



TRAFFIC CALMING AND COMPLETE STREETS BEST PRACTICES **TOOLBOX**



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INTRODUCTION

The Traffic Calming and Complete Streets Best Practices Toolbox supports Western Connecticut Council of Governments (WestCOG) members' municipal staff and practitioners in planning, design, and implementation of traffic calming and Complete Streets projects.

PROJECT BACKGROUND

WHAT ARE COMPLETE STREETS?

Complete Streets is an approach to street design that features and facilitates the safety and accessibility of all modes – walking, biking, transit, and vehicles – and people of all ages and abilities.

By making spaces more comfortable and convenient for people to travel in different ways, Complete Streets can encourage mode shift (people choosing other forms of transportation beyond driving), expand and improve connectivity, promote community-oriented spaces, and reduce the negative impacts of the transportation system like congestion, air and noise pollution, and stormwater runoff.

Some Complete Streets feature dedicated space for different modes such as bike lanes, sidewalks, loading zones, and bus-only lanes. A local example of these facilities on a Complete Street is presented in the image of an intersection in Norwalk, CT, below.

However, many streets do not have the right-of-way width to allow for dedicated lanes or design elements serving different modes. In these contexts, communities can support design, policy, or programming to prioritize safety and convenience for people walking, biking, and rolling.

COMPLETE STREETS IN THE U.S.

Complete Streets is a growing movement in the U.S., with over 1,700 policies adopted by State, regional, and local government agencies. At the national level, the U.S. Department of Transportation (USDOT) has referenced their benefits for years, highlighting reduced risk and severity of crashes and strengthened economic vitality. The Infrastructure Investment and Jobs Act (IIJA) created the first Federal requirements and funding programs specific to Complete Streets. Goals for Complete Streets, as defined by the Federal Highway Administration (FHWA), are outlined below:

- + **Safety**, with emphasis on safer behaviors encouraged and enforced through design.
- + **Accessibility**, to address infrastructure (or lack thereof) that obstructs access, regardless of ability.
- + **Equity**, to reflect a community's unique context, and ensuring all users have access to safe options.
- + **Connectivity**, or prioritizing multimodal connections to key destinations or address gaps in the network.
- + **Mobility**, with an objective to make all transportation options convenient, safe, and comfortable.
- + **Environment**: elements to reduce concerns such as stormwater runoff or air and noise pollution.



Fort Point Street at Seaview Avenue in Norwalk, CT (Source: City of Norwalk)

COMPLETE STREETS STRATEGIES

Complete Streets policies focus on commitments to incorporate all modes in decision-making and design. To actually accomplish and integrate these elements into design processes and projects, municipalities typically rely on strategies such as checklists, design guidance or manuals, and dedicated plans to ensure Complete Streets principles are reflected in projects.

Checklists: A core aspect of Complete Streets is that planning for all modes is the **default** approach. This hinges on considering the needs of people walking, biking, or rolling early in projects that impact the public right-of-way, referencing data such as :

- + Availability and condition of existing pedestrian, bicycle, and transit facilities or accommodations
- + Active transportation data, with emphasis on enablers and barriers such as connectivity, level of traffic stress, lighting, connectivity, and amenities
- + Transit stops/stations, amenities, and ridership data
- + Traffic and roadway conditions such as vehicle volumes, lanes, driveways, parking or loading needs.
- + Streetscape features or furniture such as trees, stormwater management, wayfinding, and public art
- + Community points of interest and destinations (especially those frequented by children, aging adults, and people living with a disability)
- + Relevance to local plans, priorities, and goals

Design Manuals: Design manuals and criteria, such as this Toolbox, the Connecticut Department of Transportation (CTDOT) Complete Streets Design Criteria, or City of Stamford's Complete Streets Manual, present recommendations and processes that consider all users, prioritize safety, and encourage alternative transportation.

Manuals or standards may be updated to prioritize Complete Streets principles in public projects. For example, municipalities may adopt capital program evaluation criteria that prioritize addressing gaps in the pedestrian or bicycle network.

Planning Documents: Complete Streets efforts are often complemented by the adoption of a Bicycle and/or Pedestrian Master Plan. These plans serve to provide actionable steps for expanding access for non-motorized users, and often incorporate the Complete Streets priority for improved connectivity for all modes.



Bank Street in New Milford, CT

COMPLETE STREETS RESOURCES

There are many resources for crafting and adopting Complete Streets policies, applying strategies such as checklists or design manuals, and shifting to a Complete Streets framework. The examples below are great starting points for learning about the fundamentals of Complete Streets; see Section 4 for additional resources.

- + [Smart Growth America - Complete Streets Coalition and Resource Hub](#)
- + [National Association of City Transportation Officials \(NACTO\) Urban Street Design Guide](#)
- + [FHWA Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts](#)
- + [FHWA Small Town and Rural Multimodal Networks](#)
- + [Moving to a Complete Streets Design Model: A Report to Congress on Opportunities and Challenges](#)
- + [ITE Complete Streets Resources](#)

COMPLETE STREETS IN THE WESTCOG REGION

Complete Streets efforts are growing in the WestCOG region. The following section outlines policies and initiatives that have been adopted at State and Municipal Levels in support of Complete Streets.

COMPLETE STREETS THE WESTCOG REGION

- + Connecticut enacted a Complete Streets law in 2009 — the 10th state in the country to do so — which required that all users be considered and integrated into public projects on state highways.

- **CT Complete Streets Legislation (§ 13a-153f)**

- + In 2014 the Connecticut Department of Transportation (CTDOT) adopted a Complete Streets Policy, outlining safety and mobility objectives and implementation procedures such as a checklist and performance measures.

- **CTDOT Complete Streets Policy**

- + CTDOT published Complete Streets design criteria in 2023, with specifics on incorporating pedestrian, bicycle, and transit provisions in projects. In 2024, CTDOT issued an engineering directive to support quick-build Complete Streets projects on State roads.

- **CTDOT Complete Streets Design Criteria**

- **CTDOT Quick-Build Directive**

- + While Complete Streets programs are advancing statewide, local adoption remains limited—just twelve Connecticut municipalities have Complete Streets ordinances. This includes two in the WestCOG region: Stamford (2015) and Norwalk (2024). Beyond the Cities with policies, many Towns in the region have published plans noting the importance of a Complete Streets philosophy and its relevance to local traffic safety and accessibility goals.

- **Stamford Complete Streets Ordinance**

- **Stamford Complete Streets Manual**

- **Norwalk Complete Streets Ordinance**

- **Norwalk Complete Streets Design Guide**

WESTCOG MUNICIPALITIES' COMPLETE STREETS INITIATIVES

Municipality

	Complete Street Policy or Ordinance	Complete Street Design Manual	Active Transportation Master Plan	Other Supportive Plan or Policy
Town of Bethel			X	X
Town of Bridgewater				
Town of Brookfield				X
City of Danbury				X
Town of Darien				X
Town of Greenwich				
Town of New Canaan				X
Town of New Fairfield				
Town of New Milford			X	
Town of Newtown				
City of Norwalk	X	X	X	X
Town of Redding				
Town of Ridgefield				X
Town of Sherman				
City of Stamford	X	X	X	X
Town of Weston				
Town of Westport				
Town of Wilton				X

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WHAT IS TRAFFIC CALMING?

Traffic Calming refers to the strategic use of self-enforcing measures—physical design elements, educational programs, policies, and more— **to reduce speeding, increase driver awareness, and combat unsafe driving behaviors.** These measures make streets feel safer and more comfortable for all users.

SELF-ENFORCING DESIGN

Traffic calming is often referred to as “self-enforcing” because the designs make speeding uncomfortable; drivers slow down, pay attention, and self-enforce their behavior.

SPEED MANAGEMENT

Traffic calming is entwined with “speed management,” the goal of reducing speeds and designing context-sensitive streets. Relevant definitions are noted below:

- + **Speeding:** breaking the law by driving above a street’s posted speed limit.
- + **Posted Speed:** the speed limit or maximum lawful speed for a street. Speed limits can be statutory, applying to all streets of a given class (i.e., 25 MPH for residential roads) even if a regulatory sign is not available.
- + **Operating Speed:** how fast most drivers actually drive on the street. 85th percentile speed is the speed at which 85% of vehicles travel in free-flow conditions. Operating speed may be higher or lower than posted speed, and is influenced by the design features or context of a street.
- + **Design Speed:** the maximum speed that vehicles could operate given the context and the geometric design of the street. Engineers use designated design speed in the geometric design processes, particularly for highway settings. Design speed has historically been set higher than posted speed, even in urban contexts.
- + **Target Speed:** the maximum speed vehicles should ideally operate given the street’s context.

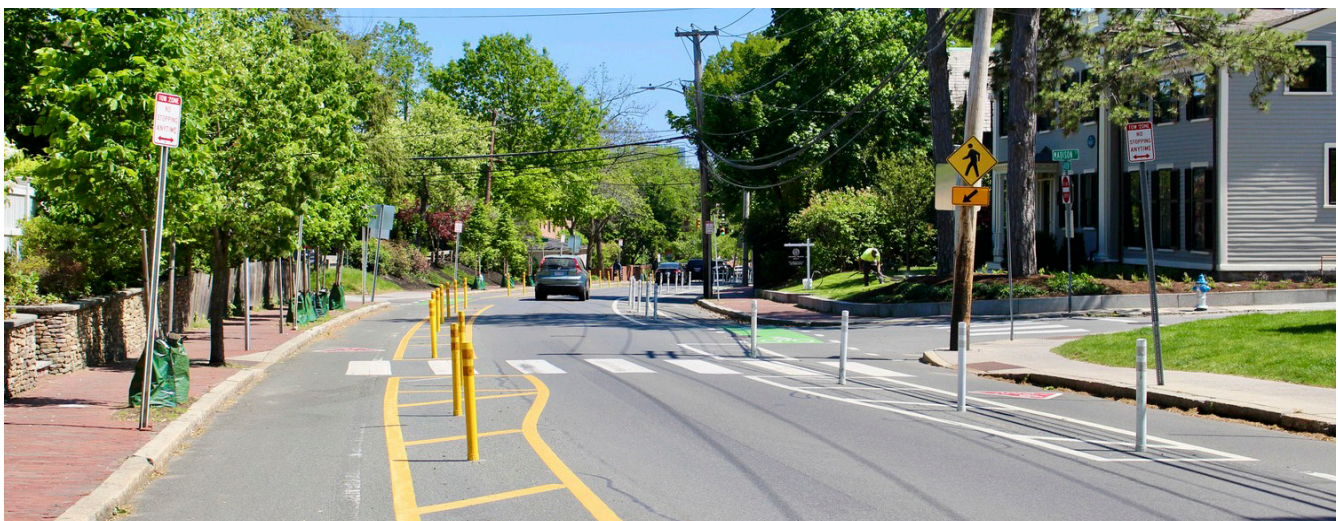


Any disconnect between these concepts leads to safety issues—design and posted speeds contribute to operating speed, though design tends to be most influential.

Consider a residential street designed for vehicles moving at 45 MPH: it feels odd to drive along its swooping curves and wide travel lanes at the posted 25 MPH. With traffic calming, the design speed is adjusted to match the target speed through (mostly) physical measures that change the geometry of the street and make speeding feel uncomfortable; drivers self-enforce their operating speed to the target speed.

This process of identifying a safe target speed given the context and implementing measures to bring the operating speed to match it is **speed management**.

Primary strategies include traffic calming measures and enforcement strategies. Noting that traffic enforcement can be costly, the self-enforcing nature of traffic calming reduces the need (and associated costs) for law enforcement and allows local police officers to tend to other public safety needs.



Traffic Calming in Cambridge, MA

GATEWAYS, TRANSITIONS

The WestCOG region has a diversity of contexts from dense urban cores to more rural and agricultural areas, as well as many small towns. Transitions between these contexts result in safety concerns, as drivers are expected to significantly reduce speeds and change behavior when entering more populous areas.

