PERSPECTIVES IN PLANNING

NEXT GENERATION TRAILS

New Mobility Trends in Shared-Use Path Design and Management

SUMMARY

Historically, shared-use paths were exclusive spaces for human-powered activity. However, new technologies are transforming them into places that may include power-driven personal and shared mobility vehicles. These changes are creating new challenges for trail managers and require an understanding of design, operation, and management of new mobility modes. This paper provides a framework for the next generation of shared-use paths to balance utility, safety, and user experience.

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ALTA

As a global leader in mobility innovation for over 24 years, Alta helps make positive changes in communities to empower all people to live active, healthy lives. We are dedicated to connecting people to places by working across disciplines and scale to address social equity, access, and environmental resilience.

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Disclaimer: The dimensions, design details, recommendations, and findings in this document are based on a survey of existing installations, theoretical ideas, conceptual analysis, and design. In developing the document's recommendations, the authors used prior experience, professional judgment, and industry standards where available.

01 INTRODUCTION

For many communities, more **travel choices** are key to a sustainable transportation future. Electric bikes, electric scooters, electronic personal assistance mobility devices (EPAMDs), neighborhood electric vehicles (NEVs), and other powered micromobility devices can help reduce single-occupant car trips and fill in gaps in the transportation network. Powered micromobility devices expand the suite of alternative transportation modes to reduce automobile dependency. They can be more readily combined with transit and human-powered transportation trips to expand transportation options.

In the US, shared-use paths serve as important low-stress links in local and regional transportation networks. Most trails have historically been designed, constructed, and operated for non-motorized uses such as bicycling and walking, and are funded as such. The same low-stress, low-speed environment that makes trails ideal for human-powered transportation also makes them logical spaces for the operation of powered micromobility. **Determining how shared-use paths can safely function with powered micromobility users will expand individuals' range of mobility and attract use.**

Shared-use paths can be used comfortably by a diverse range of individuals, from children on bikes to seniors walking. The culture of the trail environment is safe, low-stress, and comfortable—without the concerns of automobile-centric spaces and motorized vehicles. Many trails also provide access to open spaces, natural areas, or places of historic or cultural importance.

Policies limiting noise, potential emissions, size, weight, and speed of powered mobility devices on trails are necessary in some communities to protect natural assets and maintain the safety and comfort of all users.

What is Micromobility?

Micromobility is a term that refers to the growing suite of small, human- or electric-powered low-speed transportation vehicles such as bicycles, scooters, skateboards, low-speed neighborhood vehicles and mopeds. These devices may be personally owned or part of a shared mobility service (such as bike share, scooter share, etc).

Powered micromobility refers specifically to low-speed, motorized devices. These devices are most commonly electric (e.g. e-bikes and e-scooters), but may come in other forms. This paper focuses on powered micromobility as the specific element that is influencing trail planning, design, and management.

These definitions align with the National Association of Transportation Officials (NACTO) 2019 report *Guidelines for Regulating Shared Micromobility* and the 2019 SAE *J3194 Taxonomy & Classification of Powered Micromobility Vehicles.*

Micromobility Principles

Historically, shared-use paths were exclusive spaces for human-powered activity. However, new technologies are transforming trails into places that may include power-driven personal and shared mobility vehicles. These changes are creating new challenges for trail managers and require an understanding of design, operation, and management of new mobility modes. This paper provides a framework for the next generation of trails to balance utility, safety, and user experience on shared-use paths.

Is there a way to focus on solutions that can be applied now—that will advance locally determined goals—while also preparing for the future?

Building from what is known about new mobility, powered micromobility devices, and what local governments are doing, new strategies are emerging for accommodating an expanded suite of mobility options.

Mobility Devices and the Americans with Disabilities Act

In 2011, the US Department of Justice (DOJ) published a ruling under the Americans with Disabilities Act (ADA) allowing "other power-driven mobility devices (OPDMDs)" to be used on trails by "individuals with mobility disabilities".[1] A power-driven mobility device is anything with a motor that can be driven, regardless of size or horsepower, if driven by a person who has a mobility-related disability. Under the DOJ rule, trail managers may restrict certain classes of OPDMDs that the agency has determined cannot be operated in accordance with legitimate safety requirements.

1. *www.ada.gov/opdmd.htm*

Accommodating human-powered and electric-powered micromobility devices requires a trail typology that is flexible and forward-looking.

Principles to Guide Decision Making

Alta developed the following six principles to guide decision-making for accommodating powered micromobility devices on trails. They are rooted in factors that are foundational to shared-use path planning, design, and operations regardless of land use context: safety in relation to user conflict, user experience, connectivity, and the natural environment. They are also grounded in the idea that shared-use paths are part of low-speed transportation networks for all ages and abilities and must be considered with that trip purpose in mind.

Advance Mobility Justice

Advance Mobility Justice

Shared-use paths provide access to health, economic opportunity, and safe and affordable transportation. There is potential that powered micromobility further extends that reach through longer trip distances, faster travel, and a wider range of abilities. Historically marginalized communities and people facing the greatest mobility barriers have the most to gain from improved access and should be centered in the planning and design process. This includes making decisions about a trail's "design users" and "design uses."

Design for Safety

Design for Safety

An expanded range of users indicates an expanded range of speeds, volumes, vehicle maneuverability, and potential hazards. Designing for safety requires identifying and prioritizing the most vulnerable trail user first, then accounting for design features that will improve safety for all users. This could include turn radii, signage placement, speed guidance, sight distances, and surface maintenance or repair. High volumes or heavy vehicles (e.g. NEVs) warrant physical separation, speed designated lanes, or policy actions such as designating no-power zones and the use of geofencing technologies for speed control.

Complement the Natural Environment

Complement the Natural Environment

Shared-use paths can provide access for multimodal and powered mobility while still preserving users' experience with the natural environment. Design and management strategies should reduce interferences with the natural context with considerations for sound, wildlife interactions (e.g. bird watching), and speed reductions.

Prioritize the Human Experience

Prioritize the Human Experience

Shared-use path design should strive for a consistent user experience and predictable level of comfort. With a "do no harm" approach to accommodating new modes alongside traditional shared-use path users, design modifications and new management policies should prioritize the human experience, including the experience of the trail's most vulnerable user. Future-ready trails recognize perceptions of safety and level of comfort as very real factors that influence trail usage.

Expand User Amenities

Expand User Amenities

New amenities will improve how shared-use paths accommodate new users. With powered micromobility and other new and emerging modes, public charging infrastructure offers convenience while also reducing risk of "stranded" users or inoperable devices/vehicles that have lost power. Such investments can also provide public charging for motorized wheelchairs or personal phones. Other amenities could include added storage or parking at trailheads and maps/signage for connecting to shared micromobility docking stations and parking corrals.

