIDELINES

- Trail width, surface, lines of sight, grades and other design factors should be in conformance with AASHTO and ADA.
- Concrete surfaces are preferred in flood prone areas to minimize risk of washouts.
- Trail above 10-yr flood elevation preferred for tunnels.
- Use appropriate safety signage/warnings such as curve arrows per MUTCD.
- Provide a minimum of 8' of headroom for multi-use (bikes and peds.) 10' min. if equestrian use though 12' of headroom is preferred.
- Provide centerline stripe to promote user safety.
- Provide clear line of sight under bridge with no hiding places.
- 24" edge/rumble strip on each side of path preferred.
- Provide bypass ramps to a safe road crossing point for high water events.
- For attached shared-use path provide min. 12' width and min. 54" safety barrier (min. 42" barrier between path and traffic lane may apply in some instances). Refer to AASHTO and traffic engineers.
- Work with qualified lighting engineer to provide appropriate 24-hour lighting in all tunnels/underpasses.

- In some locations, the trail will go under bridges or through low areas subject to flooding. In some cases, the trail will need to be substantially anchored (with concrete, rock, Geoweb or similar system) and armored with rock where appropriate to prevent wash out from flowing water. A engineer with flood expertise should be consulted to ensure the underpass is durable and will not adversely impact flood conveyance.



STREAM CROSSINGS

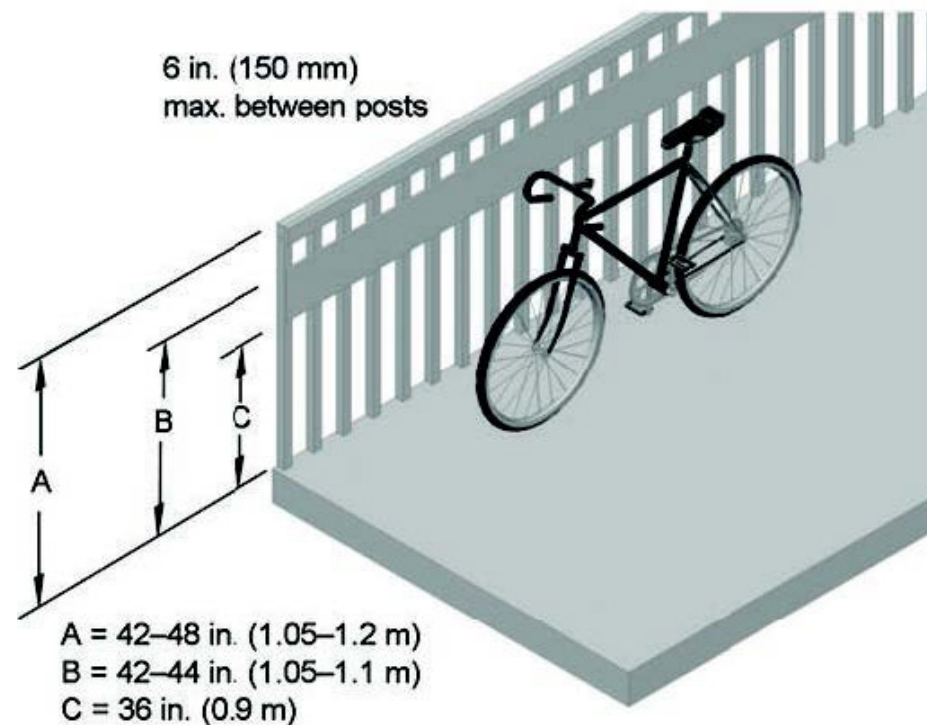
DESCRIPTION

Multi-use path stream crossings provide the Highlands to Islands Trail access over natural features. The type and size of bridge can vary widely depending on the trail type and specific site requirements.

Bridges often used for multi-use paths include suspension bridges, prefabricated span bridges and simple girder bridges. When determining bridge design for multi-use paths, it is important to consider emergency and maintenance vehicle access.

GUIDELINES

- Pedestrian spans should be able to carry weight of maintenance and emergency vehicles (12,000 pounds) unless alternative access is available.
- Spans should be wide enough to accommodate both trail traffic and people who may want to linger on the span to enjoy the view. Absolute minimum width should be 12' but 14' is preferable, both to accommodate those who linger and possible future trail widening. In some instances, such as higher traffic areas, a "belvedere" or small "balcony" may be attached to the side of the bridge deck to accommodate people wanting to linger out of the path of trail traffic.
- All railings should be at least 44" high (54" on highly elevated decks and bridges). Provide approach railings as safety dictates leading to bridges with the opening flared. Approach railing styles should match bridge styles and materials.
- Clear-span crossings are preferred, as opposed to low water crossings on multi-use path. This will avoid washouts and sediment build-up problems. Clear spans should be placed above the 100-year flood level wherever possible, but in some instances may be lower, provided the structure will not raise the 100-year flood level in developed areas without proper mitigation (an engineer with flood expertise should be consulted).



Bridge railing guidelines

Source: AASHTO Guide for the Development of Bicycle Facilities (2012), Figure 5-11.

- Generally, pre-manufactured, self-weathering steel structures are preferred for cost-effective construction and maintenance.
- Wherever appropriate, cost-effective and feasible bridges could include enhancements such as abutment trim, monuments, arches and artistic components.
- Trail above 10-yr flood elevation preferred.
- Optimize headroom vs. trail elevation above creek invert (bottom) to
- Boardwalk design and materials should fit with the branding



Boardwalk Bridge in Memphis, TN
Source: Alta Planning + Design



Wolf Creek Guide Trail Bridge
Source: Alta Planning + Design

EROSION CONTROL, SLOPE PROTECTION, AND BANK RESTORATION

DESCRIPTION

In a number of instances, steep slopes, stream banks, construction cuts, and other areas subject to erosion will require erosion control and stabilization improvements. In instances where retaining walls are not needed, other forms of erosion control and slope protection will be required.

GUIDELINES

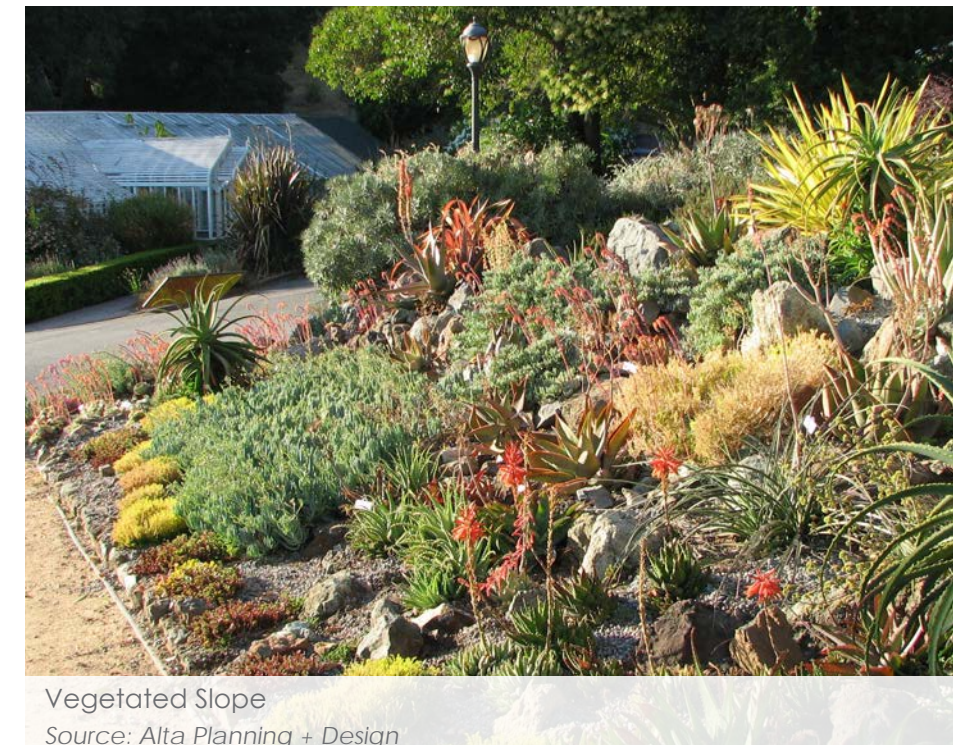
- Typically erosion control should be considered where grades exceed 3:1 unless well stabilized by vegetation .
- Consider incorporating raingardens and bioretention areas along trail to handle storm runoff from paved sections, especially in areas with steeper slopes to prevent erosion from runoff.
- Where feasible, use natural or natural-appearing stabilization that promotes the re-growth of vegetative cover such as woven plant fiber matting.
- If rock rip rap is used for stabilization provide an adequate buried toe along creek and stream banks and bury rock with soil that is stabilized and revegetated to conceal rock and promote a more natural slope.
- Along creek and stream banks and other embankments terrace slopes to create a natural appearance and establish a healthy riparian edge with reforestation.
- Wherever feasible restore disturbed slopes with appropriate indigenous vegetation.
- Local and state guidelines prevail for all erosion and sediment control in Georgia. Refer to the Georgia Soil and Water Conservation Commission's manual.



Natural Retaining Wall
Source: Hansons Garden Village



Vegetated Slope
Source: Alta Planning + Design



Vegetated Slope
Source: Alta Planning + Design

RETAINING WALLS

DESCRIPTION

In general, any slope in excess of 3:1 grade will require stabilization or retention to control erosion. In many cases this will require a structural retaining wall. Walls may vary in height from a 6" curb to a higher wall or wall system of 5- to 12' or more. Walls should be built of stone or brick, or may have a stamped façade over a concrete base.

GUIDELINES

- Where possible, it is desirable to keep wall height less than 4'. On steep, high slopes this may require "splitting" a wall with half of the height on the uphill side of the trail and half on the downhill side or "terracing" the slope with multiple shorter walls.
- Walls should be designed by a qualified professional and walls in excess of 4' high should be reviewed and approved by a qualified engineer.
- Where feasible, stacked-natural stone walls are preferred for aesthetics, although segmental retaining walls may be used (see image).
- Where stone is not feasible, or where feature wall surfaces are desired, they can be faced with a natural appearing stone façade such as Tennessee fieldstone.
- Protruding and sharp edges should be avoided and where this is not feasible, such as the ends of walls, blunt ends should be marked with "hazard" demarcation panels per the Manual of Uniform Traffic Control Devices if they are within 30" of the edge of the trail.
- Walls can be constructed of concrete, anchored block system, stone or other appropriate material.
- Where retaining walls are required but facing will not be seen from the trail, standard block walls can be used for cost savings.

MORTARED GRANITE STONE



Recommended Application

Used as the standard stone for retaining walls

TENNESSEE FIELDSTONE



Recommended Application

Used for retaining walls in specialty areas

A blue-tinted photograph of a paved path leading towards large white letters spelling 'MODA' on a grassy area. The path is in the foreground, leading towards the letters. The letters are large and white, standing on a grassy area. In the background, there are trees, utility poles, and a building. The sky is overcast.

4 | Fit and Finish

OVERVIEW

The following section contains guidance and recommended furnishings and amenities for the Highlands to Islands Trail network. Each amenity category has detailed guidance on placement and typical applications. Recommended products and manufacturers are also provided for each amenity. The proposed manufacturers and products were chosen based on feasibility, maintenance and the County and City's desired aesthetic.



The Highlands to Islands Trail
Source: Gainesville Times

SEATING

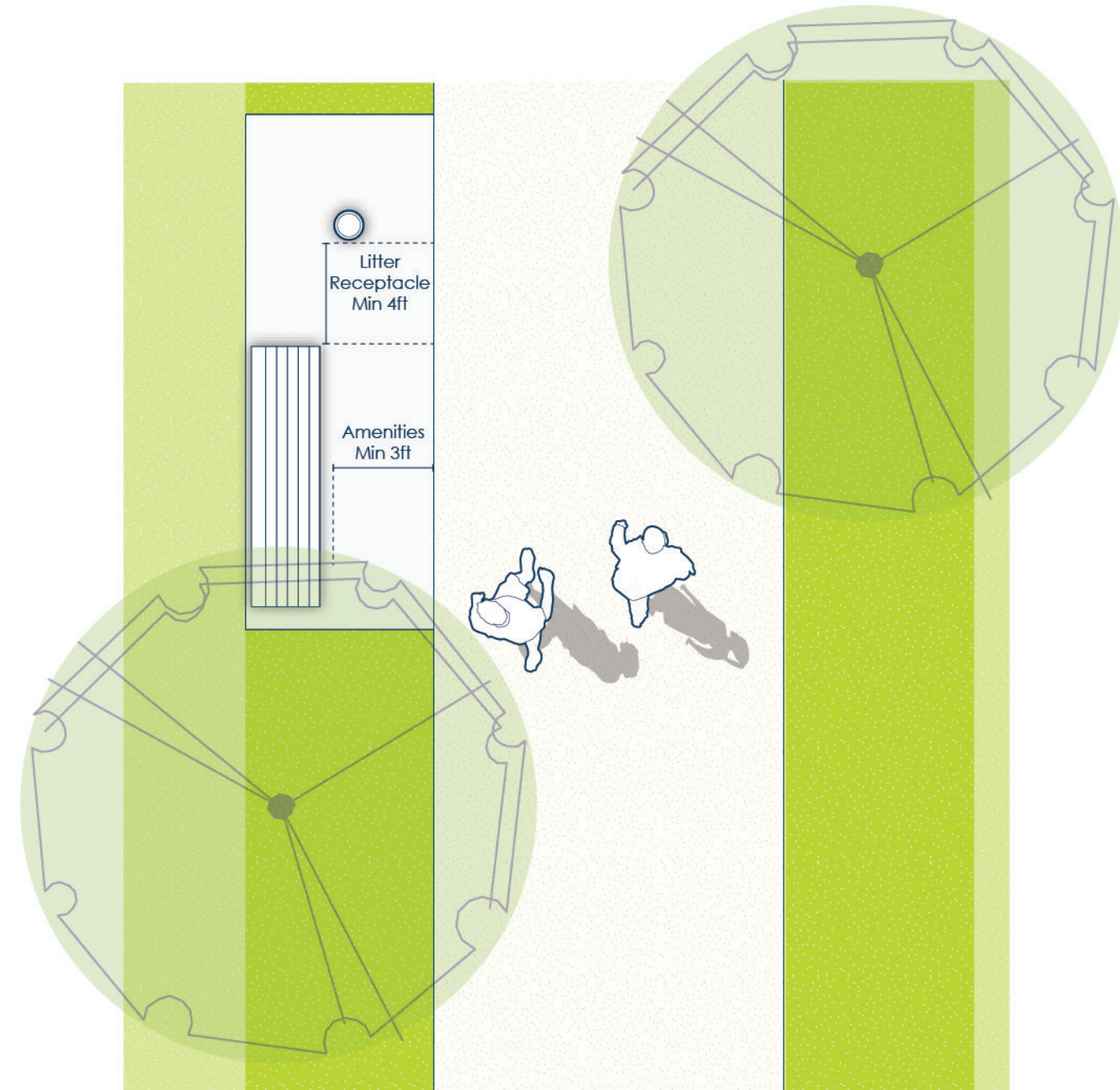
DESCRIPTION

Seating along trails provides a place for trail users to rest, congregate, contemplate, or people-watch along trails and throughout the trail system. Benches can be designed to create identity in a place or along the trail or be strictly utilitarian. Picnic tables provide places for trail users to congregate for meals or to just relax.

GUIDELINES

- Locate benches at all gateways, trailheads, picnic areas and at regular intervals along the trail.
- Locate all seating (and other site furniture) a minimum of 3' from the edge of the trail.
- Swing benches should be located a minimum of 10' from the edge of the trail.
- Locate benches a minimum of 4' from restrooms, phone booths and drinking fountains and a minimum of 2' from trash receptacles, light poles and sign posts.
- Seating should be placed in shaded area, especially where there is minimal shade available.
- Drainage should slope away from the bench and the trail.

