



Montgomery County

# CURBLESS & SHARED STREETS DESIGN GUIDE

September 2024

**DRAFT**



# Acknowledgments

## Staff Team

Darcy Buckley, AICP, Montgomery County Planning Department  
Andrew Bossi, P.E., Montgomery County Department of Transportation  
David Anspacher, Montgomery County Planning Department  
Dan Sheridan, P.E., Montgomery County Department of Transportation

Prepared By  
Toole Design

Chaplin Place, Chevy Chase, MD

This guide contains information intended to be used as an input during the design process; however, field verification, site condition assessments, engineering analysis, and design are necessary prior to implementing guidance contained herein.



# Contents

<b>Section 1: Introduction</b>	<b>1</b>
1.1 Purpose	2
1.2 Role of Curbless and Shared Streets	5
1.3 Desired Outcomes of Curbless and Shared Street Design	6
1.4 How to Use This Guide	7
<b>Section 2: Fundamentals</b>	<b>9</b>
2.1 What Are Curbless and Shared Streets?	10
2.2 Siting Considerations	12
2.3 Definitions of Zones	14
2.4 Design Principles	16
<b>Section 3: Street Types</b>	<b>19</b>
3.1 Street Types	20
3.2 Curbless Streets	22
3.3 Shared Streets	26
3.4 Other Similar Streets	30
3.5 Summary of Street Types	31
<b>Section 4: Special Considerations</b>	<b>33</b>
4.1 Intersections	34
4.2 Accessibility	38
4.3 Stormwater Management and Drainage	44
4.4 Lighting	48
4.5 Emergency Access	50

# Acronyms

- » **AASHTO** American Association of State Highway Transportation Officials
- » **APS** Accessible Pedestrian Signal
- » **ADA** Americans with Disabilities Act
- » **DEP** Montgomery County Department of Environmental Protection
- » **DPS** Montgomery County Department of Permitting Services
- » **FHWA** Federal Highway Administration
- » **ROW** Right of Way
- » **MCDOT** Montgomery County Department of Transportation
- » **MCFRS** Montgomery County Fire and Rescue Services
- » **MDOT** Maryland Department of Transportation
- » **MDOT SHA** Maryland Department of Transportation State Highway Administration
- » **M-NCPPC** Maryland-National Capital Park and Planning Commission
- » **MUTCD** Manual on Uniform Traffic Control Devices
- » **MD-MUTCD** Maryland Manual on Uniform Traffic Control Devices
- » **NACTO** National Association of City Transportation Officials
- » **PROWAG** Pedestrian Right-of-Way Accessibility Guidelines
- » **USDOT** United States Department of Transportation



# Key Reference Documents

- » *Montgomery County Complete Streets Design Guide (CSDG)*
- » *Montgomery County Drainage Design Criteria*
- » *Montgomery County Fire Department Access: Performance-Based Design Guide*
- » *Montgomery County General Plan, Thrive Montgomery 2050*
- » *Montgomery County Local Area Transportation Review Guidelines*
- » *Montgomery County Pedestrian Master Plan*
- » *Montgomery County Rustic Roads Functional Master Plan*
- » *Montgomery County Vision Zero Action Plan*
- » *Maryland Manual on Uniform Traffic Control Devices (MD-MUTCD)*
- » *Maryland Stormwater Design Manual*
- » *MDOT SHA Accessibility Policy and Guidelines for Pedestrian Facilities along State Highways*
- » *MDOT SHA Bicycle Policy and Design Guidelines*
- » *MDOT SHA Environmental Guide for Access and District Permit Applicants*
- » *MDOT SHA Guidelines for Traffic Barrier Placement and End Treatment Design*
- » *MDOT SHA Highway Drainage Manual*
- » *MDOT SHA Standard Specifications for Construction and Materials*
- » *MDOT SHA Traffic Control Devices Design Manual*
- » *Americans with Disabilities Act (ADA) Standards for Accessible Design*
- » *Pedestrian Right-of-Way Accessibility Guidelines (PROWAG)*
- » *FHWA Accessible Shared Streets*
- » *FHWA Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts*
- » *FHWA Manual on Uniform Traffic Control Devices (MUTCD)*
- » *AASHTO Policy on Geometric Design of Highways and Streets (Green Book)*
- » *NACTO Urban Street Design Guide*
- » *NACTO Urban Street Stormwater Guide*



Boston, MA



# Section 1: Introduction



# 1.1 Purpose

## DEFINITIONS

A Conventional Street is a typical street design with movement separated by mode.

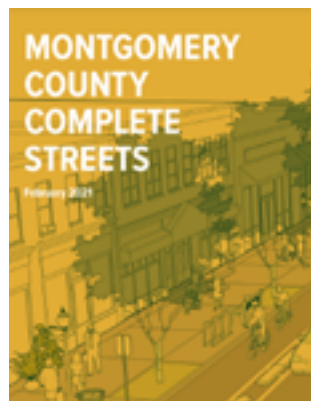
A Curbless Street operates similarly to a Conventional Street, but without a traditional vertical curb and gutter. The street is designed to have a consistent height, creating a seamless connection between the building faces. The space allocated for cars, bikes, and scooters is separated from the pedestrian area by a low sloping curb that is just 2 inches tall. Curbless Streets are designed to encourage slow speeds. The overall design and use will lead people walking and rolling to use the “Comfort Zone”—space dedicated to non-motor vehicle use—and to cross at designated crossings.

A Shared Street is also curbless, and lacks the modal separation seen in a Curbless or Conventional Street. It provides a space that is shared by all modes of travel—people walking, rolling, biking, and driving mix in the same space. The design emphasizes that cars are guests, discourages through-traffic, and ensures motor vehicle speeds and volumes remain very low.

The *Curbless and Shared Streets Design Guide*, a supplement to the *Complete Streets Design Guide*, provides planning, policy, and design guidance for Curbless and Shared Streets in Montgomery County, Maryland.

Montgomery Planning of the Maryland-National Capital Park and Planning Commission (M-NCPPC) and the Montgomery County Department of Transportation (MCDOT) developed this guide to ensure that Curbless and Shared Streets contribute to the vision for streets presented in the *Complete Streets Design Guide*. The guide serves to:

- » Promote the delivery of high-quality Curbless and Shared Streets in Montgomery County that demand greater driver attention and help to achieve a safe and shared environment for people walking, rolling, biking, and driving.
- » Align policies, regulations, and practices specifically relating to Curbless and Shared Streets.
- » Ensure that Curbless and Shared Streets are fully accessible for people with disabilities, provide access for emergency vehicles and maintenance activities, and integrate stormwater management—a unique design consideration given the lack of curbs.
- » Inform the master planning and development review and approval process promoting consistent design elements and terminology.



For more information about the *Complete Streets Design Guide*, and to review specifications related to Complete Streets, visit the [Montgomery Planning website](#).



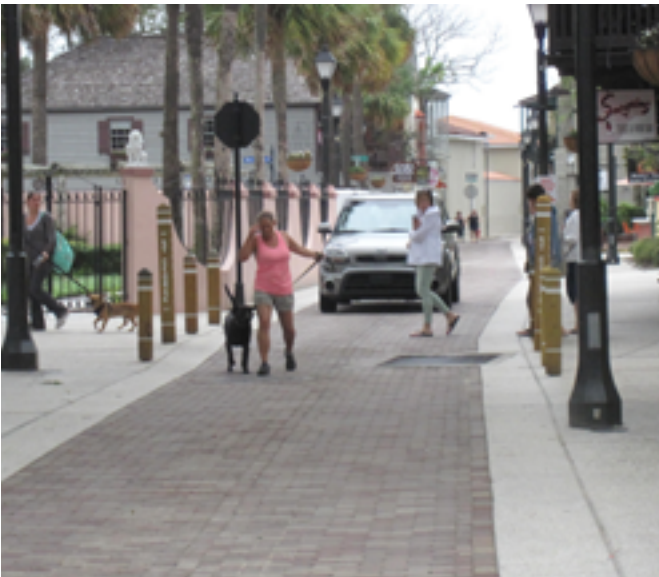


Figure 1. Examples of Curbless and Shared Streets, Clockwise from top left: Montreal, Quebec, Canada; Emeryville, CA; Bristol, RI; Riverside, CA and St. Augustine, FL.

## Developing the Guide

The study process involved regular interdisciplinary meetings with experts in various fields, including planning, engineering, development review, environmental protection, stormwater facilities, emergency access, and other specialties. The team conducted a comprehensive literature review, evaluated existing policies and regulations, and engaged in discussions with development review staff.

Additionally, the study included outreach and engagement with the Montgomery County Commission on People with Disabilities, focusing on planning and design for accessibility.

## Overview

**1 Section 1** provides an **overview of the guide**. This section explains the guide's purpose and usage and describes the role of and desired outcomes for Curbless and Shared Streets in Montgomery County, Maryland.

**2 Section 2** provides the **fundamentals of Curbless and Shared Streets**, discussing design principles and planning considerations. The Comfort Zone, Furniture Zone, Frontage Zone, and Shared Zone are introduced as the different design zones.

**3 Section 3** provides **extensive planning and design guidance** and detailed information about Curbless and Shared Streets, including street types, defining elements, functions, and appropriate contexts, .

**4 Section 4** examines **special considerations** for Curbless and Shared Streets, including the design of intersections and roadway crossings. This section also covers accessibility, emergency access, lighting, and stormwater management.



Figure 2. Examples of Shared Streets in Washington, DC and Wichita, KS



# 1.2 The Role of Curbless and Shared Streets in Montgomery County

Curbless and Shared Streets contribute to the quality of life by creating great places, designed with all users in mind, and equitably shared among diverse communities and mobility needs. The following roles and outcomes of Curbless and Shared Streets are summarized in four areas of interest.

## Transportation

Curbless and Shared Streets include features to slow traffic and provide safe transportation facilities in support of the County's [Vision Zero](#) goals. They provide comfortable, accessible paths of travel for all modes and accommodate a variety of activities including freight and deliveries, emergency access, utilities, and maintenance. They support local trips and provide space for and access to community activities and amenities.

## Economic Exchange

A quality street adds value to the properties surrounding it, strengthening local businesses and generating tax revenue. Curbless and Shared Streets serve as a venue for commercial activity in the form of sidewalk dining outside restaurants and cafés and storefront retail spaces that draw customers into shops. In addition to brick-and-mortar businesses, Curbless and Shared Streets can support more temporary or itinerant commercial activities, such as farmers' markets, food trucks, and sidewalk vendors. These streets promote economic exchange, support local businesses, and increase property values.

## Recreation and Social Engagement

Curbless and Shared Streets serve as the backdrop for public life, outdoor exercise, and social interaction. Curbless and Shared Streets (when temporarily closed to traffic) can serve as the venue for large celebrations like annual festivals, races, and parades. Streets also host regular gatherings such as holiday markets or concerts.

## Infrastructure and Ecology

Curbless and Shared Streets are also an important part of Montgomery County's public infrastructure. Like all streets, they support utilities delivering electricity, gas, water, and communications to homes and businesses. They can play an important role in stormwater treatment, collecting and filtering rainwater. These streets can support environmental and sustainability goals through the provision of green infrastructure, permeable surfaces, and stormwater management. Trees on Curbless and Shared Streets can also provide shade and habitat, improving the environment.

# 1.3 Desired Outcomes of Curbless and Shared Street Design

Montgomery County has identified three desired outcomes for all streets, including Curbless and Shared Streets.

## 1 Safety

As noted in the *Complete Streets Design Guide*, maximizing safety for people is the paramount objective of street design in the county. Curbless and Shared Streets must be planned and designed to be safe, low-speed environments that manage traffic speeds and reduce hazards for all users.

## 2 Sustainability

Curbless and Shared Street designs can enhance ecological functions and the visual and economic appeal of a streetscape. Sustainable design elements, such as street trees, vegetation, and stormwater management, can enhance the urban ecosystem. Street designers are encouraged to incorporate additional green and sustainable features, make use of low-maintenance and recycled materials, and preserve water and energy resources wherever feasible.

## 3 Vitality

Curbless and Shared Streets can enhance the visual and economic appeal of a streetscape. They help create great places that attract commerce, encourage a thriving community, and promote all modes of transportation, including walking, biking, and rolling.



Figure 3. Shared and Curbless Streets in Montgomery County (Bethesda and Chevy Chase, MD)



# 1.4 How to Use This Guide

The *Curbless and Shared Streets Design Guide* provides policy and design guidance to government agencies, consultants, private developers, community groups, and other stakeholders



When **siting** Curbless or Shared Streets, as part of new developments or as street retrofit projects.



When **designing** and determining appropriate elements and treatments for Curbless or Shared Streets.



When **engaging** across agencies, in communities, and with developers or other stakeholders.

This guide establishes policy for the design of private and County-owned Curbless and Shared Streets. For any such State-owned roads, it is intended to present the County's vision for the roadway, to serve as a starting point for collaboration between the County and Maryland Department of Transportation, State Highway Administration (MDOT SHA).