Design for the Future Trail

Design for the Future Trail

Plan for the shared-use path's future. A range of tools available now can leverage big data, local transportation trends, and modernized modeling tools to estimate future volumes of trail users. Trail designers and managers should track trends, identify shifts in user groups, and conduct research when possible (e.g. counts or intercept surveys). Understanding latent demand and estimated future volumes for a growing suite of trail modes, users, and uses will determine effective design solutions that will have lasting impacts on trail success.

02 POLICY GUIDANCE

Policy can dictate where, when, and how people use trails. It can also influence how a trail is designed. When creating policy for trail access, the goal should be to make requirements that are clear for the user and can be monitored by the trail manager. Policy should be considered concurrently with design, as the trail design can greatly influence the desired uses of the trail. To keep the policy clear, it is important to define which devices and which trails the policy is being directed towards.

Devices

Managing vehicle types is the traditional method of managing trail use, often by ordinance or regulation. Historically, less diversity of vehicle types made exclusion of certain types of vehicles fairly straightforward. For example, prohibition of motorized vehicles excluded cars, motorcycles, or ATVs from trail use. Those vehicles are much larger and travel at speeds that create serious safety issues.

With the growth of new mobility vehicles like e-scooters and e-bikes, there is now a spectrum of motorized vehicles that may be more compatible with the desire to keep trails low-speed and human-scaled. 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 as a regular bike versus an e-bike.

Trail policy can allow or prohibit bicycles, e-bicycles, scooters, e-scooters, Neighborhood Electric Vehicles, all-terrain vehicles, skateboards, e-skateboards, and more. Policy language can categorize some vehicle types by motorized or non-motorized. Additionally, e-bikes can be classified into three different categories for the purpose of regulation and establishing user requirements. E-bikes are not by default treated as bicycles unless local policy states that this is the case. Trail policy should explicitly allow or deny e-bike access based on e-bike Class 1, 2, or 3 and trail type.

Trail Classification

Trails vary widely from narrow, singletrack unpaved rustic hiking or mountain biking trails to wide, paved regional trails extending along rail, former rail, roadway, or utility corridors. It is important to match the policy to a specific trail or trail classification.

For the purpose of this paper, we are focused on paved shared-use paths. Some communities develop a hierarchy of trails for understanding user types and resulting design standards and policy. Trail hierarchies are useful in establishing order for trails as primary active transportation or recreation corridors (or both). Paved trails are used by the most diverse range of recreational and transportation users, and can be funded with transportation dollars. The design of trails must consider the scale and type of landscape they traverse, from natural resources and wildlife habitat to land use and traffic conditions.

User Behavior

Policy is more effective and remains up-to-date as new technologies emerge if it is written to regulate the concern rather than specific transportation devices. Policy makers should begin the process of drafting policy by thinking about the goals of the trail, either specifically or categorically, and how policies should address safety and user experience concerns such as speed, access, parking and noise or air pollution. It is hard to regulate and influence behavior for each specific technology because new devices can appear faster than policy is written or updated. Additionally, it is sometimes difficult to distinguish an e-scooter, bike, or skateboard from a standard, human-powered device. Policies can define trail types and appropriate uses and speeds for each, and delineate parking areas.

Image: Alta

Electric Bicycle Classifications

TYPE	ASSET TYPE	MAX ASSIST SPEED	ACCESS + USE
Class 1	Pedal	20 MPH	Same as bicycle — use all existing bike infrastructure + no additional age, helmet, or operating restrictions
Class 2	Pedal / Throttle	20 MPH	
Class 3	Pedal	28 MPH	Use, access and equipment restrictions

03 POLICY CONSIDERATIONS

There are many variances and nuances to trails and how micromobility and trails policies apply in various scenarios. Key items to consider include the following:

Trail Funding

Funding to aid in setting aside the land and creating a trail can influence how a trail is designed, built, and ultimately used. If a trail has received transportation funding, there are different implications for the use of that trail compared to one being funded for environmental preservation, for example. If a trail has been funded by CMAQ funds to reduce air quality emissions, the use of the trail by motorized devices including combustion engines may conflict with the grant funding terms.

Trail Users

Each trail user type has its own needs and demands. Bird watchers, commuters, families, and people seeking exercise all have differing expectations and requirements of the trail to meet those needs. Some may desire the ability to travel at faster speeds while others are looking for quiet seclusion. A single trail rarely accommodates all user types and thus should not encourage all users. Most park systems offer a wide range of trail types, and trail users find their desired space based on the design of and policies for each trail. Trail width, surface type, and adjacent space commonly set the tone for trail use. Policy and the messaging and signage that goes along with it provides trail users with the cues necessary to determine where they belong.

Trail Context

Sometimes a trail can have competing identities and uses. A trail adjacent to a waterway, well-shaded with thick vegetation and home to several protected and endangered species, is a great place for hiking, walking, and bird watching. If the trail is also paved and provides critical connections to neighborhoods, key employment destinations, and across barriers like highways and high-speed arterials, it is also a key spine of a transportation network. The commuters using the trail may travel at

speeds that make hikers, walkers, and bird watchers uncomfortable. Both are competing but important community resources, and trail design, policy, and signage reduces the conflict between competing user groups.

Pilot Policy

If a trail manager is not ready to codify trail user regulations on their trails, they can consider a pilot program for testing out different user types on their trails. A pilot program for a selected trail can be customized to that trail and the user group or powered micromobility device in question. During the pilot period, data is gathered about the trail user experience, speeds, trail surface wear and tear, and trail user type counts. This can be done through automated or manned counts, surveys, and/or speed measuring devices. After a set amount of time, the trail manager will have data to support either keeping, extending, or removing a trail policy. This is being done to test e-mountain bike access on trails across the nation[2].