TYPICAL DETAIL



RECOMMENDED SEATING OPTION (CURRENTLY IN USE)

FS-50 BENCH

Manufacturer:

Victor Stanley

Dimensions:

H (32.375") L (4', 6', and 8') D (23.75")

Mounting:

Surface mount or In-ground mount

Materials and Finish:

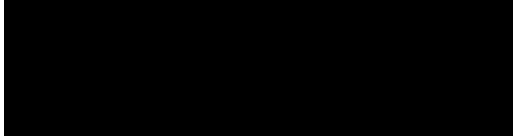
- Horizontal steel rod tubing and steel rod seating
- All metal components are steel shotblasted, etched, phosphatized, preheated and electrostatically powder-coated with TGIC polyester powder coatings

Options:

- Multiple bench lengths are available upon request (4', 6', 8')
- Skateboard guards can be added



Recommended Powdercoat Finishes



FS-50 Bench
Source (All Images): Victor Stanley

DASH BENCH

Manufacturer:

Forms + Surfaces

Dimensions:

H (18") W (72") D (20.5")

Mounting:

Surface (Mounted with tamper resistant anchor bolts)

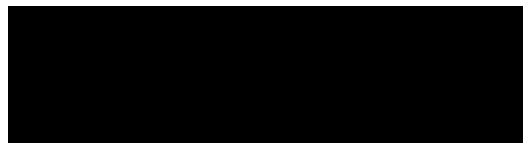
Materials and Finish:

- TENSU Ultra High Performance Concrete (UHPC) with an aluminum frame
- Various powder coat finishes are available

Options:

- Custom powder coat colors can be created upon request

Recommended Powdercoat Finishes



Dash Bench
Source (All Images): Forms + Surfaces

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BIKE PARKING

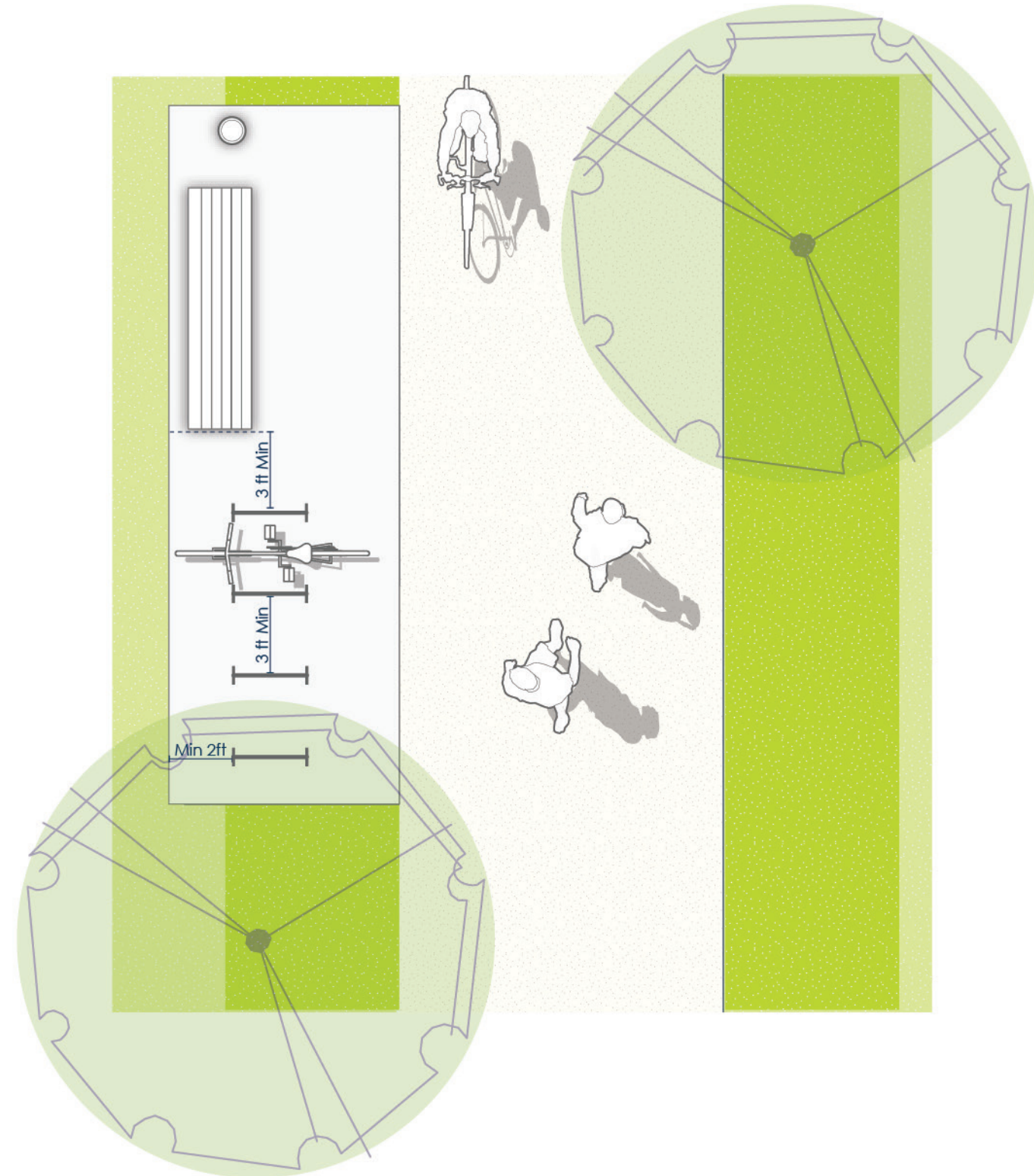
DESCRIPTION

Short-term bicycle parking is meant to accommodate users departing in two hours or less. In places where bicyclists will want to leave their bikes for significantly longer, it may be appropriate to provide long-term storage in the form of bicycle shelters or Secure Parking Areas (SPAs). Racks should be placed adjacent to comfort stations, visitor centers, seating areas, and be weather protected where possible. The Association for Pedestrian and Bicycle Professionals (APBP) provides standards for bike rack design, spacing, and placement. Local, state, and federal codes should be consulted for additional count requirements and installation regulations.

GUIDELINES

- In urban settings: 2' minimum from the curb face to avoid 'dooring.'
- As close to destinations as feasibly possible; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and a property line.
- Should be highly visible from adjacent bicycle routes and pedestrian traffic.
- Locate racks in areas that cyclists are most likely to travel.
- Provide racks that support the frame in at least two places such as a U-shape, arch, hoop, or other single form.
- Finish should be matte black or silver.

TYPICAL DETAIL



RECOMMENDED BIKE PARKING

LOOP BIKE RACK

Manufacturer:

Landscape Forms

Dimensions:

H (31") W (36") D (14")

Mounting:

Embedded

Materials and Finish:

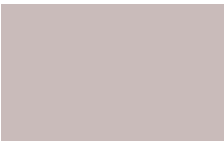
- Aluminum casted frame
- All metal parts are finished with Landscape Forms' propriety Pangard II polyester powder coat, a hard yet flexible finish that resists rusting, chipping, peeling, and fading.
- Various powder coat finishes are available in a gloss, metallic, or low sheen finish

Recommended Powdercoat Finishes

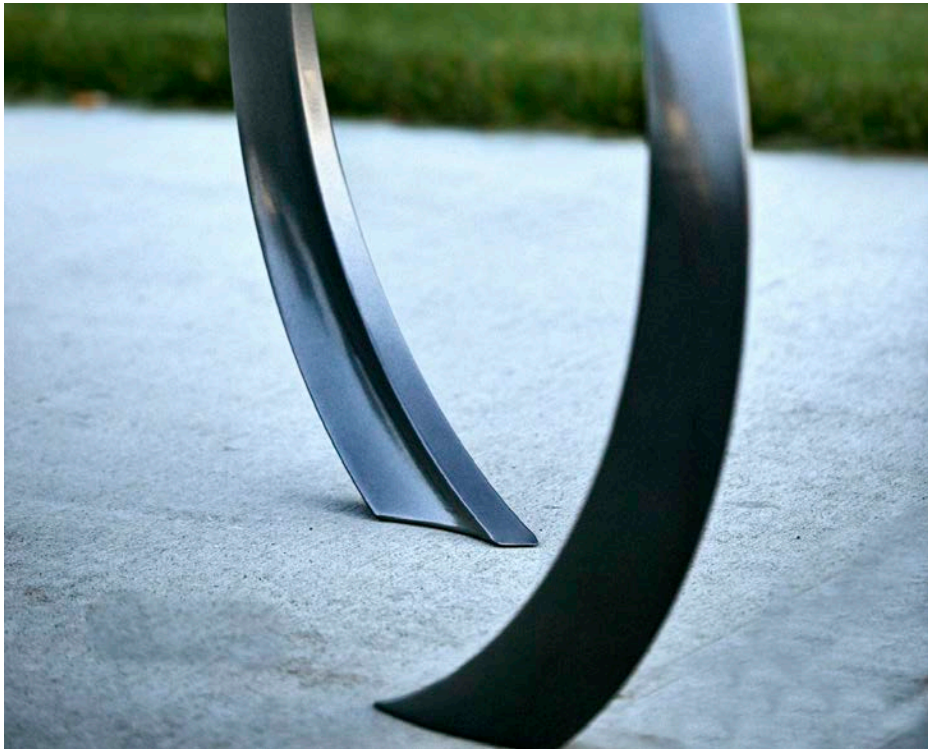
Gloss Option



Metallic Option



Loop Bike Rack
Source (All Images): Landscape Forms



OLYMPIA BIKE RACK

Manufacturer:

Forms + Surfaces

Dimensions:

H (35 1/2") W (7") D (3")

Mounting:

Surface

Materials and Finish:

- Corrosion-resistant cast aluminum with a powder coat finish
- Various powder coat finishes are available

Options:

- The U-lock design allows for various bike parking configurations

Recommended Powdercoat Finishes



Olympia Bike Rack
Source (All Images): Form + Surfaces



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TRASH RECEPTACLES

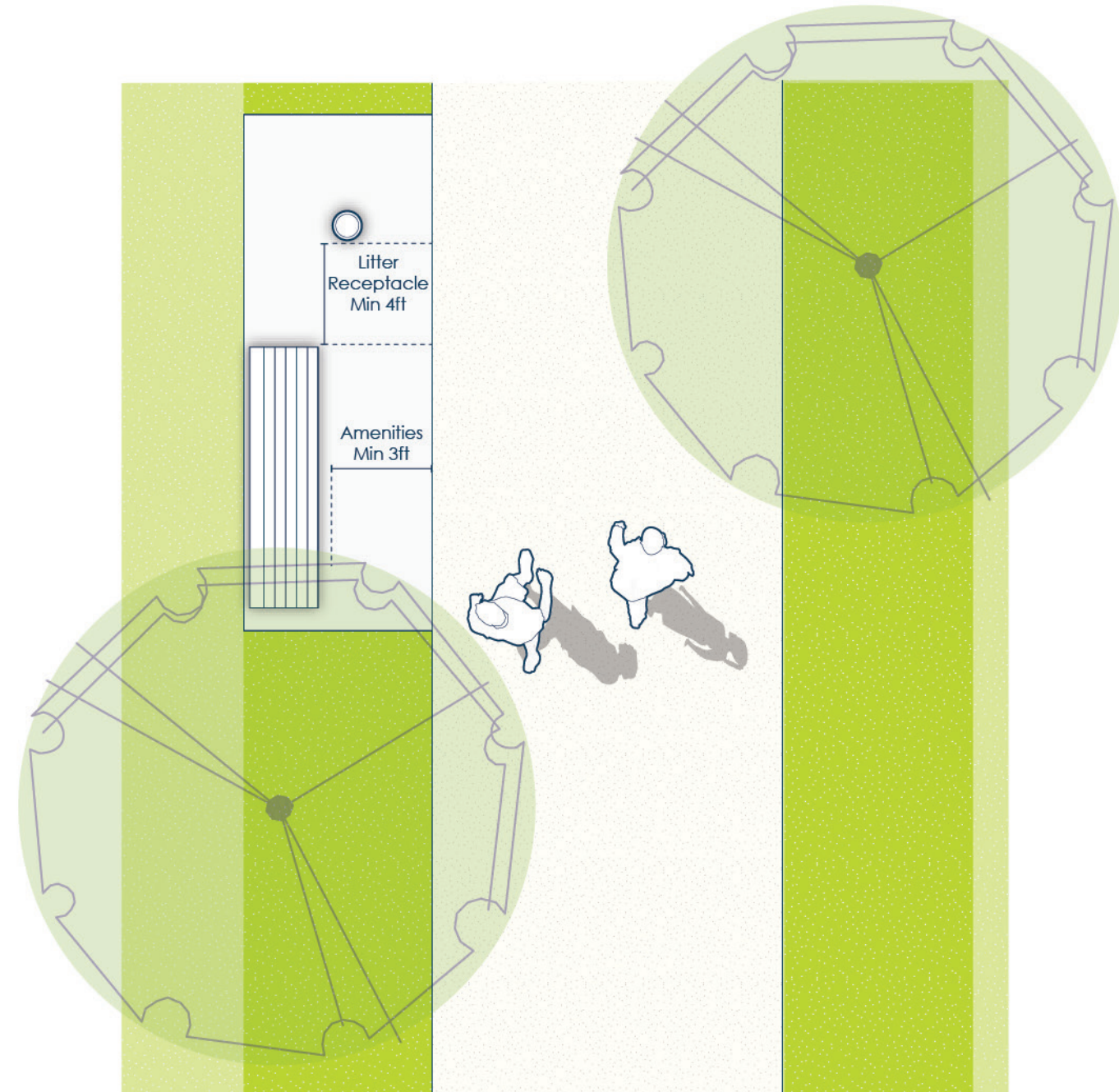
DESCRIPTION

Trash and recycle receptacles provide for proper maintenance and appearance of the trail system. Trash and recycle receptacles should be placed at gateways, rest stops or comfort stations, concession facilities, or area where users might stop to drink and eat.

GUIDELINES

- Locate receptacles at each trailhead and each seating area (1 per every 1 picnic table, 1 per every 2 benches).
- Locate receptacles a minimum of 4' from edge of trail.
- Placement of other receptacles will depend upon the location of concessions, facilities and areas of group activities.
- Receptacles should be selected using the following criteria:
 - Expected trash amount
 - Maintenance program requirements
 - Types of trail users
 - Durability

TYPICAL DETAIL



RECOMMENDED TRASH RECEPTACLE OPTION

(CURRENTLY IN USE)

HA SERIES SINGLE TRASH ENCLOSURE (MODEL HA-P)

Manufacturer:

Bearsaver

Dimensions:

H (46") W(24") L(24")

Materials and Finish:

- Housing and doors are made from corrosion resistant steel with a 40 gallon rigid liner
- Textured powder coat finish that is resistant to humidity, salt spray, fog, ultraviolet rays, abrasion and chemicals
- Various powder coat finishes are available (Fir Green finish is currently being used on the Chicopee Trail)
- ADA Compliant

Options:

- Labels can be placed on top lid (i.e. Trash, Recycling)



Recommended Powdercoat Finishes



HA Series Single Trash Enclosure
Source (All Images): Bearsaver

CHANDLER RECEPTACLE

Manufacturer:

Thomas Steele

Dimensions:

H (40 3/4") Dia (24 1/8")

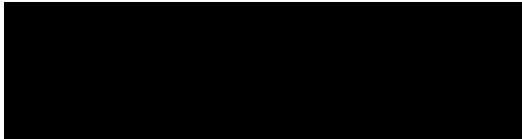
Materials and Finish:

- Frame and siding is constructed of carbon structural steel flat bars
- Use e-coating with an epoxy resin water-based paint that produces highly durable coating
- Various powder coat finishes are available

Options:

- Has an optional door and side opening feature

Recommended Powdercoat Finishes



Chandler Receptacle
Source (All Images): Thomas Steele

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DRINKING FOUNTAIN AND BOTTLE FILLER

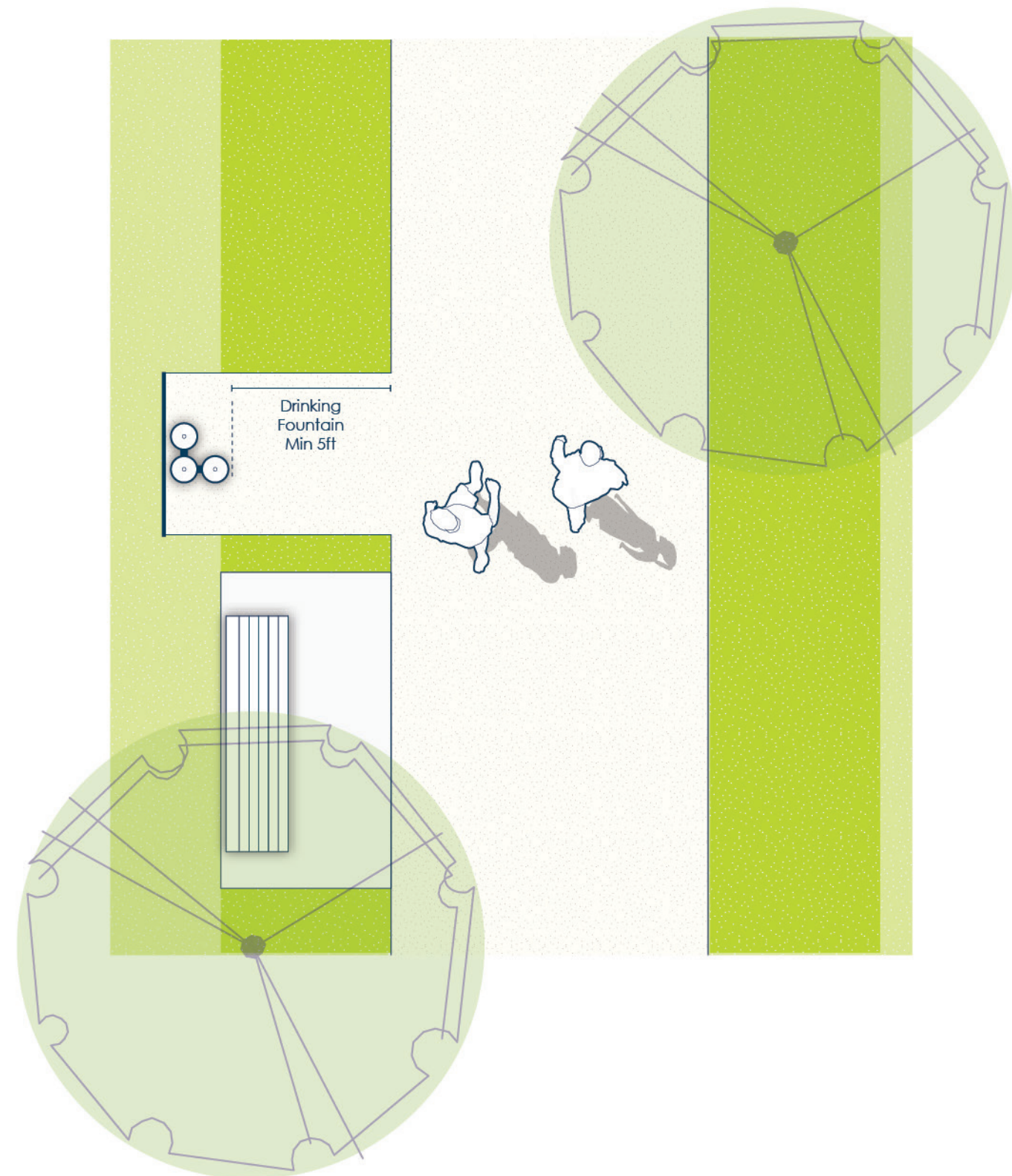
DESCRIPTION

Access to drinking water is crucial to safety and trail enjoyment for multiple user types. Sources of potable water should be identified along the trail alignment with spacing of five miles or less. If access points are more than five miles apart, signs should be placed at potable water access points to indicate distance to the next source.