Transition Zones are where drivers gradually lower their speed as the surrounding environment and roadway infrastructure transition from higher-speed and often less dense contexts to lower-speed town or community settings.

To effectively communicate the change and to slow vehicle speeds appropriately, transition zones begin with a mix of warning signs and pavement treatments well in advance of the change in environment to prepare drivers to decelerate (the *approach zone*). As drivers enter the new context, traffic calming and gateway treatments physically reduce the comfortable operating speed (the *transition zone*) and alert drivers to a change in character (the *gateway zone*).

These zones are a critical traffic calming priority as many arterials double as a community's Main Street as they pass through small towns and villages. In these areas, the design of the street may shift to accommodate pedestrian and bicycle facilities, on-street parking, and other streetscaping; the speed of traffic must be reduced to ensure safety for all users.

Gateway treatments, installed at the entrance to the new environment, visually define the new space and local identity. Gateway treatments include physical or geometric landmarks that indicate a change in environment, often from a higher speed roadway to a lower speed residential or commercial district.

As one example, roundabouts are a common practice for slowing vehicle speeds while maintaining throughput, and can provide an opportunity to integrate placemaking, planting, and signage to visually welcome people to the new context.

UNDERSTANDING THE ZONES

Transition zones and gateways feature three "zones", as illustrated by the example from Engelskirchen, Germany, below.

APPROACH ZONE



In the **APPROACH ZONE**, devices warn drivers to the upcoming area (e.g., speed limit signs or variable message boards)



On a 50 MPH rural road, signs for the town and posted speeds begin to appear alongside median treatments

TRANSITION ZONE



In the **TRANSITION ZONE**, traffic calming such as lane reductions and medians physically reduce operating speeds



Approaching the town, the median and sidepath become a striped median, then narrow lanes with chicanes.

GATEWAY ZONE



At the **GATEWAY** to the new context, traffic calming cues drivers to a new operating speed and may be paired with posted speed limit signs



In town, traffic calming, textured pavement, and multimodal designs help the street feel dense with pedestrian activity taking priority over vehicle speed

PROJECT PURPOSE

Developing Complete Streets and traffic calming guidance for WestCOG requires a shared understanding of the successes and challenges of the current state of practice. In order to implement traffic calming strategies in WestCOG municipalities, best practices were thoroughly researched nationally and regionally to help shape local recommendations.

Grounded in the principles of context-sensitive design, the Toolbox emphasizes that the selection and application of traffic calming measures responds to the unique character and functional role of each street and WestCOG municipality. It supports the expansion and connection of the WestCOG region's active transportation network by prioritizing safe, multimodal access to key destinations such as schools.

The Toolbox also highlights the importance of well-designed transition zones that communicate shifts in roadway context and reduce speed. It explores opportunities for shared spaces that balance mobility and placemaking, creating people-oriented environments where walking, bicycling, and social activity can co-exist.

Finally, the Toolbox encourages a systemic solutions approach rather than spot treatments in a reactive way, focusing on identifying and addressing risk factors, bundling improvements when possible, and advancing proactive, data-driven strategies for implementation.



Traffic Calming along a Bicycle Boulevard

RESEARCH PROCESS

The research process involved three phases to gather an understanding of the local context, to identify best practices, and to apply these precepts to the WestCOG context in order to create a practical Toolbox.

- + REGIONAL STATUS QUO:** The project team conducted a preliminary review of local guidance and plans used in the WestCOG region. These documents reflect and respond to a range of contexts and helped to identify shared concerns and opportunities related to improving traffic safety.
- + FOCUS GROUPS:** The team hosted two focus groups to engage the local emergency services and responder community, as well as other transportation providers and operators. These discussions helped surface insights incorporated into the Toolbox, such as specific operational needs.
- + BEST PRACTICES REVIEW:** The project team

conducted a review of best practices and case studies from around the world that informs concepts and designs suitable for WestCOG streets.

- + OTHER PROJECT ACTIVITIES:** Each step of the research process was supported and reviewed by the Project Advisory Committee (PAC), a group of municipal leaders and technical experts representing WestCOG communities who generously shared their time and insights to this project. Additional engagement for this project included presentations to the WestCOG Transportation Technical Advisory Group (TAG) and a public workshop hosted in December 2025.

REGIONAL EFFORTS AND PRIORITIES

The Complete Streets initiatives and improvements in this Toolbox equip all member municipalities with practical guidance on continuing and expanding local efforts. To understand the current context, key themes and strategies from regional and local plans, studies, and priorities are summarized below.

A preliminary gap analysis revealed opportunities for WestCOG and its member municipalities to build greater consistency and depth in applying Complete Streets and traffic calming principles across the region. The analysis underscores the importance of adopting context-sensitive, evidence-based design approaches; requiring pedestrian facilities as the default in new developments and roadway projects; and supporting funding mechanisms such as payment-in-lieu-of-sidewalks (PILOS) programs to close network gaps.

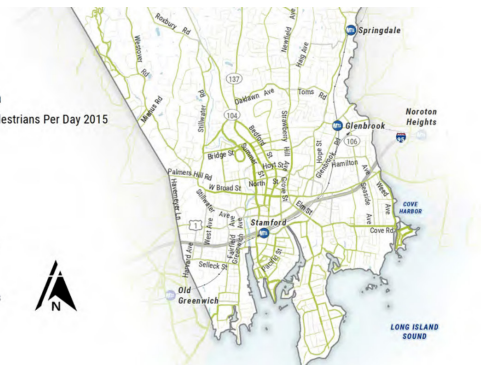
It also highlights opportunities to realign intersections to 90-degree angles, establish preferred rather than minimum facility widths, and develop a regional project prioritization framework to promote data-driven and transparent decision-making.

Additional priorities include integrating national best practices and design guides, advancing access management and right-sized parking strategies, and updating local codes to better support shared street concepts and emerging micromobility technologies.

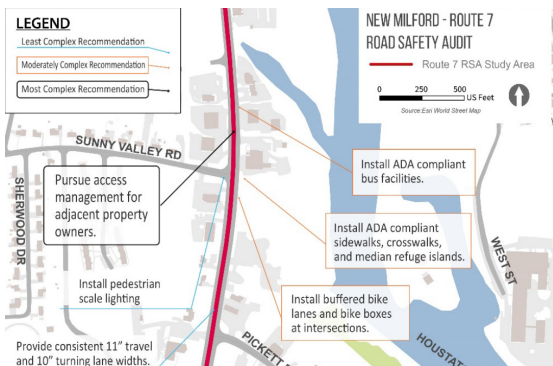
Together, these recommendations position this Toolbox as a practical resource to help WestCOG municipalities design safer, more connected, and contextually appropriate streets.



Norwalk developed a series of roundabout concepts for complicated intersections in the City, such as the intersection of South Main Street, Wilson Avenue, Meadow Street, and Meadow Street Extension. (source: City of Norwalk)



The Stamford Bicycle and Pedestrian Plan included a pedestrian activity analysis using Strava data to identify where people are tracking walking and running activity. (source: City of Stamford)



New Milford's Route 7 Road Safety Audit assessed a primary community corridor to identify traffic calming measures to reduce speed and improve safety. (source: Town of New Milford)



The Glenville Corridor Traffic Improvements Project in Greenwich, CT includes lane realignment, signal upgrades, reduced corner radii, and bicycle and pedestrian facilities. (source: Town of Greenwich)

REGIONAL STATUS QUO: KEY THEMES

ADVANCING TRAFFIC CALMING AND COMPLETE STREETS



ADVANCING TRAFFIC CALMING AND COMPLETE STREETS

The need for traffic calming is a consistent theme across many municipal plans and regulations, with several communities identifying corridors where excessive speeds or traffic volumes could be mitigated through targeted interventions.

Municipal efforts vary. Some municipalities, such as Stamford, have established toolkits and design guides that outline traffic calming treatments. Others have organized advisory committees focused on neighborhood safety and street design.

Common priorities include addressing cut-through traffic and speeding on residential streets, integrating traffic calming into maintenance or resurfacing projects, and pairing physical design measures with education and enforcement initiatives.

Collectively, these efforts demonstrate growing regional momentum toward safer, context-sensitive, and community-driven approaches to managing vehicle speeds and enhancing multimodal safety.



REALIGNING INTERSECTIONS

Many municipalities in the WestCOG region are exploring intersection realignment strategies to enhance safety and reduce vehicle speeds by introducing more deliberate, 90-degree turning movements. Existing intersections with large curb radii often encourage higher-speed turns and increase pedestrian exposure to conflicts, whereas right-angle designs compel drivers to slow down, improve visibility, and shorten crossing distances.

Municipalities such as New Canaan, New Milford, Norwalk, Redding, Ridgefield, Brookfield, Wilton, and Stamford recommend realigning intersections to achieve these benefits. In addition to geometric adjustments, several municipalities are implementing or planning roundabouts to simplify complex intersections, reduce conflict points, and maintain efficient traffic flow.

Complementary measures further support safer, more context-sensitive intersection design. This may include curb extensions, signalization, gateway treatments, and daylighting. Daylighting refers to the use of paint and flex posts (or similar) to restrict parking too close to an intersection. Daylighting does not remove parking spaces, but rather physically delineates where it is illegal to park. This reduces blind spots, improves visibility for drivers and people walking and biking, and can also reduce speed for turning vehicles.



EXPANDING BICYCLE AND PEDESTRIAN INFRASTRUCTURE

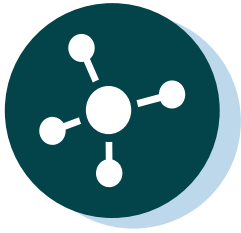
Improving connectivity for people walking, biking, and rolling is a shared priority across all municipalities, though approaches vary based on community context.

Many are working to close gaps in sidewalk networks through zoning and subdivision requirements, with several providing detailed design guidance and specifications, including Bethel, Brookfield, Stamford, Sherman, and Darien.

Data-driven analyses, including Bicycle Level of Service (BLOS) studies and sidewalk inventories, are increasingly being used in municipalities like Weston, Westport, and New Fairfield to identify priorities and guide investments.

Larger municipalities, such as Stamford and Norwalk, have developed dedicated bicycle and pedestrian plans to establish long-term visions and performance measures, while others such as Danbury, New Canaan, and New Milford recommend developing similar plans or corridor-specific strategies.

Even in smaller or more rural towns, there is growing interest in enhancing walkability and expanding trail networks, with municipalities such as Bridgewater, Wilton, Brookfield, and New Milford emphasizing improved connections between local destinations and off-road facilities.



PROMOTING ACCESS MANAGEMENT

Access management is a consistent safety and design priority across urban, suburban, and rural communities, as frequent driveways and curb cuts create conflicts for pedestrians, bicyclists, and motorists alike. Municipalities are working to consolidate access points, enhance visibility, and promote internal site circulation to reduce conflict and improve safety for all users.

Strategies include updating driveway siting and review processes (as seen in Westport and Danbury); adopting goals to reduce curb cuts through shared access and revised site design requirements (as seen in Greenwich and Redding); and creating targeted access management zoning or overlay districts (as seen in New Milford's Route 7 and Route 202 Access Management Overlay Zone).

Other examples include Brookfield's design guidelines for service road connectivity, and Ridgefield's and Newtown's curb cut and access management plans, all of which aim to balance access needs with the creation of safer, more predictable travel environments.



IMPROVING PARKING MANAGEMENT

Many municipalities in the WestCOG region are advancing parking management strategies aimed at reducing excessive parking supply and supporting more efficient, multimodal, and economically vibrant downtowns. Common approaches include lowering parking minimums in higher-density or commercial areas (as seen in Darien and Bethel) and encouraging shared or off-site parking arrangements (as implemented in Brookfield and Greenwich).

Several communities are also exploring fee-in-lieu programs (such as in New Canaan and Ridgefield) that allow developers to contribute to centralized parking solutions rather than providing on-site spaces. Other innovations include digital tools and apps that inform motorists about parking availability and location (proposed in Bethel and Greenwich) which could enable demand-responsive pricing and reduce congestion from drivers searching for a parking space.