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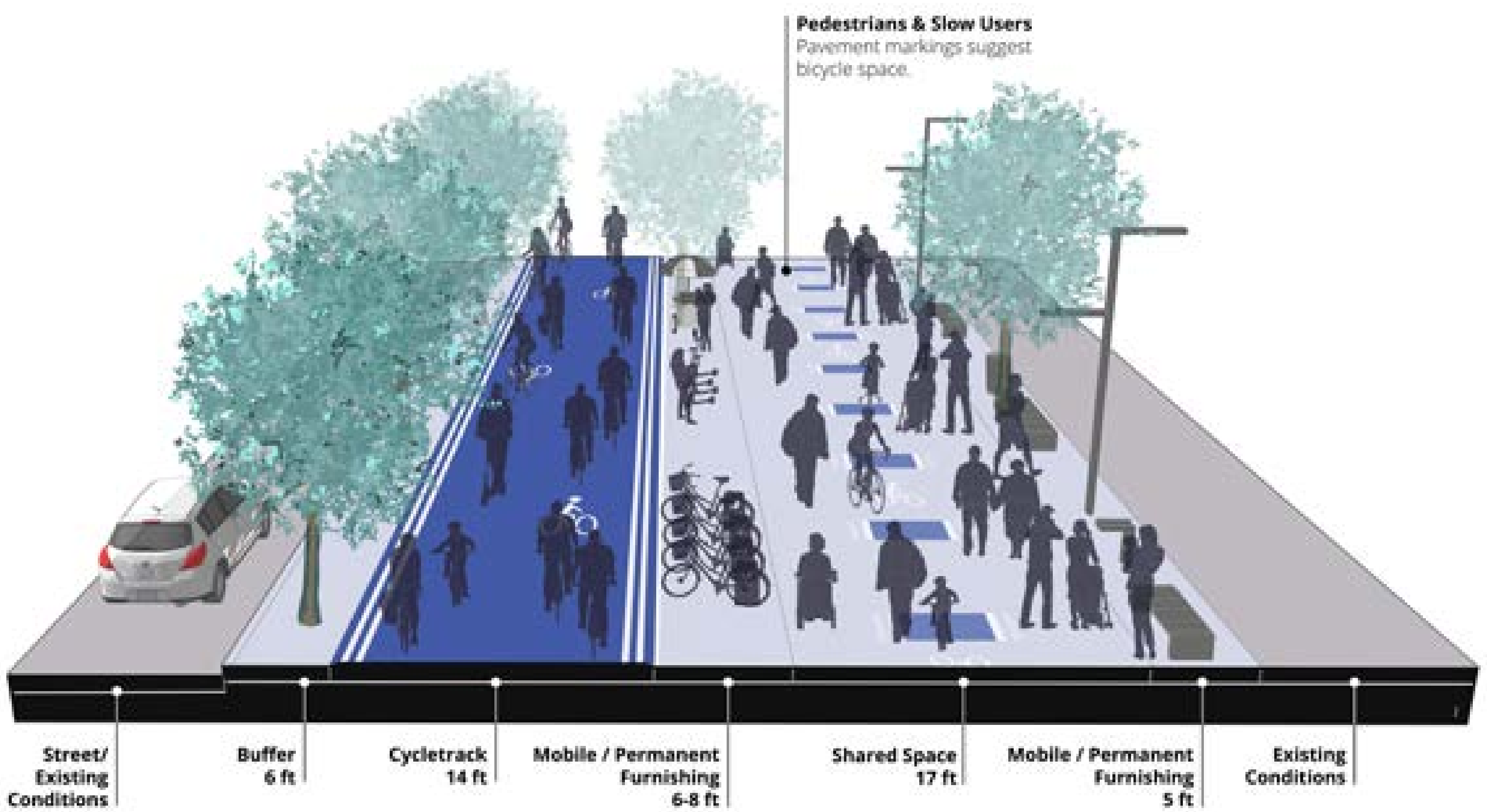
2. https://peopleforbikes.org/our-work/e-bikes/for-land-managers/

04 DESIGN CONSIDERATIONS

The demand, context, and policy issues for accommodating powered micromobility devices on trails in each region will vary widely. When accommodating emerging modes on multi-use trails, there are design and management factors to consider. The following considerations apply more to the physical design of the trail rather than management of the trail's use, which is covered in the Policy section. Design considerations are a starting point to inform discussion and decision-making for powered micromobility devices on trails.



The future of trails may be separated, shared, flexible, or all three.

User/Vehicle Types

User Type	Speed of Travel	Path Needs
WALKERS	1 to 3 mph	• Need wider areas for traveling in groups or walking dogs • Comfortable on sidewalks and paths that are grade-separated from vehicles and fast active users
RUNNERS	5 to 9 mph	• Prefer off-street paths with consistent lighting • Fast runners may prefer to share space with cyclists during periods of high pedestrian traffic
WHEELCHAIR USERS	1 to 3 mph (non-motorized) 3-5 mph (motorized)	• Comfortable on sidewalks and paths that are grade-separated from vehicles and fast cyclists
CASUAL AND NEW CYCLISTS	6 to 12 mph	• Prefer riding on off-street facilities • Compared to experienced cyclists, casual cyclists are more likely to utilize rest areas
EXPERIENCED CYCLISTS	12 to 25 mph	• Very experienced cyclists may choose to use roadways over paths • Most prefer fewer crossings, separated paths, and room to pass slower cyclists
E-BIKE USERS	16 to 23 mph	• Class 1, 2, and 3 (use, access and equipment restrictions apply to Class 3); electric tricycles; electric cargo bikes; and pedal-less e-bikes • Most prefer fewer crossings, separated paths, and room to pass slower cyclists • Opportunities for shared mobility docking stations with charging stations
E-SCOOTER USERS	Up to 20 mph	• Stand-up and seated versions, e-skateboards, hoverboards, balance board • Access to on-street corrals, racks in the furnishing zones, shared mobility parking zones
NEIGHBORHOOD ELECTRIC VEHICLES	Up to 25 mph, policy typically caps speed at 20mph on trails	• Low-speed vehicles, which can include golf carts, are a proxy for possible autonomous low-speed shuttles on trails • Needs locations to pull off in congested areas, and space to pass people using lower-speed mobility devices • Consider electric charging stations and separation from pedestrians • Policy and signage needed for interactions with other mobility devices and motorized vehicles at street intersections

This table highlights some of the design considerations related to personal mobility and potential powered micromobility being used on trails.