GUIDELINES

- Locate drinking fountains at least 5' from trail edge.
- Standard, accessible, and dog height bowls should be installed to accommodate all trail users.
- Drinking fountains should be placed on a well drained surface (for example: 2% sloped concrete slab, with 3 in gravel strip to prevent erosion)
- Consider the use of durable and vandalism-resistant materials such as steel, or stone.
- Ensure the use of "auto off" features to prevent waste, bowl overflow, and open lines.
- Include hose bib connections for maintenance purposes.
- Schedule regular inspections to monitor leaks, clogged drains, cracked pipes, and vandalism

TYPICAL DETAIL



RECOMMENDED DRINKING FOUNTAIN

BOTTLE FILLING STATION, BI-LEVEL FOUNTAIN AND PET STATION

Manufacturer:

Global Industrial

Dimensions:

H (60 1/4") W (47 3/4") D (10 1/4")

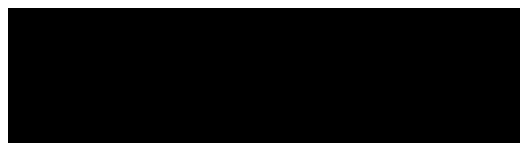
Mounting:

Surface

Materials and Finish:

- Marine-grade 316 stainless steel prevents corrosion
- Vandal resistant bubblers (water spout) with hood guards
- 4 color finishes are available (Silver, Green, Black, and Blue)

Recommended Powdercoat Finishes



Bottle Filling Station
Source (All Images): Global Industrial

BIKE REPAIR STATION

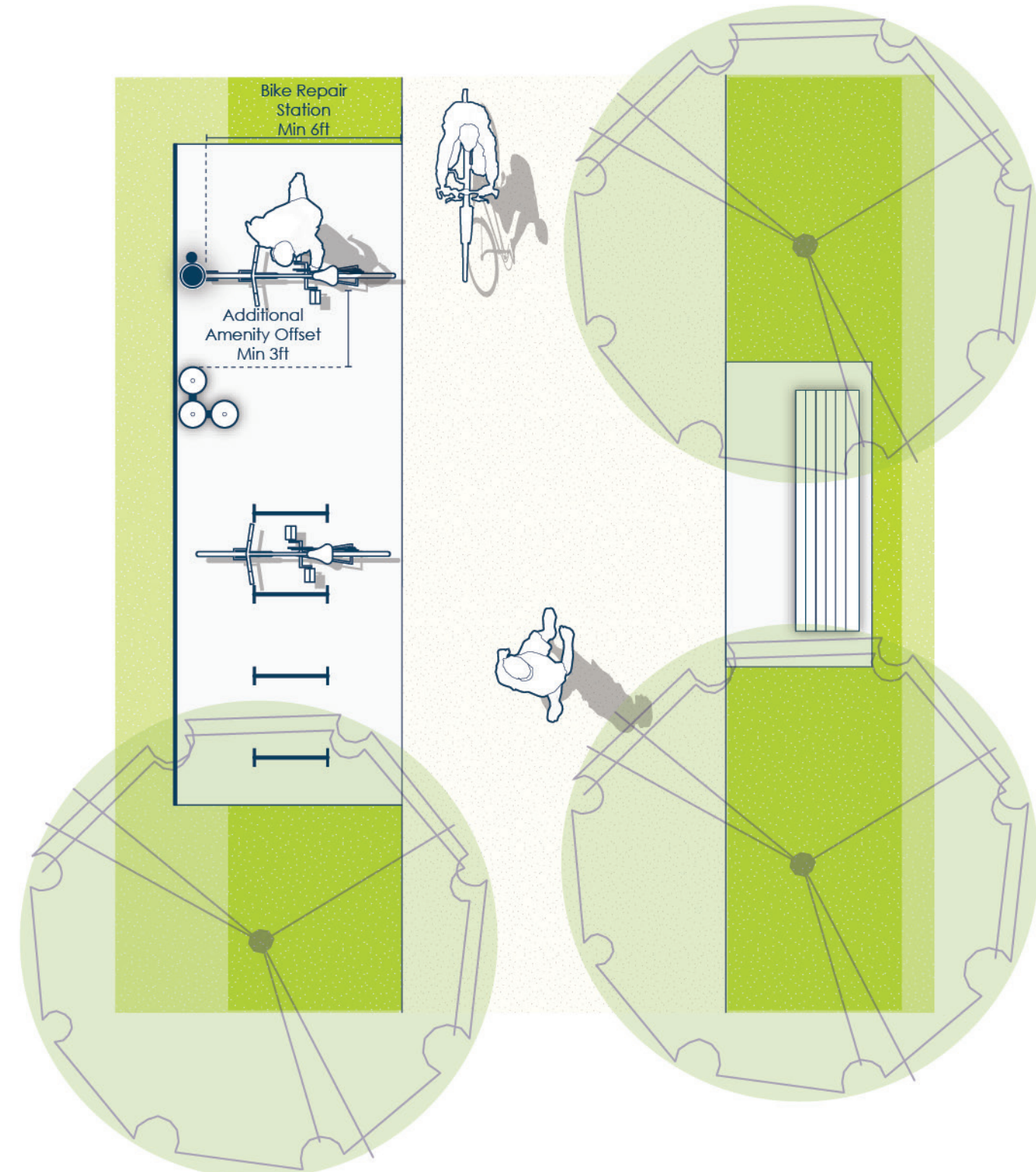
DESCRIPTION

Bicycle repair stations are self-serve kiosks designed to offer a complete set of tools necessary for routine bicycle maintenance. Popular locations include gateways, trailheads, plazas, farmer's markets, and any public center of activity that is well monitored and easily accessible by foot or bicycle.

GUIDELINES

- Group with other amenities in areas such as trailheads, parking lots, public spaces, and major trail intersections.
- Bicycle repair stations should be at least 6' from trail edge to allow room to repair bicycles.
- Stations should be secured to a durable pad, such as concrete.
- Bicycle repair station tools are secured by high security cables, but will still be an attractive target for theft. Proper placement of kiosks in areas of high activity is one key strategy to reduce potential vandalism.

TYPICAL DETAIL



RECOMMENDED BIKE REPAIR

BIKE FIX-IT STATION

Manufacturer:

Dero

Dimensions:

Body (6 X 3/16" Tube)

Bike Hanger (1.5" sch. 40 Pipe, 1/4" Plate)

Foot (5/32" Stainless Steel Cable)

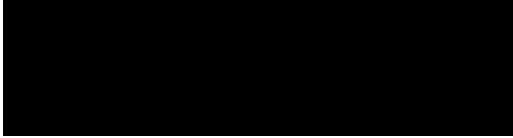
Materials and Finish:

- Hot-dipped galvanized or stainless steel finish is available
- Various powder coat finishes are available

Options:

- Custom powder coat colors can be created upon request

Recommended Powdercoat Finishes



Bike Fix-it Station
Source: Dero



Bike Fix-it Station
Source: Dero



Bike Fix-it Station
Source: The Berkshire Edge

BOLLARDS

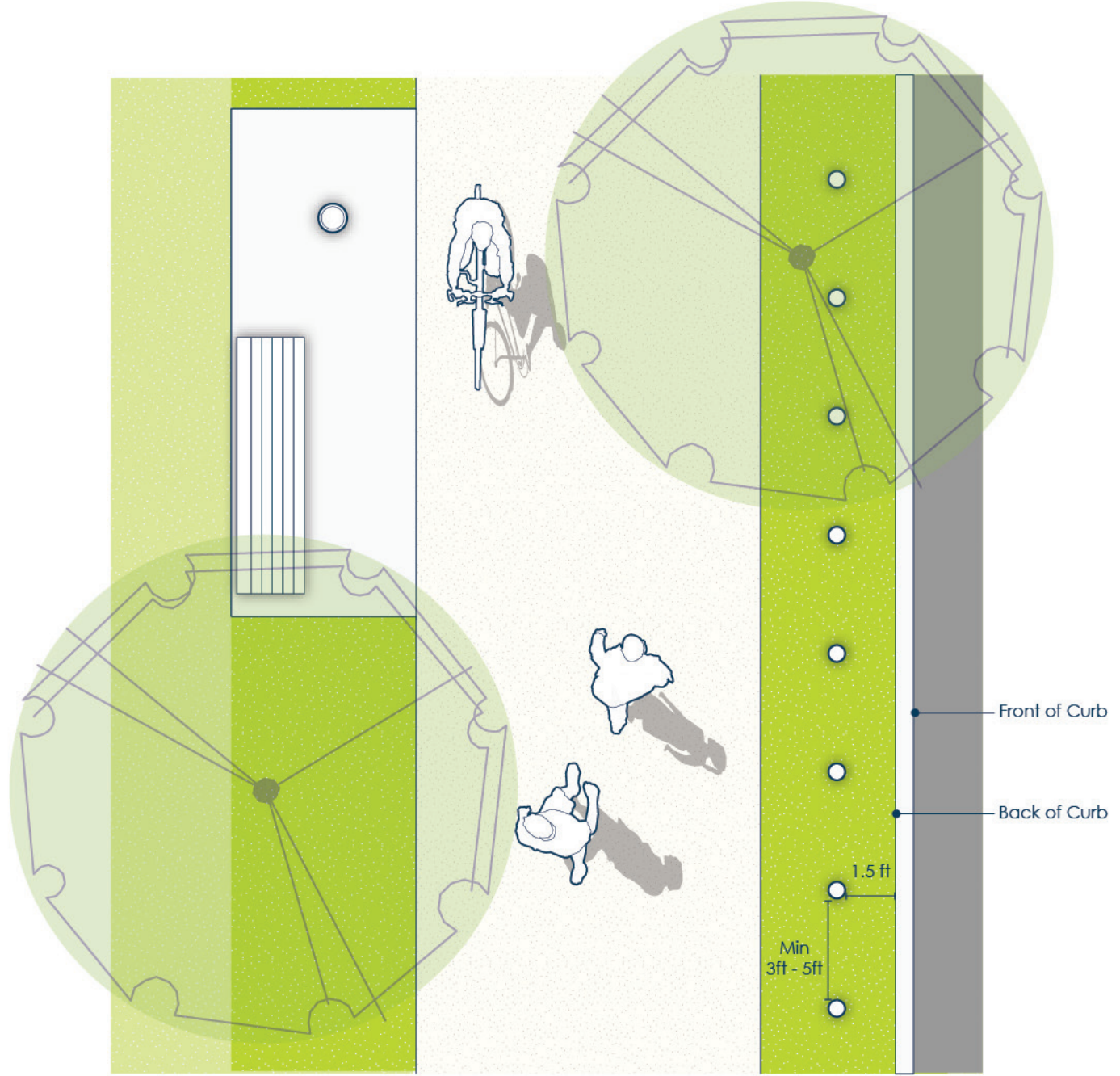
DESCRIPTION

Bollards are physical barriers designed to restrict motor vehicle access multi-use paths and other pedestrian spaces. Bollards can be used to provide additional lighting for pedestrians if they are manufactured with a light feature.

TYPICAL DETAIL

GUIDELINES

- Bollards should be 30" - 40" in height to achieve visibility
- Bollards should be placed at least 3' from pedestrian flow of traffic and 18" from back-of-curb.
- Bollards must be visible and include either retro-reflective surface or lighting elements
- Can be applied for full block segments or at key locations (i.e., shared streets between parking and sidewalk)
- Decorative bollards can be placed at locations at unique pedestrian designated spaces



RECOMMENDED BOLLARD

LIGHT COLUMN BOLLARD

Manufacturer:

Forms + Surfaces

Dimensions:

Series 500 | Dia (5") x H (45")

Series 600 | Dia (6") x H (45")

Mounting:

Surface or Embedded

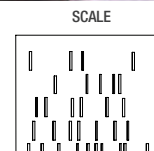
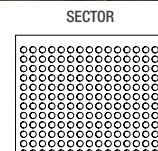
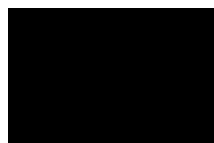
Materials and Finish:

- Stainless steel column with 1/2" thick stainless steel base plate
- White-frosted acrylic lens that protects custom LED light engine
- Ceramiloc surface treatment applied for enhanced protection from weather and graffiti

Options:

- Various shield designs are available

Recommended Powdercoat Finishes



Light Column Bollard
Source (All Images): Form + Surfaces

LIGHTING

DESCRIPTION

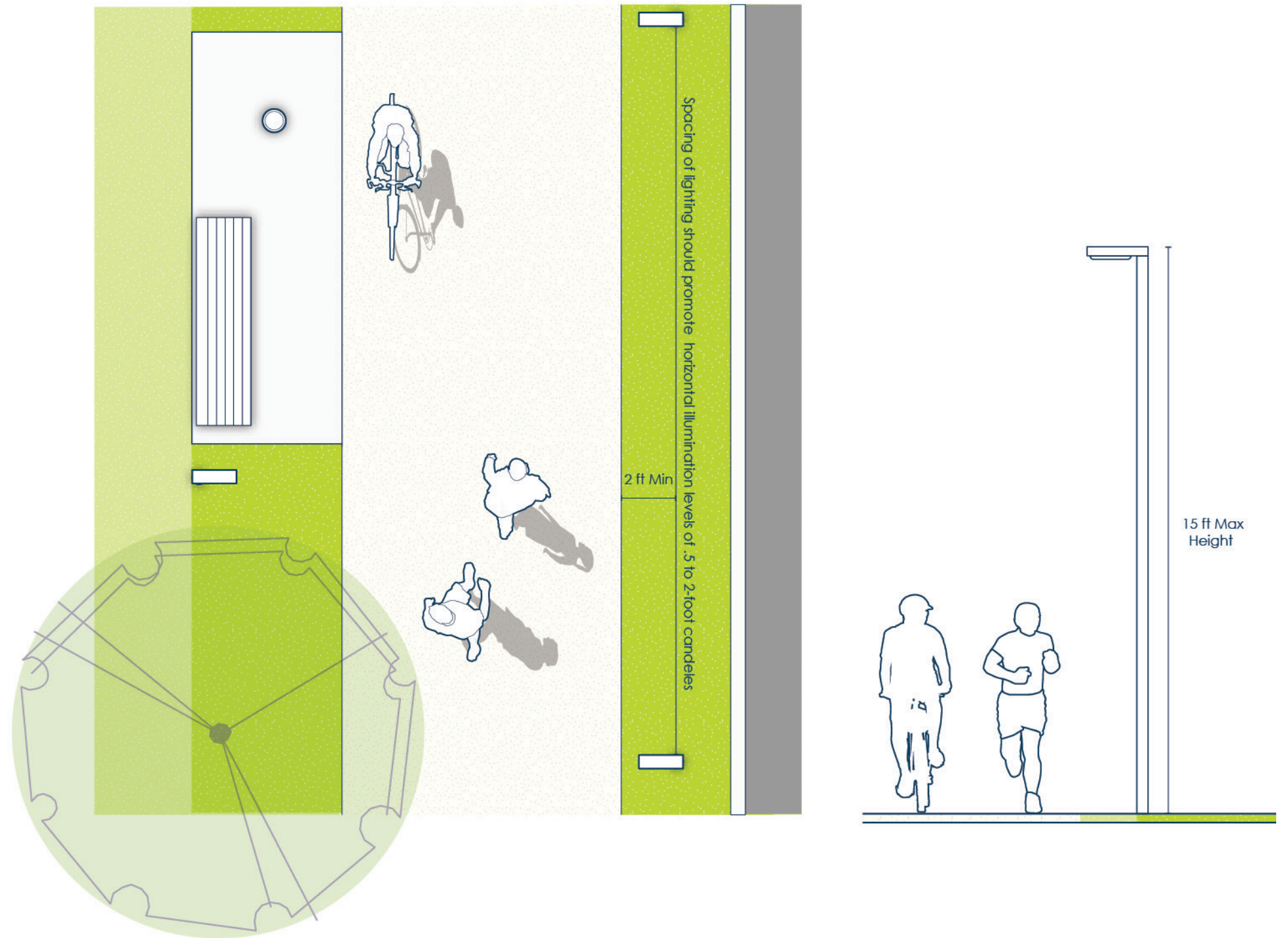
Lighting for trails should be analyzed per segment context with full consideration for safety needs, sensitive habitats, trail function, and maintenance commitments. In general, lighting is not appropriate for trails in remote areas, trails with low use, or where there is little to no development.