The guide should be used early in the planning and design process to identify desired outcomes and align street type selection. Recognizing that street design is complex and must respond to local conditions and site constraints, this guide should be used in conjunction with engineering judgment to make decisions for specific streets. Guidance is intended to evolve and adapt to incorporate new treatments and techniques as they emerge. Cost and maintenance must be considered as part of each project.

The *Curbless and Shared Streets Design Guide* supplements existing manuals and standards such as the Montgomery County *Complete Streets Design Guide*, DOT Design Standards, and the MDOT SHA *Context Driven: Access and Mobility for All Users* guide. It also supports the *Montgomery County Bicycle Master Plan* and *Pedestrian Master Plan*. These guidelines will serve as the foundation for design discussions with applicants during the development review process.

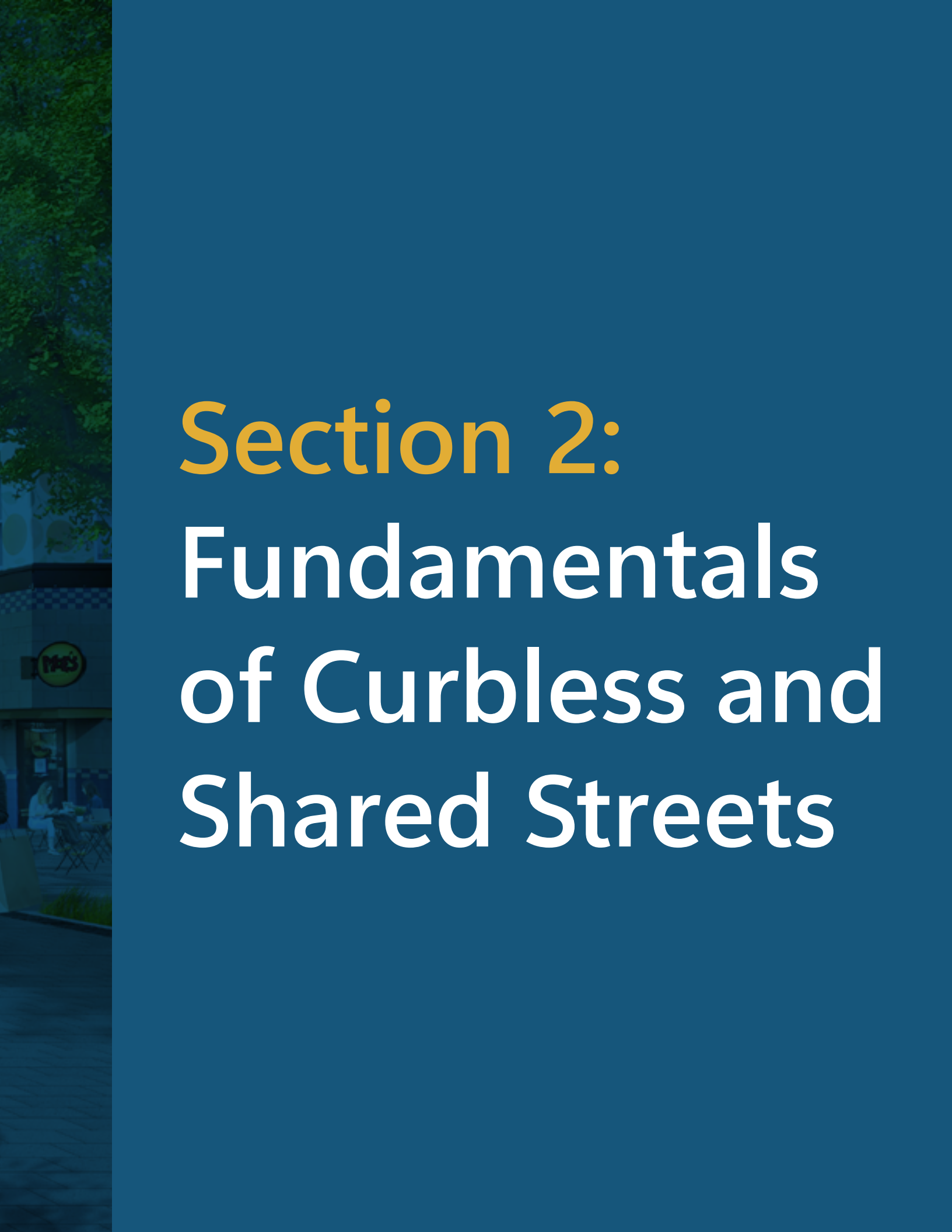
Curbless and Shared Street designs will rely on the standard set of processes, including plans and permits, that pertain to other streets in Montgomery County. A review of the permitting and review process is outlined in Chapter 9 of the *Complete Streets Design Guide*. Additional details and guidance pertinent to Curbless and Shared Street design are available online through the [Department of Permitting Services website](#).





Concept Design for Atlanta, GA. Source: Toole Design





# Section 2: Fundamentals of Curbless and Shared Streets

## 2.1 What Are Curbless and Shared Streets?

Curbless and Shared Streets re-envision the use of public spaces between buildings, highlighting the social aspects of streets alongside their mobility functions. By eliminating physical barriers that separate different modes of movement and promoting the mixing of these modes at slow speeds, Shared Streets can become lively and safe areas for people to move and gather. Similarly, Curbless Streets can serve as venues for community events while functioning as Conventional Streets at other times.

A **Curbless Street** operates similarly to a Conventional Street but without a vertical curb and gutter. The surface is elevated to a single level, generally flush with the building faces. The area designated for motor vehicle travel is separated by a 2-inch tall sloping curb. Curbless Streets are designed to promote slow motor vehicle speeds, allowing pedestrians to cross anywhere. However, the overall design encourages pedestrians to use the exclusive Comfort Zone for travel along the street. Also known as “festival streets,” these areas can serve as civic spaces and host community events when temporarily closed to traffic. This feature is ideal for high-density areas and cultural hubs.

A **Shared Street** is curbless, and it lacks the formal modal separation seen in a Curbless or Conventional Street. It provides a space that is shared by all modes of travel—people walking, rolling, biking and driving mix in the same space. The design emphasizes that cars are guests, discourages through-traffic, and ensures motor vehicle speeds and volumes remain very low. Shared Streets can support a variety of land uses, including commercial, civic, entertainment, dining, and residential.

While streets such as Alleys, Rustic Roads, and open-section Conventional Streets share commonalities with Curbless and Shared Streets, they are not considered Curbless nor Shared Streets within this guide. The *Complete Streets Design Guide*, *Rustic Roads Functional Master Plan*, and County design standards provide detailed information for these types of streets.



Figure 4. Examples of Shared Streets in California, Japan, and Maryland



## Characteristics of Curbless and Shared Streets

- » **Accessible**, with inclusive and **Human Scale** design at the core of the concept, providing pedestrians with full freedom of movement.
- » **Flexible** and **Adaptable**, with design treatments that enable the street to be easily closed to car traffic to create optimal spaces for special events and reconfigured to support a wide range of social and cultural functions.



Figure 5. Exhibition Road, a Shared Street in London, is a destination for cultural institutions and museums, retail, and cafes. The design of the street encourages all users to share space.



Figure 6. Ellsworth Drive, a Curbless Street in Silver Spring, MD, functions as a gathering space for recreation (including an exercise class). (Source: Visit Montgomery)

## 2.2 Siting Considerations

When planning a Curbless or Shared Street in a new development or assessing existing streets for a curbless redesign, key considerations include its role in the transportation network, connectivity, equity, and the surrounding land use and character.

### Role in the Transportation Network

Designers of Curbless and Shared Streets should avoid creating these spaces for through-traffic, as they are not usually intended for roads that are key components of the regional street network.

- » Curbless and Shared Streets are ideal for streets with higher pedestrian and active transportation activity or demand, and lower motor vehicle traffic.
- » For existing streets, consider evaluating the traffic impact of a Shared Street redesign by organizing an “Open Streets” or car-free day, using temporary measures to close the road to through-traffic.

### Equity and Community

Shared Streets should be equitably located to serve people from a wide range of backgrounds, especially people from historically marginalized groups and people with low incomes. The space should be available for everyone, not just those who can afford to live or shop in a specific area. Events, programming, art, and other interpretive aspects of the space should reinforce the message that this is a space for all people.

- » Apply an equity lens to the siting evaluations, including any data analysis, outreach, and planning. The [Community Equity Index](#), a composite measure of equity-related conditions across Montgomery County, can be applied to understand the socioeconomic context of a proposed location.
- » Identify local stakeholders or project champions who can support the Curbless or Shared Street in becoming a venue for regular and inclusive programming opportunities. This is particularly crucial in neighborhoods that lack sufficient gathering spaces and parks.

Curbless and Shared Streets are **context-sensitive design concepts** that must be evaluated and customized to the unique conditions and surroundings of the candidate street. This guide presents a starting point for discussions.

## Land Use Context and Character

Curbless and Shared Streets are ideal in commercial and residential areas with high pedestrian activity and low motor vehicle volumes and speeds. The following area types and land use contexts are recommended for siting Curbless and Shared Streets, based on the definitions presented in the *Complete Streets Design Guide*: Downtowns, Town Centers, and Suburban Areas.

### Downtowns

Downtowns are the areas of most intensive activity and include central business districts and urban centers. With walkable and well-connected street grids, these areas feature consolidated areas of mixed-use developments, retail, dining, and cultural activity, and include significant Commercial, Residential, and Employment zoning designations. This mix of uses is organized to reflect a consistent frontage and promote high levels of walking, biking, rolling, and using transit.

### Town Centers

Town Centers are similar to Downtowns in terms of mixed use but are generally less intense, as they cover a smaller geographic area. Town Centers are commonly high-to-moderate intensity residential development, commercial, and retail uses. Town Centers typically have medium to high levels of pedestrian activity.

### Suburban Areas

The Suburban area type often features a low-intensity network grid with consolidated development. The areas are envisioned with low- to moderate-intensity residential development and isolated retail.



Figure 7. Bethesda Row, a Shared Street in a Downtown context in Bethesda, MD. While typically closed to traffic, it is designed to enable off-peak service vehicle access.



Figure 8. Winthrop Street in Cambridge, MA demonstrates how a Shared Street can provide a comfortable connection in a context similar to that of a Town Center.



Figure 9. A Shared Street at the University of British Columbia in Vancouver, Canada, illustrates how the concept can apply to campus environments, a consistent development type within Montgomery County's Suburban Areas.



## 2.3 Definition of Zones

There are four specific zones to serve defined uses or access. Maintaining these zones ensures safe and comfortable movement for all users.

### Shared Zone

The center of the street is a **Shared Zone** where users of all modes can expect to encounter one another. The design and treatments should communicate pedestrian priority, emphasizing means of slowing vehicles through the area and forcing vehicle operators to be aware of the street context and alert to their surroundings.

### Furniture Zone

A **Furniture Zone** separates the Shared Zone from the Comfort Zone. It includes features that help provide separation while also allowing the zone to be porous and allow pedestrians to comfortably pass through. Features may include, but are not limited to: trees, planters, seating, trash and recycling bins, bicycle parking, and light poles. These features must ensure adequate sight lines between all modes. Detectable edges will provide definition between the Furniture Zone and the Shared Zone, and perhaps also between the Furniture Zone and Comfort Zone.



On Wall Street in Asheville, NC, the Furniture Zone separates the Comfort and Shared Zones.

Figure 10. Example of a Shared Street in Asheville, NC

### Comfort Zone

A pedestrian-only **Comfort Zone** is delineated near the buildings for pedestrians who prefer not to mix with other modes. The Comfort Zone offers a continuous, clearly defined, direct, obstacle-free area that is at least 6 feet wide and provides connections to all important destinations along the street. The Comfort Zone can be defined with contrasting materials, colors, or detectable changes in texture, rather than striping or level changes. The Comfort Zone includes detectable wayfinding guidance for pedestrians with vision disabilities.

### Frontage Zone

The interface between building faces and the street is defined as the **Frontage Zone**. Elements in the Frontage Zone include landscaping, front stoops, door swings, awnings, café seating, retail signs, and displays. The Frontage Zone may be omitted under right-of-way constrained conditions or with the consent of the fronting property owner.





Figure 11. Zones of a Curbless and Shared Street

## Design Elements

While specific designs vary based on context, the delineation of these zones employs accessible surface elements to ensure that Shared and Comfort Zones are detectable by all users and navigable by pedestrians with vision disabilities. In this guide, detectable refers to the ability of a treatment to be detectable underfoot and with a white cane. Three detectable treatments, described below, ensure safe access along and across the different zones. Additional information is provided in Section 4: Special Considerations.

- » **Detectable Warning Surfaces (DWS):** Tactile surfaces composed of truncated domes that are detectable underfoot and by white cane are used to indicate safe crossings. *For more information about DWS, refer to PROWAG Section R305.1.*
- » **Directional Indicators:** A linear and raised guidance surface serves as a wayfinding tool for people with vision disabilities to enable safe navigation along the Comfort Zone. *Details about the placement and design of Directional Indicators are included in Section 4.*
- » **Gateways:** Distinctive treatments at a Curbless or Shared Street's entry and exit points alert all users that they are entering an environment where modes interact and pedestrians have the right-of-way. While these tactile elements are required, gateway treatments often extend beyond surface treatments to include decorative elements, lighting, or landscaping.