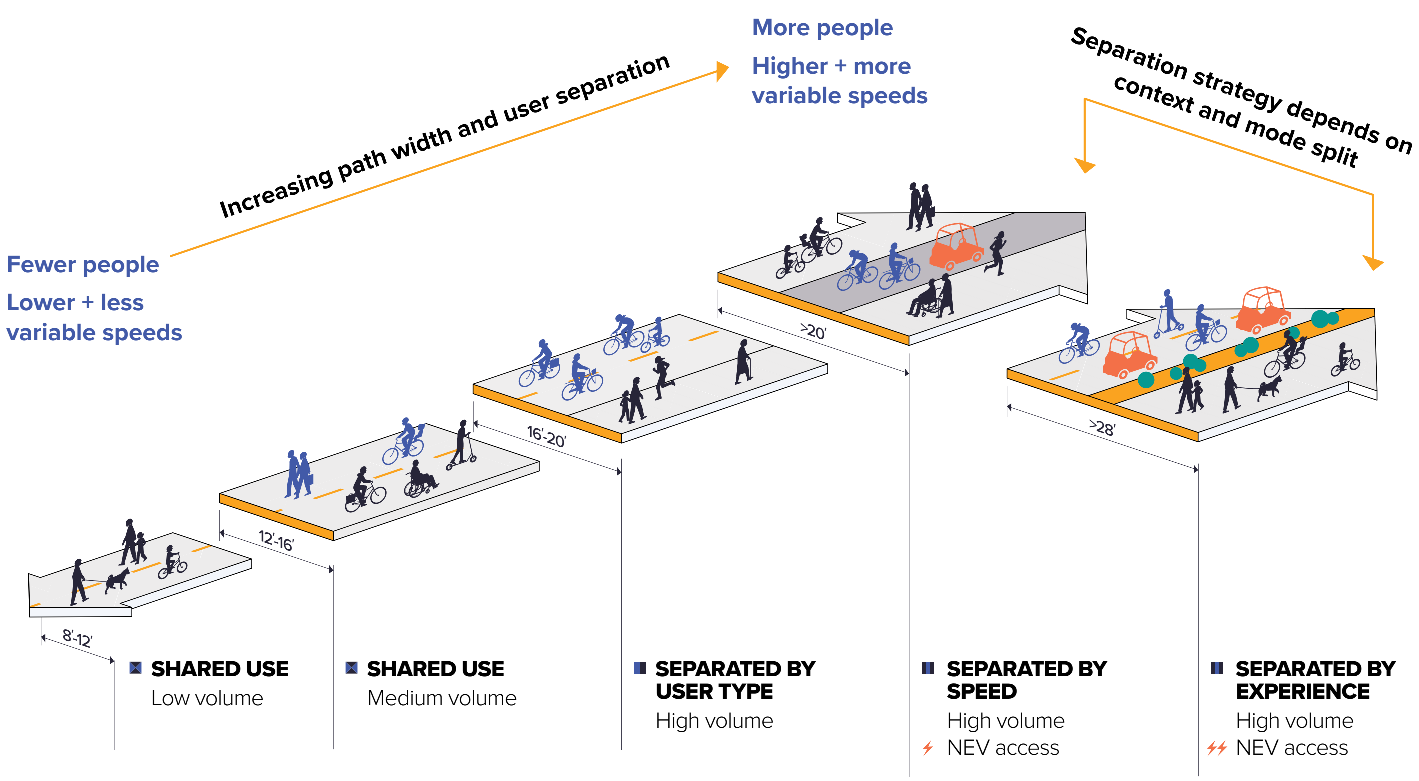
Speed and Volume

There are plenty of examples for how to use speed to separate different users and vehicles. A common example is on-street bikeway design. Along a quiet neighborhood street with slow vehicle speeds and low vehicle volumes, riding a bike in the street and sharing space with vehicles can be comfortable for most users. The difference in speed between someone biking and someone driving is relatively small and the frequency of getting passed by someone driving is low.

If this example is applied to a street with high vehicle speeds and volumes, additional safety treatments need to be applied to maintain the level of comfort experienced on the neighborhood street. A dedicated bikeway and physical separation between motor vehicles would be needed, at a minimum.

The consideration of speed and volume will be different on trails—for example, the consideration of speed and volumes of bikes and scooters relative to people walking. Similar principles apply: higher volumes and speed differences between users translates to more separation and space needed to accommodate everyone comfortably and safely.

The graphic below illustrates how considerations for speed and volumes of different trail users can be applied to the width of trails and whether to create dedicated space for different users.



Separated rolling and walking paths provide for a high volume of users and variances in speed to create safe, joyful, and sustainable trails.

Experience and Use

Just as streets should be designed in context to their surroundings, so too should trails. Different trail modes require separation and design considerations based on adjacent density, land use, and nearby attractions.

For example, there might be a vantage point or photo opportunity at a skyline or natural area along a trail. Good trail design takes the experience into consideration by providing a wayside for viewing. This separation of use prevents congestion and conflict, and provides benefits for all people having different experiences on the trail.

Another typical condition is to design for split modes, common along waterfront trails. Often, trails in this condition serve as both a throughway and a destination. For people passing through, a bikeway route may accommodate higher speeds and more direct connections, while a separate path for pedestrians may be designed for strolling or observation.

This approach to considering trail experience and use can be applied to designing trails to accommodate micromobility vehicles and other power-driven devices. Separate treads, waysides, and mixing zones can be tailored to the various modes along trails.

The table below summarizes some of the ways experience and utility can be used to assess when to separate or share trail experiences.

CRITERIA	DEFINITION	APPROACH
Safety Related to User Conflicts	Some physical constraints of the corridor may prove challenging for the trail. Trails require sufficient space, otherwise conflicts arise between user groups.	Consider danger to users from pedestrian, vehicular, and other bicycle conflicts. For the purpose of evaluation, criteria can be: **Cautious / Suitable / Preferred**
User Experience	The quality of the trail, from the perspective of the user, will affect how people value the trail as part of the community. This criterion identifies the ability of a trail to accommodate people traveling, as well as its ability to provide opportunities for amenities that provide enjoyment and interpretation of the surrounding area. It should consider potential views, as well as characteristics of the trail context such as noise and air quality.	Estimate potential width of trail corridor, grade changes, enclosure, and opportunities for landscape, public art, and amenities. For the purpose of evaluation, criteria can be: **Challenging / Modest / Enjoyable**
Connectivity	The location of the trail, combined with access points, determines whether the trail can serve the connectivity needs of the community.	Identify any missing links or key destinations that the trail will not serve. For the purpose of evaluation, criteria can be: **Path Only / Minor Connections / Well Connected**
Natural Environment	Trails provide an opportunity to address the human need to experience nature to have a physically and mentally healthy life. Even small encounters with water and street trees are an asset to the health of a community.	Assess the opportunity for direct access, and the scale and quality of views of natural areas from the trail. For the purpose of evaluation, criteria can be: **Inaccessible / Minor Access / Accessible**

Trail Messaging and Signage

While well-written policy is important for all public trails, it is equally, if not more, important to have those policies and regulations translated into simple and effective messaging for trail users. This includes signage at trail access points and along the trail corridor as well as anywhere users will go to seek trail information, including printed and online resources, and trail system maps and publications.

There are a number of signing and striping tools that help foster safe and correct use of a trail system. These include regulatory signs and striping, warning signs, wayfinding guide signs, kiosks or rule signs, etiquette signs, and surface or architectural treatments. While all of these tools help users safely use and navigate a trail, regulatory signs are the only tools that are legally enforceable.

Regulatory signs provide directives to trail users. These signs are MUTCD standard signs that are traffic control devices. Examples include stop and yield signs. Local jurisdictions can develop custom regulatory signs to clearly define the use conditions along a trail. For example, regulatory signs can be posted along a separated-use trail indicating which path users should take.