Street lighting can improve visibility of the crossing and trail users for motorists. Lighting may also be necessary for day-time use in trail tunnels and underpasses.

GUIDELINES

- Lighting should be at pedestrian scale. Placement, spacing, and other finish specifications depends on the fixture and optics.
- Place lighting at decision points and areas of interest, such as street crossings, intersections with other trails, trail spurs, and near commercial and mixed-use developments.
- Consider CPTED principles whenever lighting is introduced, such as color rendering, dimly lit “hiding places” and abstracted illumination.
- Lighting should avoid trees and be placed outside of canopy edge at all times.
- Solar powered lighting is available where utility connection is difficult or when alternative energy sources are desired. Daylight hours should be analyzed per season prior to specifying solar lighting.
- Avoid light fixtures at eye level that could impair visibility.
- Dependent upon trail hours, consider uses in urban and/or commercial land use areas.

TYPICAL DETAIL



RECOMMENDED LIGHTING

RAMA AREA LIGHT

Manufacturer:

Landscape Forms

Dimensions:

LED Housing I H (2 1/8") W (36 3/4") D (7 5/8")

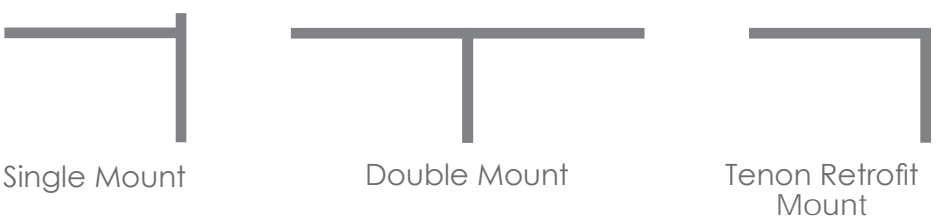
Pole I H (Recommended 14.7') Dia. (5")

Materials and Finish:

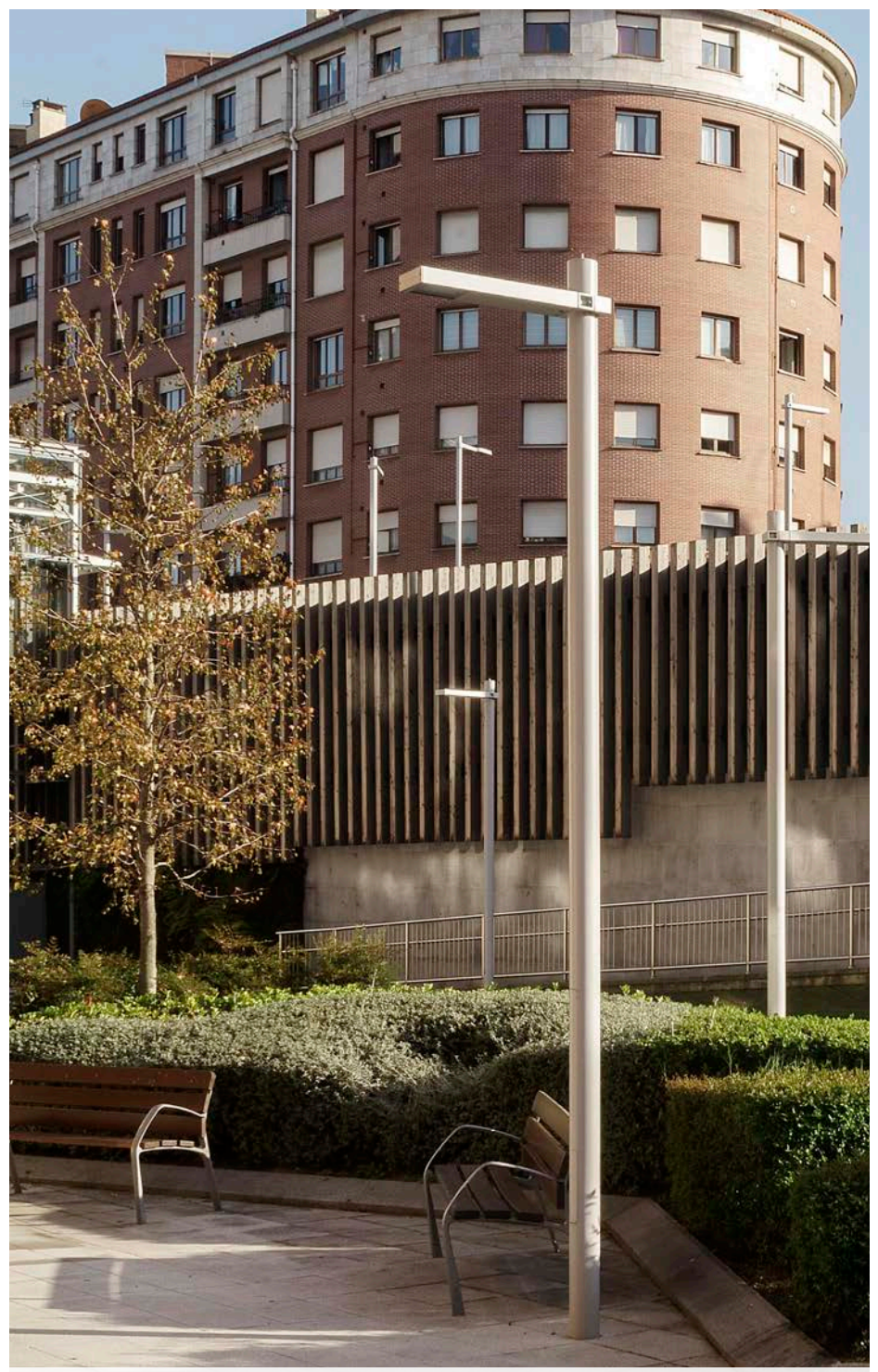
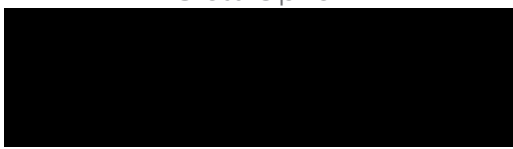
- Pole and LED housing frame is aluminum casting
- LED housing frame can be powdercoat finished
- Various powder coat finishes are available

Options:

Three luminaire mounting options are available:



Recommended Powdercoat Finishes
Gloss Option



Rama Area Light
Source (All Images): Landscape Forms



ALCOTT AREA LIGHT

Manufacturer:

Landscape Forms

Dimensions:

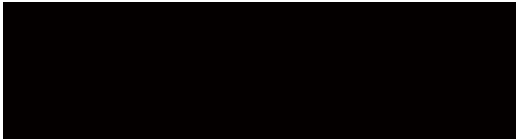
LED Housing I H (2 1/8") W (36 3/4") D (7 5/8")

Pole I H (Recommended 14')

Materials and Finish:

- Pole and LED housing frame is aluminum casting
- All metal parts are finished with Landscape Forms' propriety Pangard II polyester powder coat, a hard yet flexible finish that resists rusting, chipping, peeling, and fading.
- Various powder coat finishes are available

Recommended Powdercoat Finishes
Gloss Option



Alcott Area Light
Source (All Images): Landscape Forms



SECURITY CAMERAS

DESCRIPTION

In order to enhance safety, security cameras can be placed along the trail. Security cameras can be placed to complement other design measures that create sense of safety along the trail. Security cameras should consider all required operational, maintenance, and coordination requirements prior.

GUIDELINES

- Cameras can be mounted on existing light posts
- If new poles are being installed for security cameras, they should be placed 2' from the trail (behind the 2' shoulder)
- When placing the camera, consider all variables that may effect the view that the camera will have: pole positions, field of view, blind spots, and detection scene



Security camera along trail
Source: Alta Planning + Design



Axis Q-6074-E PTZ Outdoor Network Camera
Source: Axis Communications



Pole mount for outdoor security camera
Source: Verkada

HANDRAILS AND GUARDRAILS

DESCRIPTION

Handrails and guardrails are safety barriers that serve several functions depending on the situation. A "handrail", for example, is primarily a safety device intended to protect trail users from a potential hazardous condition including keeping small children and toddlers from slipping through the railing.

A "guardrail" primarily serves to protect bicyclists, roller skaters and other higher speed wheeled users from a hazardous situation. In some instances, such as above a vegetated embankment where the threat of impact is minimal the railing may be lower in height. Where the threat of impact is substantial, such as over a highway, the rail would be higher. (Heights are determined per national published bicycle design standards.) In many cases, particularly where the drop off is more hazardous, the safety barrier serves both a handrail and guardrail function.

GUIDELINES

- For handrails, if there is a drop-off in excess of 18" or other hazard, openings on the rail should not pass a 4" sphere (confirm with local codes).
- A guardrail should withstand a 250 lb. load with 1/2" deflection with a w=50 pound per linear foot transverse and vertical load capacity.
- Rails should not present sharp or protruding edges and ends should be flanged and marked with MUTCD-specified hazard panels to reduce the chance of injury from collision.
- Handrails should conform to local and national building codes.
- Guardrails and guardrail/handrail combinations should conform to the specified minimum heights per the AASHTO Guide to The Development of Bicycle Facilities and other local and state standards—ranging from 42" to 54" depending on the situation.
- Where bicycle traffic will be present, an off-set "rub rail" should be provided to prevent entanglement of bicycles with the railing structure. Rub-rail is optional on overlooks, or pull-offs out of main stream of bike traffic.
- There should be a minimum clear-zone (typically 10') between the insides of the railings when rail is on both sides of the trail.
- Structures should be durable and affordable to build and maintain, such as weathered steel or powder coated steel.
- Aesthetic designs should conform to overall branding standards including consistent selection of materials and colors per each character district.



Wood cable railing along Logan Lake Boardwalk
Source: PermaTrak



A cable railing and guardrail combination
Source: VIVA Railings

RECOMMENDED RAILING (URBAN CONTEXT)

STAINLESS ROUND CABLE RAILING

Manufacturer:

Stainless Cable & Railing

Dimensions:

H (36") L (Varies)

Mounting:

Surface or Core

Materials and Finish:

- Marine grade stainless steel round terminal posts and (1/8" or 3/16") cable infill

Options:

- Top rail can be stainless steel rod or wood
- Sold as kits. (max length is 37ft kit)



Stainless steel round cable railing
Source (All Images): Stainless Cable & Railing

RECOMMENDED RAILING (RURAL CONTEXT)

WOOD RAILING SYSTEM

Manufacturer:

Stainless Cable & Railing

Dimensions:

H (36") L (Varies)

Mounting:

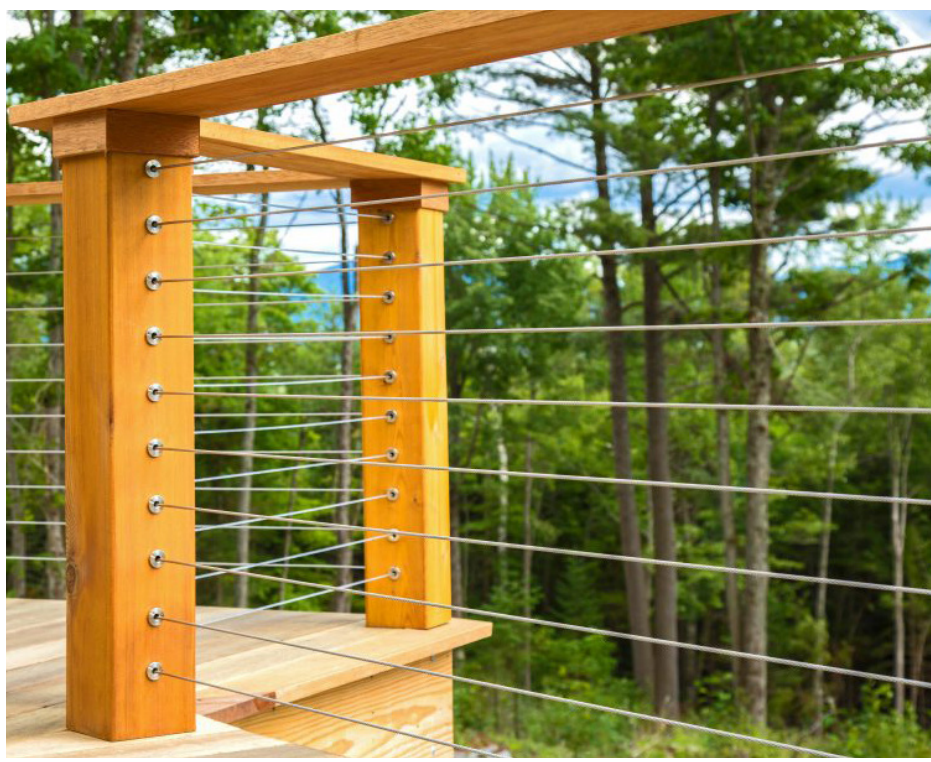
Surface or Core

Materials and Finish:

- 4x4 IPE terminal wood post and (1/8" or 3/16") cable infill
- IPE wood is very durable and is not susceptible to insects, mold, rot, decay, and fire

Options:

- Four wood species for posts are available (IPE Brazilian Walnut, Balau Mahogany, Western Red Cedar, Alaskan Yellow Cedar)
- Wood or composite option for top rail



Stainless steel round cable railing
Source (All Images): Stainless Cable & Railing

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BOARDWALKS

DESCRIPTION

Boardwalks are elevated structures that allow the trail to pass through or over wetlands, water bodies, unstable soils, and other sensitive areas. Depending on conditions and other trail planning considerations, boardwalks may be only a few inches off the ground or several feet or more above the surface. Low decks may have no defined edge or a curb, with deck surface 30" or more off the ground surface or where a hazard is present will have a safety railing.

GUIDELINES

- Boardwalks have a clear unobstructed width (inside of curb or handrails) and should match or exceed the specified widths of the trails they serve. In some instances, however, there may be a transition area to allow tapering to interface the trail with the boardwalk while meeting safety standards.
- Sustainable design techniques are used to minimize adverse impacts or intrusion of the structure on the environment during both construction and use.
- Hand railing heights meet local and national code standards for the anticipated use including heights specified in the AASHTO Guide to the Development of Bicycle Facilities. Provide a minimum 42" high for low drops and 54" for high drop offs. Railings are designed to protect small children with appropriate minimal gaps where conditions dictate.
- Use resilient materials with low maintenance. Concrete decking and steel or cable railing is preferred. Decking may be composite material or concrete for long term maintenance and resiliency.
- Boardwalk design and materials should fit with the branding and furnishing styles of the various character districts of the Highlands to Islands Trail.