## 2.4 Design Principles

Curbless and Shared Streets have features that distinguish them from Conventional Streets, which should be considered in the planning and design process:

1

### Design for Universal Access at the Human Scale

- » **Remove Barriers to Improve Access:** Curbless and Shared Streets are curbless, making it easier to move throughout the space and easier for people with limited mobility, wheelchairs, or strollers to move around.
- » **Wayfinding:** In addition to the design treatments that alert users to the unique function of the street, integrate layers of informational guidance to help people use the space, including signs, kiosks, and auditory cues, as well as information provided to navigational applications.
- » **Frontage Considerations:** A Curbless or Shared Street should support the adjacent buildings and land use, using the Frontage Zone, Furniture Zone, and possibly the Shared Zone to support uses such as café space, seating and tables, bike parking, landscaping, and event programming.

2

### Minimize Delineation of Space within the Street

- » **Minimize Segregation of Modes:** The traditional segregation of modes (i.e., separate lanes for driving, biking, and walking) is discouraged by minimizing road markings and signs. By eliminating these cues, all users negotiate movement through the space and yield to pedestrians.
- » **Tactile Cues:** Tactile cues are used along street edges and throughout intersections to indicate the change in environment, which is especially necessary for people with vision disabilities. The design may include 2-inch sloping curbs or unwalkable surfaces (e.g., landscaping, street furniture) to delineate shared and pedestrian-only spaces. However, defined pedestrian crossing locations are the only locations where detectable warning surfaces should be used.

3

### Create an Environment Distinct from Adjacent Conventional Streets

- » **Gateway Treatments:** Gateway features notify people when they are entering and leaving the shared environment, and identify the street as a destination.
- » **Unique Surface Treatments:** Special colored or patterned pavement is used to make the street distinct from Conventional Streets, delineate zones (i.e., the Frontage, Comfort, Furniture, and Shared Zones), and create an attractive environment that communicates pedestrian priority.

## 4 Allow for Flexible Use of Street Space and Streetscape Elements

- » **Encourage Gathering and “Festival Street” Uses:** Places for people to gather and rest are mixed throughout the street. These can range from a bench in the shade of a tree to larger plaza spaces for events.
- » **Bicycle and Micromobility Accommodation:** People using bikes and micromobility (e.g., scooters, skateboards, and other small mobility aids) should be accommodated in the shared space, not in the pedestrian-only space. Space for bike/scooter parking should typically be provided in the Furniture Zone to serve as a buffer between different uses of the space. Bike/scooter parking may also be placed in the Frontage or Shared Zones, to function as traffic calming.
- » **Lighting:** The lighting is designed at the human scale, rather than the automotive scale. Like drainage features, light poles can be placed to help separate the pedestrian-only Comfort Zone from the Shared Zone.

## 5 Consider Operations and Maintenance Implications

- » **Building Access:** Consideration must be given to loading/unloading and pickup/dropoff activities, including parcel deliveries, meal and grocery collections and deliveries, and transit and ridehail services. The regulation of access to buildings and destinations, including parking garage access, is especially important in shared spaces and needs to account for context, such as whether it is a commercial or residential area, how densely built up the area is, and what other factors may impact anticipated use.
- » **Parking:** Off-street parking should be limited along Curbless Streets, and restricted entirely or limited to very few spaces along Shared Streets. On-street parking can be incorporated but should not detract from the mixed nature of the area serving all users. Parking can function as a barrier to pedestrians, potentially eroding the benefits of a Curbless or Shared Street. Where parking is provided, it should be limited to one side of the street at a time, in small groupings of only a few spaces at a time, and/or limited to accessible parking, vehicle types, time of day, or for short durations.
- » **Plan Ahead for Maintenance Needs:** Curbless and Shared Streets often incorporate high-quality design elements, such as special pavers and stormwater management infrastructure, that may be associated with a higher cost for installation and maintenance or require special considerations for ongoing maintenance. Longer-term considerations and maintenance agreements are particularly important for privately owned Curbless and Shared Streets that may transition to County-owned streets.





Spartanburg, SC



# Section 3: Street Types

## 3.1 Street Types

This section summarizes the distinction between Conventional Streets, Curbless Streets, and Shared Streets.

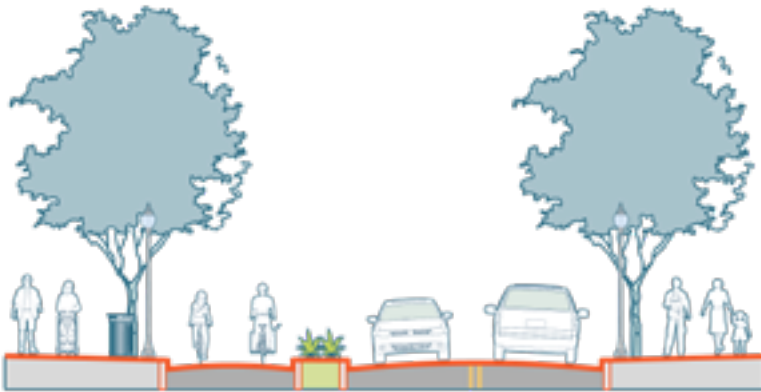


Figure 12. Conventional Street



Figure 13. Example Conventional Street (Chicago, IL)

- 1** On a **Conventional Street**, movements are channelized by mode, with physical separation (curbs and delineators) in place to keep modes from mixing.
- › Design prioritizes safe vehicle movement.
  - › The street surface is grade-separated from the sidewalk and is crowned to direct stormwater toward the curbs.
  - › Bicyclists are in dedicated facilities, share space with pedestrians, or share space with motor vehicles.
  - › See the *Complete Streets Design Guide* for more information on Conventional Street design.





Figure 14. Curbless Street



Figure 15. An Example of a Curbless Street (Kirkland, WA)



Figure 16. Shared Street



Figure 17. An Example of a Shared Street (Wichita, KS)

- 2 On a Curbless Street**, the street is generally leveled to a single surface, building face to building face, but must include a 2 inch tall sloping curb or another unwalkable surface where pedestrian crossings are not provided.
- › Movements are channelized by mode, with separation through pavement style, markings, furniture, trees, sloping curbs, and more.
  - › Pedestrians are prioritized; they feel comfortable crossing in designated areas.
  - › Bicyclists feel comfortable within the Shared Zone.
  - › Crowning and reverse crowning may be applied to direct stormwater to drains.
  - › See pages 22-25 for more information on Curbless Street design.

- 3 On a Shared Street**, the street surface remains leveled, channelization of modes is removed, and all modes mix within the right-of-way.
- › Pavement treatments, tactile wayfinding surfaces, and other design elements inform users of a clear pedestrian Comfort Zone.
  - › Pedestrians are prioritized; they feel comfortable using or crossing any part of the street.
  - › Pedestrians should feel comfortable anywhere.
  - › Bicyclists feel comfortable within the Shared Zone.
  - › See pages 26-29 for more information on Shared Street design.

## 3.2 Curbless Streets

A Curbless Street lacks the vertical curb and gutter of a Conventional Street and uses paving treatments and other design elements to distinguish separate zones for each mode.<sup>1</sup> The surface may be raised to a single level, flush between the Frontage, Comfort, Furniture, and Shared Zones, if other reliably detectable treatments (trees, benches, bike parking areas, etc.) are continuously provided along the street. If these detectable elements are not continuous, then a 2" tall sloping curb should be provided between the Furniture Zone and Shared Zone spaces. Modal separation is defined by paving treatments, sloping curb, and other vertical elements. The lack of vertical curbs and other design elements make it easier to periodically close the street to vehicular traffic and use the entire space for festivals and other events with less concern about people tripping over curbs.

### Key Features

- » **Delineated Vehicle Travelway:** Yes
- » **Motor Vehicle Presence:** Low
- » **Motor Vehicle Operating Speed:** Low
- » **Expected Through-Traffic:** Low
- » **Loading and Unloading:** Can be accommodated
- » **Garage Access:** Can be accommodated
- » **Accessible:** Yes
- » **Comfortable for Pedestrians to Walk Anywhere Along Street:** Only when the street is closed

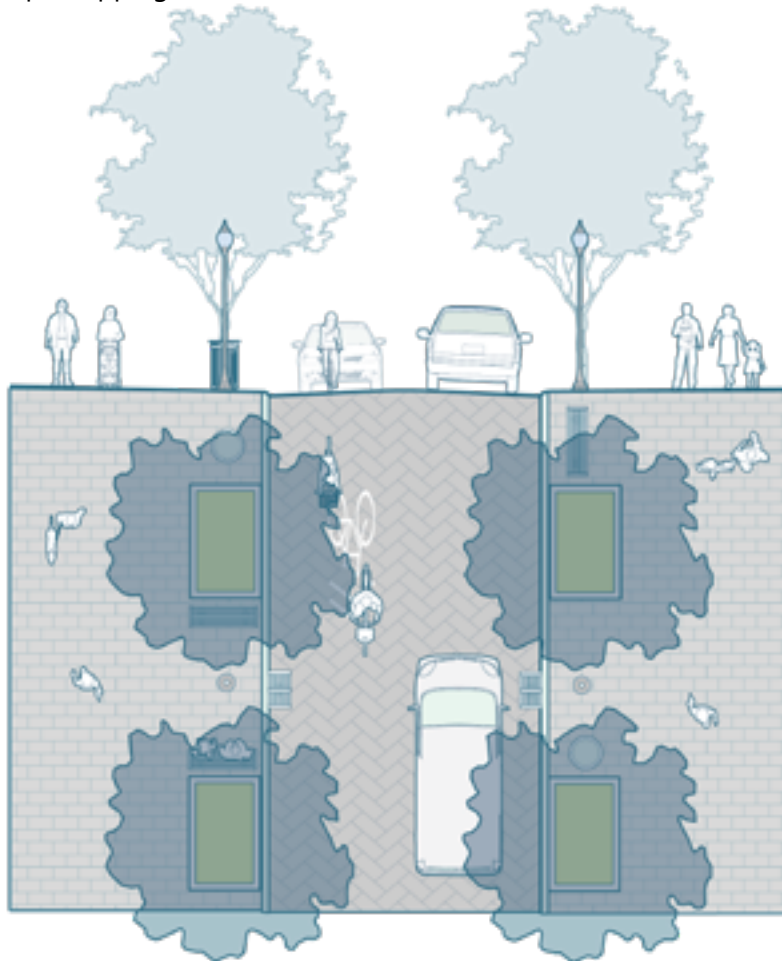


Figure 18. Curbless Street

<sup>1</sup> Curbless Streets are distinct from open-section roads, which lack curbs but are otherwise Conventional Streets. Open-section roads are typically found in more rural areas and are typically lined with drainage swales, whereas Curbless Streets have integrated stormwater and drainage infrastructure.

# Curbless Street Design

- FZ** Frontage Zone
- CZ** Comfort Zone
- PZ** Furniture/Planting Zone
- P** Parking Lane
- SZ** Shared Zone