Warning signs inform users about changes in the trail ahead. Warning signs are important to alert trail users about both physical changes along a trail as well as changes in user types and conditions.

Wayfinding guide signs enhance wayfinding along a trail. Guide signs can also serve to help direct different user types to the correct areas of a trail corridor to walk or ride. They are informed by MUTCD standards but can be customized to provide local branding as well.

Santa Monica Beach Path: bike left, walk right.

Etiquette signs help provide cues for courteous trail behavior without being overly regulatory.

Wayfinding kiosks are useful in any trail system. Strategically placed at trailheads, they greet users and introduce them to the trail. They can include such information as a system map, what uses are allowed and where, rules and regulations, and a directory of area attractions and destinations.

Etiquette signs are informal signs intended to promote courtesy and educate trail users on a wide variety of topics, including using safe speeds, where users should be walking or riding, and how to perform passing and other maneuvers safely.

Trail surface treatments can be used to help delineate separated-use trails, provide tactile indications for mixing zones, direction of travel, and other path transitions or conflict zones, and to demarcate edge conditions. Custom surface or architectural treatments also add to the character of place, bringing coherence in trail identity and aesthetic which can reinforce its identity as a multimodal trail.

05 APPROACH TO CHANGE

Managing change, especially a change in use along trails, is a process. Powered micromobility devices aren't new for communities. Many already have ongoing and evolving policy initiatives to design new trails or enhance and maintain existing trails to accommodate powered micromobility devices.

The difference today is that the pace of change is fast and unpredictable. The process outlined below is a modification of what some communities are already doing, with the flexibility for faster feedback loops to adapt more quickly.

Reallocate Space

In constrained rights-of-way, reassigning space to serve the design program is one solution, whether widening a trail or creating dedicated space at a trailhead for restrooms or parking. How the limited space is allocated influences how people use trails.

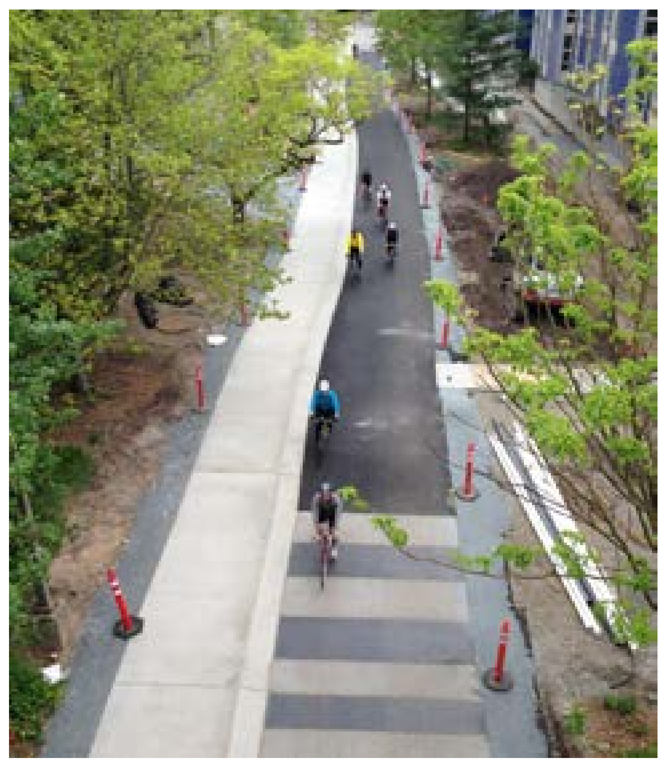
Test it Out

Demonstration projects and other temporary installations have been used successfully to test new designs and treatments across the country. They offer a faster alternative to major capital projects, allow for real-time public (and industry/private sector) input, and are nimble and adaptable by design.

Measure Outcomes

Apps and other technology have expanded the ways to measure outcomes. For example, communities have been exploring the concentration of Instagram photos in a particular place to measure demand and use of public spaces. This could be used to measure demand of trail features that support lingering at a particular spot along a trail.

E-scooter parking areas on Atlanta BeltLine Eastside Trail.



Piloting mode split on Burke Gilman Trail.

06 CASE STUDIES

Atlanta BeltLine E-Scooter Safety Measures

Context

Atlanta BeltLine is one of the largest urban redevelopment programs in the United States focused on creating an equitable, inclusive, and sustainable city life by connecting neighborhoods and reinvestment in communities. Affordable housing and equitable transportation are key to this initiative, which is centered around a 22-mile multi-use trail that circuits around Downtown Atlanta, generally following a former railroad right-of-way. Thirty-five percent of the trail is built and in recent years e-scooters have become a popular transportation choice for both commuters and recreational users.

Problem Solved

The BeltLine was originally designed for shared uses such as bicycling and pedestrian use. As micromobility modes such as e-scooters, increased, so did congestion, resulting in conflicts due to speed and the amount of available space on the trail. E-scooter policy throughout the City of Atlanta caps scooter maximum speed at 15 mph and requires deceleration and yielding to pedestrians. On the BeltLine, where e-scooter users and pedestrians share space, yielding is critical to avoid injuries, especially during peak use. Unfortunately, many e-scooter users were not obeying protocols. Speeding and improper yielding presented safety concerns for others.

Therefore, in June 2019, the City implemented a Reduced Speed Zone on the Eastside BeltLine Trail using geofencing. The virtual perimeter, restricts e-scooters to a maximum speed of 8 mph during periods of congested activity. The speed of 8 mph was chosen due to its similarity with bike speeds during congested pedestrian periods. Messaging describing the Reduced Speed Zone policy was carried out through City department social media, Atlanta BeltLine communication channels, local TV and radio reports, and several in-person "etiquette days" that were focused broadly on trail behavior.

Public Outreach and Response

The public has responded positively to the Reduced Speed Zone. Fewer complaints about unsafe riding behavior are reported and trail users say they feel safer. Some e-scooter companies reported cost and time factors hurting their bottom line, while others reported no effect from the policy.

Trouble Shooting

There are some technological challenges related to GPS accuracy so, when a rider comes from outside the reduced speed zone and rides into the zone, their device may have a short delay in slowing down while the GPS updates.

CVLink Coachella Valley, CA

Context

CVLink is planned as a 50-mile regional pathway through the Coachella Valley. From the beginning, the pathway has been planned and then designed to be inclusive of pedestrians, bicyclists, and low-speed electric vehicles (LSEVs), which includes golf carts. Many of the communities in the Coachella Valley use LSEVs as a common mode of transportation. The design for the main pathway is mostly off-street with grade-separated crossings of major roads. As the plan became a reality, more communities desired connections to the main CVLink and more connections along surface streets are being developed.