Collectively, these strategies reflect a regional shift toward more flexible, context-sensitive parking policies that align with Complete Streets and land use goals.

REGIONAL RESOURCES

Examples and resources from local traffic calming and Complete Streets projects are referenced throughout the Toolbox.

The full Regional Status Quo memorandum is available online the [WestCOG website](#).

For links to online guidance and materials, please visit Section 4 (Resources).

FOCUS GROUPS: KEY THEMES

The project team conducted two focus groups in 2025 (one in-person event that took place in April 2025 in Wilton, CT, and one virtual focus group meeting conducted in June 2025). The focus groups served to provide an opportunity to listen and learn from members of the local emergency services, transportation, safety, and operations community.

Across both sessions, participants emphasized the importance of balancing safety improvements with emergency response needs, recognizing the constraints of historic roadway networks, and aligning transportation strategies with broader land use, development, and multimodal goals.

The focus groups brought together 15 experts representing ten WestCOG municipalities. The attendees of these events brought unique expertise and perspectives to these discussions, with representation from the following: Departments of Human Services, Fire Departments, Emergency Management Offices, Police Departments, Public School Districts, Public Works Departments, Transit Agencies, and Transportation Departments.



A Focus Group discusses the Traffic Calming and Complete Streets Toolbox and associated strategies in April 2025 in Wilton, CT.

Participants identified the following key themes:

- + Congestion and road impact challenges due to popular tools such as Waze rerouting through traffic onto local roadways.
- + Increased traffic, speeding, and safety issues in general on local roadways.
- + Specific constraints with existing or historic networks due to limited available right-of-way, historic textures or surrounding elements that require context-sensitive interventions.
- + Conversely, historic streets and narrow rural roadways are examples of informal or natural traffic calming that exist across the region today.
- + Emphasis on supporting housing development measures with emergency access.
- + Vertical deflection measures with a preference for raised crosswalks, noting that these are more cost-effective and have less impact on emergency response than other vertical measures.
- + A preference for adaptive, context-sensitive design strategies that balance safety and emergency access, including speed cushions, raised crosswalks, mountable curbs, and horizontal deflection treatments where appropriate.
- + Recognition that while some traffic calming measures may introduce minor response time impacts, they are generally outweighed by documented safety benefits, including reductions in crash frequency and severity. Emphasis was placed on the need to coordinate potential tools/measures with new development and redevelopment projects.
- + Support for education and automated enforcement tools such as school zone camera programs, public campaigns, and awareness efforts.

TRAFFIC CALMING AND EMERGENCY RESPONSE

In the emergency response and public safety community, response time is critical. A common concern for traffic calming projects is the potential to inflict delay on emergency vehicles as they travel to a scene or transport to a hospital. Many first responders report that the benefits of reducing unsafe driving behaviors, fewer crashes (typically in the realm of 25 -35% fewer crashes), and the reduced severity of crashes that do occur outweighs the potential 15-30 seconds of delay that may occur in traffic calmed corridors.

To minimize impacts on response time and ensure emergency responders are equipped to support the community, traffic calming and Complete Streets projects can consider the following strategies:

- + Engage emergency response personnel throughout the design process, including demonstration events or pilot installations to test how vehicles operate with new designs.
- + Adapt traffic calming measures to accommodate large emergency vehicles. Examples include mountable curbs and speed cushions that are spaced to allow for easy throughput of emergency vehicles.

RELEVANT EXAMPLES



An emergency vehicle demonstrates how to around a mini-roundabout in Denver, CO



An emergency vehicle uses the mountable curb of a roundabout in Towson, MD



A car driving over a speed cushion illustrates the placement of wheel gaps in Washington, D.C.



Textured truck apron in St. Albans, VT





HOW TO USE THIS TOOLBOX

The Toolbox provides guidance on the selection, siting, and design considerations that should be weighed when evaluating traffic calming and Complete Streets measures for use on streets in the WestCOG region.

The following section provides a high-level overview of the types of measures and approaches that help to define different measures based on what they are and how they work.

Hyperlinks are included throughout this document to provide access to additional information and resources. Because websites may change over time, some links may become inactive or obsolete.

To help users locate original source materials, full references and spelled-out URLs are provided in [Chapter 4](#).

UNDERSTANDING THE TOOLBOX

The Traffic Calming and Complete Streets Best Practices Toolbox categorizes the 'tools' into two groups: Things you can do to a street, and things you can do beyond a street.

THINGS YOU CAN DO TO A STREET

Things you can do to a street refers to physical 'on-the-ground' changes to the street itself to reduce speeds, improve safety, and increase access.

Examples of measures in this group include lane changes and reconfigurations, curb changes, vertical and horizontal shifts to the travel path, and other self-enforcing geometric changes that reshape the design of the roadway to encourage safer driving behavior and create comfortable spaces for walking, biking, rolling, and transit.

In addition, typical traffic control devices such as speed enforcement and feedback signs, speed limit pavement markings, and automated enforcement are discussed as potential tools for municipalities to incorporate in their traffic calming efforts.

Through design, rethinking the use of the right-of-way, and incorporating elements that help define the area as an attractive space for people to use, the '*things you can do to a street*' can help support community priorities such as mode shift, placemaking, and economic vitality.



Curb extensions involve physically installing a measure within the right-of-way: these are a "thing you can do to the street"

THINGS YOU CAN DO BEYOND A STREET

Things you can do beyond a street refers to the tools, strategies, decisions that influence safety and traffic calming beyond the actual design of the street. These measures shape how the street network is used, managed, programmed, and understood.

For example, Complete Streets Policies and design guidance can give practitioners a set of standards and requirements to consider in each relevant project. Transit-Oriented Development overlay districts can encourage co-locating housing, businesses, and services adjacent to transit hubs. By linking transportation access and land use, communities in the WestCOG region can support walkable communities and lifestyles, and encourage growth without increasing the demand on the roadway network capacity. As a final example, Safe Routes to School programs can serve as campaigns and focus areas to target traffic calming and safety improvements to school zones as a key safety priority areas.

The '*things you can do beyond a street*' focuses on the surrounding environment and changing the context to shape safer travel patterns and behavior.



Safe Routes to School initiatives can support education and awareness of safe behaviors, but do not change the street design

THINGS YOU CAN DO TO A STREET

SPEED MANAGEMENT

Things you can do to a street focus on speed management: **Measures, devices, or strategies to reduce traffic speeds to a desirable level.**

There are two categories of tools within speed management: **Traffic Calming** and **Traffic Control Devices**.

TRAFFIC CALMING

Context-sensitive, self-enforcing measures to improve conditions for all modes and street users, improve the safety of drivers and driver behavior, and reduce speeds to a desirable speed. Measures are organized around **special street types, periodic measures, cross-section measures,** and **gateway treatments**. Within these categories are different types of treatments based on the way that they effectively reduce vehicle speeds, such as vertical or horizontal deflection.

Special Street: measures that alter the surface of the street in such a way that the street operates or functions differently than other streets,:

- + Shared spaces and curbless streets
- + Yield streets

Periodic: measures that are placed intermittently to reduce speeds:

- + Vertical deflection: Speed humps, cushions, and tables, raised crosswalks, and raised intersections
- + Horizontal deflection: Chicanes, neighborhood traffic circles or mini-roundabouts, modern roundabouts, and median islands

Cross-section: measures that are installed continuously such that they are part of the street cross-section:

- + Horizontal deflection: Curb extensions
- + Street width reduction: Lane reconfigurations or lane narrowing
- + Routing restriction: Diagonal diverters, closures, median barriers and forced turn islands

Gateway: physical or geometric landmarks that indicate a change in environment from a higher speed roadway to a lower speed residential or commercial district.

TRAFFIC CONTROL DEVICES

Signs, signals, and markings as included in the Manual on Uniform Traffic Control Devices (MUTCD). Traffic control devices may be featured in traffic calming measures, but are not inherently traffic calming. Examples include:

- + Reducing posted speed limits
- + Automated speed enforcement
- + Speed feedback signs
- + Gateway signs

THINGS YOU CAN DO BEYOND A STREET

Things you can do beyond a street focus on the surrounding context and the factors that influence how people use and interact with the street. **Measures, devices, or strategies serve to support livability and increase the availability and convenience of multimodal options.** There are two categories of tools: **Softening the Street** and **Programs, Planning, and Policies.**

SOFTENING THE STREET

Design treatments and measures to enhance the physical environment to be welcoming, pedestrian-scale, and comfortable for all users. Measures focus on tactile and visual changes to the street area, especially considering the features and amenities that make the space feel like an attractive and inviting public space more than a thoroughfare. Measures are organized based on their approach and impact: surface changes and enclosure effects.

Surface Changes: measures that involve changing the paving material or design of the street in a way that support traffic calming and placemaking objectives.:

- + Textured Surface Paving

Enclosure Effects: measures that help to craft a sense of space and an enclosure. These both enhance the perceived safety and comfort of the street for pedestrians, and can visually narrow the street for drivers in support of traffic calming goals.

- + Tree coverage
- + Pedestrian scale lighting

PROGRAMS, PLANNING, AND POLICIES

Initiatives, programs, and approaches to planning communities that support traffic calming and Complete Streets even if they do not directly influence or intersect with the design of the right-of-way. These include initiatives that prioritize multimodal networks, walkable communities, safe access to community destinations such as schools and transit hubs, and strategies to reduce demand for single vehicle trips and parking:

Site Planning and Policies: measures that can have direct influence on the built environment, such as zoning regulations, special districts and overlays, and guidelines that govern site planning or network strategies and access management plans that influence the future street network and connections.

- + Zoning regulations and streetscape guidelines
- + Special districts and improvement programs
- + Access and network management

Programs: safety, Complete Streets, and traffic calming-related programs that support the goals of these priorities without directly impacting the design or function of streets. This includes safety education programs to encourage safe behavior, demand management strategies to reduce car dependency, and incorporating stormwater management into public projects.

- + Safety education programs
- + Multimodal Programs
- + Stormwater Management

TOOLBOX CONSIDERATIONS

This section summarizes the many considerations to evaluate when identifying and selecting potential measures, as well as details to support concept development and design.

CONTEXT CONSIDERATIONS

The region comprises a spectrum of development patterns, density, and roadway networks. Tools may be more or less suitable based on the surrounding context. For the toolbox, context refers to the following broad categories, based primarily on the land use contexts and definitions established by the CTDOT Bicycle Facility Selection Guide.

The CTDOT Bicycle Facility Selection Guide organizes contexts into two groups: **Community centers** and **Lower-density residential areas**. For this Toolbox, the added context of **“Transition Zone”** is included as a distinct and important site for traffic calming measures.

Downtown/Commercial Business District: High density downtown cores, often with gridded street networks, continuous sidewalks, and multimodal systems. Pedestrian and bicyclist activity is high, and transit services and major hubs are common. Parking is typically metered or time-restricted, or in garages.

Urban: High-density mixed-use areas with high levels of pedestrian, bicyclist, and transit activity. Streets typically have sidewalks and on-street parking.

Suburban Town Center: “Main Streets” that serve as active community centers with a mix of land uses, often in towns and small cities. Commercial uses are typically grouped together and setback from the street. Sidewalks are typically present.