- Opportunities exist to build seating and signage into boardwalks
- Wetland plants and natural ecological function to be undisturbed



PRECAST BOARDWALK SYSTEM

Manufacturer:

PermaTrak

Dimensions:

Treads | W(3'9" Min -15'4" Max)

Beams | L (20' Max)

Abutments | W (3'9")

Piers | (H 18")*

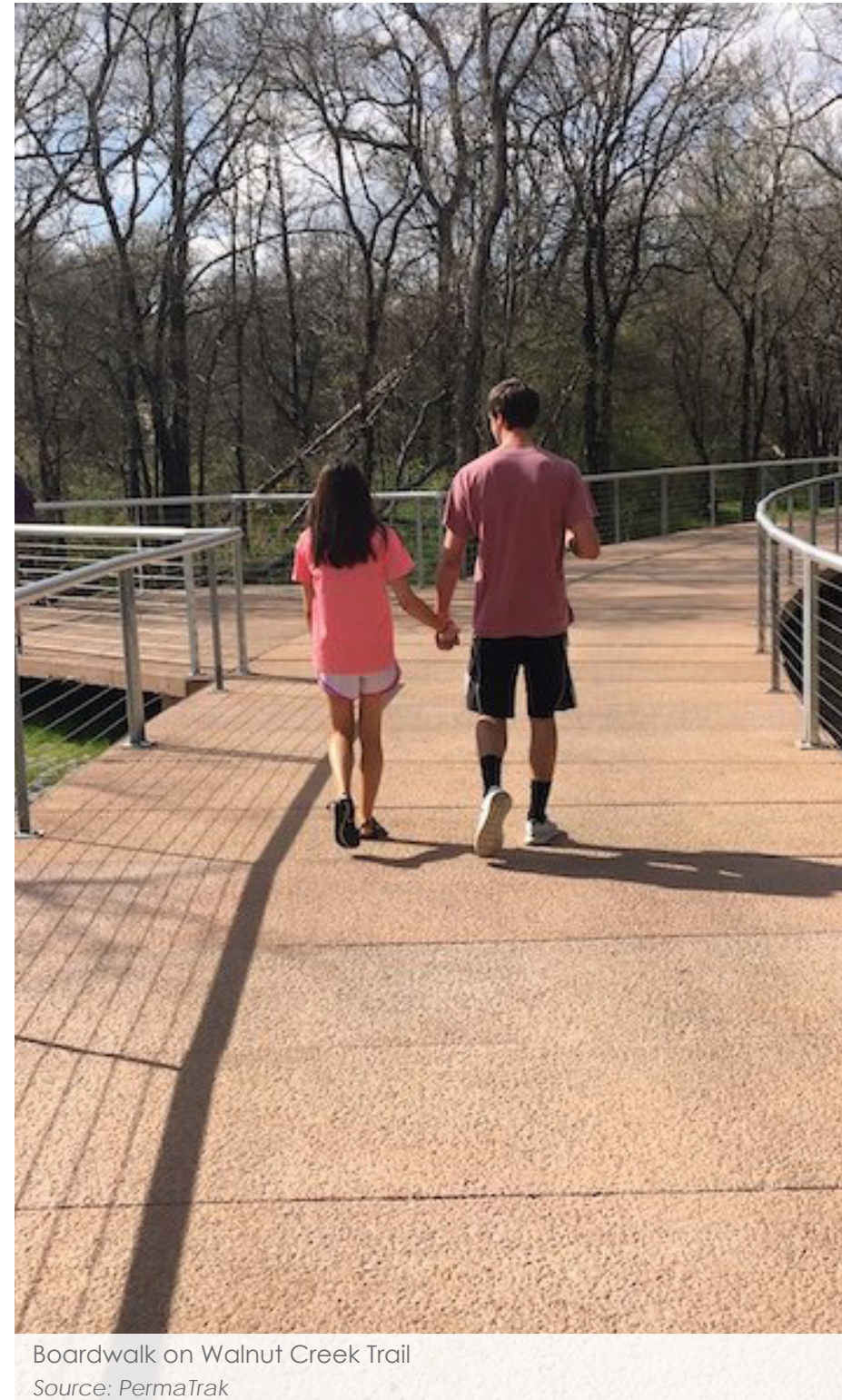
*Pier consist of precast base, riser, and cap. The heights of each component are 6" nominal

Materials and Finish:

- The concrete treads can be made in various colors and textures

Options:

- The boardwalk system is designed to work with various types of railings and curbs



Boardwalk on Walnut Creek Trail
Source: PermaTrak



SHADE STRUCTURES

DESCRIPTION

Whether it be protection from the rain or a place to rest during a sunny day, shade structures and shelters create comfort and protection for all trail users. Shade structures should be sensitive to context and designed to integrate with intended function of the site and trail user needs. All structures will require approval from jurisdiction staff and should include little to no maintenance.

GUIDELINES

- The orientation of structures should be considered to provide maximum protection from elements.
- Can be placed in any setting (grass, concrete, asphalt, etc) with considerations for ADA access to and into the structure.
- Plants may be incorporated into the design of the structures especially where they can provide additional user benefits (vines or greenwall for cooling effect). Plant material should be context sensitive and low maintenance.
- Structures should not impede bicycle and/or pedestrian movement and shall be located adjacent to the trail (not within the travelway).
- Structures should not block viewsheds of historic, natural, or cultural elements.
- Structures should incorporate other amenities, especially benches and picnic tables.
- Colors should fit into a natural setting and not be bright oranges, pinks, blues, etc.
- Provide shade structures, particularly where mature trees are not available to provide shade.
- Appropriate shade tolerant grasses should be used under shade structures when grass is desired underneath.



Sculptural sun shade in Las Vegas
Source: Alta Planning + Design



Shade sails provide spatial flexibility and color options
Source: City of Webster



Hyperbolic shade at Park
Source: Awnings NH

RECOMMENDED SHADE STRUCTURES

HYPERBOLIC SHADE SAIL

Manufacturer:

Superior Shade / KorKat

Dimensions:

- Offer standard heights of 8', 10', and 12'
- Dimensions vary based on design

Mounting:

Surface or Embedded

Materials and Finish:

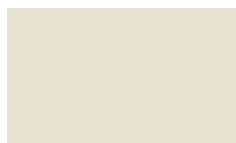
Fabric

- UV stabilized cloth and high-density polyethylene material
- Minimum fading after 6 years (3 years for red and yellow color)

Steel Tubing

- Galvanized steel tubing
- Various powder coat finishes are available

Recommended Fabric Color



Hyperbolic shade sail at University of West Georgia Campus
Source (All Images): Superior Shade

WAYSIDES AND OVERLOOKS

DESCRIPTION

Waysides and overlooks afford places to stop, rest, eat a snack, have a drink, take refuge from the sun or enjoy a view. These spots may also offer interpretive, cultural and wayfinding information as well as public art. Several kinds of rest areas could be provided including rest pads, larger rest areas, overlooks, and trail pavilions.

A larger wayside might include two or more benches and possibly a drinking fountain with a toilet facility nearby. A pavilion wayside might include a shelter and picnic table(s). An overlook is a special kind of rest area tied to a view of special interest. An overlook might include interpretive signage describing the area being viewed.

GUIDELINES

- All waysides and overlooks should be designed to move users and their bicycles off the main trail to eliminate any possible traffic hazard.
- Waysides and overlooks should be located in attractive, quiet, secure-feeling settings away from traffic noise and not close to private residences.
- Waysides and overlooks should be accessible per the ADA and should offer shade with either trees or a sun shelter.
- Rest areas, at least rest pads, should be located every 1/4 to 1/2 mile depending on grade.
- Larger waysides or overlooks should generally be located every one to two miles and should include a crushed stone or concrete pad with benches, a bike rack, informational signage, trash receptacle and drinking fountain.
- Larger rest areas and overlooks, especially those with trash receptacles should be readily accessible by maintenance vehicles.
- Consider storm shelters, sunshade structures and picnic shelters appropriately grounded for lightning.



Engine 209 Park serves as a rest area to the Midland Greenway segment of the Highlands to Islands Trail
Source: Tricia Terrell



Rest area along the Empire State Trail
Source: Empire State Trail



Morgan Falls Overlook
Source: The Urban Baboon

VEHICLE PARKING

DESCRIPTION

Vehicle parking provides spaces for trail users to load and unload bicycles, scooters, or wheelchairs. Vehicle parking can also be found at access points or trailheads that serve the local trails. Trail wayfinding, restrooms, and seating are also basic amenities that can be found at vehicle parking locations.

GUIDELINES

- Signage and wayfinding installation at existing parking areas that provide access to the trail. Provide signage that direct people to parking locations from major roads.
- Provide adequate accessible parking spaces.
- Provide parking stalls and lanes that accommodate loading and off-loading bicycles.
- If applicable, provide additional amenities ; benches, bicycle parking, bottle filling station, and trash receptacles.
- Utilize permeable surfaces for parking areas (i,e; gravel, porous asphalt, porous concrete, plastic reinforcement grid, and permeable pavers).
- Consider all vehicles that each parking location will potentially serve when designing the parking layout (i,e; automobile and trailers).
- If applicable, provide green infrastructure for stormwater manage.



SIGNING AND MARKING

DESCRIPTION

A path wayfinding system consists of comprehensive signing and/or pavement markings to guide users to their destinations along preferred routes.

TYPICAL APPLICATION

- Wayfinding signs will increase users' comfort and accessibility to the path system.
- Signage can serve both wayfinding and safety purposes including:
 - Help familiarize users with the path system.
 - Help users identify the best routes to destinations within bicycling, and golf-cart-trip distances or connections to other modes.
 - Help address mis-perceptions about time and distance.
 - Help overcome a "barrier to entry" for people who do not frequent the path system.

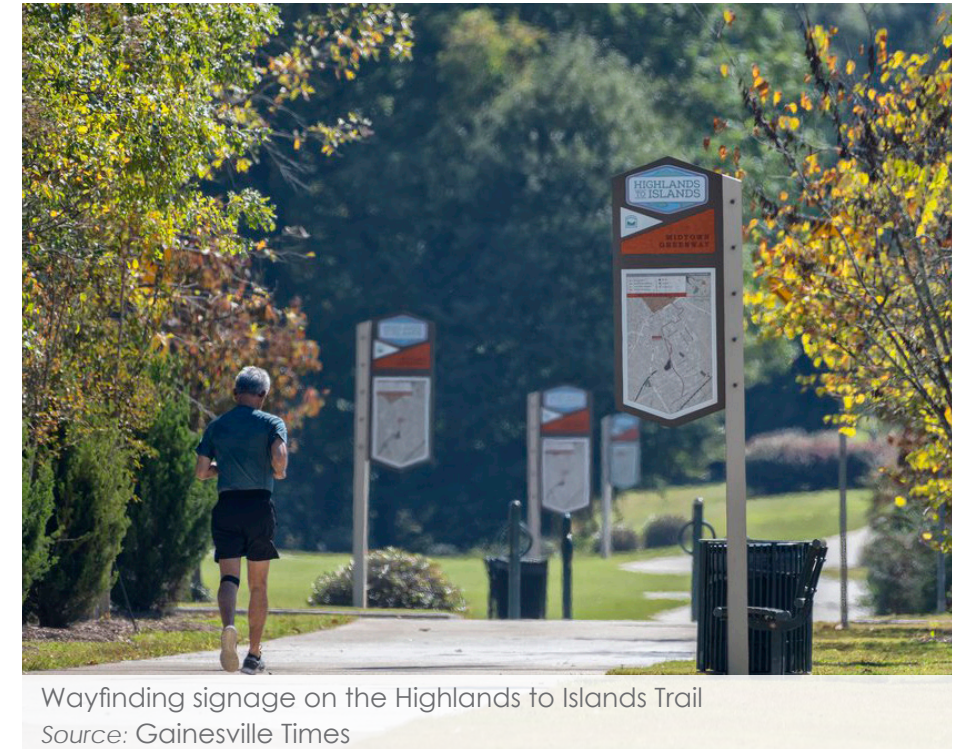
CENTERLINE MARKINGS

DESCRIPTION

Centerline striping can be used to delineate lanes for each direction of travel, or to indicate where it is unsafe to pass others on the trail. Under most conditions, centerline markings are not necessary. Centerline markings should only be used if necessary for clarifying user positioning or preferred operating procedure. Centerlines help communicate that in order to pass slower traffic, trail users must merge into a lane of opposing traffic. FHWA research suggests this results in more cautious passing maneuvers, but that it also depresses bicyclist level of service.

GUIDELINES

- Solid line indicates no passing, dashed line indicates lane placement.
- Trails with a high volume of bidirectional traffic should include a centerline. This can help communicate that users should expect traffic in both directions and encourage users to travel on the right and pass on the left.
- Where there is a sharp blind curve, painting a solid yellow line with directional arrows reduces the risk of head-on collisions.
- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.



Wayfinding signage on the Highlands to Islands Trail
Source: Gainesville Times



Centerline marking on paved trail
Source: Alta Planning + Design

WAYFINDING

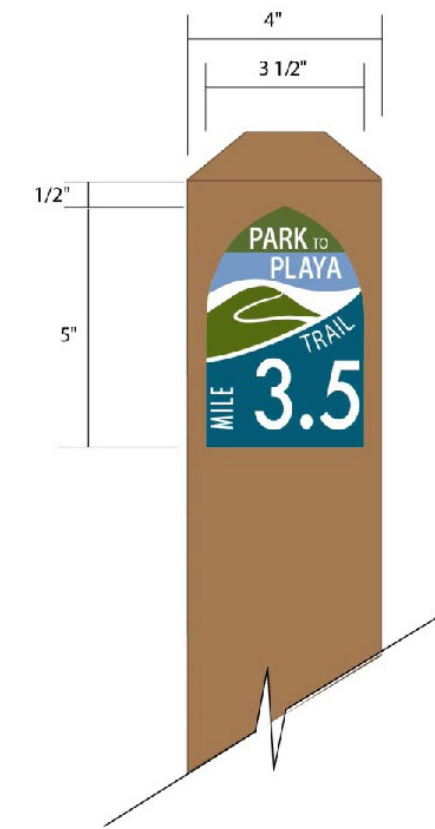
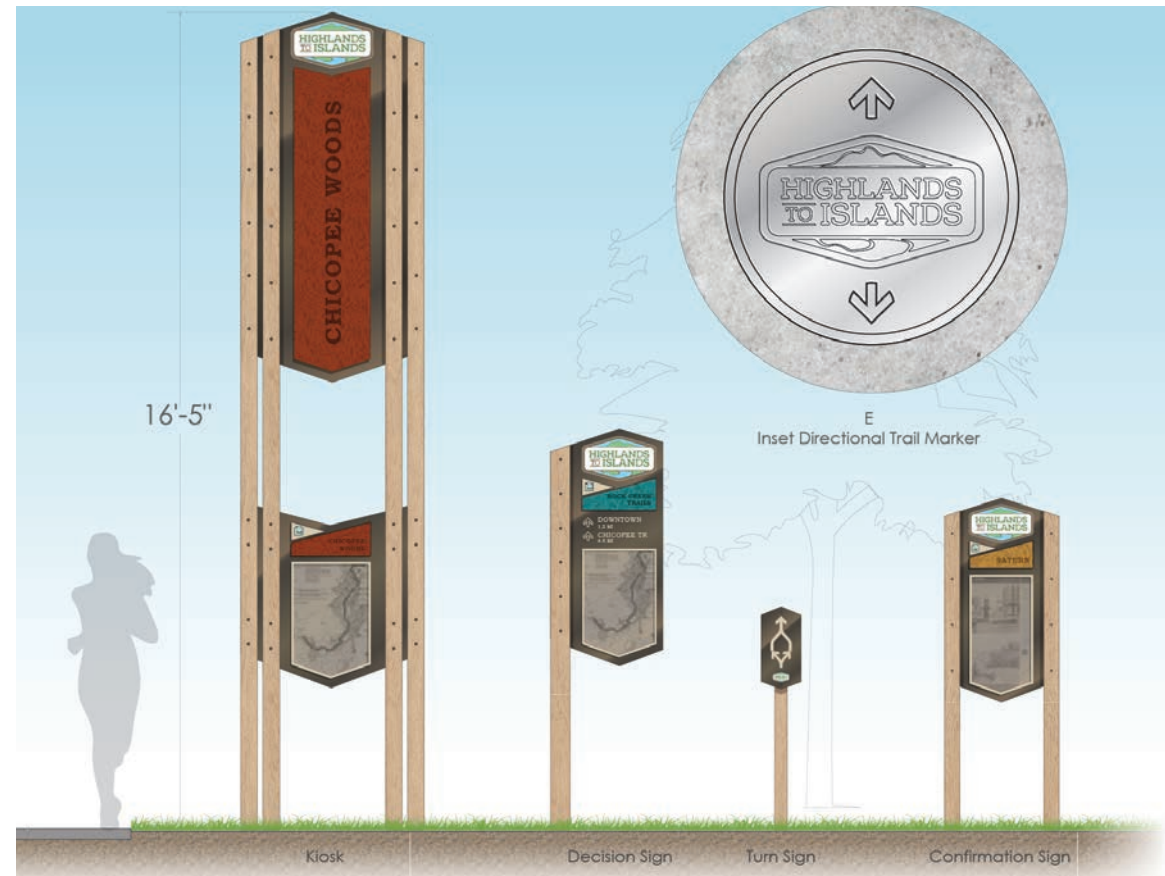
DESCRIPTION

The image on the right shows the Highlands to Islands Trail existing wayfinding signage. It was originally developed in March 2018. While the Highlands to Islands Trail has an existing wayfinding family, the addition of mile markers to the wayfinding family will enhance user navigation and experience on the trails.