Problem Solved

Design and planning for CVLink has included both policy and design considerations to create a Next Generation pathway.

Policy: The cities in the Valley did not have a consistent and unified standard for the use of LSEVs as transportation modes within their boundaries. Some had policies around this, while others did not. Alta worked with the Coachella Valley MPO to develop a Neighborhood Electric Vehicle Transportation Plan that summarizes the policies of each city in the valley. Working within those policies, this plan recommends unifying the policy and standards for vehicle definition, facility types, signage, and pavement markings and striping. The plan was unanimously adopted by the California Traffic Control Devices Committee in March of 2015. The maximum speed for LSEVs on the pathway is posted at 20 MPH. Electric vehicles yield to bicycles and pedestrians on the pathway and must adhere to the policies of each city if they venture off the pathway. All cities in the Valley allow some form of LSEVs on some or all of their streets.

Design: 3.5 miles of CVLink have been built with another 20 miles set to begin construction in December 2020. The path is wide enough to safely and comfortably accommodate multiple user types. In congested areas, modes are separated and pull-offs provide opportunities for passing and amenities such as shade structures. The paving provides directional cues and the wayfinding signage clearly shows distances to community resources. The branding highlights the different modes allowed on the path to encourage safe and considerate path use for all modes.

Public Outreach and Response

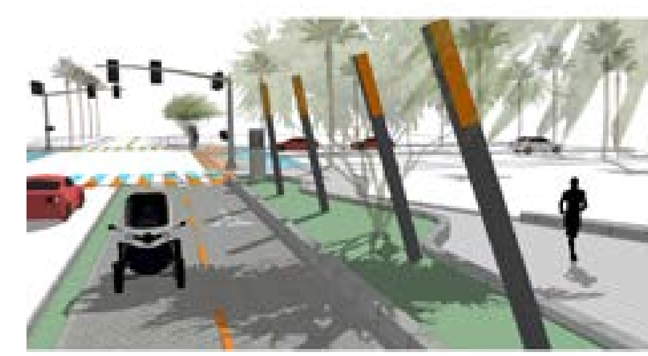
The first 2.4 miles of CVLink was built in 2018. It gave the design team an opportunity to see how users actually interacted with various modes on the pathway. The pathway is a success in the eyes of the public. The design team did not make significant changes to the design of the remaining segments of CVLink based on the response to this first segment.

From the beginning, CVLink was planned and designed to accommodate all modes of powered micromobility devices and human-powered modes, including pedestrians, bicyclists and low-speed electric vehicles.

Nodes along the CVLink provide amenities for users and helps to relieve congestion in busy areas.

Wayfinding and branding.

Sharing the path with all modes.



Concept design for on-street section.

Peachtree City, GA Path System Neighborhood Electric Vehicle Ordinance

Context

The trail system in Peachtree City, GA is used primarily by golf carts (low-speed vehicles) and provides access to nearly every neighborhood and commercial district in the City. The trail system is 90 miles of predominantly eight- to ten-foot-wide asphalt paths. While paths were not part of the plan when the City was incorporated in 1959, developers built a golf course in the 1960s, and paths were added for residents who wanted a way to take their own carts to the course. More paths were added as more neighborhoods were built, and the City adopted an ordinance requiring that all new development include a connection to the existing system. The City accepted that golf carts are an advantageous mode choice and desired by residents, and therefore reformed roadway and multi-use trail policy to allow for the operation of low-speed vehicles (LSVs) and golf carts. Trends in new mobility include discussions and testing of low-speed electric and automated vehicles and shuttles on trails. Trails are less costly to build and have a smaller footprint than roads. They can also provide more direct point-to-point route. Peachtree City is an example of a city who is seeing positives to this type of trail use.

Problem Solved

Allowing LSVs and golf carts on trails and roads requires integration of multiple modes with altering speeds and space requirements to use the same space. One concern is maintaining trails as safe and comfortable spaces for pedestrians and bicycles. Similarly, the safety of all roadway users requires a clear understanding of how modes will operate together.

Policy: Peachtree City developed a policy for LSVs and golf carts that states they are allowed on all citywide paths “provided that the vehicle is operated only in a mode or other restriction which does not allow the vehicle to exceed 20 miles per hour.”
Chapter 78, Article III of Peachtree City’s ordinance further establishes the following:

- Those driving golf carts shall yield to all other modes of transport.
- Pedestrians should be given due consideration and reasonable right-of-way.
- Golf carts are not permitted on sidewalks at any time.

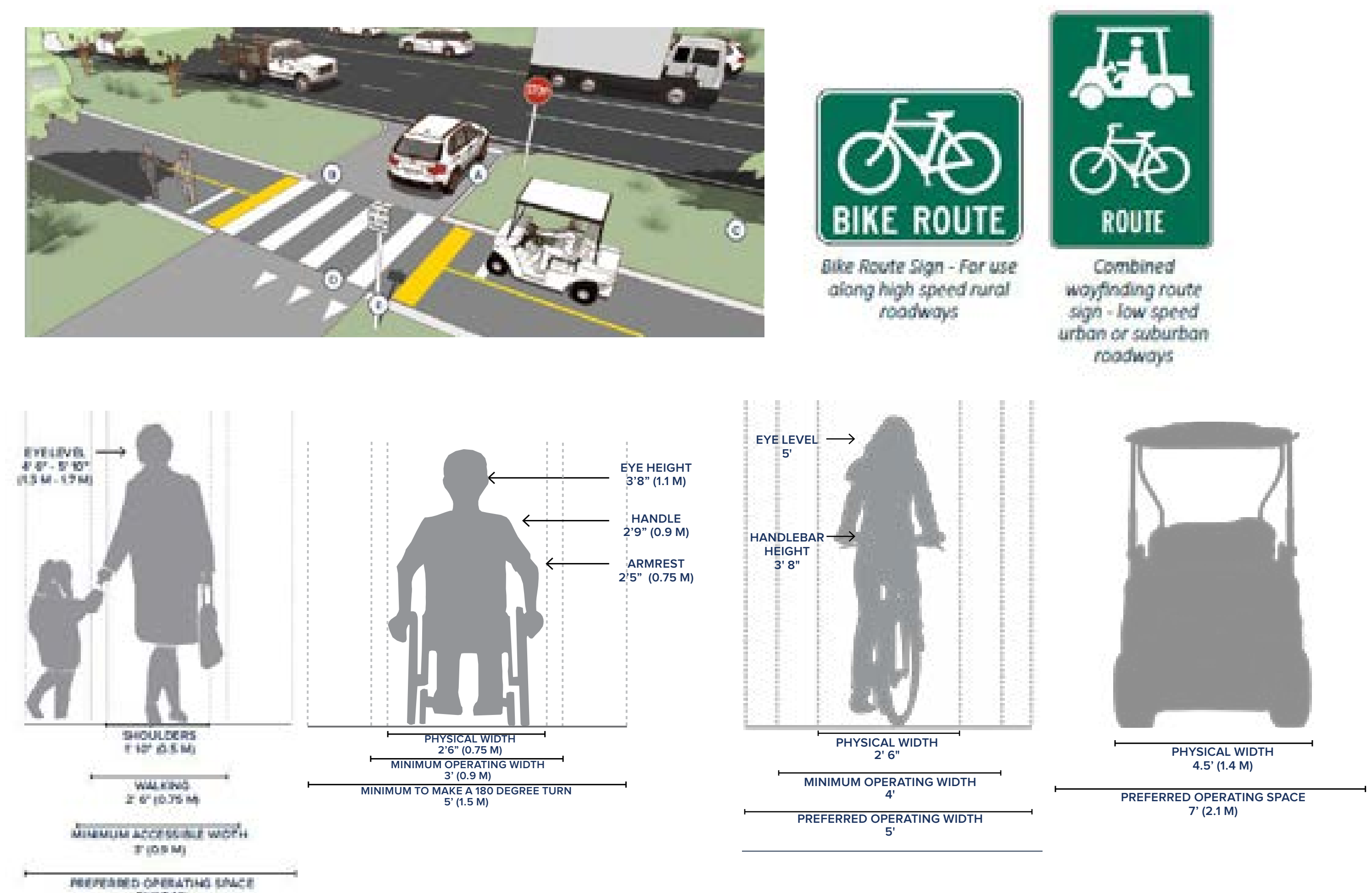
To help message and reinforce this policy, Peachtree City developed a path user guide, stating that golf cart operators should use caution at all times. They do not have the right-of-way on paths or in crosswalks. Similarly, they must yield to motor vehicles on roadways and stop before crossing roadways or driveways.