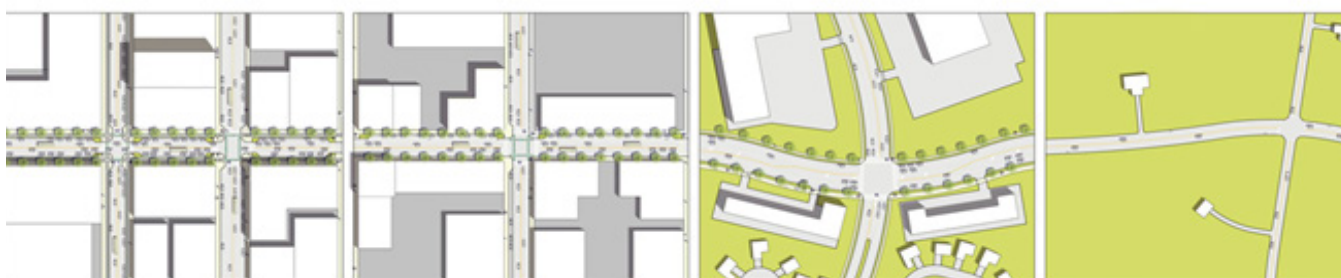
Rural Town Center: Commercial areas in more rural contexts. These areas feature low density and a mix of land uses, and pedestrian and bicyclist facilities are not necessarily available or consistent.

Transition Zone: Area between a lower density area and a community center, where drivers should be alerted to the changing context, prepare to operate at slower speeds, and be attentive to people walking, biking, or rolling.

Suburban Residential: Low to moderate density residential areas with occasional commercial uses. Located on the fringes of urban contexts, these areas may have transit service, and pedestrian and bicyclist activity is higher than in rural areas.

Rural Residential: Quiet, residential, low-density areas with occasional commercial uses. Buildings may not be visible from the street, and pedestrian and bicycle activity may not have dedicated facilities.

Rural: Largely undeveloped areas where low volumes of vehicles can lead to excessive speed.



Example of an Urban/Downtown/Commercial Business District-to-Rural Transect - Context and Treatments

TEMPORARY, QUICK-BUILD, AND PERMANENT PROJECTS

By pairing tactical projects with long-term capital improvements, municipalities can address immediate safety concerns, evaluate effectiveness, and build durable, system-wide improvements over time.

Short-term or “quick-build” treatments are low-cost, adaptable measures that allow municipalities to rapidly test concepts, demonstrate benefits, and engage communities in the design process. These can include demonstration projects, which are designed to be

removed after a short period (e.g., a month), and quick-build projects, which are designed to be more durable but expected to be updated as needed.

Long-term or capital projects translate proven concepts into permanent infrastructure through coordinated planning, funding, and engineering. These projects are designed to last long-term (e.g., 5+ years) and materials cannot be changed or updated easily once installed.

QUICK BUILD PROJECTS

Quick-builds are low-cost, temporary strategies to improve streets. These typically take the form of an improvement project that can be rapidly implemented and iteratively tested, bridging the gap between pop-ups or demonstration projects and a permanent installation that requires capital investment.

Demonstration projects are a proof of concept that are installed temporarily. Pilot projects are longer-term installations that can be reoriented based on feedback and conditions. Projects should have clear and measurable success conditions (e.g., slower vehicle speeds). If the project is successful, it may be converted into a semi-permanent interim design until capital funding is secured for permanent installation.

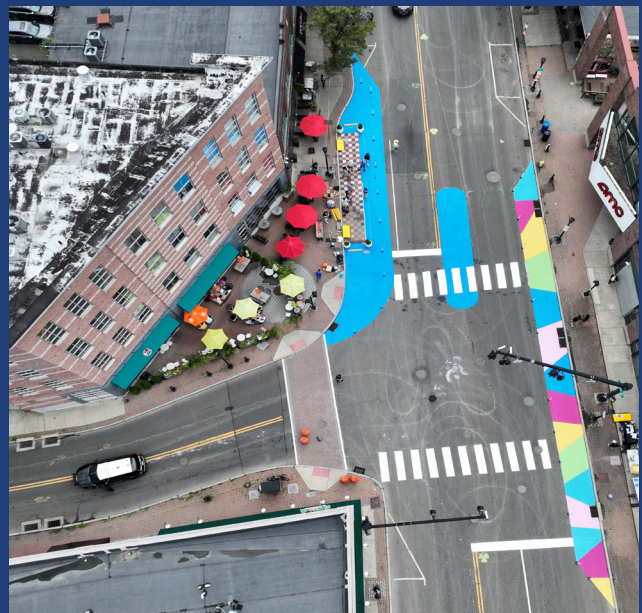
Common quick build designs and projects: Materials typically include paint, traffic cones/barrels, flex posts, movable barriers, parking/curb stops, planters, movable ramps, and signage. Common quick build projects include curb extensions, mini-roundabouts, daylighting, pedestrian refuge islands, crosswalks, speed humps, parklets, bike lanes, and murals.



How to Get Started: Municipalities interested in a quick build project should consider the following steps:

1. Identify a need for a quick build project and determine potential suitable measures
2. Contact your regional partner and the CTDOT Bicycle and Pedestrian Coordinator for support
3. Establish permit and design needs, including project dates and success conditions
4. Develop concepts and project design and submit to CTDOT for approval

Resources: Projects should conform to the Connecticut Complete Streets Controlling Design Criteria, an engineering and construction directive intended to provide safe and continuous facilities to people walking, biking, and using transit ([CTDOT Complete Streets Quick-Build Directive](#)).



Example of a Demonstration Project in Norwalk, CT in 2024. Temporary traffic calming measures included painted curb extensions and a median island, as well as a parklet. (Source for both images: City of Norwalk)

PROJECT PRIORITIZATION

Project prioritization can take many forms. Safety action plans prioritize addressing high crash and risk locations while active transportation planning might prioritize off-road network connectivity or access to schools or other places that experience high pedestrian volumes. There is no one way to select project sequence, but identifying goals (safety, connectivity, access, and so on) and tying repeatable, publicly available metrics to those goals is a good place to start.

High Injury/High-risk networks refer to roads where a high number of serious injury or fatal crashes have taken place and where interventions could address a majority of the most serious incidents. Once identified, systemic safety interventions are typically piloted along these networks before being implemented elsewhere.

Crash Modification Factors (CMF) is a number that quantifies the expected safety benefits of installing a measure by estimating how many crashes are expected post-installation. A CMF with a value of 1.0 means no effect on expected crashes, but below 1.0 suggests a reduction in crashes (e.g., a speed hump on a local road has a CMF of 0.60, suggesting a 40 percent reduction in crashes). The FHWA maintains a database of CMF values, available online ([Crash Modification Factors Clearinghouse](#)). CMF can be helpful to understand the significance of an intervention and the potential safety benefits realized through its installation.

Evaluating streets for 'right-sizing' tools such as lane reconfigurations or narrowing should prioritize where the right-of-way offers more capacity than needed. For example, 12-foot lanes in a Village District can be narrowed to allow for other modal facilities; in an area with low traffic volumes, a multi-lane two-way road can become one lane in each direction with limited impacts to congestion and often maintaining the same level of service. Evaluation criteria should consider traffic volumes, surrounding context, and the safety priorities of the area.

Project Cost refers to a high-level estimation of the level of effort and investment required to successfully install the measure. Some measures have quick-build options and can be deployed as demonstration projects or pilots at a significantly reduced cost. Project cost can be very influential in prioritizing projects, especially when identifying projects that are eligible for certain funding opportunities or grants. Municipalities may also prioritize lower-cost projects to allow for more widespread safety improvement projects (i.e., rather than large and costly capital projects in individual areas). The Toolbox icons refer to the broad estimates of project costs:

-  < \$10,000
-  \$10,000 - <\$25,000
-  >\$25,000

Community Points of Interest Many municipalities prioritize traffic calming measures proximate to schools, parks, and senior access areas in order to slow speeds in areas with a high concentration of vulnerable road users. When evaluating the candidacy of a given street or neighborhood, nearby community points of interest should be a key consideration.

PROJECT DELIVERY CONSIDERATIONS

In order for a traffic calming or Complete Streets project to move forward, the municipality or agency leading the project must receive Concept Approval. The CTDOT Office of State Traffic Administration (OSTA) is responsible for projects on State-owned roadways; projects on locally-owned roadways must be approved by the Local Traffic Authority (LTA). These entities will also review the analyses and design plans as the project progresses towards implementation. There are many processes, permits, and other considerations that may apply based on the project context and scope. The tables below outline project delivery guidance and permitting processes specific to roadway ownership and the source of funding.

PERMITTING

Permit	Issuing Authority	Applies When...	Local	State	Federal	Notes
CTDOT Encroachment Permit	CTDOT	Project touches state highway or ROW	—	●	●	Required regardless of funding if state ROW is affected
CTDOT Utility Permit / Agreement	CTDOT	Utilities in state ROW	—	○	○	Often bundled with encroachment permit
Municipal Road Opening / Excavation Permit	Municipality	Work in municipal ROW	●	●	●	Required even if CTDOT is involved
Traffic Control Plan Approval (MUTCD)	CTDOT / Municipality	Any work affecting traffic	●	●	●	MUTCD applies to all public roads
Municipal Building Permit	Municipality	Sidewalks, walls, drainage, structures	○	○	○	Varies by town and scope
Local Zoning / Site Plan Approval	Planning and Zoning	When local code applies	○	○	○	Some towns exempt public ROW projects
Wetlands / Watercourse Permit	Local Wetlands Commission/DEEP	Wetland or watercourse impacts	○	○	○	Ownership/funding does not matter
DEEP Environmental Permits	CT DEEP	Floodplain, stormwater, species impacts	○	○	○	Triggered by resource impacts
CEPA Environmental Review	State (CTDOT or sponsor)	Project is a "state action"	—	●	●	Often required for LOTCIP and state-sponsored projects
NEPA Environmental Review	FHWA (via CTDOT)	Federally funded project	—	—	●	TAP, STBG, HSIP, SS4A, etc.
Section 106 (Historic Review)	SHPO / FHWA	Federal undertaking	—	—	●	Runs in parallel with NEPA
ROW / Easement Acquisition	Municipality/State	New ROW or easements needed	○	○	○	Must be complete before construction

● = Required, ○ = Conditional / sometimes required, — = Not applicable

DESIGN GUIDANCE

Design Guidance	Local	State	Federal	Notes
CTDOT Highway Design Manual (HDM)	●	★	★	Primary geometric design reference for state & state-administered projects
CTDOT Standard Specs (Form 819)	●	★	★	Required for construction on state & state-funded projects
MUTCD (Federal)	★	★	★	Required on all public roads, regardless of funding
AASHTO Green Book	●	★	★	Used in conjunction with HDM; flexibility required where conflicts exist
AASHTO Bike Guide	●	●	●	Often subordinate to CTDOT unless explicitly incorporated
NACTO Urban Street Design Guide	●	●	●	Allowed as supplemental guidance, especially for urban streets
NACTO City Limits (Speed Setting)	●	●	●	Consistent with MUTCD 11th Ed. and Safe System
NACTO Bikeway Design Guide	●	●	●	Commonly accepted with engineering judgment
ITE Recommended Practices	●	●	●	Used to supplement geometric & operational decisions
FHWA Proven Safety Countermeasures	●	★	★	Strongly encouraged for state & federal projects
FHWA Safe System / Vision Zero Guidance	●	●	★	Federal-aid projects expected to align
PROWAG / ADA Standards	★	★	★	Required for pedestrian facilities on all projects
Local Public Improvement Standards	★	●	●	Governing standard for purely local projects
Context-Sensitive Solutions (CSS)	●	●	●	Explicitly supported by CTDOT & FHWA
Design Exceptions / Deviations	●	●	●	Formal approval required for state & federal projects

★ = Required or primary reference, ● = Allowed/Commonly Used, ● = Allowed with justification

Additional design guidance documents, online resources, and other supportive materials are included as resources in Section 4 of the Toolbox.