MILE MARKERS

Function: Mile markers aid pathway users with measuring distance traveled. Also provide pathway managers and emergency response personnel points of reference to identify field issues such as maintenance needs or locations of emergency events. System brand mark, distance in whole number miles or decimal miles. Path name and jurisdiction may be included. Marking distance in miles may be achieved via physical sign elements or pavement markings.

Placement: They should be placed every $\frac{1}{4}$ to $\frac{1}{2}$ mile along the pathway network. Point zero should begin at the southern and western-most terminus points of a pathway. Mile numbering should be reset at zero as a pathway crosses a jurisdictional boundary. Although it is ideal to place mile markers on the right hand side of the path facing bicycle traffic, they may also be installed on one side of a pathway, on a single post back-to-back.



TREE TRAIL INTERPRETIVE SIGNAGE

DESCRIPTION

The Tree Trail Interpretive Signage is a collection of storyboard signs that mark native tree species along a trail or greenway.

GUIDELINES

- The signs can be placed with the collaboration of the local Master Naturalists Program Volunteers and the Parks and Recreation Department.
- Signs can provide information on the historic, ecological, and economic importance of the marked tree species. It can also include the following:
 - Typical characteristics of the tree species (i.e; leaves, flowers and tree bark characteristics)
 - Height and spread of species
 - Pollinators and wildlife that the species attracts
- A QR Code can be placed on the sign to provide additional information or an audio recording of the information displayed on the sign.



A storyboard sign displaying information on the Paw Paw tree
Source: Master Woodsman



A Master Naturalist presenting signage information on the Bald Cypress
Source: Forsyth County News

TRAIL SAFETY EDUCATION CAMPAIGN

DESCRIPTION

Trail safety education campaigns are the most effective way to promote safety, discourage speeding and avoid incidents and conflicts on trails. These campaigns reinforce safety for all users by highlighting guidelines that all trail users are suggested to follow

GUIDELINES

- Endorse a trail etiquette initiative or campaign (i.e. Share The Trail)
- The most effective way to educate the public on the trail safety campaign, is through:
 - Branding: Create a logo that is associated with the campaign
 - In-person Promotion: Hold events that promote the campaign
 - Print and Online Promotion: Create flyers, ads, and brochures
- These campaigns generally highlight the following guidelines:
 - Use safe speeds
 - Keep right and pass left
 - Stand aside, if you are standing still
 - Mind your pets
 - Be alert
 - Keep the trail clean
- Place signage or pavement markings that reinforce these guidelines along the trail.
- Have "Share the Trail" information on trail and other associated websites.



"Share the Trail" signage
Source: Alta Planning + Design



"Share with Care" pavement marking
Source: Scott Hammond (Stuff)



"Share the Trail" ad on a bench
Source: Ryan Harvey Co.

ENTRY MONUMENTATION

DESCRIPTION

Monumentation consists of decorative structures that demark points of entry to the trail system—from a street, a trailhead/parking area or other entry to the trail. These may vary in size with larger structures for intermodal trailheads (with parking) and smaller structures for local access points. Monumentation should also include larger identity monuments—large structures, prominently located within sight of major roads and highways that provide a high level of visibility and help build community awareness of the Highlands to Islands Trail.

GUIDELINES

- Entry monumentation should be consistent with the aesthetic for each character district.
- Trail identity monuments should be provided at key locations along the Highlands to Islands Trail corridor. These should be clearly visible and recognizable from nearby major roadways.
- Intermodal entry monumentation should be clearly visible and recognizable from passing vehicles. Size and scale should vary based upon site and location conditions.
- At local access points, use monuments that are more modest than those at the intermodal entryways. Local access markers are lower key and should be compatible with local neighborhoods.
- Monuments may be placed on one or both sides of trail at both local access and intermodal entry points.



Wolf Creek Guide Monument
Source: Alta Planning + Design



Wolf Creek Guide Monument
Source: Alta Planning + Design



Entry Monument at Overton Park
Source: Alta Planning + Design

PUBLIC ART

DESCRIPTION

The Highlands to Islands Trail offers many opportunities for public art. Artists could be engaged in the design and installation of both free-standing art works as well as incorporating art into the design of furnishings, signage, branding, paving surfaces, and other infrastructure along the trail. Art might also be used for murals on building walls, bridge abutments or other structures.

GUIDELINES

- Public art is best utilized in urban and residential districts although more natural art displays can be used as appropriate.
- Generally, public art along a trail is most appropriate in association with infrastructural elements along or in association with the trail such as: bridges, underpasses, building walls, and on buildings.
- Artistic designs should be durable and maintainable.
- Art should not pose hazards to users.
- For infrastructure and furnishings, generally promote artistic design consistent with the character district branding scheme in color, shape form and texture.
- Where possible, local artists should be involved in the art selection and design process.
- Art may be used to delineate the three character districts, as well as cultural, community and neighborhood identity.



LANDSCAPE

DESCRIPTION

Native vegetation along the Highlands to Islands Trail provides visual interest as well as habitat for animals and insects that may use the trail corridor for migration or habitat. A primarily native plant palette should be used when feasible, and include layering for all seasons. Recommended plants include canopy trees, understory trees, shrubs, herbaceous plants, and groundcovers. Planting plans should consider local guidance for canopy goals, habitat creation, stormwater best practices, screening, disease resistance, avoidance of invasive species, and maintenance requirements.

GUIDELINES

- Planting should be used to provide a buffer between off-road sections of the trail and adjacent uses.
- Shade trees should be strategically placed near rest areas to provide shade to seating areas and other amenities.
- Soil and drainage conditions should be considered prior to final plant palette selection.
- Planting Plans should be designed by a Professional Landscape Architect registered in GA.
- Trees used around seating areas should have minimal leaf, fruit, and flower litter.
- Appropriate shade tolerant grasses should be used under shade structures when grass is desired underneath.

RECOMMENDED LANDSCAPE PLANTS

The University of Georgia's cooperative extension provides a publication, *Landscape Plants for Georgia*, with suggested plants organized into various sizes and groups. The focus of the list is a showcase of the best possible groupings according to the principles and requirements of good landscape design and plant maintenance.

<https://extension.uga.edu/publications/detail.html?number=B625&title=Landscape%20Plants%20for%20Georgia>



PLANT PALETTE

LARGE DECIDUOUS TREES

Swamp White Oak | *Quercus bicolor*

Height: 50 - 60'

Spread: 50 -60'

Bloom Time: April

Maintenance: Low

Water Use: Medium to Wet

Native: Native

Suggested Use: Shade Tree, Street Tree,
Rain Garden



Creek Birch "Heritage" | *Betula nigra*

Height: 40 - 70'

Spread: 40 -60'

Bloom Time: April - May

Maintenance: Low

Water Use: Medium to Wet

Native: Native

Suggested Use: Shade Tree, Rain Garden



Tulip Poplar | *Liriodendron tulipifera*

Height: 60 - 90'

Spread: 30 -50'

Bloom Time: May - June

Maintenance: Low

Water Use: Medium

Native: Native

Suggested Use: Shade Tree, Rain Garden,
Flowering Tree



Red Maple | *Acer rubrum*

Height: 40 - 70'

Spread: 30 -50'

Bloom Time: March - April

Maintenance: Low

Water Use: High

Native: Native

Suggested Use: Shade Tree, Street Tree,
Rain Garden



Willow Oak | *Quercus phellos*

Height: 40 - 75'

Spread: 25 -50'

Bloom Time: April

Maintenance: Low

Water Use: Medium to Wet

Native: Native

Suggested Use: Shade Tree, Street Tree,
Rain Garden



Sweetbay Magnolia | *Magnolia virginiana*

Height: 40 - 50'

Spread: 15 - 20'

Bloom Time: May - June

Maintenance: Medium

Water Use: Medium

Native: Native

Suggested Use: Rain Garden



SMALL DECIDUOUS TREES

Flowering Dogwood | *Cornus florida*

Height: 15 - 30'

Spread: 15 -30'

Bloom Time: April - May

Maintenance: Medium

Water Use: Medium

Native: Native

Suggested Use: Flowering Tree



Eastern Redbud | *Cercis canadensis*

Height: 20 - 30'

Spread: 25 -35'

Bloom Time: April

Maintenance: Low

Water Use: Medium

Native: Native

Suggested Use: Street Tree, Flowering Tree



American Hornbeam | *Carpinus caroliniana*

Height: 20 - 35'

Spread: 20 -35'

Bloom Time: February

Maintenance: Low

Water Use: Medium

Native: Native

Suggested Use: Street Tree



Fringe Tree | *Chionanthus virginicus*

Height: 12 - 20'

Spread: 12 - 20'

Bloom Time: May - June

Maintenance: Low

Water Use: Medium

Native: Native

Suggested Use: Flowering Tree



Japanese Maple | *Acer palmatum* 'Bloodgood'

Height: 15 - 20'

Spread: 15 -20'

Bloom Time: April

Maintenance: Low

Water Use: Medium

Native: Non-native

Suggested Use: Understory Tree, Border



Yaupon Holly | *Ilex vomitoria*

Height: 10 - 20'

Spread: 8 - 12'

Bloom Time: April

Maintenance: Medium

Water Use: Medium to Wet

Native: Native

Suggested Use: Hedge, Screen, Windbreak



SHRUBS

Virginia Sweetspire | *Itea virginica*

Height: 3 - 5'

Spread: 3 - 5'

Bloom Time: June - July

Maintenance: Low

Water Use: Medium to Wet

Native: Native

Suggested Use: Rain Garden



Glossy Abelia | *Abelia x grandiflora*
'Kaleidoscope'

Height: 2 - 2.50'

Spread: 3 - 4'

Bloom Time: May - September

Maintenance: Low

Water Use: Medium

Native: Non-native

Suggested Use: Hedge



Smooth Hydrangea | *Hydrangea arborescens*
'Grandiflora'

Height: 3 - 5'

Spread: 3 - 5'

Bloom Time: June - August

Maintenance: Low

Water Use: Medium

Native: Native

Suggested Use: Hedge, Rain Garden



American Beautyberry | *Callicarpa americana*

Height: 3 - 6'

Spread: 3 - 6'

Bloom Time: June - August

Maintenance: Medium

Water Use: Medium

Native: Native

Suggested Use: Border



Common Buttonbush | *Cephalanthus occidentalis*

Height: 5 - 12'

Spread: 4 - 8'

Bloom Time: June

Maintenance: Low

Water Use: Medium to Wet

Native: Native

Suggested Use: Rain Garden



Winterberry | *Ilex 'Sparkleberry'*

Height: 6 - 10'

Spread: 6 - 10'

Bloom Time: May - June

Maintenance: Low

Water Use: Medium to Wet

Native: Non-native

Suggested Use: Hedge, Rain Garden



GROUND COVER AND GRASSES

Big Blue Lilyturf | *Liriope muscari*

Height: 1 - 1.50'

Spread: .75 - 1'

Bloom Time: August - September

Maintenance: Low

Water Use: Medium

Native: Non-native

Suggested Use: Massing, Edger



Daylily | *Hemerocallis 'Stella de Oro'*

Height: .75 - 1'

Spread: .75 - 1'

Bloom Time: May - August

Maintenance: Low

Water Use: Low

Native: Non-native

Suggested Use: Massing, Edger, Border



Purple Coneflower | *Echinacea purpurea*

Height: 2 - 5'

Spread: 1.50 - 2'

Bloom Time: June - August

Maintenance: Low

Water Use: Dry to Medium

Native: Native

Suggested Use: Massing, Border, Meadow



Bishop's Hat | *Epimedium pinnatum subsp. colchicum*

Height: .75 - 1.50'

Spread: .75 - 1.50'

Bloom Time: March - May

Maintenance: Low

Water Use: Dry to Medium

Native: Non-native

Suggested Use: Massing, Edger



Mexican Feather Grass | *Nassella tenuissima*

Height: 1 - 2'

Spread: 1 - 2'

Bloom Time: June - September

Maintenance: Low

Water Use: Dry to Medium

Native: Non-native

Suggested Use: Massing, Borders



Pink Muhly | *Muhlenbergia reverchonii 'Autumn Embers'*

Height: 2 - 3'

Spread: 1.50 - 2'

Bloom Time: August - November

Maintenance: Low

Water Use: Dry to Medium

Native: Non-native

Suggested Use: Massing, Borders



VEGETATIVE SCREENING AND FENCING

DESCRIPTION

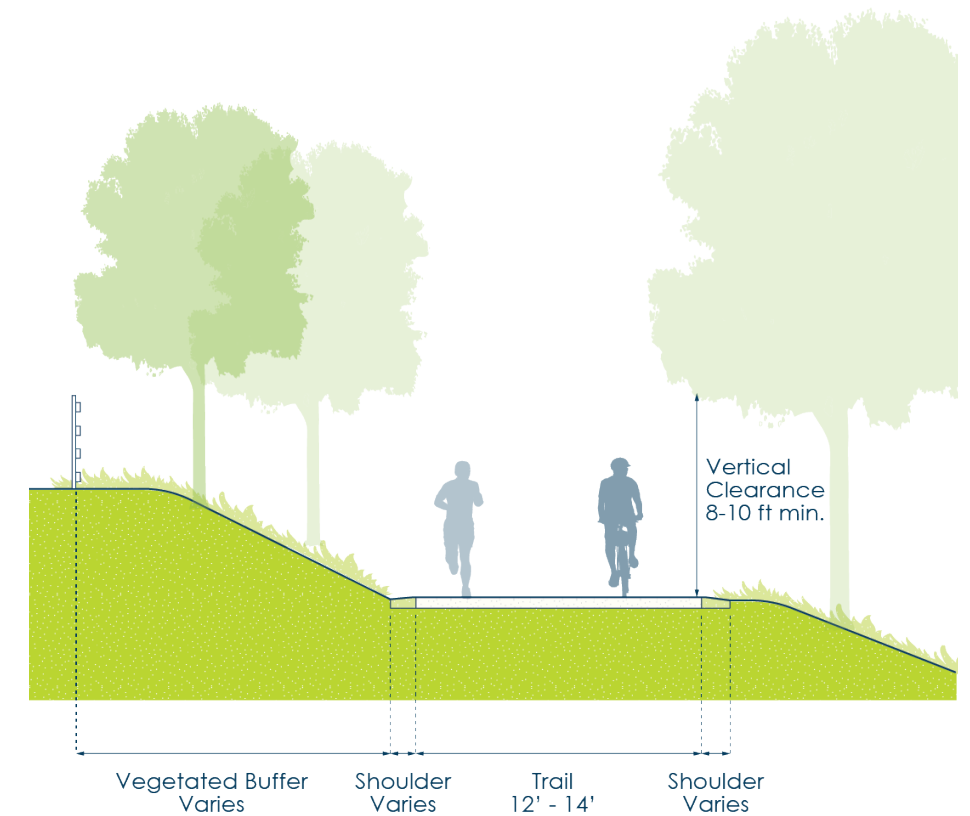
In some instances screening is desired either to conceal visually unattractive objects (such as overhead power lines) from trails or to screen from adjacent land uses such as residences in the interest of privacy. This may be accomplished with plantings, screen fences or other delineators such as a rail-type fence to create a sense of delineation.

SCREENING GUIDELINES

- All groundcover should be trimmed to a maximum of 24" above ground level height.
- Where vegetative screens are recommended to provide privacy for private properties, they are not to exceed 4' in height.
- Consider Crime Prevention Through Environmental Design (CPTED) principles when providing screening along trails.
- Trees should be trimmed to provide a minimum of 8 ft (2.4 m) of vertical overhead clearance, 10 ft (3.0 m) preferred (AASHTO Bike Guide).
- Tree canopies should not obstruct pathway illumination.
- Select and place trail vegetation to provide seasonal comfort; shade in the warmer months and sunlight in colder months.