Design: Additionally, in 2019, the Fayette County Master Path Plan was updated (as a part of the Comprehensive Transportation Plan). Alta assisted by developing trail design guidance for LSVs and golf carts regarding user needs, path widths, setbacks at intersections, and signage. **As new trails are built, the policy enacted by the City will be supported by design that clearly provides space for the requirements of the policy and visual cues to make the policy more intuitive to uphold.**

Public Outreach and Response

Today 50% of all trips under five miles happen by golf cart in Peachtree City, and there are over 600 golf cart parking spaces at the local high school. By modernizing local policy to accommodate preferred alternative modes of transportation, residents and visitors are encouraged to travel using means other than a motor vehicle. As a result, residents benefit from reduced local traffic congestion, relatively inexpensive annual costs to maintain and operate their vehicles (compared to standard motor vehicles), improved air and noise quality, and improved parking and vehicle maneuverability.

Above: Golf cart being used in Fayette County near Peachtree City, GA.
Below: Excerpt from the Fayette County Master Path Plan.



Burke Gilman Trail Retrofit, Seattle, WA

Context

The Burke Gilman Trail is one of the oldest rail-to-trail conversions in the US, and has become an integral part of Seattle's active transportation infrastructure. The Burke Gilman Trail serves as a local network within the University of Washington campus and nearby destinations, as well as a crosstown commuter link with few alternative options. As Sound Transit opened an extension of Seattle's light rail system connecting downtown to the University, it became clear that the antiquated 12-foot-wide trail would soon be overwhelmed by the growing local and regional transportation demand. In addition to congestion, the types of users have become more diverse: people riding bicycles and walking share the space with scooters, bike share and skaters, creating a collage of active transportation users. In the 1.7-mile project area, the 12-foot -wide trail had more than 35 formal and numerous informal trail connections and side trails.

Problem Solved

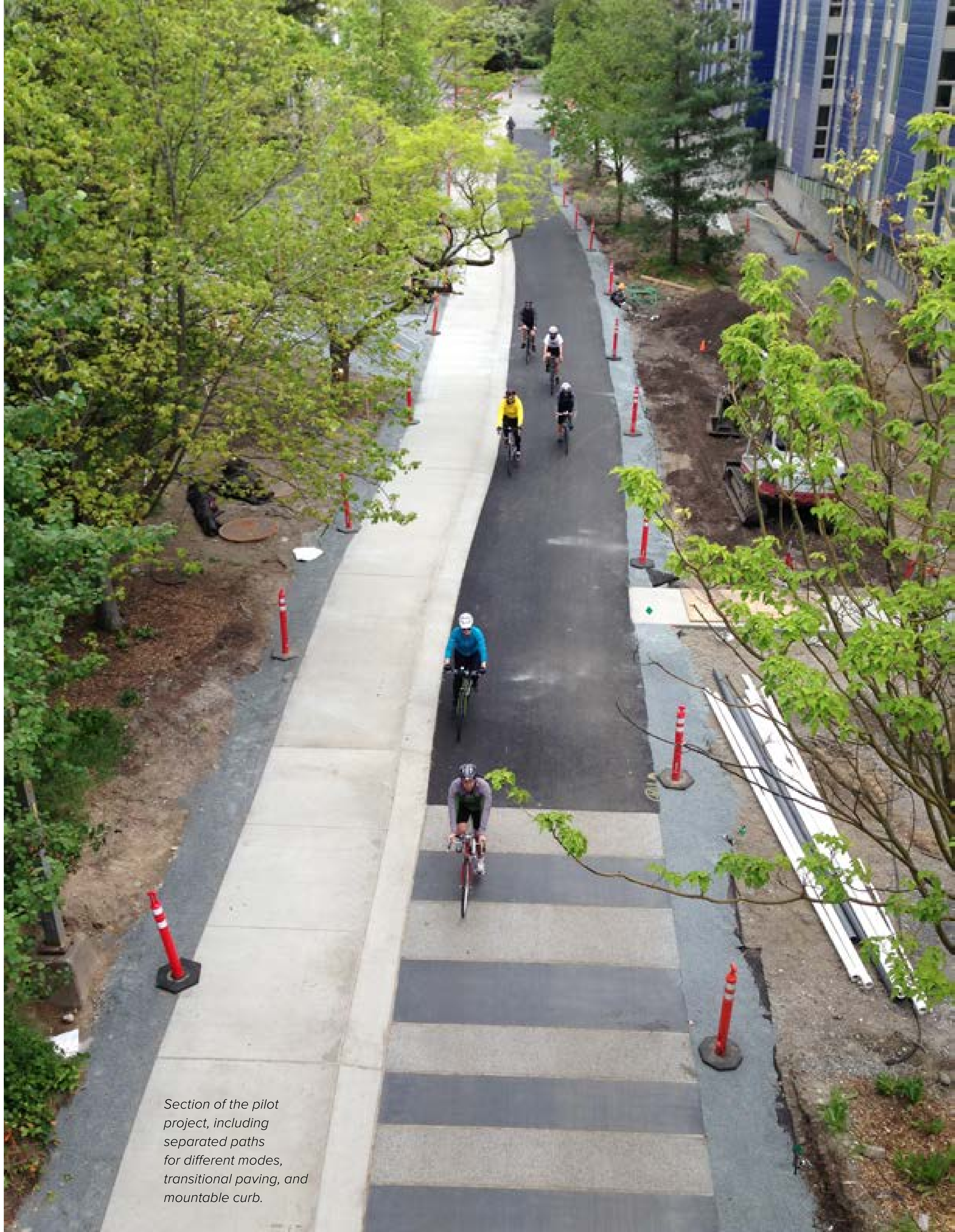
Alta worked with the University to better serve Burke Gilman Trail users making both recreational and utilitarian trips. The solutions included separation of pedestrian and wheeled users using clear distinctions in color and elevation, eliminating random intersections, and organizing circulation through intersection "mixing zones." The trail tread was widened to 28 feet with the concrete walking surface raised 3" above the asphalt cycling surface. A mountable curb separates the users without presenting a tripping hazard or mobility barrier. Intersections were reduced by more than half and large plazas or mixing zones were created to provide space for trail users to navigate their paths turning or as through-travelers. Additionally, the path pavement transitions to alternating stripes of asphalt and concrete as users approach the mixing zones.