TOOLBOX MEASURES

Traffic Calming Measures

Treatment Type		Measure	Reduce Speeds	Reduce Conflicts	Safer Crossings	Walkable Communities
Special Streets	Special Street Types	Shared Space	X			
		Curbless/Flush Street	X			
Periodic Measures	Vertical Deflection	Speed Hump, Table, or Cushion	X			
		Raised Crosswalk	X		X	
		Raised Intersection	X		X	
	Horizontal Deflection	Chicane	X			
		Lateral Shift	X			
		Median Island	X	X		X
		Roundabout	X	X		
		Mini-Roundabout	X	X		X
	Routing Network Changes	Diagonal Diverter		X		X
		Closures (Half/Full)		X		X
		Forced Turn Island	X	X		X
Cross-section Measures	Horizontal Deflection	Realigned Intersection	X	X	X	
	Street Width Reduction	Lane Reconfiguration	X	X	X	
		Lane Narrowing	X	X		
		Yield Streets	X			
		Curb Extension	X	X	X	X
		Low-speed Corner Radii	X			
	Pedestrian/Bicycle Facilities	Bicycle Lanes		X		X
		Advisory Bicycle Lanes				X
		Bicycle Boulevards	X	X		X
		Separated Bicycle Lanes		X		X

Traffic Control Devices

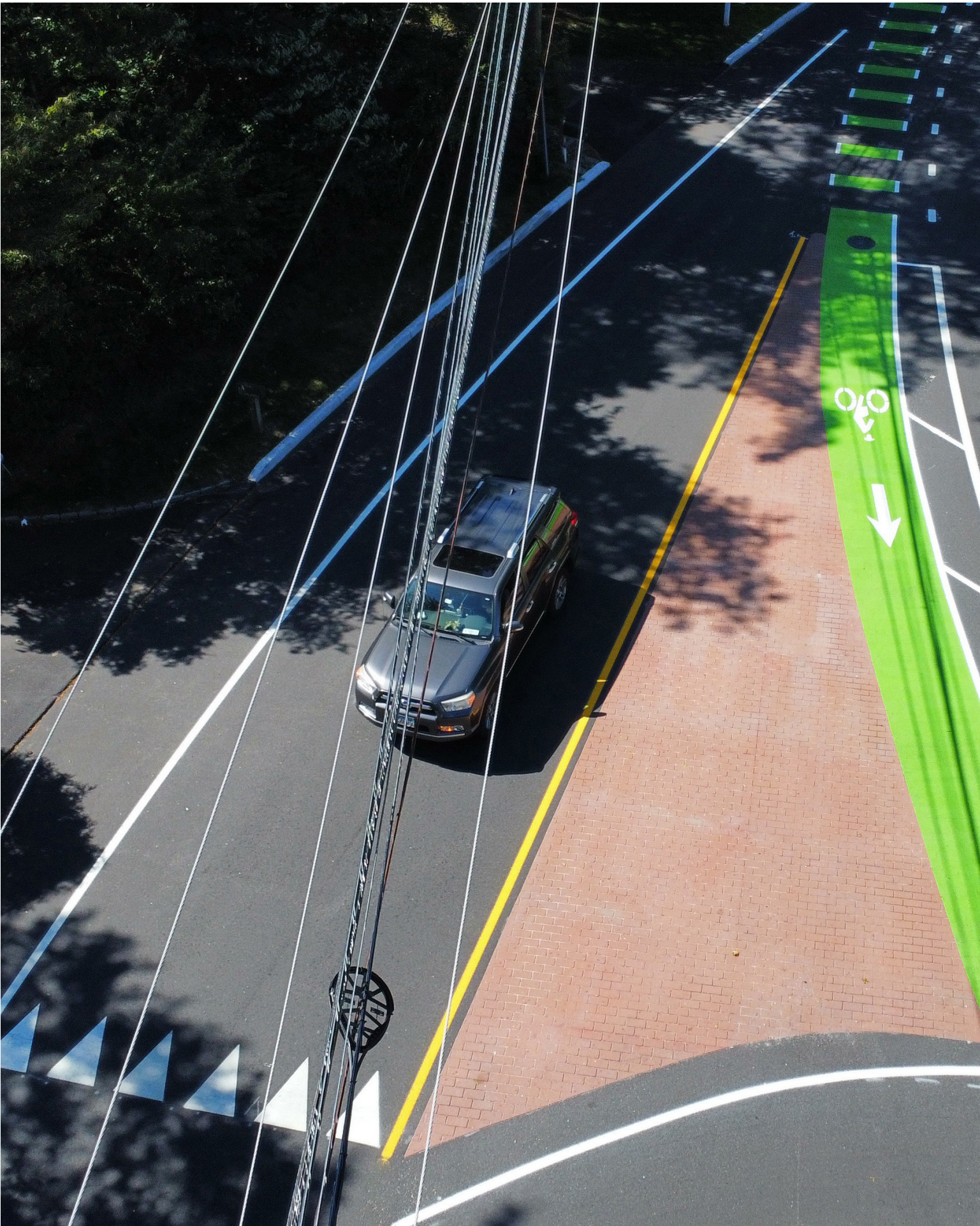
Treatment Type		Measure	Reduce Speeds	Reduce Conflicts	Safer Crossings	Walkable Communities
Periodic	Signs and Markings	Reduce the Posted Speed Limit	X			
		Speed Feedback Signs	X			
		Speed Limit Pavement Markings	X			
		Transverse Rumble Strips	X			
		Remove Lane Markings	X			
	Signals	Signal Coordination		X	X	
		Protected Turn Signal Phasing		X	X	
		Rectangular Rapid Flashing Beacon (RRFB)	X		X	
	Enforcement	Automated Speed Enforcement	X			

Softening the Street

Treatment Type		Measure				
Periodic and Cross-section	Surface Change	Textured Pavement	X			X
	Enclosure Effect	Tree Coverage	X			X
		Pedestrian Scale Lighting	X			X

Planning Programs and Policies

Treatment Type		Measure				
Site Planning and Policies	Adopt a Complete Streets Policy			X	X	X
	Zoning regulations and streetscape guidelines					X
	TOD and overlay districts					X
	Special districts and improvement programs				X	X
	Access management			X		X
	Networks and "A-Side" frontages					X
Programs	Safety education programs		X	X		X
	Safe Routes to School (SRTS) programs		X	X		X
	Transportation Demand Management (TDM)					X
	Neighborhood traffic calming requests		X	X		X
	Stormwater management					X



An aerial photograph of a paved road with yellow double lines and a white edge line. A large white number '3' is overlaid on the left side of the image. The road curves to the right, and there is a grassy area on the right side. The number '3' is positioned over the road's surface.

3

TRAFFIC CALMING AND COMPLETE STREETS TOOLBOX

The following section presents tools and concepts to equip WestCOG municipal leaders and partners with traffic calming and Complete Streets best practices and measures. Each measure included in this document supports the following goals. Many offer complementary impacts and safety benefits when installed together.

- ✚ Reduce vehicle speeds through self-enforcing designs and other measures=
- ✚ Support connectivity of pedestrian and bicycle networks with emphasis on access to key community destinations
- ✚ Reflect and enhance the community context
- ✚ Improve the safety of crossings to support visibility and increase rates of yielding to pedestrians
- ✚ Reduce the frequency and severity of crashes on roadways in the region

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SPECIAL STREET TYPES

- Shared Space
- Curbless and Flush Streets

SHARED SPACE

A Shared Space, also frequently referred to by the Dutch concept of a Woonerf, is a street on which all users share the right-of-way—people walking, biking, rolling, or driving travel at similar speeds and often negotiate movement through visual communication such as eye contact and hand signals. The surface of the street is a single, flush surface, expanding comfortable accessibility, especially for people traveling on foot and allowing the space to support placemaking and programming in a range of residential, commercial, and cultural contexts.

PURPOSE

Shared spaces reduce car throughput and speeds through traffic calming and design features, thus increasing safety and comfort for bicyclists and pedestrians.

DESCRIPTION

Shared space, sometimes referred to as shared streets, refers to a design concept in which the street surface is level and all users share the public right-of-way. With one level or flush surface, a shared space lacks the formal channelization of modes —i.e., curbs or physical, vertical delineation between spaces for walking, biking, driving, or parking. Shared streets use many traffic calming measures to reduce car throughput and speeds (i.e., to a walking pace), with an emphasis on gateway treatments to alert drivers to the new context, and horizontal treatments such as chicanes.

CRASH MODIFICATION FACTOR

CMF not available; Studies demonstrate a 20% crash reduction on residential streets converted to shared spaces and up to 50% when considering all shared spaces.

CATEGORY

Special Street Type
Highly accessible and slow facility

ESTIMATED COST



APPLICABLE LOCATIONS

- + Shared spaces are appropriate in Downtown/ Commercial Business District, Urban, and Town Center contexts where there are a lot of pedestrians, bicyclists, and other roadways users, with anticipated conflicts with motorists.

REFERENCES

[FHWA Accessible Shared Streets](#)

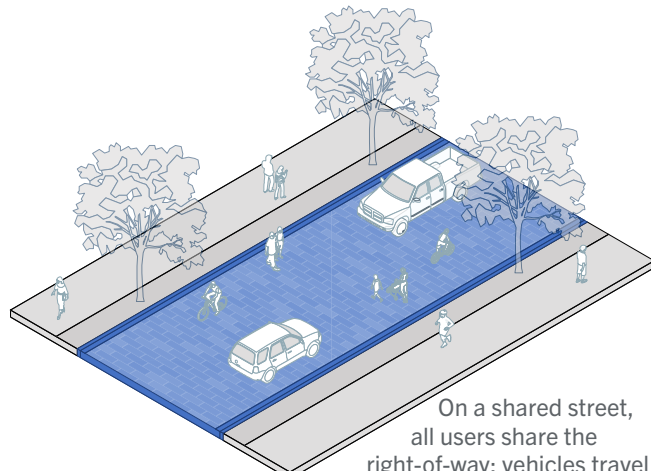
[NACTO Urban Street Design Guide](#)

[DVRPC Curbless Streets](#)

[Montgomery County Curbless and Shared Streets Design Guide](#)

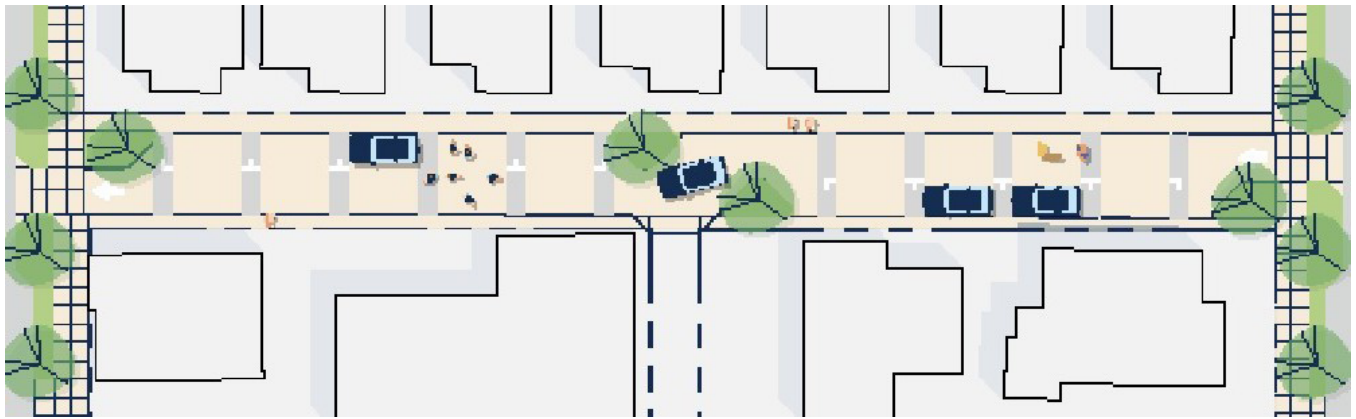
SAFETY BENEFITS

- + Reduces motorist speeds
- + Facilitates yielding to pedestrians and bicyclists
- + Discourages motor vehicle traffic
- + Curbless design improves accessibility and encourages cautious behavior by all users



CONSIDERATIONS

- + Vehicle speeds must be kept very low (i.e., walking speed) to ensure safety.
- + Generally inappropriate on streets with through travel.
- + Generally, streets with more than 100 vehicles per hour are inappropriate. Where necessary, volumes may be reduced through other traffic calming elements as part of the conversion of a street into a shared environment.
- + Emergency access and loading activities must also be considered.