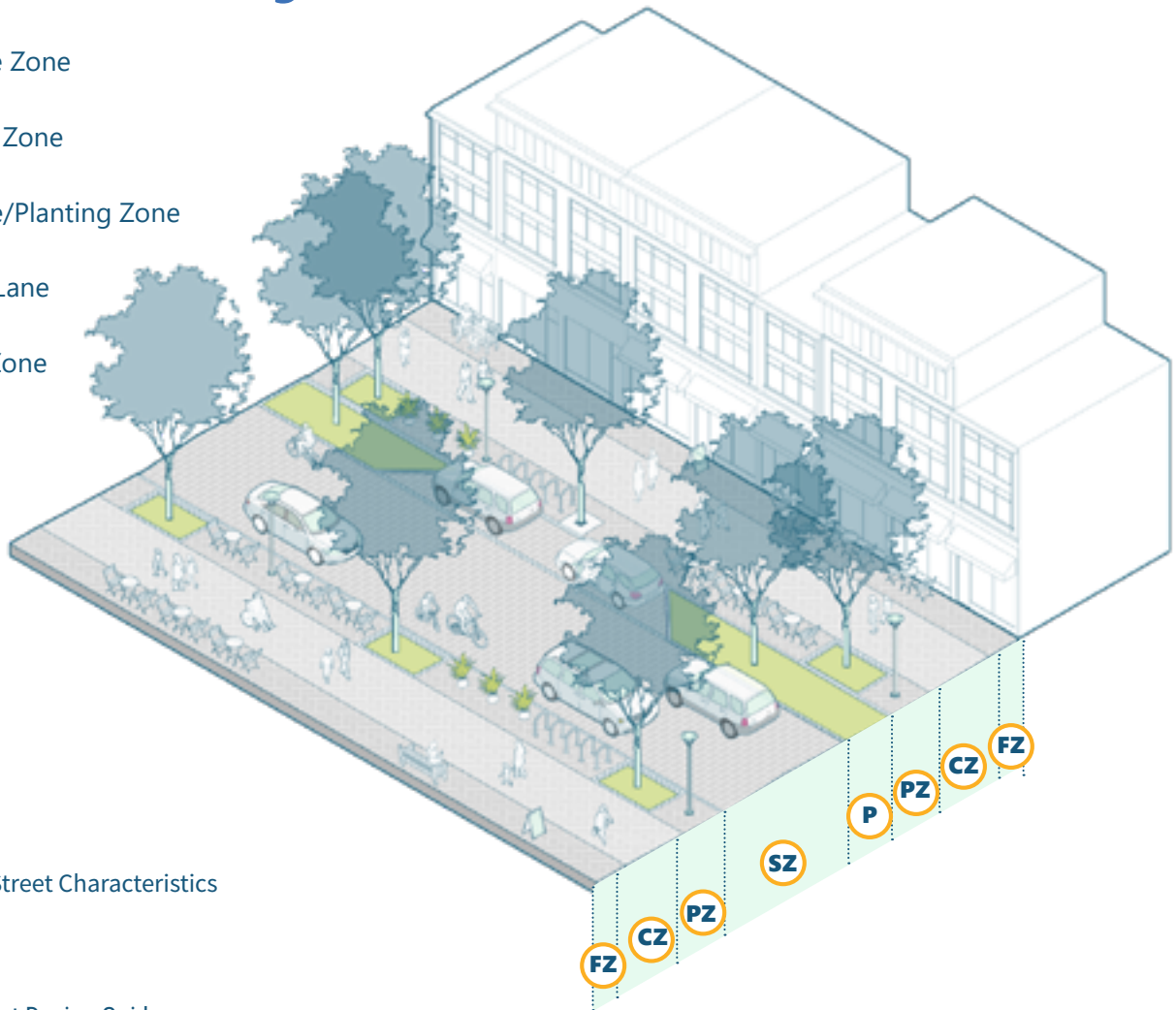


Figure 19. Curbless Street Characteristics

Table 1. Curbless Street Design Guidance

Item	Design Guidance (Width)	Notes
<b>Total Right-of-Way (ROW)</b>	66' default / 30' min.	
<b>Frontage Zone</b>	7' default / 0' min. (each side)	May be reduced from default where existing ROW is limited, or with consent of fronting property owners.
<b>Comfort Zone</b>	10' default / 6' min. (each side)	May be reduced from default by Design Exception; must adequately meet all Special Considerations (see Section 4); Comfort Zone should provide +2' above Minimum along each side where a fixed object spans 6' or more longitudinal length.
<b>Furniture Zone</b>	6' default / 3' min. (each side)	May be reduced from default by Design Exception; must adequately meet all Special Considerations.
<b>Shared Zone</b>	20' default / 18' min. (bidirectional) 12' default and min. (one way)	Includes drains. Less than 20' only permitted if no large vehicles expected to use the street, other than emergency vehicles. The width across the Shared Zone, measured between fixed objects within the Furniture Zone, must be no less than 20'.
<b>Parking</b>	7' default, 13' for accessible spaces	If provided, maximum of 1 side at a time. Consider forming chicanes (serpentine curves) by alternating which side parking is provided on.



# Curbless Street Key Characteristics

## Planning

- » Curbless Streets are primarily seen in higher density and higher activity areas such as Downtowns and Town Centers. Curbless Streets may also be appropriate in low-volume Suburban areas.
- » Siting evaluations should first consider if vehicle speeds and volumes, surrounding context, and community interest support a Curbless Street design.
- » Planning analyses consider network impacts and integrations, including major destinations and pedestrian connectivity, loading and parking demand, transit access, and bicycle facility connections.



Figure 20. Example of a Curbless Street in Chevy Chase MD

Note: The use of detectable warning surfaces is not recommended as an edge treatment and should be used only in designated pedestrian crossing areas.

## Design

- » The curbless design can create a “building face to building face” enhancement to the public realm.
- » This enhanced design makes the street feel more attractive and can improve the perception of safety for pedestrians, especially compared with Conventional Streets.
- » The overall design and use will lead pedestrians to use the Comfort Zone for travel along the street.
- » The following design aspects clearly define pedestrian and vehicular areas:
  - › Pavement treatments clearly define the vehicle and pedestrian zones and identify the street as a unique environment requiring slower speeds.
  - › Vertical delineators such as furniture, planters, bollards, trees, and/or a 2 inch tall sloping curb channelize and separate modes.
  - › Detectable warning surfaces are used to alert pedestrians to street crossing locations.
  - › Defined ADA-accessible pedestrian crossings across the Curbless Street should be provided at a maximum spacing of 400', with no minimum spacing.
- » Traffic calming is important for these streets and should seek to limit travel speeds to no more than 15 MPH. The aesthetic configuration of the design should inherently lend itself to lower speeds, but additional features (such as horizontal deflection through chicanes, narrowed travel areas, median fixtures) may need to be incorporated.



Figure 21. Example of Curbless Streets in Denver, CO,; West Palm Beach, FL; and Eugene, OR, where the travel lane and zones are defined by planters, bollards, and other furniture elements.

## Considerations

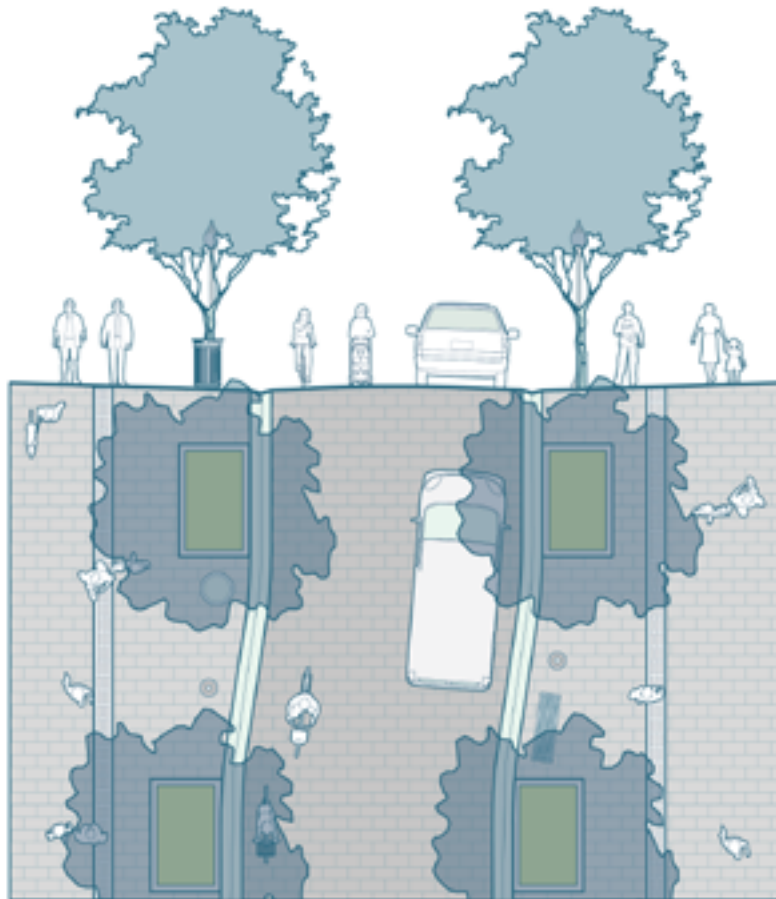
- » The generally flush surface allows the street to serve as a barrier-free space for special events or when closed to vehicles. Consider community programming opportunities and incorporating temporary closure elements such as removable bollards that can support and enable this “Festival Street” function.
- » On-street parking and loading areas should be limited and designed carefully to support separation from pedestrian areas and reduce speed (e.g., organizing parking on alternate sides to create chicaning movement). High amounts of parking can erode the intent of a Curbless Street by creating a barrier that functions as a de facto curb, limiting ability for pedestrians to freely travel between areas of the street.
- » All curbless designs (including Shared Streets) require non-standard stormwater management treatments to effectively capture and convey water away from buildings. *See Section 4 for recommendations.*

## 3.3 Shared Streets

Shared Streets are also curbless, but are distinguished by having pedestrians, people riding bicycles, and motor vehicles predominantly mixing in the same space. There is no space reserved for motor vehicles, though there should be a “Comfort Zone” exclusive to pedestrians. Shared Streets use an array of vertical design elements such as lighting, planters, or benches to mark out pedestrian Comfort Zones. While motor vehicles are permitted, the street design emphasizes that cars are guests in the space, discouraging through-traffic, and encouraging extremely low vehicle speeds and volumes.

### Key Features

- » **Delineated Vehicle Travelway:** Vehicles use the Shared Zone
- » **Motor Vehicle Presence:** Very low
- » **Motor Vehicle Operating Speed:** Very low
- » **Expected Through-Traffic:** Limited, through-traffic will likely choose a parallel street given slow speed
- » **Loading and Unloading:** Regulated, limited to certain hours or only certain vehicles or vehicle sizes
- » **Garage Access:** Strongly discouraged
- » **Accessible:** Yes, Shared Streets are fully accessible to people with ambulatory disabilities across their entire breadth and width, though people with vision disabilities may need guidance to find the edges and assist with navigating the space
- » **Comfortable for Pedestrians to Walk Anywhere Along Street:** Yes, but clearly defined and detectable crossing locations are provided for pedestrians with vision disabilities





# Shared Street Design

- FZ** Frontage Zone
- CZ** Comfort Zone
- PZ** Furniture/Planting Zone
- SZ** Shared Zone

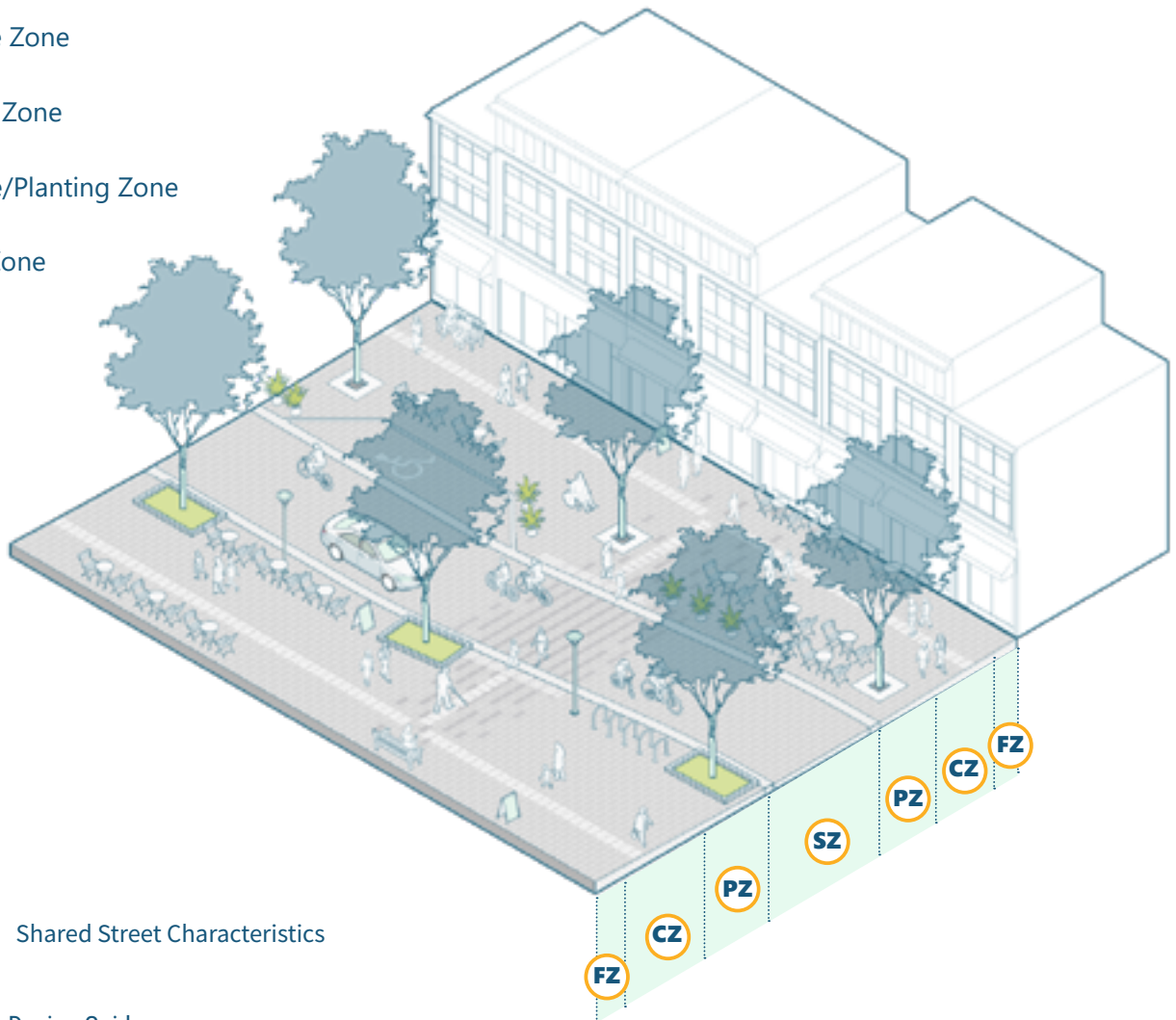


Figure 23. Shared Street Characteristics

Table 2. Shared Street Design Guidance

Item	Design Guidance (Width)	Notes
<b>Total ROW</b>	60' default / 30' min.	
<b>Frontage Zone</b>	7' default / 0' min. (each side)	May be reduced from default where existing ROW is limited, or with consent of fronting property owners.
<b>Comfort Zone</b>	8' default / 6' min. (each side)	May be reduced from default by Design Exception; must adequately meet all Special Considerations (see Section 4); Comfort Zone should provide +2' above Minimum along each side where a fixed object spans 6' or more longitudinal length.
<b>Furniture Zone</b>	6' default / 3' min. (each side)	May be reduced from default by Design Exception; must adequately meet all Special Considerations.
<b>Shared Zone</b>	18' default / 16 min. (bidirectional) 12' default and min. (one way)	Includes drains. Less than 18' only permitted if no large vehicles expected to use the street, other than emergency vehicles. The width across the Shared Zone, measured between fixed objects within the Furniture Zone, must be no less than 20'.
<b>Parking</b>	7' default width, 13' width for accessible spaces	<i>If provided, maximum of 1 side at a time. Consider forming chicanes by alternating which side parking is provided on.</i>