FENCING GUIDELINES

- Minimize use of fencing, height and type of fencing (i.e. simple post and wire to protect an area where security or privacy is not a major concern). A 48" height is preferred to 72" unless higher required by security or safety concerns.
- Avoid opaque fencing to permit visibility.
- Attempt to conceal fencing behind vegetation where feasible.
- When securing private property include placards that state: "Private Property: Please Respect Owner's Privacy"
- As much as possible fencing should blend with the natural trail environment.
- Where appropriate affix "Do Not Trespass", or "Sensitive Wildlife Area" or other appropriate regulatory or informational signage to fences.





5 | Maintenance and Operations

OPERATIONS AND MAINTENANCE DEFINED

Operations and management refers to specific day-to-day tasks and programs performed to assure resources and facilities are kept in good usable and safe condition. This begins with sound design, durable components, and a comprehensive operations and management plan.

MAINTENANCE – ROUTINE, REMEDIAL AND SEASONAL

Routine Maintenance refers to the day-to-day regime of trail sweeping, trash and debris removal, sign replacement, weed control, tree and shrub trimming, ice or snow removal and other regularly scheduled activities. Routine maintenance also includes minor repairs and replacement such as fixing cracks and potholes or repairing a broken handrails.

Remedial Maintenance refers to correcting significant defects as well as repairing, replacing or restoring major components that have been destroyed, damaged, or significantly deteriorated during the life of the project. Some items ("minor repairs") may occur on a five to ten year cycle such as repainting, sealcoating asphalt pavement or replacing signage. Major reconstruction items will occur over a longer period or after an event such as a flood. Examples of major reconstruction remedial maintenance include stabilization of a severely eroded hillside, repaving a significant stretch of the trail surface, repaving a street used for biking or replacing a bridge. Remedial maintenance should be part of a long-term capital improvement plan.

Seasonal Maintenance is in addition to the routine and remedial categories and includes seasonal tasks that should be performed on an as needed basis.

Designated maintenance crews should remove leaf debris, sediment from flood events, snow, and ice, etc. from all network facilities as soon as possible. (Leaf debris is potentially hazardous when wet and special attention should be given to facilities with heavier usage).

During inclement weather, Highlands to Islands Trails will be officially closed to public use. Closure of the trail affects routine, remedial and seasonal maintenance work.

TRAIL COMPONENTS THAT ARE MAINTAINED

Following are the key components of the Highlands to Islands Trails:

- Multi-use paths
- Amenities
- Associated vegetation and drainage areas
- Trailheads and Access Points

Typical operations tasks include:

- User Courtesy and Regulatory Framework/Hours of Operation
- Conflict Reduction and Resolution
- User Safety and Risk Management
- Prompt graffiti and vandalism repair
- Pest Management
- Programming and Events
- Stewardship and Enhancement
- Coordinate volunteer and adopt-a-trail/street activities
- Oversight and Coordination
- User/Neighboring Property Feedback and Response

ACCESS AND USE

PUBLIC ACCESS TO HIGHLANDS TO ISLANDS TRAILS

Residents and visitors shall have access to and use of The Highlands to Islands Trails during normal hours of operation. All public access and use is governed by a Trail Ordinance. The use of the trail system is limited to hiking, bicycling, in-line skating (where provided), running, jogging, wheelchair users and others who rely on mobility aids or other approved power-driven mobility devices. The only motorized vehicles permitted to use the pathway are those owned or licensed for maintenance, first responders and/or security purposes by the County or Cities or contracted employees.

HOURS OF OPERATION

Unlike the recreational greenways and off-street trails, the Highlands to Islands Trails are located adjacent to roadways and within the public right-of-way. These trails were designed and intended for both recreation and transportation. As an element of the transportation system, these trails cannot be subjected to the same hours of operation as other park facilities. This distinction should be made through signage along the perimeter trails, at trailheads and parks, and on the County and cities and Highlands to Islands Trails websites.

Temporary closure of trails: Temporary closure of the Highlands to Islands Trails may occur from time-to-time for public safety

VEGETATION MANAGEMENT AND TRAIL EDGE GROOMING

DESCRIPTION

There are several areas of landscape management to promote both an ecologically and user-friendly greenway and trail system.

Multi-use Path Edge — the zone immediately adjacent to and above paved multi-use paths. Vegetation management refers to trimming the shoulder and beyond to assure a safe, usable trail. It also includes maintaining (trimming and/or mowing) an under-story “clear zone” back into the adjacent vegetation to promote lines of sight for safety and security and a more groomed appearance of the trail corridor. This edge should appear natural and should undulate and can vary in some areas from 5' to 20' back into the adjacent forest or meadow.

Sidepaths — Highlands to Islands Trail sections visible from nearby streets with a more parklike open landscape setting. These reaches may vary from 50' to 200 feet wide and are intended to create a more formal park feel. There may be mowed turf grass or other managed landscape including tree groupings with cleared understory.

Parks and Feature Areas — more formal areas of the Highlands to Islands Trail that incorporate parks and other attractions along the corridor. Typically these are turf grass areas, plazas or other more formal areas maintained by Parks and Recreation.

Managed “Natural” Areas — are designated areas with scenic enhancement or interpretation. An example of this might be a meadow planted in wildflowers or a variety of ornamental grasses.



Vegetation management

Source: United Rentals

TRAIL SYSTEM IMPROVEMENTS RECOMMENDATIONS

This section provides an overview of opportunities to address short-term needs and improve the long-term success, lifespan, and function of the Highland's to Islands Trail network.

- Resurface at the end of trail life cycle for existing trails (approx 30 years for concrete).
- Repair all tread areas that are cracking or damaged to improve quality and maintain safe conditions for users.
- Maintain positive drainage by targeting standing water and potholes. Reconstruct areas of the network lacking adequate cross slope for drainage.
- Close gaps in the trail network to encourage ridership and provide safe conditions.
- Install Highlands to Islands Trail network maps on kiosks at strategic locations.
- Prune vegetation obstructing trail the corridor.
- At all major signalized intersections that connect to the trail network, install pedestrian-activated signals, high visibility crosswalks, and curb ramps.
- At all commercial driveway intersections, install high visibility crosswalks and advanced pedestrian warning signage.
- Execute a maintenance schedule for the entire trail network to ensure clear conditions on the trail surface.

OPERATIONS AND MANAGEMENT OVERVIEW

The Highlands to Islands Trail network should promote a well-maintained, well-groomed, safe, secure and pleasant-to-use network within Hall County and incorporated jurisdictions.

The trail network is an asset to the community and a “good neighbor” to surrounding properties and businesses. It is imperative that the standard of care and quality is consistent across the diverse landscapes that are accessed by the trails.

The term operations and management refers to day-to-day tasks, long-term functions, and programs operated within the trail network, to assure that associated resources and facilities are kept in good usable condition. This begins with sound design, durable components, and a comprehensive management plan.

The management plan must be embraced by Hall County and the cities that the trail serves. For future trails, community groups, residents, business owners, land developers and other stakeholders should be engaged in the long-term stewardship of the resources preserved and enhanced by Highlands to Islands Trail.

The majority of Highlands to Islands Trails are concrete, paved, shared-use, non-motorized corridors that accommodate bicyclists, pedestrians, in-line skaters, and physically challenged persons who depend on wheelchairs, mobility aids and other power-driven mobility devices.



reasons. Hall County and the appropriate city jurisdictions will work to officially close sections of the trails that are not safe for public use or undergoing repair. Temporary barricades of the trails, or facilities, will be erected, along with appropriate signage, to inform the public of the sections that are temporarily closed. The County and cities will use appropriate communication strategies to inform the public of temporary closure.

Inclement weather policy: Inclement weather, inclusive of winter snow, ice storms, heavier than normal rainfall, and severe weather events, may result in temporary closure of the Highlands to Islands Trails. The County and cities will determine when inclement weather has created dangerous conditions for public use. When the trails are closed for inclement weather, Hall County and cities will use appropriate communication strategies to inform the public of the temporary closure for inclement weather.



CARE AND MAINTENANCE OF THE HIGHLANDS TO ISLANDS TRAILS

The County and cities and their contractors, shall be responsible for the care and upkeep of the trails and all lands, drainage features, signage, fences, bridges, trail heads, landscape plantings and trail amenities.

DRAINAGE MANAGEMENT POLICY

The County and cities shall coordinate with their appropriate street departments to maintain drainage channels, ditches and streams that bisect or intersect with the Highlands to Islands Trails. The County and cities shall ensure that the drainage structures are free flowing and unimpeded. Management of drainage channels and structures shall include the removal of vegetation, trash and debris that would serve to block the flow of surface waters which may flood the trails.

FACILITY MANAGEMENT

Trail management shall include the removal of all debris, trash, litter, obnoxious and unsafe human made structures, vegetation and other foreign matter. Trailheads, points of public access, and other activity areas shall be maintained in a clean and usable condition at all times. The primary concern for pathway maintenance shall always be public safety.

All trail facilities shall be maintained in a safe and usable manner during hours of operation, and in accordance with applicable Americans with Disability Act policies. Rough edges, severe bumps or depressions, cracked or uneven pavement, gullies, rills and washed out tread surface shall be repaired in a timely manner by the County or cities, and/or its designee. Volunteer vegetation occurring in the trail tread should be removed in such a manner so that the trail surface is maintained as a continuous, even and clean surface. Graffiti should be removed and vandalized elements of the trail and trail amenities should be repaired in a timely manner.

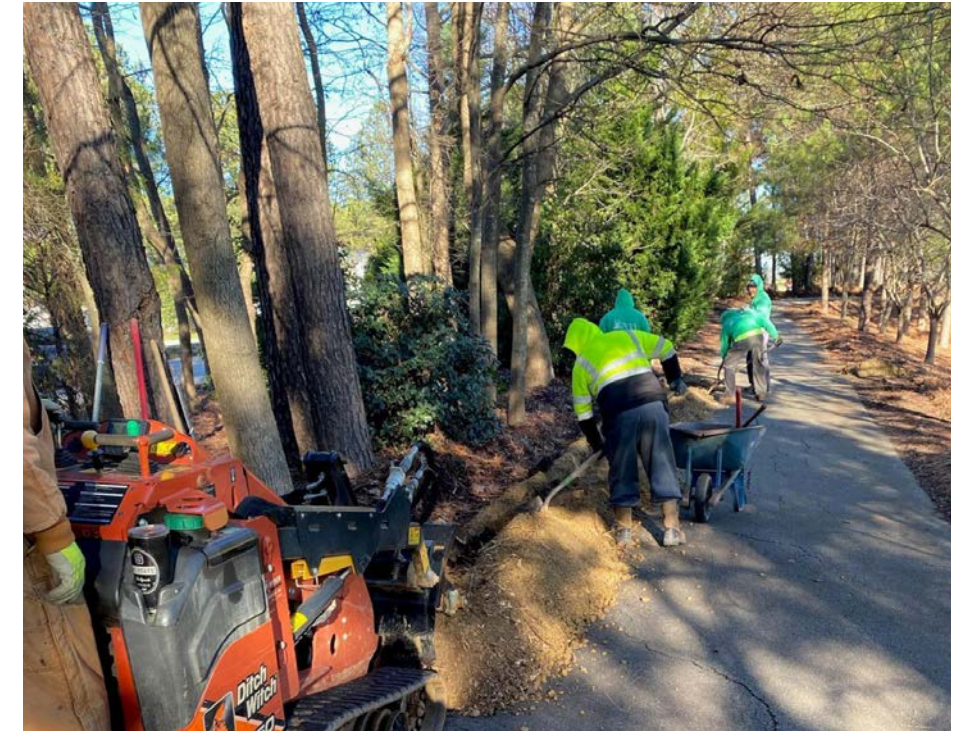
Vegetation within the trail corridors should be managed to promote safety, serve as habitat for wildlife, buffer public use from private property when possible, enhance water quality, and preserve the unique aesthetic values of the natural landscape. Removal of native vegetation should be done with clear purpose

and discretion. The objective in controlling growth of vegetation shall be to maintain clear and open lines of sight along the trail at all times, at intersections with roadways and driveways, and along roadways.

Vegetation removal within the trail development zone should be accomplished to eliminate potential hazards that could occur from natural growth. To promote safe use of the trail, all vegetation should be clear-cut to a minimum distance of 3 feet from the edge of the trail tread, and 8 feet of overhead clearance. Selective clearing of vegetation should be conducted within a zone that is defined as being between three to ten feet from the edge of the pathway.

At any point along the Highlands to Islands Trails, a user should have an unobstructed view, along the centerline of the pathway, 250 feet ahead and behind his/her position. The only exception to this policy is where terrain or trail curvature is a limiting factor. The County and cities are responsible for the cutting and removal of vegetation.

The following tasks should be performed on a regular basis to keep all network facilities in good, usable condition. Maintenance tasks should be conducted more frequently for trail facilities where use is the most concentrated. Methods such as trail use counts, sketch plan analysis methods for estimating demand, public survey results, and public meeting comments can be used to determine which areas are the most heavily used and may require the most maintenance attention. The frequency of required maintenance tasks should be established as new phases are implemented and should be reviewed and updated annually to reflect any changes in usage, safety issues, or other concerns.



ROUTINE AND REMEDIAL MAINTENANCE

TYPE	TASKS	
FACILITY MAINTENANCE	Sweeping	
	Trash Removal	
VEGETATION MANAGEMENT	Tree and shrub trimming and pruning	
	Mowing of vegetation	
	Mulching and edging	
	Invasive species control	
FACILITY REPAIR OR REPLACEMENT	Replenish gravel, mulch, or other materials	
	Repaint/restripe/restain	
	Repave/seal	
	Replace asphalt or concrete	
	Remove encroaching debris along paved trail/sidewalk edges	
	Regrade to prevent or eliminate low spots and drainage issues	
	Add culverts, bridges, boardwalks, retaining walls, etc. to prevent or eliminate drainage and/or erosion issues	
	Reroute trail, if necessary, to avoid environmentally sensitive or overused areas and any safety issues	
	SEASONAL MAINTENANCE	Remove leaf debris, snow, or ice from all network facilities as soon as possible. Leaf debris is potentially hazardous when wet, and special attention should be given to facilities with heavier usage.
		Ice control and the removal of ice build-up is a continual factor because of the freeze-thaw cycle. Ice control is most important on grade changes and curves. Ice can be removed or gravel/ice melt applied. After ice is gone, leftover gravel should be swept as soon as possible.
Remove leaf litter from network facilities via raking, blowing, mulching, etc. as needed to sustain the safe usability of all network facilities and prevent any storm water drainage or erosion issues		
	Remove snow and ice from network facilities, via plowing, shoveling, picking, salt, sand, etc. by 6 AM the morning following a storm	

TYPE TASKS

TYPE	TASKS
HABITAT ENHANCEMENT AND CONTROL	Plant vegetation, such as trees and shrubs
	Take preventative measures to protect landscape features from wildlife, such as installing fencing around sensitive or newly planted plant materials
	Apply herbicide to eliminate any problem plant species, such as poison ivy, kudzu, etc.
	Apply herbicide to maintain facility edges and prevent encroaching vegetation, such as along trails and sidewalks
	Deter interaction between facility users and facility inhabitants, such as feeding the wildlife, etc.

SECURITY AND PUBLIC SAFETY, RISK MANAGEMENT AND LIABILITY

Promoting safety and security of trail users and the security of adjacent properties should be the foremost objective of this operations and management plan. This should begin with a comprehensive risk management plan and program. The County and cities should establish a coordinated plan and a coordinating committee of operations staff to promote both a uniform standard of care and to help each other by information exchange and resource sharing.

The following are optimal recommendations. It is understood that resource limitations and staffing may limit the complete deployment of the safety and security plan. Elements of this include:

- Working with the County and city staff to routinely review trail and plans, operations, and issues and incidents. Policy of risk management inspection should be reviewed.
- Keeping good records of O&M activities and including documenting accidents, incidents, damage to adjoining properties and other issues and incidents. This would be greatly facilitated using GPS locations of problems and incorporating into GIS mapping systems. Good mapping could help identify possible "problem areas" and "incident clusters."

Cooperation by police and fire/rescue personnel is vital to good documentation.

Key considerations in promoting public safety and security include:

Have good, current, data—Implement a data base management system, a crime tracking system, with police for tracking the specific locations and circumstances of all incidents, such as accidents, crime and vandalism, and create a safety follow-up task force or board subcommittee to address any problems that develop.

Monitor the condition of facilities—Schedule and document frequent inspections to determine the amount of use, location, age, type of construction, and condition of railings, bridges, trail surfaces, signage, etc. Evaluate and remove all obstacles or objects

that could impede facility usage such as debris, rumble strips, etc. and provide solutions such as alternative routing, removal of obstacle, etc. Follow-up with the appropriate corrective measures in a timely manner.