GUIDANCE

- + Design must meet ADA standards, including detectable warnings at points where pedestrians should expect to interact with vehicles, and a clear, unobstructed pedestrian access route where no vehicles are allowed.
- + Shared street signage, pavement treatments, or other gateway designs should be used at entrances to a shared street to alert all users to the change in environment and expectations.
- + Maintain a clear path (also referred to as a Comfort Zone) where vehicles are discouraged and pedestrians can travel unobstructed.
- + Shared space is intended be used by people walking, biking, driving, alongside non-mobility uses such as gathering, sitting and dining, playing, or other gathering and event activities.
- + The design of the right-of-way lacks the formal and often vertical separation between mode spaces (i.e., sidewalks and bike lanes), and instead blurs this delineation so that all users share the space.
- + Traffic calming measures are included with a focus on gateways, paving treatments, and horizontal shifts; however, traffic control devices and signage are minimized as much as possible.
- + Shared streets can include trees and landscaping to capture stormwater runoff, as well as bioretention areas and changes in pavement material to allow additional capture of stormwater.



Proposal for a Shared Street concept



Shared Street provides walkable connections in Cambridge, MA

CURBLESS OR FLUSH STREET

A Curbless Street is defined by its lack of curbs: The street surface is level or flush. However, Curbless Streets can differ from shared spaces because users may remain channelized by mode with the dedicated lanes for vehicles and for space pedestrians that common on conventional streets. Curbless Streets may be more commonly applied in denser or higher activity areas, such as near train stations or event centers where the curbless design enables the street to be closed to vehicles and to function as a plaza or festival space for major events.

PURPOSE

Bicyclist and pedestrian comfort is increased by slowing motorist speed through design features that prioritize pedestrians and bicyclists and emphasize that motorists are guests in the space.

DESCRIPTION

Curbless or flush streets, with the absence of a vertical curb, create a continuous, shared space between motorists, pedestrians, and other multimodal users. This design allows pedestrians and bicyclists to use the entire street and cross at any location, with motorists yielding right-of-way. Other design elements, such as narrow entry points, overall narrow street width, and pavement texture or markings help to ensure low motor vehicle speeds.

While Curbless Streets can be shared spaces, they can also function as conventional streets with defined areas for walking, biking, and driving with physical separation between these areas.

CRASH MODIFICATION FACTOR

American data is limited, but Dutch streets converted to curbless or flush streets saw a 40% reduction in crashes

CATEGORY

Special Street Type
Highly accessible and slow facility

ESTIMATED COST



APPLICABLE LOCATIONS

- + Curbless or flush streets are appropriate in Downtown, Urban, and Town Center areas where emphasizing and promoting pedestrian activity is desirable, and vehicular activity can be limited to local or business access or closed temporarily for community events.
- + They are not appropriate for through streets with high traffic volumes.

SAFETY BENEFITS

- + Lower motor vehicle speeds and reduce severity of collisions
- + Encourages cautious behavior by all users.
- + Slow speeds and pedestrian/bicycle centered design discourages motor vehicle traffic

CONSIDERATIONS

- + Generally, streets with more than 100 vehicles per hour are inappropriate for this treatment. Where desired, volumes may be reduced through other traffic calming elements to create a comfortable shared condition.
- + Shared street signage should be used at entrances to a curbless or flush street.
- + Vehicle speeds must be kept very low to ensure safety.
- + Design must meet ADA standards.
- + Emergency access and loading activities must also be considered.
- + Drainage impacts are likely and should be part of considerations.

REFERENCES

[FHWA Accessible Shared Streets](#)

[NACTO Urban Street Design Guide](#)

[DVRPC Curbless Streets](#)

[Montgomery County Curbless and Shared Streets Design Guide](#)

GUIDANCE

- + In contrast to Shared Spaces where all users share the same space, the right-of-way is flush but remains channelized by mode on curbless streets. Separation is defined by pavement treatments, physical elements such as bollards, trees, parking, furniture, or rolling curbs.
- + Pedestrians should feel comfortable crossing at designated locations, but they are not expected to cross as freely as in shared space designs.
- + Traffic calming measures should be applied to reduce the travel speed to around 15 MPH if possible.
- + On-street parking and loading areas are allowed but should be clustered and separated to create a chicaning effect when possible.
- + Curbless streets, which are often appropriate in higher density and active areas, can function as community gathering or event spaces. These may be referred to as festival streets or ceremonial streets. In these instances, consider design treatments that allow the street to be temporarily closed to traffic entirely through the use of vertical elements, movable bollards, or other barriers.



A curbless street in Eugene, OR



Bollards and parking provide physical separation in WA



A festival street in Portland, OR regularly hosts community events and gatherings

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PERIODIC MEASURES

- Vertical Deflection
- Horizontal Deflection
- Routing Network Changes

SPEED HUMP, CUSHION, OR TABLE

Speed humps, speed cushions, and speed tables are common vertical traffic calming treatments in which a vehicle needs to reduce its travel speed to safely pass over the raised feature. These measures are often placed as a series of installations (i.e., along a corridor or within a neighborhood) for the greatest traffic calming effect.

PURPOSE

Speed humps, cushions, and tables raise the pavement area, which requires motorists to slow down in order to travel across them.

DESCRIPTION

Speed humps, speed cushions, and speed tables are all gradual mounds of asphalt built into the pavement that act as a vertical traffic calming measure.

- Speed humps are continuous and maintain the hump height across the roadway cross-section.
- Speed cushions or speed lumps include wheel cutouts at set locations to allow larger vehicles such as buses or emergency vehicles to pass without vertical deflection while reducing passenger car speeds. The wheel cutout also allows people riding bicycles to pass through without slowing down.
- Speed tables include a longer taper and a wider flat top for more gradual deflection. Often, speed tables are designed as raised intersections or mid-block crosswalks.

CRASH MODIFICATION FACTOR

Vertical traffic calming measures have been linked to a 60% reduction in injury crashes on local roads within urban and suburban areas

CATEGORY

Periodic Measure
Vertical Deflection

ESTIMATED COST



APPLICABLE LOCATIONS

- + Speed humps, speed cushions, and speed tables are a periodic traffic calming measure often deployed in a series along a roadway or in multiple roadways within a neighborhood for a consistent traffic calming effect.
- + Appropriate in Downtown, Urban, and Town Center contexts, as well as Suburban and Rural Residential areas and in transition areas.
- + Speed humps are more typical for local roadways and residential areas.
- + Speed cushions can more comfortably accommodate larger vehicles (e.g., emergency vehicles, trash trucks) and therefore, may be more appropriate for higher volume streets in community center and transition areas.

SAFETY BENEFITS

- + Provide vertical deflection and reduce motorist speeds
- + May reduce frequency and severity of crashes

CONSIDERATIONS

- + Speed humps, speed cushions, and speed tables should be located to avoid conflict with underground utility access and drainage structures. They should not be placed in front of driveways.
- + These measures should typically not be installed if the design speed for the roadway is more than 30 MPH.
- + Emergency vehicle and transit routes should be considered and coordinated with operators to minimize impacts.

REFERENCES

[FHWA Traffic Calming ePrimer](#)

[ITE Traffic Calming Fact Sheets](#)

[Manual on Uniform Traffic Control Devices](#)

LOCAL EXAMPLES

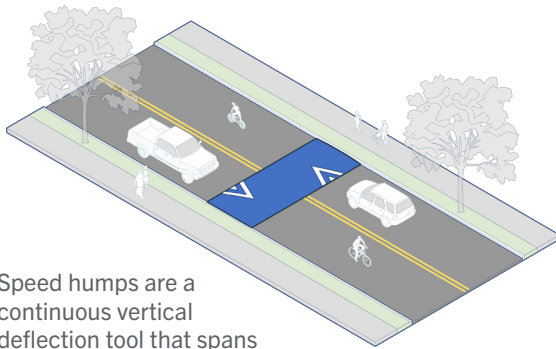


Speed hump on Larson Road in New Milford, CT
(source: UCONN - CTI)

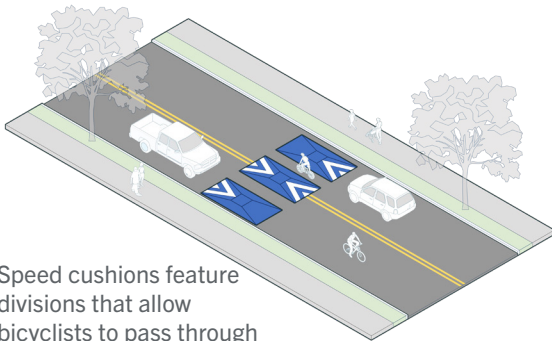


Speed table with a raised pedestrian crossing on Highland Avenue in Norwalk, CT (source: City of Norwalk)

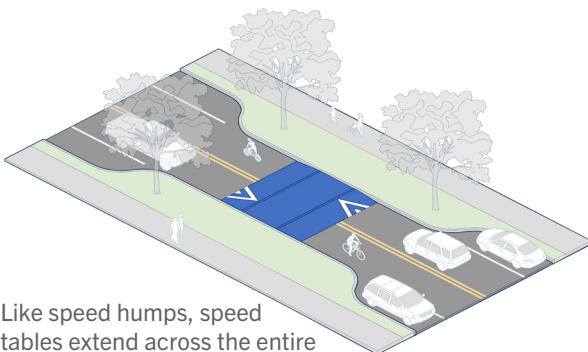
GUIDANCE



Speed humps are a continuous vertical deflection tool that spans the roadway.



Speed cushions feature divisions that allow bicyclists to pass through unobstructed.



Like speed humps, speed tables extend across the entire roadway and can pair with other treatments, such as a raised intersection or raised crossing.

Speed humps

- + Speed humps are typically about 3 inches in height at their center, and 12-18 feet wide. Designs depend on the posted speed limit, context classification, and reasoning.
- + Speed humps should typically be installed in a series and generally placed between 150 and 250 feet apart.
- + When mid-block crossings are present, a speed hump should be placed no more than 50 feet ahead of the crosswalk to ensure drivers do not accelerate as they approach the crosswalk.
- + Speed humps should generally be placed 150 feet from an unsignalized intersection, or 250 feet from a signalized intersection.
- + Speed humps should be accompanied with "speed hump" signs (MUTCD W17-1).

Speed cushions or speed lumps

- + The cutouts in the speed cushions should be positioned such that a passenger vehicle cannot pass it without traveling over a portion of the raised pavement.
- + Speed cushions should be the same height as speed humps, and their placement guidance is the same as speed humps.

Speed tables

- + Speed table extends across the roadway like a speed hump; however, they have a flat top (typically, 10 feet) to accommodate the entire wheelbase of most passenger cars. Lengthier flat tops may be considered in contexts where larger vehicles are common.
- + A speed table grade should be no greater than 1:6.

RAISED CROSSWALK

A raised crosswalk is a speed table that includes a marked pedestrian crossing. In addition to the speed reduction benefits of a traditional speed table, raised crosswalks have other safety benefits as the added elevation makes pedestrians more visible to drivers and increases drivers' yielding rates. These measures are frequently paired with mid-block crossings that may otherwise be uncontrolled and are mostly applied in areas with high pedestrian activity and demand, such as access points for transit stations, schools, or trails.

PURPOSE

Raised crosswalks provide vertical deflection at crossing locations, requiring motorists to slow on approach to the crosswalk. This treatment also improves visibility between pedestrians and motorists, encouraging yielding to pedestrians at the crosswalk.

DESCRIPTION

Raised crosswalks raise the crossing area to the same level as the sidewalk, requiring motorists to ramp up to "sidewalk level" and then back down.