# Shared Street Key Characteristics

## Planning

- » Shared Streets are primarily used in Downtowns and Town Centers, though they may also be applicable in low-volume Suburban areas.
- » Siting evaluations should first consider if vehicle speeds and volumes, surrounding context, and community interest support a Shared Street design.
- » Planning analyses can identify ways that traffic can be diverted. Shared Street designers should not design these spaces for through-traffic.
- » Shared Streets should be equitably sited in locations where people from a wide range of backgrounds including people with lower-incomes and from historically marginalized groups.



Figure 24. Example of a Shared Street Concept in Bristol, RI

## Design

- » Shared Streets are multi-purpose public spaces lacking the formal modal separation found in conventionally designed streets.
- » Pedestrians have freedom of movement and generally feel comfortable walking across or along the entire right of way. While there is no exclusive vehicle zone, there should be a Comfort Zone delineated with detectable materials to guide those with vision disabilities and others uncomfortable sharing the space with vehicles.
- » People riding bikes and using other micromobility devices should be accommodated in the Shared Zone; associated parking for bikes and micromobility devices can be a tool to differentiate between uses of space.
- » Degree of definition is flexible and may be simple paving from building face to building face or more complex arrangements. Subtle but recognizable and consistently applied changes in material provide intuitive cues to all users on how to use and share the space.
  - › Transitions to Shared Streets need to be clear. Gateway treatments such as vertical or textural changes, and curb extensions, also known as bulb-outs or neck-downs, alert all users to new conditions.
  - › Carefully selected materials and design discourage drivers from using the space and force those who do to proceed with caution and care.
  - › Alternatively, Shared Streets can be a canvas for pavement art, which helps define and give identity to the space, but must be implemented with consideration of impacts to users with vision disabilities.
  - › Defined ADA-accessible pedestrian crossings of the Shared Street should be provided at a maximum spacing of 200', with no minimum spacing.
- » Bollards should be discouraged on Shared Streets, as they visually channelize modes into separate areas rather than sharing space, and rigid bollards can pose safety concerns if struck by pedestrians or people riding bicycles. Where possible, other vertical and horizontal elements should be used. Subtle horizontal shifts and chicanes can slow and/or disallow drivers from gaining too much speed.
- » Traffic calming is important for these streets and should seek to physically limit travel speeds to no more than 5 MPH.

## Considerations

- » Consult accessible design and planning resources (see Section 4).
- » The regulation of access to buildings and destinations, including garage access, is especially important and needs to be carefully considered to account for context—such as land use, density, and other factors that impact use.
- » If parking must be accommodated, time limits can provide access while reducing negative impacts. Loading and unloading are secondary street uses and should be sited away from Shared Streets if possible.



Figure 25. All modes share space on Shared Streets in Boston, MA; Washington, D.C.; and London, United Kingdom.



## 3.4 Other Similar Streets

The County maintains two street types that function like Shared Streets, as the design of these streets requires all users to share space and negotiate movement. However, despite their commonalities, Alleys and Rustic (and Exceptional Rustic) Roads are not the subject of this guide. There are also many roads in the county that are planned to eventually have dedicated pedestrian or bicycle facilities but presently lack them. These roads are also not the subject of this guide.



Figure 26. Alley Characteristics

### Alleys

Alleys are narrow streets in which constrained width and service uses discourage vehicle throughput, and the frequent lack of sidewalks causes pedestrians to share the same space with vehicles. Though they operate like a Shared Street, their design is not the subject of this guide. For detailed information, refer to Section 2.6 of the *Complete Streets Design Guide*.

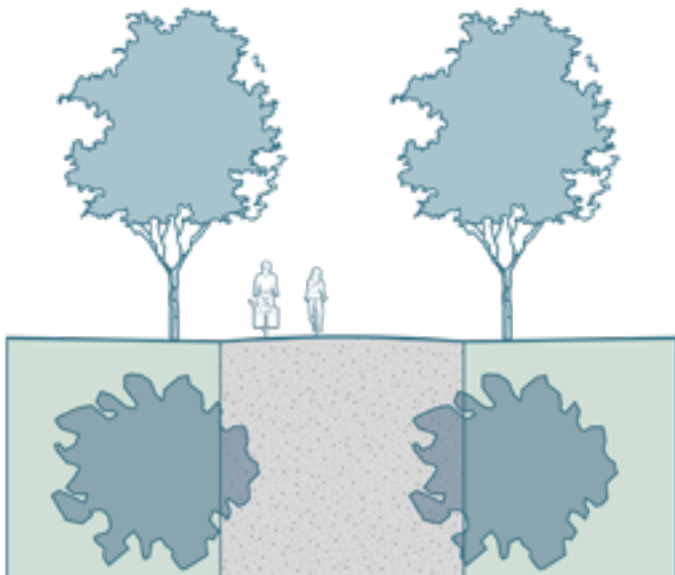


Figure 27. Rustic Road Characteristics

### Rustic Roads

Rustic Roads are narrow, low-volume streets in low-density or rural areas that serve primarily local trips. Because of the very low volume, all travelers use and share the full width of the street, whether they are riding a bicycle, walking, or driving—or even riding a horse or driving a tractor in agricultural areas. With their unique context they do not require or present the same design treatments covered by this guide. Through the Rustic Roads Program, Montgomery County outlines specific design and maintenance considerations to ensure that all users travel at slow speeds and share space safely.

# 3.5 Summary of Street Types

The table below presents a summary of street features and functions on Curbless and Shared Streets.

Table 3. Comparison of Street Design Features and Functional Considerations

Item	Curbless Street	Shared Street
<b>Delineated Vehicle Travelway</b>	Yes	Vehicles use the Shared Zone
<b>Motor Vehicle Operating Speed</b>	Low	Very low
<b>Motor Vehicle Presence</b>	Low	Very low
<b>Through-Traffic</b>	Low	Limited, through-traffic will likely choose a parallel street given slow speed
<b>Loading and Unloading</b>	Can be accommodated	Regulated, limited to certain hours or only certain vehicles or vehicle sizes
<b>Garage Access</b>	Can be accommodated	Strongly discouraged
<b>Accessible</b>	Yes	Yes, fully accessible to people with ambulatory disabilities across their entire breadth and width, though people with vision disabilities may need guidance to find the edges and assistance with navigating the space
<b>Comfortable for Pedestrians to Walk Anywhere Along Street</b>	Only when the street is closed	Yes, but clearly defined and detectable crossing locations are provided for pedestrians with vision disabilities
<b>Intersections</b>	May be controlled or signalized	Priority to shared space where feasible
<b>Total ROW Width</b>	66' default / 30' minimum	60' default / 30' minimum
<b>Frontage Zone</b>	7' default / 0' minimum (each side)	7' default / 0' minimum (each side)
<b>Comfort Zone</b>	10' default / 6' minimum (each side)	8' default / 6' minimum (each side)
<b>Furniture Zone</b>	6' default / 3' minimum (each side)	6' default / 3' minimum (each side)
<b>Shared Zone</b>	20' default / 18' min (bidirectional) 12' default and min. (one way)	18' default / 16' min (bidirectional) 12' default and min. (one way)
<b>Parking</b>	7' default, 13' for accessible spaces	7' default, 13' width for accessible spaces
<b>Target Speed*</b>	10–15 MPH	5 MPH

\* Note: Current Maryland state law requires a minimum posted speed of 15 MPH





Concept Design for Atlanta, GA. Source: Toole Design





# Section 4:

# Special

# Considerations

# 4.1 Intersections

Shared Streets are, by design, areas where all modes mix and priority is given to pedestrians. At intersections where Shared Streets intersect with other streets, there are unique design and operational considerations that shape how movement should proceed through the intersection. These considerations depend on the types of streets that connect, defined here as either Conventional-to-Shared Street intersections or plazas. As Curbless Streets maintain the modal separation of Conventional Streets, intersections between Curbless Streets or with Conventional Streets adhere to traditional design guidance and are not discussed in this section.

## Conventional-to-Shared Street Intersections

Conventional-to-Shared Streets intersections are where Shared Streets connect to Conventional Streets with curbs, modal separation, and other standard design and traffic control elements.

### Planning

- » The design and function of a Conventional-to-Shared Street Intersection will depend on which street (and street type) will be the primary street, and which street is the secondary street. The terms primary and secondary refer to the level of importance or priority of the street at the intersection. For example, if a Shared Street crosses a Downtown Boulevard and the Shared Street has comparably lower volumes, activity, and design, the Shared Street will be secondary to the design and function of the Downtown Boulevard. Identifying these levels allows planners to determine which street maintains the primary design and function, and which street adapts to the primary's context.
- » **If a Conventional Street crosses and interrupts the Shared Street**, there should be appropriate traffic control devices in place to ensure that it is legible where all modes cross the intersection. This may include strategic use of pavement markings or designs, signs, or vertical elements to guide all users through the intersection.
- » **If the Shared Street is the primary street, and it interrupts and crosses a Conventional Street**, then the Conventional Street needs to transition into the Shared Street design. A Shared Street may be identified as the primary street based on comparatively higher density of surrounding land use and activities, higher number of person trips, or other factors that establish the street as a desirable route. In practice, the resulting design may appear similar to a raised intersection, where the street surface is elevated to a single, curbless level as the street approaches the intersection.

## Plazas

Plazas can occur at the intersection of Shared Streets or be entirely independent. The mixing of modes may carry into the plaza, with all users sharing space and priority given to pedestrians.

## Planning

- » Complicated confluences of streets from multiple directions can be strong candidates for conversion to shared plazas; a broad open space with less formal delineation of spaces can induce drivers to slow down and be cautious without requiring extensive regulatory signing or markings.
- » Even in large, shared plazas, signing (other than wayfinding) is often omitted.