Preventative maintenance—Watch for and identify potential safety problems such as a missing curve or stop sign, a damaged trail surface, a missing railing, leaf litter, sediment from flood events, snow and ice buildups (especially hidden ice and snow), flash flood issues, storm water drainage and/or erosion issues. Important to check for these after events like storms or construction along the trail corridor.

Safety and security features through planning and design—This includes adhering to state-of-the-practice standards such as the AASHTO Guide to the Development of Bicycle Facilities, The Manual of Uniform Traffic Control Devices, Americans with Disabilities Act, and US Department of Transportation Federal Highway Administration Guide for Maintaining Pedestrian Facilities for Enhanced Safety, 2013, OSHA. It also includes incorporating good lines of sight, trimming vegetation and other measures to avoid hiding places and other defense through-design techniques to help reduce crime and accidents.

Multi-disciplinary plan review—All proposed plans and construction drawings should be circulated amongst pertinent staff coordinating agencies and departments for review. This may include key field staff, planning and zoning (community services), streets and storm water management departments, police, fire and rescue, and maintenance department.

User courtesy and conflict reduction—Posting signs, equipping patrol persons, using brochures and Web site to educate public on trail etiquette including bicycle yield, equestrian courtesies, dog on leash and safe practices (See "conflict reduction" below).

Wayfinding and location identification—This includes wayfinding signage system, street signs at cross streets readily visible from the trail and "mile markers" located every 1 mile giving the location based on a north to south or west to east numbering starting at a

single "point zero" and running the entire length of the trail.

Patrol and enforcement—Fielding a bicycle mounted patrol. This might be a multi-jurisdictional patrol with wireless communication capability and first aid training.

Protecting adjacent properties—Working with adjacent landowners, tenants, and businesses to assure the trail is a good neighbor. This may include where appropriate, security barriers, do not trespass signage, and communication with impacted neighbors.

Medical emergencies and rescue, response and access—Working with police and fire/rescue for optimal emergency response including design for rescue and vehicle (to accommodate up to 5 tons) personal access, incident reporting by location using GPS, and location identification.

Address system—Have in place an "address system" such as mile markers to identify locations for all trail facilities. On-road facilities should make use of the existing street names and adjacent property addresses. Each local emergency response office/ unit should have an up-to date map of all Highlands to Islands trails.

The County and cities should work in cooperation to develop and implement a safety and security program for the Highlands to Islands Trails. All jurisdictions should engage police, fire, EMS, Homeland Security, and the appropriate parties in this work. This program should consist of well-defined safety and security policies; the identification of trail management, law enforcement, emergency and fire protection policies; and a system that offers timely response to the residents and visitors for issues or problems related to safety and security.

Important components of the safety and security program should include:

1. Establishment of a safety committee and/or coordinator,
2. Preparation of a pathway safety manual,
3. Establishment of user rules and regulations,
4. Development of pathway emergency procedures,
5. Preparation of a safety checklist for the pathway,
6. Preparation of a pathway-user response form,
7. A system for accident reporting and analysis,
8. Regular maintenance and inspection programs,
9. Site and facility development and review,
10. Public information programs,
11. Employee training programs for safety and emergency response, and
12. Ongoing research and evaluation of program objectives.

CONFLICT REDUCTION

User conflicts are bound to occur along trails especially as the trail system becomes increasingly popular and more crowded. Planning, designing and managing ahead of the curve can help reduce conflicts and promote a safer, more enjoyable trail experience.

Steps to promote conflict reduction include:

- **Anticipate issues**—Including reckless and unsafe behavior; incompatible uses; trespassing; disturbances and adverse environmental impacts. Respond to illegal or disturbing activity quickly.
- **Consider varied user goals**—Recognize the different goals of different users, such as equestrians and bicyclists, and separate where feasible.
- **Educate**—Provide user education through signage, patrol, volunteers, brochures, and media.
- **Enforce**—Post user courtesy signs and speed limits for bicyclists. Cite and if necessary ticket reckless behavior including excessive bicycle speeds, dogs off of leash, etc.
- **Anticipate the need for adequate capacity**—Provide adequate trail mileage and bicycle, pedestrian, and trail acreage to accommodate user populations.
- **Solicit input from user groups**—By providing contact information to report problems and responding promptly and effectively to complaints, concerns, or suggestions
- **Monitor problems**—Track, document, and log problem areas and address problems through design and management.

POLICE PATROL AND EMERGENCY RESPONSE

In order to provide effective patrol and emergency response to the needs of trail users and adjacent property owners, the County and cities should develop a specific patrol and emergency response plan. This plan should define a cooperative law enforcement strategy for the trail based on the capabilities of different agencies and services typically required for the facility. The County and cities should work together to define an emergency response system in conjunction with appropriate local fire and paramedical units in order to define which agencies should respond to 911 calls, and provides easy-to-understand routing plans and access points for emergency vehicles. Local hospitals should be notified of these routes so that they may also be familiar with the size and scope of the project.

NATURAL SURVEILLANCE

Natural surveillance increases the threat of apprehension by taking steps to increase the perception that people can be seen. Natural surveillance occurs by designing the placement of physical features, activities and people in such a way as to maximize visibility and foster positive social interaction among legitimate users of public space. Potential offenders feel increased scrutiny and limitations on their escape routes.

- Use adjacent roadways and the passing vehicular traffic as a surveillance asset.
- Create landscape designs that provide surveillance, especially in proximity to designated points of entry and opportunistic points of entry.
- Use the shortest, least sight-limiting fence appropriate for the situation.
- When creating lighting design, avoid poorly placed lights that create blindspots for potential observers and miss critical areas. Ensure potential problem areas are well-lit: pathways, stairs, entrances/exits, parking areas, children's play areas, recreation areas, storage areas, dumpster and recycling areas, etc.

- Avoid too-bright security lighting that creates blinding glare and/or deep shadows, hindering the view for potential observers. Eyes adapt to night lighting and have trouble adjusting to severe lighting disparities. Using lower intensity lights often requires more fixtures.
- Place lighting along pathways and other pedestrian-use areas at proper heights for lighting the faces of the people in the space (and to identify the faces of potential attackers).

NATURAL ACCESS CONTROL

Natural access control limits the opportunity for crime by taking steps to clearly differentiate between public space and private space. By selectively placing entrances and exits, fencing, lighting and landscape to limit access or control flow, natural access control occurs.

- Use a single, clearly identifiable, point of entry
- Use low, thorny bushes to keep people out of sensitive areas.
- Use waist-level, picket-type fencing to control access and encourage surveillance.
- Natural access control is used to complement mechanical and operational access control measures, such as target hardening.

NATURAL TERRITORIAL REINFORCEMENT

Territorial reinforcement promotes social control through increased definition of space and improved proprietary concern. An environment designed to clearly delineate private space does two things. First, it creates a sense of ownership. Owners have a vested interest and are more likely to challenge intruders or report them to the police. Second, the sense of owned space creates an environment where unwanted behavior stands out and is more easily identified. By using buildings, fences, pavement, signs, lighting and landscape to express ownership and define public,

semi-public and private space, natural territorial reinforcement occurs. Additionally, these objectives can be achieved by assignment of space to designated users in previously unassigned locations.

- Maintained premises and landscaping such that it communicates an alert and active presence occupying the space.
- Provide trees in residential areas. Research results indicate that, contrary to traditional views within the law enforcement community, outdoor residential spaces with more trees are seen as significantly more attractive, more safe, and more likely to be used than similar spaces without trees.
- Restrict private activities to defined private areas.
- Avoid cyclone fencing and razor-wire fence topping, as it communicates the absence of a physical presence and a reduced risk of being detected.
- Placing amenities such as seating or refreshments in common areas in a commercial or institutional setting helps to attract larger numbers of desired users.
- Scheduling activities in common areas increases proper use, attracts more people and increases the perception that these areas are controlled.
- Territorial reinforcement measures make the normal user feel safe and make the potential offender aware of a substantial risk of apprehension or scrutiny.

RISK MANAGEMENT

The design, development, management and operation of the Highlands to Islands Trails must be carefully and accurately executed in order to provide a resource that protects the health, welfare, and safety of the public. Liability most often occurs when a facility has been under-designed for the intended volume of use; when management of the facility is poor; or when unexpected accidents occur because the trail manager failed to recognize the possibilities of a potentially hazardous situation. To reduce the exposure to liability, the County and cities and their partners should have in place the following measures for continued trail use:

1. A complete maintenance program that provides the appropriate duty or level of care to trail users
2. A risk management plan that appropriately covers all aspects of the trail
3. A comprehensive working knowledge of public use laws and recent case history applicable in Georgia.

Liability claims pertaining to loss incurred by users of The Highlands to Islands Trails system are covered under existing State of Georgia policies for tort claims against governmental entities and public employees. Local agencies such as the County and cities have a legal responsibility to provide "reasonably safe condition[s]" on highways, roadways, and projects like perimeter trails. As the County and cities continue to operate and expand the trail system, it will be important to follow design standards and guidance to ensure a safe and reliable facility for trail users.



Appendix A

Gainesville Maintenance Guidelines

GAINESVILLE MAINTENANCE GUIDELINES

The Gainesville Maintenance Guidelines purpose is to provide the citizens of Gainesville with pleasant and aesthetically pleasing Parks, trails, and grounds. The Highlands to Islands Trail system can model Gainesville's maintenance guidelines that apply to trail maintenance and upkeep.

TRAIL SPECIFIC GUIDELINES

SERVICE AND INSPECTION

A maintenance crew should be scheduled to visit each area no less than 35 times or every 7 to 10 days during the growing season, per fiscal year (July 1 to June 30) to perform the following tasks:

- Mowing – Bermuda turf & fescue areas will be mowed every visit during the growing season. Bermuda area mowed at 1" to 2" heights while fescue areas are mowed at 3" to 4" heights.
- Edging/Trimming - A string trimmer will be utilized to trim grass adjacent to obstacles and other inaccessible areas during every mowing. Curbs, drives, walks, and paved areas will be edged during every mowing.
- Herbicide Applications - Herbicides will be utilized to treat areas around the perimeters of obstacles, buildings, etc. in order to prevent damage by string trimmers.
- Fertilization – Bermuda turf & fescue areas should be fertilized three (3) times annually using a custom blended slow release fertilizer based on soil test analysis to provide the appropriate blending of fertilizer.
- Clipping Removal – Excess grass clippings, which are visible after mowing, will be dispersed with additional mowing or collected and disposed of on site. (Mower discharge chutes should be directed away from planting beds, walkways,

parking lots, playgrounds, etc.) Any clippings in roadways must be blown back onto property or removed.

- Aeration and Over seeding – Fescue areas should be core aerated and overseeded during the fall with K-31 tall fescue seed at a rate of 3 to 5 pounds per
- 1000 square feet. Bare turf areas should be mulched with wheat straw when overseeding. pH Analysis- Fescue soil samples should be taken for analysis annually to determine pH and appropriate recommendations made to client with an additional cost estimate to provide ideal growing conditions.

LANDSCAPE PLANTS, PLANTING BEDS, AND NATURAL AREAS CARE

- Trimming and Pruning - Landscape plants (up to 4" caliper and 12' height) should be trimmed and pruned to shape, maintain plant size within its given space, encourage new growth and flower production, and remove deadwood. Plant growth regulators may be used to encourage dense growth or maintain plant size. Contractor shall make appropriate recommendations and estimate of additional cost for pruning and/or severe pruning of plants larger than 4" caliper and 12' heights or plants damaged by severe acts of nature, vehicles or persons not employed by Contractor. Client/Owner reserves the right to negotiate this extra cost or perform the task with Client/Owner staff. Debris will be collected and disposed of in accordance with "Organic Debris Disposal" (Section #4).
- Analysis – Planting bed soil samples should be taken for analysis annually to determine pH and appropriate recommendations made to client with an additional cost estimate to provide ideal growing conditions. Client/Owner reserves the right to negotiate this extra cost or make applications with Client/Owner staff.

- Fertilization – Planting beds will be fertilized one to three times annually with a custom blended slow release ornamental fertilizer based on soil analysis to promote root development and dense top growth.
- Disease and insect Inspections – Planting beds should be inspected periodically for the presence of insects and disease. In the event pesticide applications are appropriate, contractor will consult with Client/Owner and make appropriate recommendations with an additional cost. Client reserves the right to negotiate this extra cost or make applications with Client/Owner staff.
- Weed Control and Mulch - Planting beds and natural areas will be treated with pre and post herbicides and hand weeded to prevent/remove weeds. Existing beds with Pine straw mulch will be replenished completely twice annually (March & September.)

ORGANIC DEBRIS DISPOSAL

- All organic debris will be disposed of on site or removed by Client/Owner from a designated area on site depending upon size and as agreed upon between Client/Owner and Contractor.
- Limb Pick Up - Natural areas will be policed for large limbs during the contract period. Limbs should be placed along street curbs or other designated spots for removal by Client/Owner or City of Gainesville Solid Waste Division.
- Leaf Collection - Leaves will be collected from lawn, planting beds, and paved areas every visit during the leaf season and placed in designated natural areas as well as disposal areas on site. All other leaves will be neatly windrowed at curbside for pick up by the City of Gainesville Solid Waste Division.

WALKWAYS AND PAVED AREAS

- Paved areas will be blown and/or vacuumed each visit to remove organic debris. Weeds growing in cracks in pavement will be removed with an herbicide treatment.

LITTER PICK UP

- The landscape and paved areas will be policed for litter every visit. All litter to be disposed of using on site waste receptacles.

Further information for each section can be found in the Gainesville Landscape Maintenance Guidelines









Appendix B

Furnishings and Amenities Matrix

FURNISHINGS AND AMENITIES MATRIX

		PRODUCT NAME	MANUFACTURER NAME	PRICE	PAGE NUMBER	WEB ADDRESS
SEATING		FS-50 Bench	Victor Stanley	4' Length (\$1,768) 6' Length (\$1,886) 8' Length (\$2,134)	37	https://victorstanley.com/product/fs-50/
		Dash Bench	Forms + Surfaces	\$1,500	38	https://www.forms-surfaces.com/dash-bench
BIKE PARKING		Loop Bike Rack	Landscape Forms	\$490	41	https://www.landscapeforms.com/en-US/product/Pages/Loop-Bike-Rack.aspx
		Olympia Bike Rack	Forms + Surfaces	\$549	42	https://www.forms-surfaces.com/olympia-bike-rack

		PRODUCT NAME	MANUFACTURER NAME	PRICE	PAGE NUMBER	WEB ADDRESS
TRASH RECEPTACLE		HA Series Single Trash Enclosure	Bearsaver	\$1,221	45	https://bearsaver.com/collections/bear-resistant-ha-series-trash-cans-and-recycle-bins/products/bearsaver-ha-series-single-trash-enclosure-ha-p
		Chandler Receptacle	Thomas Steele	\$1,079	46	https://www.thomas-steele.com/chandler-litter-receptacle
DRINKING FOUNTAIN		Bottle Filling Station, Bi-Level Fountain and Pet Station	Global Industrial	\$3,319	49	https://www.globalindustrial.com/p/global-industrial-outdoor-bi-level-drinking-fountain-with-bottle-filler-pet-station-ss?PicGroupKey=134594
BIKE REPAIR		Bike Fix-it Station	Dero	\$1,555	51	https://www.dero.com/product/fixit/
BOLLARDS		Light Column Bollard	Forms + Surfaces	Illuminated (\$2,178) Non-Illuminated (\$1,274)	53	https://www.forms-surfaces.com/light-column-bollard

		PRODUCT NAME	MANUFACTURER NAME	PRICE	PAGE NUMBER	WEB ADDRESS
LIGHTING		Rama Area Light	Landscape Forms	\$6,130	55	https://www.landscapeforms.com/en-US/product/Pages/Rama-Lighting.aspx
		Alcott Area Light	Landscape Forms	\$4,170	56	https://www.landscapeforms.com/en-US/product/Pages/Alcott-Area-Light.aspx
RAILING		Stainless Round Cable Railing	Stainless Cable & Railing	\$1,600 - \$4,100 (9' LF - 37LF kits)	59	https://stainlesscablerailing.com/round-stainless-steel-railing-systems.html
		Wood Railing System	Stainless Cable & Railing	\$75 - \$95/LF	60	https://stainlesscablerailing.com/wood-railings1.html
BOARDWALK		Precast Boardwalk System	PermaTrak	\$50-\$65/sf	63	https://www.permatrak.com/

		PRODUCT NAME	MANUFACTURER NAME	PRICE	PAGE NUMBER	WEB ADDRESS
SHADE STRUCTURE		Hyperbolic Shade Sail	Superior Shade / Korkat	Start at \$8,175 (20'x20' Shade Sail)	65	https://www.korkat.com/product/hyperbolic-sails/