CRASH MODIFICATION FACTOR

Raised crosswalks show a 46% reduction in injury crashes between motorists and pedestrians, and a 51% reduction in crashes between bicyclists and motorists

CATEGORY

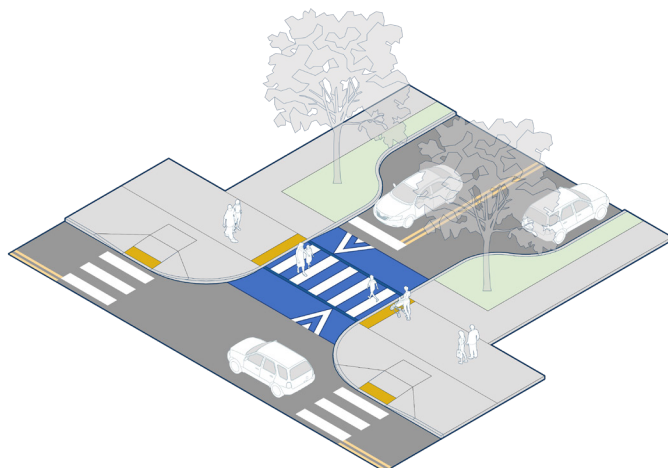
Periodic Measure
Vertical Deflection

ESTIMATED COST



SAFETY BENEFITS

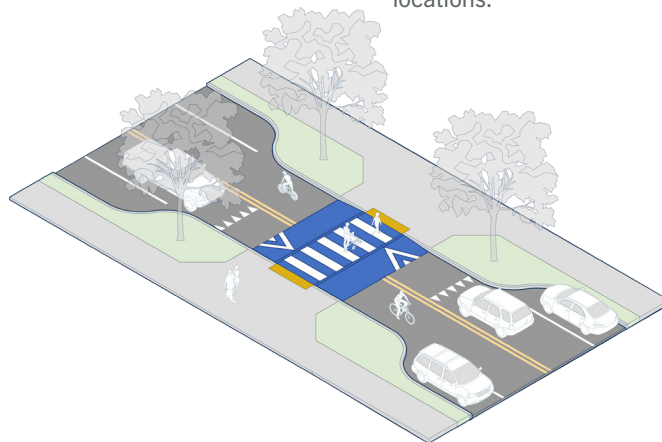
- + Reduces overall motorist speed
- + Increases visibility of pedestrians to motorists
- + May increase yielding to pedestrians
- + Provides a level crossing, making it easier for people with mobility challenges to cross the street
- + Can be used as a gateway treatment to help highlight that the intersection and approaching area is pedestrian-priority



Raised crosswalks are appropriate for intersection or mid-block locations.

APPLICABLE LOCATIONS

- + Raised crosswalks are recommended for residential local streets or a collector street. They can be placed at mid-block crossing location or at an intersection. They are, typically, installed in locations with a curb.



REFERENCES

[FHWA Traffic Calming ePrimer](#)

[ITE Traffic Calming Fact Sheets](#)

[FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations](#)

[Manual on Uniform Traffic Control Devices](#)

GUIDANCE

- + Raised crosswalks may be constructed in asphalt or concrete. When constructed in asphalt, a hardened edge-line is recommended for longevity of the raised crosswalk.
- + Raised crosswalks should be marked with high-visibility crosswalk markings.
- + The transition slope for the raised crosswalk depends on the roadway classification, posted speed limit, and other context information. While some guidance refers to slopes between 8 and 10%, local practice reflects slopes between 4.2 - 5.6% have been installed.
- + Raised crosswalks are typically between 3 to 6 inches above street level.
- + Pavement markings and signage (W11-2) for raised crosswalks should be installed according to the MUTCD.
- + Raised crossings should be well marked for drivers and for winter maintenance. There should be no more than a ¼ inch lip to accommodate plow blades.
- + A raised crosswalk can serve as a gateway treatment or entry feature to signal to motorists that they are entering an area where they may need to lower their speed.
- + If raising a crossing will impact existing drainage patterns, additional stormwater design will be needed.

LOCAL EXAMPLES



Raised crosswalk on North State Street in Stamford, CT
(source: UCONN - CTI)



Raised crosswalk on Highland Avenue in Norwalk, CT (source: City of Norwalk)



Raised crosswalk on Union Avenue in Norwalk, CT (source: City of Norwalk)

RAISED INTERSECTION

A raised intersection involves raising the entire roadway to a single surface level, like a speed table. Similar to a raised crosswalk, crossing pedestrians are more visible to drivers as they navigate the intersection, and drivers slow down as they approach the intersection. Raised intersections can offer accessibility benefits as travelers can navigate seamlessly from sidewalk to crosswalk without any surface level change (e.g., no ramp necessary from sidewalk to crosswalk). These measures are effective in areas where there is high pedestrian activity and demand.



Raised intersection in Somerville, MA

PURPOSE

A raised intersection requires motorists to slow down to travel through the intersection and encourages them to yield to pedestrians and other users within the intersection.

DESCRIPTION

A raised intersection raises the roadway in both directions through the intersection to the same level as the sidewalk, requiring motorists to ramp up to sidewalk level on approach to the intersection.

CRASH MODIFICATION FACTOR

Raised intersections have limited data available, but are likely to produce similar CMF to raised crosswalks.

CATEGORY

Periodic Measure
Vertical Deflection

ESTIMATED COST



REFERENCES

[*FHWA Traffic Calming ePrimer*](#)

[*ITE Traffic Calming Fact Sheets*](#)

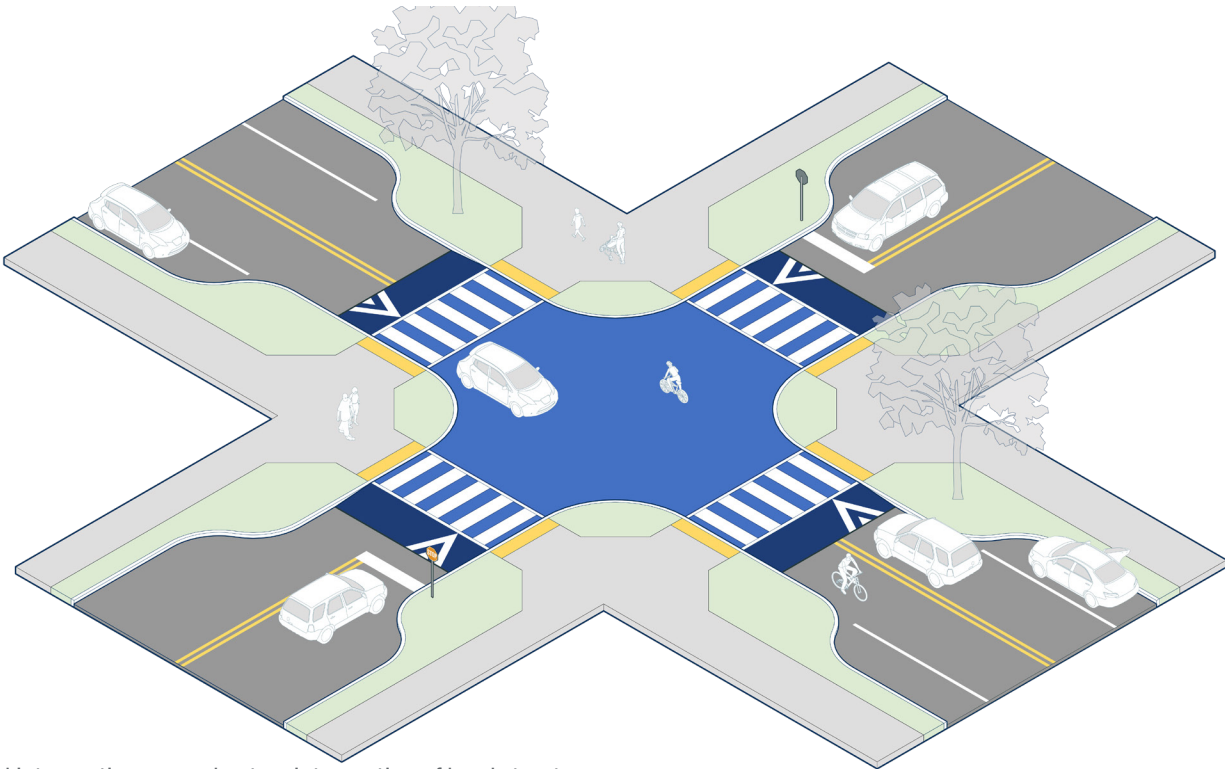
[*Manual on Uniform Traffic Control Devices*](#)

APPLICABLE LOCATIONS

- + A raised intersection is appropriate at the intersection of collector and local streets and is appropriate for residential and commercial land-use areas (i.e., Downtown, Urban, Town Centers, and Residential contexts).
- + A raised intersection may also be appropriate at intersections on downtown/Main Street low-speed business district with high pedestrian activity.
- + A raised intersection can serve as a gateway treatment or entry feature to signal to motorists that they are entering an area where they may need to lower their speed.

SAFETY BENEFITS

- + Reduces overall motorist speed
- + Increases visibility of pedestrians to motorists
- + Encourages yielding to pedestrians
- + Provides a level crossing, making it easier for people with mobility challenges to cross the street
- + Can provide a gateway function and help highlight that the intersection and approaching area is a pedestrian-priority space.



Raised intersection example at an intersection of local streets

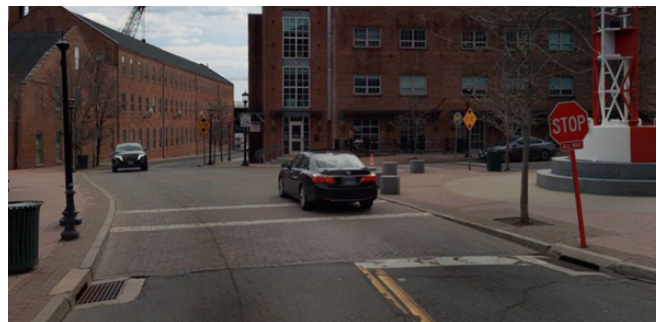
GUIDANCE

- + Raised intersections may be constructed in asphalt or concrete. When constructed in asphalt, hardened edge lines are recommended for longevity of the raised intersection.
- + Transition slope for the raised intersection are typically around 5-6%, though slopes of 8-10% are allowed. In Stamford, CT, raised intersections use a slope of 6 inches over 9 feet.
- + Pavement markings and signage (W11-2) for raised crosswalks should be installed according to MUTCD 11th Ed.
- + Raised intersection should be well marked for drivers and for winter maintenance. There should be no more than a ¼-inch lip to accommodate plow blades.



Raised intersection in Everett, MA

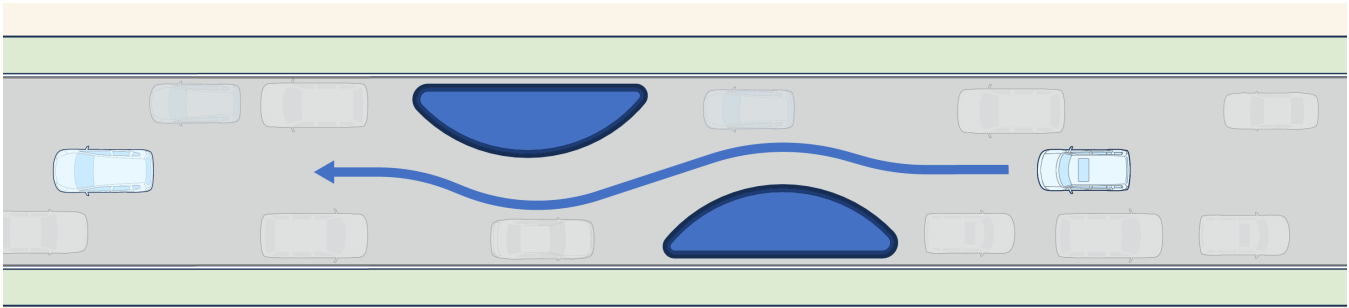
LOCAL EXAMPLES



Raised intersection on State Street in Norwalk, CT (source: City of Norwalk)

CHICANE

Chicanes use design elements to shift the travel pattern of vehicles to create “S” curves along the roadway. This small change in travel flow reduces sight lines such that drivers feel more comfortable driving slower, and disrupts chance to accelerate along long, uninterrupted straight-through segments. Chicanes can be realized through physical features such as raised bumpouts or delineators or by arranging on-street parking on either side of the road in a repeating, opposite pattern.