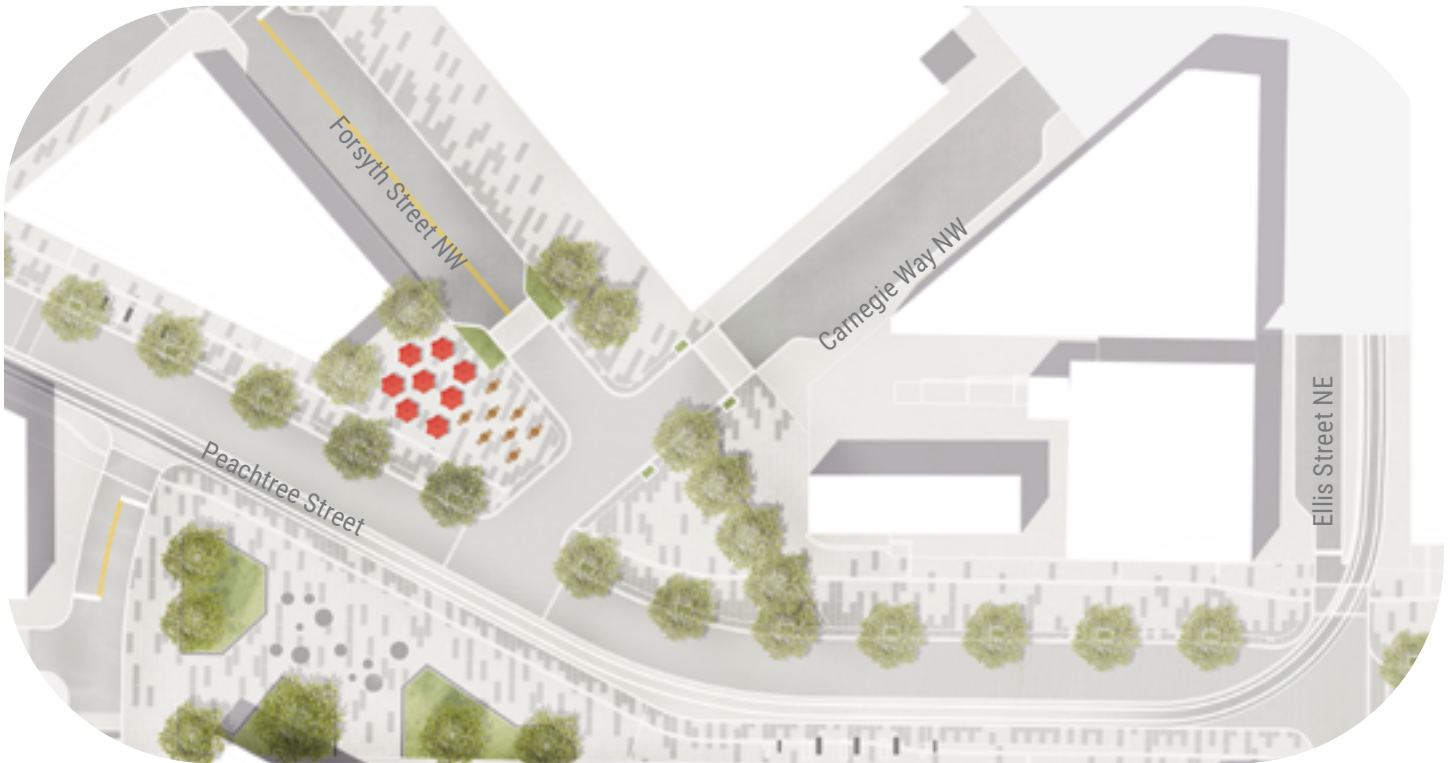


Figure 28. The Peachtree Shared Space (Atlanta, GA) proposed design features various treatments and design concepts across the Conventional-to-Shared Street Intersections and Plazas. In this example, the Shared Street (Peachtree Street) serves as the primary street and as a result the Conventional Streets transition into the Shared Street design as they approach the intersection. Street surface and pavement treatments are coupled with bump outs, pinch points, and other traffic calming elements.



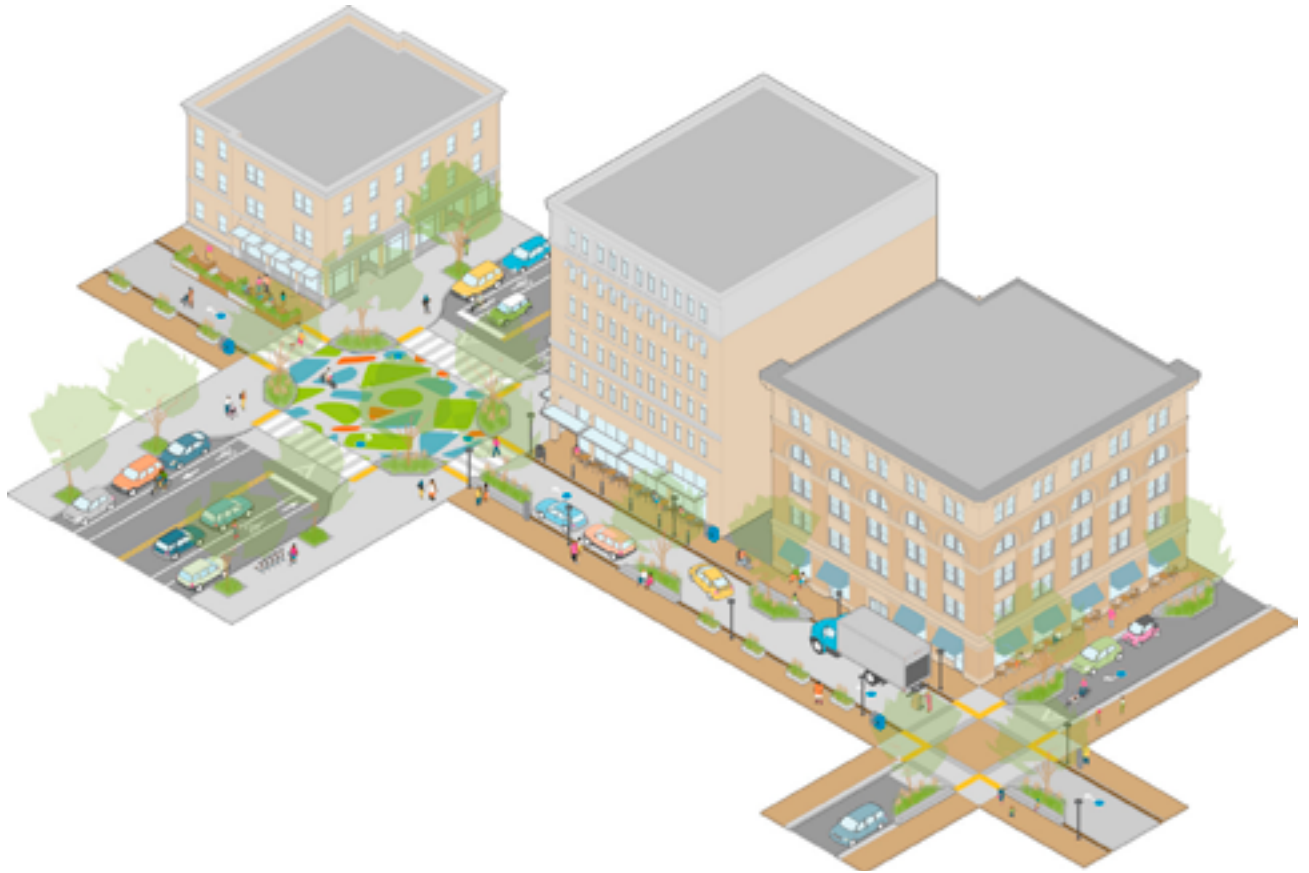


Figure 29. Example of Shared and Curbless Street Intersections (Source: Toole Design)



Figure 30. Example of a Plaza in Washington, D.C. (left) and a Plaza in Buffalo, NY (right, Source: Andre Carrotflower, Wikimedia CC4.0)

## Gateways

At intersections and other entrance and exit points, distinctive gateway treatments are used to define the Shared Street, alert users that the street operates differently than other streets, and communicate pedestrian priority. Gateway treatments can include a mix of pavement changes, signs, vertical elements and art features, and more, and should reflect the following:

- » Establish a protocol for traveling along the street, with sign and streetscape designs that increase awareness of people walking, biking, or rolling.
  - › Signing to identify the Shared Street, communicate this protocol, and promote safe and courteous negotiation of movement between different modes may be used.
- » Gateway treatments should slow motor vehicle traffic through changes in surfacing, raised crossings, and vertical elements (e.g., trees, landscaping, light posts) that physically narrow the space.
- » Target reduction in vehicle speeds to between 5 and 15 MPH through design and with advisory speed limits (or enforceable limits if available).
- » Moveable elements such as planters and removable bollards may also be used to temporarily block entry/exit points for certain uses or times of day. These elements should not be placed in the crosswalks or the pedestrian access route.
- » The gateway should be designed in a way that enables pedestrians with vision disabilities to detect an intersecting Conventional Street and navigate to a designated pedestrian crossing of the Conventional Street and the Shared Street. The specific design treatment will depend on site-specific factors, such as the width of the shared street, the number of intersection legs, and other site-specific factors. If the gateway is configured as a driveway apron, the slope of the apron should exceed 8.33%, so that a person with a vision disability walking in the Shared Zone can detect it and understand that it is not a pedestrian ramp leading to a designated pedestrian crossing.



Figure 31. Pavement design, art elements, and lighting designs serve as a gateway treatment in Eugene, OR.



Figure 32. A Shared Zone sign in Chevy Chase, MD alerts drivers to expect and yield to pedestrians and other active transportation users.

A gateway configured as a driveway apron should **exceed the standard 8.33% slope** to ensure that the Shared Zone is detectable and distinct, and not perceived as a pedestrian ramp leading to a crossing.

## 4.2 Accessibility

Accessibility is a critical aspect of Curbless and Shared Street design. The Americans with Disabilities Act requires all streets to be accessible to people with disabilities. The lack of curbs on Curbless and Shared Streets can improve accessibility for some users. However, if Curbless and Shared Streets are poorly designed, they can be challenging for some people with disabilities to navigate.

Without a defined pedestrian Comfort Zone, individuals with vision disabilities may feel especially at risk on Shared Streets, as interactions are primarily negotiated visually through eye contact and body language.

A clear, accessible, and direct pedestrian access route (along and across the street, and to key amenities) must be provided in compliance with PROWAG 203 and 302. The pedestrian Comfort Zone needs to align on both sides of an intersection, and provide access to/from adjacent properties (building entrances, outdoor dining, patios, etc.) Tactile directional indicators can assist in providing orientation and wayfinding guidance.

Curbless and Shared Streets public realms should minimize slope and grade to provide a comfortable and accessible user experience. The distinct zones should be differentiated through a combination of surface materials, landscaping, and street furnishings. It should be clear when someone is entering or exiting a shared area. Barriers, obstacles, texture that creates accessibility challenges, and other disruptions should be minimized within the Comfort Zones. The design should guide people with vision disabilities through the space and to key destinations.



FHWA's *Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities* provides design best practices, principles, and engagement considerations unique to Shared Street design and function.



## Accessibility Principles

- » Designs are consistent, predictable, and include a complete, intuitive, and convenient network of direct pedestrian access routes that enable people with disabilities to navigate the space and connect to destinations safely and independently.
- » Designs provide navigational information through multiple and overlapping elements.
- » People with disabilities, including pedestrians with vision, intellectual, and developmental disabilities, as well as guide animals, can easily distinguish between pedestrian space and shared or vehicular space and detect transitions between Conventional and Curbless or Shared Streets.
- » Designs meet or exceed PROWAG standards, including those for accessible parking and passenger loading spaces.
- » Barriers, obstacles, and disruptions are minimized in the design and programming/operation of the street.

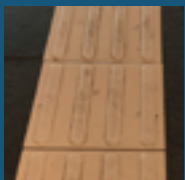
## Key Resources

- › Pedestrian Right-of-Way Accessibility Guidelines (PROWAG)
- › ADA Standards for Accessible Design
- › Montgomery County *Accessibility for People with Vision Tool Kit*
- › Montgomery County *Pedestrian Master Plan*
- › FHWA *Accessible Shared Streets*
- › NACTO *Urban Street Design Guide*

**Tactile Walking Surface Indicators (TWSIs)** are detectable by all users and provide critical information to help people with vision disabilities navigate the street. On Curbless and Shared Streets, these devices are particularly important to indicate safe crossings and to direct pedestrians into and along the Comfort Zone.



**Detectable Warning Surfaces** feature truncated domes in a grid pattern and are used to indicate the location of a safe crossing.



**Directional Indicators** feature raised parallel bars or grooved lines that guide pedestrians along designated pedestrian routes (i.e., the Comfort Zone).

Detectable Warning Surfaces and Directional Indicators have unique roles and communicate different information, but are often misused in practice. In the example below, Directional Indicators are used incorrectly to delineate the edge of the Comfort Zone—rather than an accessible path—leading people into the bollards and other elements within the Furniture Zone. The yellow marking notes the correct placement of this accessibility feature, in the Comfort Zone, one foot from the Furniture Zone.



Figure 33. Examples of Tactile Walking Surface Indicators

## Accessibility Priorities

Accessibility must be a key consideration throughout the planning and design process, and the following issues should be prioritized:

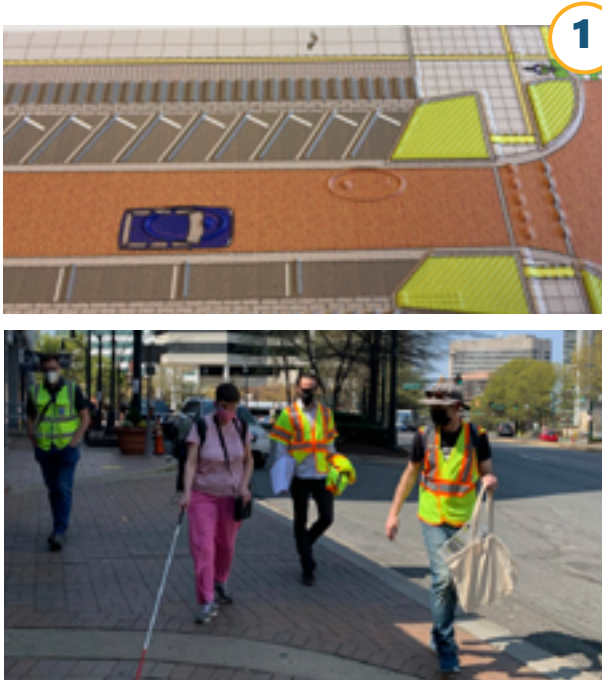


Figure 34. Two examples of inclusive engagement include tactile maps and walk audits with people with disabilities.