The University installed a pilot installation to check assumptions and evaluate design options. Based on the initial success of the design, the trail was completed.

Public Outreach and Response

Field observation has confirmed a more predictable and safe relationship between the increasing number of users of each mode. Pedestrians quickly sort themselves onto the raised walkway as they enter the trail, and cyclists remain largely in the intended path. Collisions in the cross traffic at intersections are unusual and informal side paths that previously were needed have not developed.

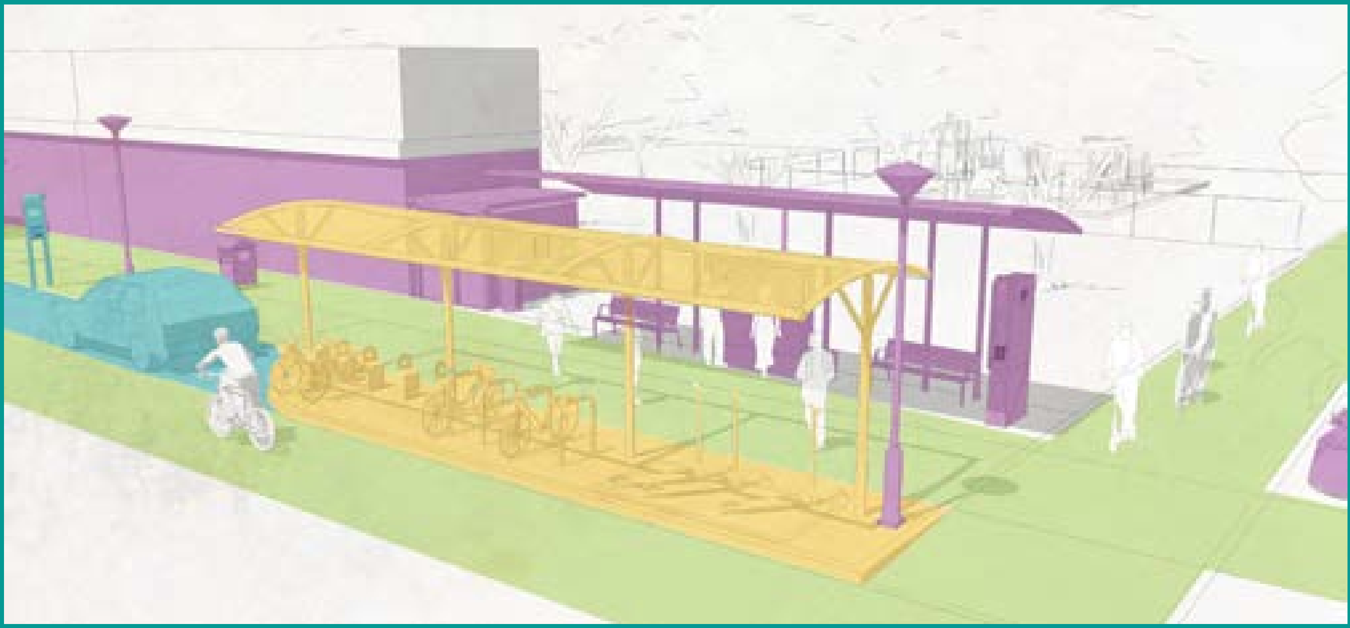
Rendering of Burke Gilman path and mixing zones by prime consultant PLACE.



Section of the pilot project, including separated paths for different modes, transitional paving, and mountable curb.

INTERESTED IN LEARNING MORE?

Alta's national experience planning and designing trails and greenways includes working in hundreds of communities across a broad spectrum of scales and project types. Our trails and greenway experts have employ well-developed, tested set of design criteria to create trails as places. By working across the disciplines of planning, landscape architecture, engineering, and community engagement, we provide innovative solutions that establish a framework for implementation.



Mobility hubs help organize space and clarify transitions between transportation modes, especially shared and active mobility networks. Locating mobility hubs at trails can provide multiple benefits, such as organizing parking and storage space for shared-use vehicles, reinforcing trail policies and classifications, providing trail users with recreational and transportation mode options, sharing information via transitional and digital kiosks, and assisting more people to get to trails more easily. This diagram, developed by Alta for an active transportation plan in Memphis, TN, demonstrates how mobility hubs can be integrated into active transportation corridors and nodes.

About the Authors

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Jean has 17 years of experience fostering change and innovation in communities across the US. She leads Alta's New Mobility Service Area, providing company-wide guidance for shared mobility, micromobility, and transportation technology research and best practices. Jean skillfully applies her hands-on experience in program development, community engagement, and project implementation. She brings expertise at every geographic scale—from small rural communities to major cities, multi-county regions, and state and national scopes.

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Britt has established her landscape architectural career around greenway and trail placemaking, natural resource-based recreation projects, and active community design and planning. She co-chairs Alta's National Trails and Greenways Service Area and serves on the East Coast Greenway Alliance Board of Trustees. Britt has worked across the country to develop projects that activate communities and improve quality of life. She manages Alta's Atlanta office.