1

**Inclusive Engagement** is particularly critical for Curbless and Shared Street designs because they differ fundamentally from Conventional Streets and from each other. Travelers must be able to consistently understand and reliably navigate along Comfort Zones and across Shared Zones, and along Shared Streets and Shared Zones. A poorly designed Curbless or Shared Street can create significant navigational challenges—especially for people with vision, intellectual, and developmental disabilities.

Groups that represent people with a range of disabilities should be actively engaged early in, and throughout, the planning and design process.



Figure 35. Diagram of a Shared Street with the Comfort Zone highlighted in yellow

2

**Comfort Zones** are provided on both sides of a Shared Street. Comfort Zones must contain a pedestrian access route that complies with PROWAG R302, are typically wider than 6 feet or a conventional sidewalk, and include edge treatments that are easily detectable and that have a readily apparent intended meaning.



Figure 36. Integrating a gateway, MUTCD-compliant crossing on a Shared Street (source: Google Maps)

3

**Crossings** should link Comfort Zones directly with a predictable pattern of designated crossing opportunities including at street entrances and exits. While Shared Streets enable pedestrians to cross at any point, FHWA suggests including “courtesy crossings” to key destinations. Gateway crossings should be compliant with the Manual on Uniform Traffic Control Devices (MUTCD) (e.g., white, retroreflective, and at least 6 feet wide), while courtesy crossings could be done in a color that contrasts with the Shared Zone to indicate the path without making the street look like a Conventional Street where automobiles have priority.



Figure 37. Example of tactile directional indicators

4

**Tactile Directional Indicators** are a form of tactile walking surface indicators (TWSIs) that help pedestrians navigate by providing tactile orientation and wayfinding guidance to direct travelers along accessible paths or to crossings. Tactile directional indicators should only be used for wayfinding, and not as warning devices, edge demarcation, or for any other use other than their intended purpose. They should contrast with adjacent surfaces (e.g., light/dark) and be installed as a linear route on the side of the Comfort Zone closest to the Shared Zone. The indicators should offset by at least 12 inches from the edge of the Comfort Zone.

TWSI design and placement should follow PROWAG standards. The *Montgomery County Pedestrian Master Plan* recommends developing County standards for TWSIs.



Figure 38. Special paving treatments, DWS, and gateway treatments alert all users to a new environment on Davis Street in Portland, OR.

5

**Contrasting Colors and Surface Textures** can help define spaces and provide legible cues to travelers about how to use the space. Designs should be simple and intuitive, as too much color or pattern can cause confusion and be difficult to navigate, particularly for pedestrians with vision, intellectual, and developmental disabilities. Changes in surface texture can signal different uses and serve as a warning for drivers to slow down and be cautious.



# Accessibility Considerations

## Planning

- » Engage accessibility leaders, experts, and individuals throughout the planning process. Examples of key stakeholders include:
  - › Montgomery County Commission on People with Disabilities
  - › Groups that represent aging adults, such as AARP, the County’s Commission on Aging, and senior centers or senior groups
  - › Groups that represent people with vision disabilities, such as the American Council of the Blind and National Federation for the Blind, and local chapters, as available
  - › Orientation and Mobility (O&M) specialists —professionals providing training on independent travel skills to people with vision disabilities
  - › Groups active with people with vision and other disabilities, such as guide dog user groups. Others with expertise on how people with different types of disabilities navigate
- » People with certain cognitive and intellectual disabilities may have difficulty understanding and navigating shared spaces. They too must be included in the entire process to make sure the result is accessible to them.
- » Outreach should be intentional about engaging the full spectrum of disabilities, including people who are deaf-blind and people with intellectual and developmental disabilities. Examples of organizations specializing in these areas include the National Association of the Deaf, the American Association of Intellectual and Developmental Disabilities, and the Arc.
- » Designs must adhere to ADA regulations and should also reflect the best practices outlined in the FHWA Accessible Shared Streets Guide.

- » Street furniture and other streetscape elements must be arranged so that pedestrian access routes and pedestrian circulation paths comply with the clear widths specified in PROWAG R302.2 and the vertical clearance and protruding object requirements in PROWAG R402.

## Considerations

- » Continue monitoring the street function and check for accessibility issues post-construction, and commit to ongoing maintenance and improvements as necessary.
- » Accessible parking and passenger loading zones may be required on the street.

## Design

- » Shared Streets should apply unique designs that distinguish them from Conventional Streets and indicate pedestrian priority, but will also need to incorporate standard accessibility treatments to ensure legibility for all users.
- » When using contrasting colors to define spaces, carefully select colors that are contrasting for people with vision disabilities and color blindness, and avoid patterns that may suggest steps or other problematic designs.
- » Entrances and transitions between Shared Zones and Comfort Zones must be easily and reliably detectable underfoot and with a long white cane, using design features such as contrasting colors and surface textures, or a surface slope exceeding 8.33% (if the entrance is configured as a driveway apron).
- » Tactile Walking Surface Indicator (TWSI) design considerations vary.
  - › Tactile directional indicators should be 1 or 2 feet wide and placed in the Comfort Zone, on the side of the pedestrian access route closest to the Shared Zone. The indicator should be placed a minimum of one foot away from the Furniture Zone to limit conflict with other users.
  - › Detectable warning surfaces (e.g., truncated domes) should only be used to identify crossings.

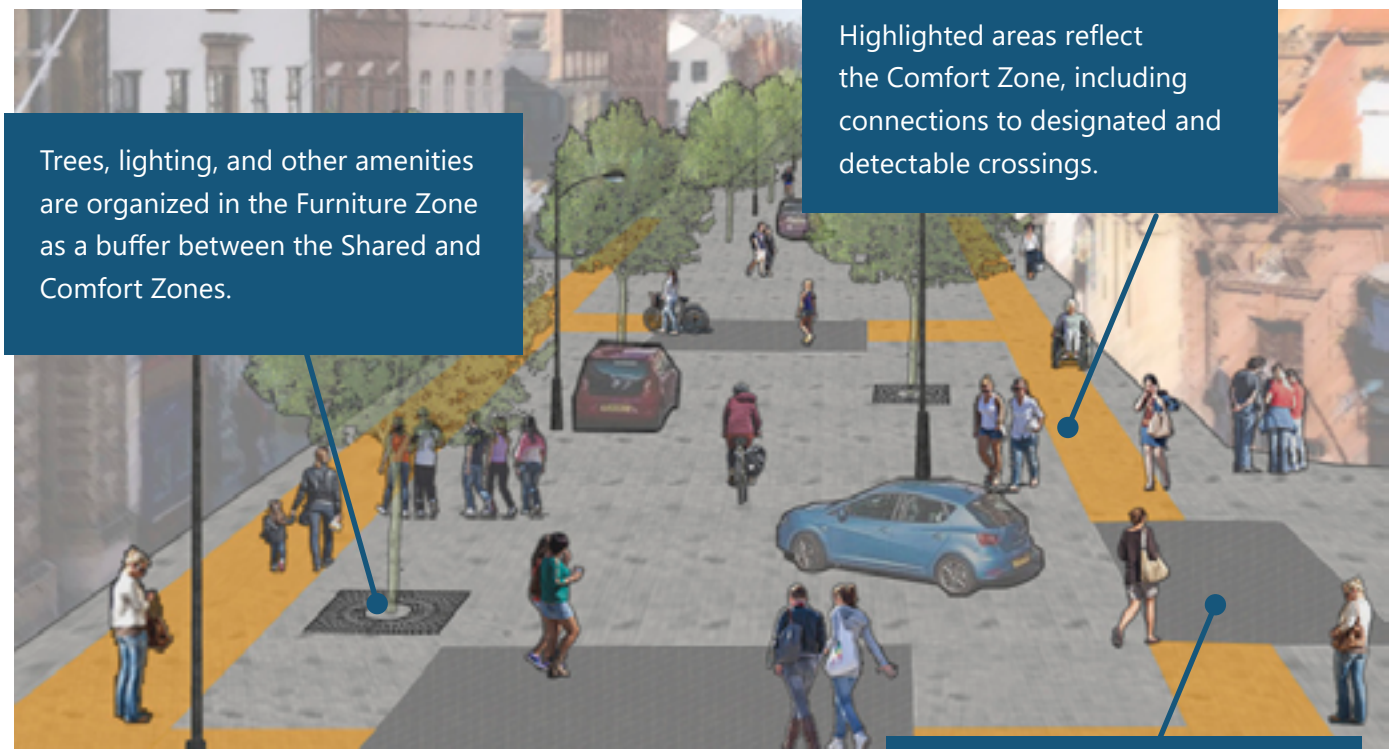


Figure 39. Concept Diagram of a Shared Street in Edmonton, Canada

Crossings are identified with contrasting pavement textures, color, and detectable warning surfaces at entrances

## 4.3 Stormwater Management and Drainage



Figure 40. Example of a slot drain on a Shared Street in Washington, D.C.



### Key Resources

- › *NACTO Urban Street Stormwater Guide*
- › Montgomery County Code (Chapter 49)
- › Montgomery County Drainage Design Criteria

Changing the surface of the street impacts stormwater management and drainage. On a Conventional Street, the street and sidewalks/pedestrian zones are designed to direct water toward the curbs, where it will flow or convey into the stormwater system. On a Curbless or Shared Street with a surface that is adjusted to be a single level/flush, the geometry of the street and its stormwater infrastructure must be adapted to effectively move water safely away from buildings and to stormwater infrastructure. The differences between these streets and Conventional Streets require different approaches to permitting and design.

Stormwater improvement projects have been frequently linked to Curbless or Shared Street retrofit projects, giving municipalities reason and opportunity to rethink the design and function of the street. Beyond leveraging these projects to redesign the street surface and drainage patterns, Curbless and Shared Streets' use of unique paving treatments has enabled municipalities to test new materials and fully integrate stormwater management tools, including permeable pavers and surfaces, bioswales, and nontraditional drain infrastructure.

However, unlike Conventional Streets where stormwater spreads (and occasional flooding) can be accommodated between the curblines, Curbless and Shared Streets require more redundancy in stormwater design to accommodate large storms and extreme events.

The effectiveness of stormwater design is crucial to the success of a Curbless or Shared Street, and discussions of drainage and conveyance must be included early and often throughout the design process and in planning for ongoing operations and maintenance.

Universal to all Curbless and Shared Street designs is the need for street geometry to be set from adjacent building entrances, not from the center of the road, with the utmost design objective of preventing stormwater flow into building entrances. Additional design principles, best practices, and considerations are outlined in the following section.



## Stormwater Management Principles

- » Drainage features and infrastructure can be part of how space is delineated on a Curbless or Shared Street.
- » Planners and developers should engage early and often with utility stakeholders to identify opportunities and potential constraints.
- » Valley gutters are preferred treatments to supplement green street infrastructure.
- » Curbless designs may require specialized calculations and permitting processes.



Figure 41. Example of a Valley Gutter on a Curbless Street

1

**Valley gutters** are the preferred approach to conveying water in the absence of a curb. Designs can feature high contrast texture or color to help delineate the street's shared and pedestrian-only zones.



Figure 42. Example of a Bioretention on a Curbless Street

2

**Bioretention, swales,** and other stormwater management features enable water collection, filtration, and retention while providing a physical separation between the Comfort Zone and the Shared Zone.



Figure 43. Example of a Permeable Alley Treatment

3

**Permeable paving materials** and other high-quality permeable treatments can support stormwater goals while helping identify and alert users to the street as a unique space.

# Stormwater Management Considerations

## Planning

- » Be proactive about discussing stormwater management and drainage, both in siting context and in identifying opportunities, constraints, and risks of proposed designs.
- » Engage local utility owners early about potential construction; if possible, plan the street design in parallel with other capital improvements (i.e., a dig once approach). This also reduces the likelihood of a newly implemented design being negatively impacted by utility work or projects in the near term.
- » For siting, consider planning analyses that explore the broader network and drainage system, and any upcoming or expected projects.
  - › Evaluate current curb drainage as part of siting criteria, as reconnecting to the system later is a major and costly challenge.
- » Permitting needs for Curbless and Shared Streets will require details on how water will be conveyed along the street; these calculations will differ from typical curbed street designs.
  - › Retrofit projects (rather than new construction developments) may require a variance from the County.

## Considerations

- » For privately developed and owned streets, clarify the ownership of the street (or timeline for transferring ownership, if applicable). This will impact the selection of materials and maintenance responsibilities necessary to design and maintain the street.
  - › In the example shown below, the City of Seattle was able to integrate trench drains and other specialized stormwater infrastructure by identifying the Department of Parks and Recreation as the owner and operator of Bell Street Park.
- » Identify the party responsible for the ultimate maintenance of the stormwater infrastructure and operation. For example, know who is responsible for addressing changes in stormwater patterns, responding to major events, or addressing clogs and other issues.

**Seattle's Bell Street Park is a four block long Shared Street corridor designed to serve as an open space for the community. The street features planters, vegetation, trench drains, and other creative and high-quality stormwater elements enabled through a partnership between the Department of Parks and Recreation and Seattle Department of Transportation.**



Figure 44. Bell Street Park in Seattle, WA (Source: Google Streetview)

## Designs

- » Well-designed stormwater features can achieve several co-benefits for the design and function of the street.
  - › Vegetation and trees enhance the streetscape aesthetic, contributing to a more comfortable pedestrian experience and potential to generate economic and community benefits.
  - › Planters and planting areas can be used as vertical barriers to designate or delineate between Comfort and Shared Zones. In addition, placement can establish a chicaning travel pattern.
- » Reverse crowns can be used to direct water away from buildings and toward the center of the road or a drain.
  - › Intersections with Conventional Streets that are crowned streets need to be carefully designed to ensure the grading of the streets supports positive drainage.
- » Linear trench drains and slot drains may be used along privately maintained Curbless and Shared Streets, but must use ADA-accessible grates and be adequately maintained such that public facilities are not impacted by inadequate maintenance.
- » Paving options have a significant influence on the street's ability to capture and convey water efficiently.
  - › Permeable pavement options, including permeable pavers, pervious concrete, or porous asphalt, can support stormwater management and infiltration goals, while supporting unique paving designs to identify the street and delineate Comfort and Shared Zones.
  - › Decorative and impervious paving options, such as stamped brick, may not be capable of infiltrating stormwater at the rates needed for the street and should not be relied upon for large storms.
  - › Where necessary, permeable paving must meet emergency vehicle standards.



Slot Drain



Bioretention Area Delineating Zones



Bioretention Area



Valley Gutter

Figure 45. Stormwater Management Features



## 4.4 Lighting

Curbless and Shared Streets must be appropriately illuminated to ensure the comfort and safety of the street. The placement and design of lighting is an important consideration for Curbless and Shared Streets, as the lighting infrastructure can play multiple roles in defining the street, its character, and its zones.

### Lighting Principles

- » Lighting is an important part of crafting a welcoming environment that is comfortable for all users, and helps to identify the street as a destination and gathering space, where people are interested in spending time.
- » Pedestrian-scale—also referred to as human-scale—lighting infrastructure is recommended on Curbless and Shared Streets.
  - › The *Complete Streets Design Guide* requires pedestrian-scale lighting for Downtown and Town Center streets, and encourages this scale of lighting for all Shared Streets.
- » Lighting installed along overhead wires or attached to building faces is encouraged for its ability to support placemaking and establish a sense of enclosure.

### Lighting Considerations

#### Planning

- » Montgomery County lighting within the right of way follows FHWA standards for illumination levels and uniformity for lighting streets and other multi-modal facilities.
- » The design of lighting fixtures is regulated by the Montgomery County Zoning Ordinance, Division 6.4.
- » Spacing, pole height, and pole placement should be determined by modeling the proposed design with engineering software to demonstrate compliance with applicable design criteria.
- » For lights that require poles, lighting placement should be placed on alternating sides of the street. If the Shared Zone is wider than 50 feet, the light poles can be placed directly across from each other. Placement should also consider the siting of trees and other streetscaping elements that could obstruct the light emitted.



Figure 46. Unique lighting designs add illumination and character on 16th Street in Denver, CO.

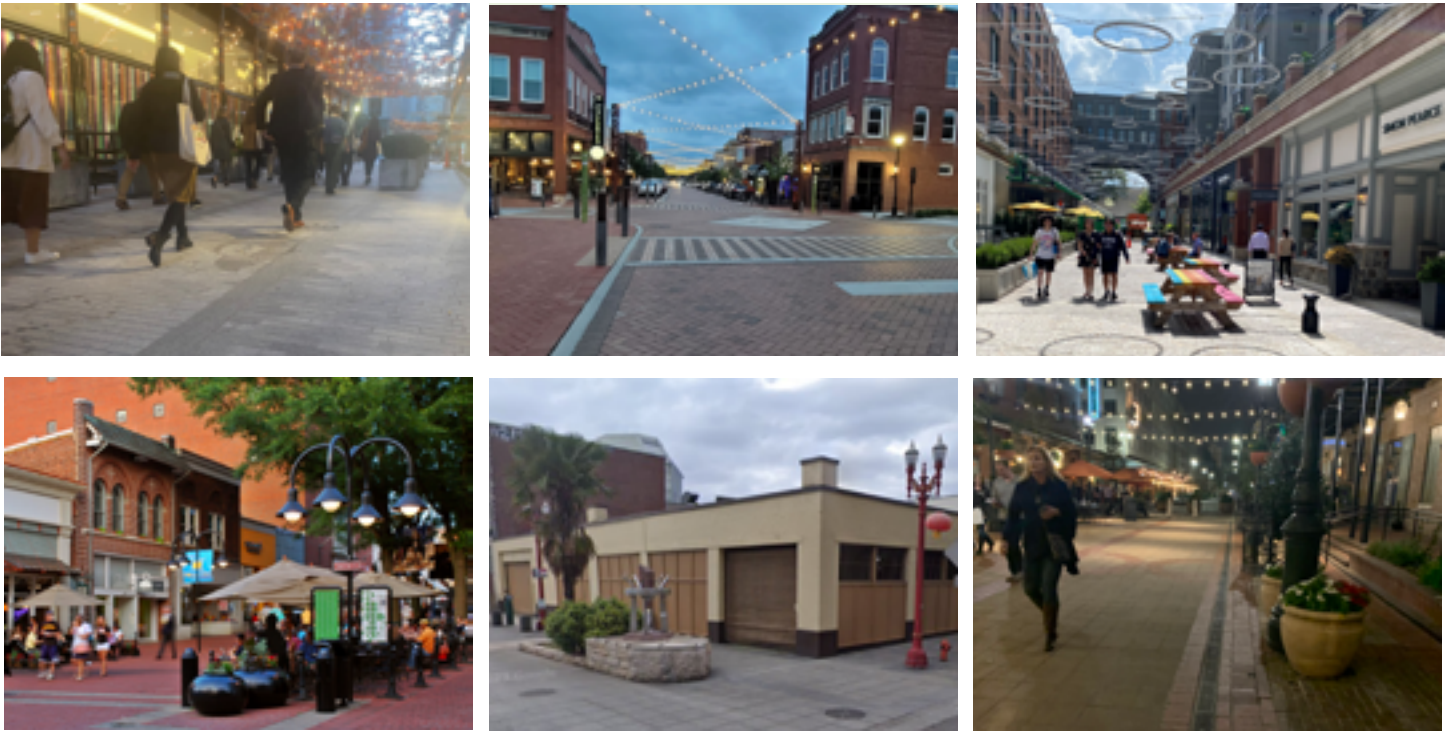


Figure 47. Clockwise from top left: Wire lights in Washington, D.C.; Greer, SC; Bethesda, MD; and New Orleans, LA; Streetlight poles double as a gateway treatment in Portland, OR (source: Google Maps) and Charlottesville, VA.

## Considerations

- » Crosswalks, gateways to the street, and any seating areas along the Curbless or Shared Street that may be used at night must be visible and lit.
- » Energy-efficient Light Emitting Diode (LED) lighting options are preferred.

## Design

- » Lighting is typically located in the Furniture Zone and oriented toward both the Comfort Zone and Shared Zone (or vehicle lane on Curbless Streets) to ensure that all spaces are illuminated.
  - › Lighting fixtures and poles must not interfere with the Comfort Zone or obstruct the pedestrian access route.
- » Consider designs that feature lighting installed across the full right-of-way, such as along building-anchored overhead wires and attached to building faces. These and other wall-mounted lighting options can be a cost-effective alternative to traditional streetlights and

help establish the character of the street as a shared space from building face to building face. Overhead wire lighting must be designed for considerations such as vertical clearance, weather protection and durability, and support pole spacing. Agreements for operations and maintenance must be in place with the roadway owner, property owners, and utility companies as applicable.

- » Lighting design can double as a defining element for the street, such as a gateway treatment, and should reflect the character of the street and neighborhood.
- » Refer to the MCDOT Luminary and Streetlight Pole specifications for details on mounting heights and pole heights.



## 4.5 Emergency Access

Curbless and Shared Streets must be designed to accommodate emergency access and operations, meeting design specifications as required by the County. The *Montgomery County Fire Department Access Performance-Based Design Guide* features a short section on Shared Streets that identifies the design as “an acceptable form of Fire Department Access, provided they create sufficient travel and operational access alternatives. The designs, materials, patterns and buffers proposed for shared streets will be evaluated during the regulatory review process.”

Emergency agencies, providers, and other related organizations should be engaged in the street design process to ensure that the design is suited to their operational needs. For example, the vertical elements installed to delineate zones require coordination with these entities to ensure that their operations are not impacted, with the understanding that specific designs’ implementation may be limited by regulations.

Relevant guidance includes the Montgomery County Fire Code and *Montgomery County Fire Access Performance-Based Guide*, those published by the National Fire Protection Association (NFPA) and adopted by the County, such as NFPA 1 (Fire Code), NFPA 1141 (Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas) and NFPA 1142 (Standard on Water Supplies for Suburban and Rural Firefighting).

However, Montgomery County recognizes that the safety improvements associated with certain street designs are of interest and value to the emergency community, and through its County Guide offers flexibility allowing for alternative street design.

**Consult the *Complete Streets Design Guide* and contact MCDOT to ensure that street design meets County regulations and emergency-related requirements.**



## Key Emergency Access Requirements

- » Fire truck access must be maintained, and fire hydrants and standpipes need to be accessible and visible.
- » A minimum clear width of 12 feet, free and clear, is required to allow safe vehicle and emergency access.
- » NFPA 1 provides guidance on street geometry (turning radii), load-bearing surfaces, and vertical clearances.
  - › NFPA 1 and the *Montgomery County Performance-Based Design Guide* note that alternative paving surfaces, such as the unique and sometimes pervious options preferred in Curbless and Shared Street designs, must be reviewed on a case-by-case basis to ensure that they provide access and have a long-term maintenance plan in place.
- » Operational access—space for fire apparatus to set up and operate while stationary—is required to be at least 20 feet wide and 50 feet long. This can be provided by design elements that provide the necessary clear width, typically by prohibiting parking, along a section of the road and designing the Furniture Zone to allow fire apparatus to set up and operate.
  - › Figure 48 illustrates how creating a 50-foot no parking zone creates a sufficient dimension for operational access.
  - › Other proposed design elements to incorporate this required space include fire hydrant locations, driveways, and intersections with streets and alleys.
  - › Areas capable of providing operational access (generally 10 feet from the centerline of the Shared Zone) should be designed to be capable of structurally supporting fire apparatus.
- » The *Complete Streets Design Guide* provides detail on minimum turning radii. The default turning radius is 15 feet but may be increased as needed to serve Design Vehicles and Control Vehicles, or reduced via Design Exception if smaller radii can adequately serve Design Vehicles and Control Vehicles.<sup>1</sup>

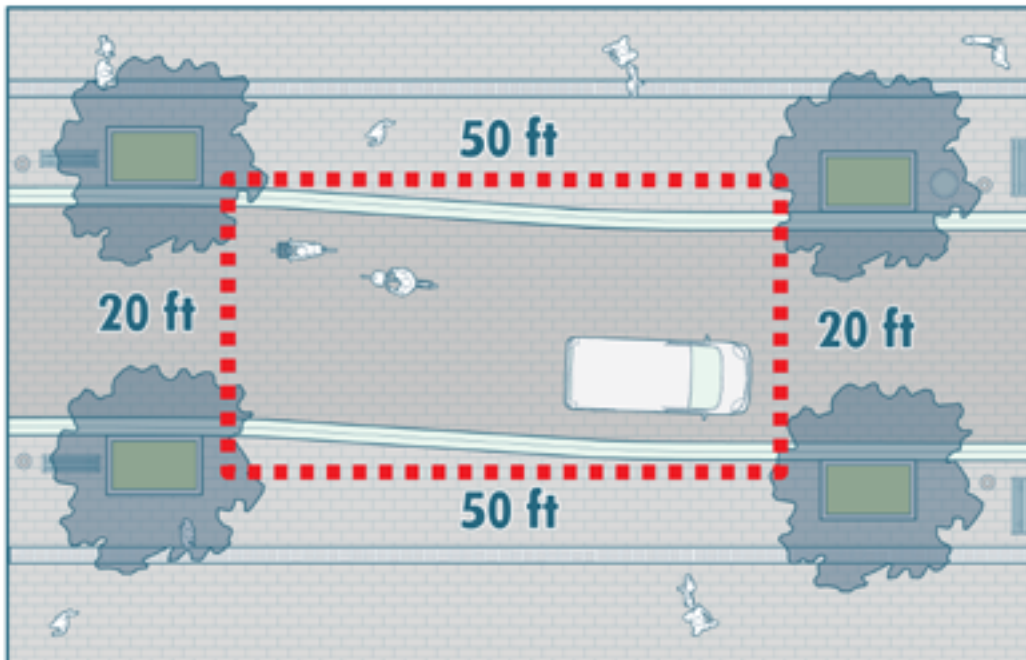


Figure 48. Operational Design Concept for Emergency Access

<sup>1</sup> Section 6.3 of the Montgomery County *Complete Streets Design Guide* outlines Geometric Design Guidance.