“S” curves created by chicanes along a local street

PURPOSE

Chicanes can reduce motor vehicle speeds by creating curves or lane shifts through horizontal deflection along a roadway.

DESCRIPTION

A chicane is a series of alternating curves or lane shifts that force motorists to weave around obstacles, reducing the speed at which a motorist can comfortably travel through the street.

CRASH MODIFICATION FACTOR

N/A

CATEGORY

Periodic
Horizontal Deflection

ESTIMATED COST



APPLICABLE LOCATIONS

- + Chicanes are most effective in reducing speeds if traffic volumes are relatively balanced in each direction.
- + Chicanes which are achieved by alternating curb extensions are typically recommended for lower volume local streets.
- + A chicane which is achieved by alternating on-street parking, or by providing pedestrian median islands may be more appropriate for Downtown, Urban, and Town Center settings.

SAFETY BENEFITS

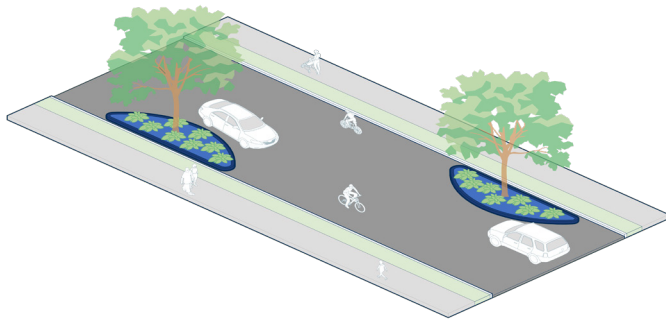
- + Reduces overall motorist speed
- + Can increase space for pedestrians through reallocation of roadway space
- + Can incorporate plantings, stormwater management infrastructure, or other placemaking and aesthetic treatments

REFERENCES

[*FHWA Traffic Calming ePrimer*](#)

[*ITE Traffic Calming Fact Sheets*](#)

[*Manual on Uniform Traffic Control Devices*](#)



Chicane infrastructure can offer additional benefits as aesthetic and stormwater management treatments.

GUIDANCE

- + Chicane curves can be created with curb extensions that alternate from one side of the street to other. They may also be implemented using tactical materials such as paint and barriers like flexible delineators or planters to achieve similar effect in the short-term.
- + A chicane-like effect can also be achieved by alternating on-street parking from one side of the street to another. This creates a taper in the roadway and forces motorists to shift instead of traveling straight along the street.
- + The length of the taper on the chicane should reflect the desired speed of motor vehicles on the roadway.
- + Chicanes may require additional signage and striping to provide drivers with a warning of change in roadway configuration.
- + Temporary or tactical treatments can be created using planters, delineators, or other barriers such as hay bales.
- + In the WestCOG region, certain residential roads may feature large boulders or other devices placed in a pattern that effectively creates chicaning patterns for drivers.



Chicanes in a transition zone in Founex, Switzerland

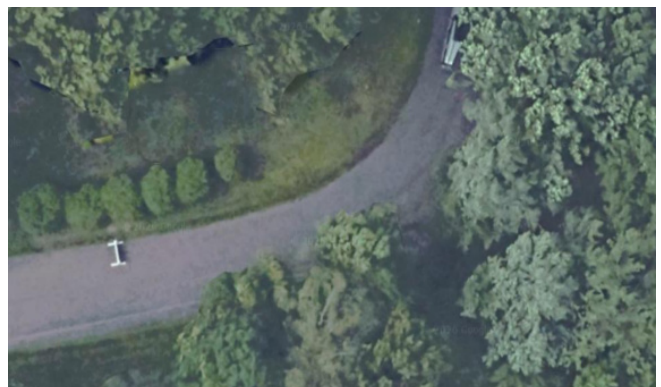


Chicanes in Seattle, WA



Chicanes in Seattle, WA

LOCAL EXAMPLES



Chicanes in Darien, CT

LATERAL SHIFT

Lateral shifts visually and physically break-up the travel path of drivers on an otherwise straight street. The measure's efficacy relies on raised, physical elements such as bumpouts along the curb and a raised median to shift the travel lane (creating a chicaning effect). As a result, drivers will need to drive more slowly and pay attention to navigate the street.

PURPOSE

Lateral shifts cause a realignment of travel lanes to reduce motor vehicle speed along an otherwise straight street

DESCRIPTION

A lateral shift causes travel lanes to shift in one direction along a straight street. The shift is, typically, created using a median island to ensure motorists do not cross the centerline.

CRASH MODIFICATION FACTOR

CMF not available

CATEGORY

Periodic Measure
Horizontal Deflection

ESTIMATED COST



APPLICABLE LOCATIONS

- + Lateral shifts are appropriate in Rural Residential and Town Center areas, and can be used in transition zones to alert drivers to pay attention and drive more carefully.
- + Lateral shifts can be appropriate for a local road, a collector road and even an arterial roadway depending on the length of taper and along the street.
- + Lateral shifts are typically applied mid-block by utilizing available shoulder or parking space.
- + Lateral shifts can be appropriate at all levels of motor vehicle traffic volume, and are more effective if volumes are balanced in both directions.

REFERENCES

[FHWA Traffic Calming ePrimer](#)

[ITE Traffic Calming Fact Sheets](#)

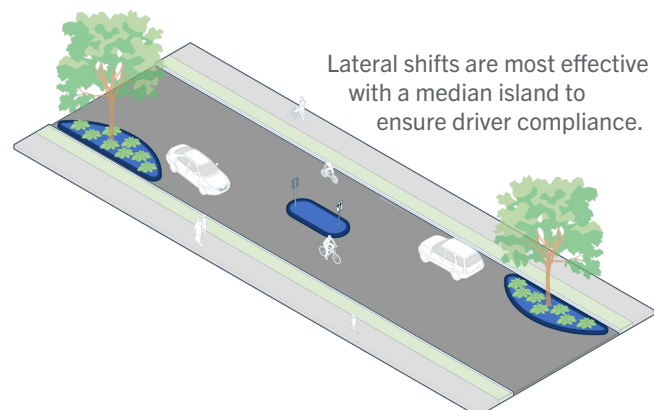
[Manual on Uniform Traffic Control Devices](#)

SAFETY BENEFITS

- + Reduces overall motorist speed. Expected speed reduction is typically less than that observed through a chicane.
- + Can increase space for pedestrians through reallocation of roadway space or by providing a pedestrian crossing island.

GUIDANCE

- + A lateral shift should be implemented using a raised median island. Without a raised island, motorists may not comply with the shift. They may be implemented using tactical materials such as paint and barriers like flexible delineators or planters to achieve similar effect in the short-term.
- + The length of the taper on the lateral shift should reflect the desired speed of motor vehicles on the roadway.
- + Lateral shifts may require additional signage and striping to provide drivers with a warning of change in roadway configuration.
- + Potential conflict zones between motorists and bicyclists should be avoided. Where bike facilities are present or bicyclists are expected, providing a bypass lane for bicyclists that is separate from travel lanes is recommended. Shared lane markings may be appropriate on low-volume and low-speed roadway where motorists and bicyclists can comfortably share the roadway.



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MEDIAN ISLAND

A median island, sometimes referred to as a pedestrian refuge islands when placed at crossing locations, is a raised feature built in the road's centerline that narrows and separates the travel lanes and conflicting vehicle movements. Median islands encourage drivers to slow down and travel more cautiously, especially when making turns. Pedestrians can use this protected space to wait when crossing the road (e.g., cross in one direction of traffic at a time). Medians can accommodate plants and stormwater features to add an aesthetic benefit to the surrounding area.

PURPOSE

A median island narrows the travel lane and provides a slight shift along the centerline, encouraging motorists to slow their speed.

DESCRIPTION

A median island is a raised island located along the roadway centerline that narrows the travel lane. It can also serve as a pedestrian crossing island where there is an uncontrolled crosswalk.

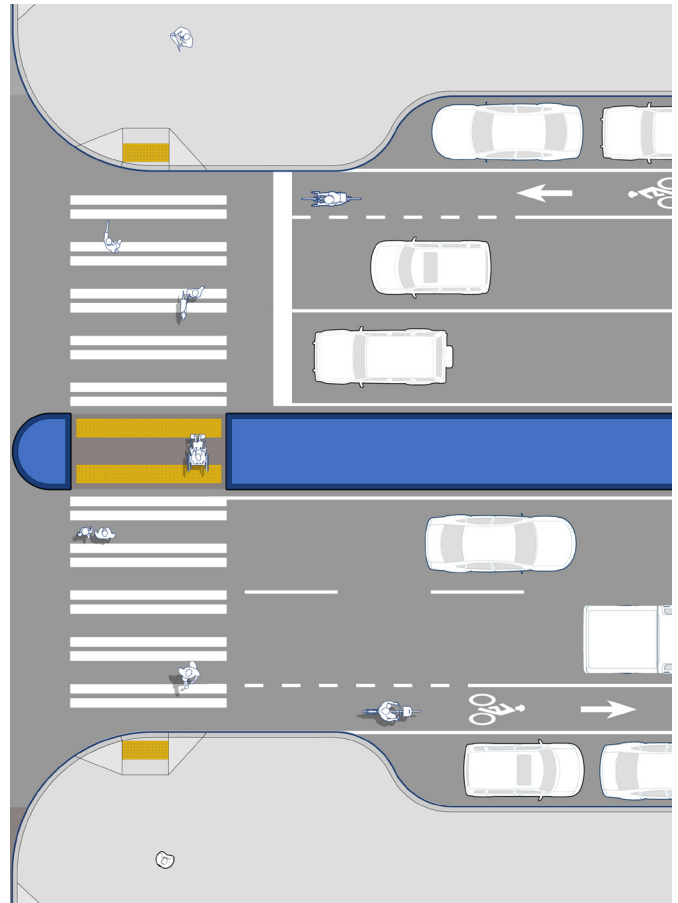
CRASH MODIFICATION FACTOR

Median islands are shown to reduce crashes by 42% when installed on a major road approach and 25% when installed on a minor road approach. When medians include pedestrian islands, evidence shows an 86% reduction in fatal crashes involving pedestrians and bicyclists

CATEGORY

Periodic Measure
Horizontal Deflection

ESTIMATED COST



A median island provides refuge for pedestrians to wait safely before continuing to cross the street.

APPLICABLE LOCATIONS

- + Median islands may be placed at mid-block or on approach to intersections.
- + They are typically found in Downtown and Urban core and Town Center areas where there is curbing but can also be appropriate in Suburban and Rural Residential areas and at transition zones.

SAFETY BENEFITS

- + Reduces motorist speeds due to the horizontal deflection and narrowing of the roadway
- + Provides space for pedestrians to wait before crossing the crosswalk
- + A median island can also serve as a gateway treatment or entry feature to signal to motorists that they need to reduce their speed.

REFERENCES

[*FHWA Traffic Calming ePrimer*](#)

[*Manual on Uniform Traffic Control Devices*](#)

[*FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*](#)

CONSIDERATIONS

- + Median islands are appropriate along primary emergency access routes. They should be designed with a radius to accommodate these vehicles.
- + Buses can operate on roadways with median islands, provided that the median curb radius can accommodate them.

GUIDANCE

- + A median may be painted or constructed with temporary materials, but it is most effective when it is defined by a raised curb. Textured pavement may also be applied on a median island where a raised concrete curb is not being implemented.
- + To allow for an accessible pedestrian refuge, median islands should be at least 6 feet long in the direction of pedestrian travel, with 8-10 feet as the preferred length.
- + Median islands should include a “nose” area that extends beyond the crossing area to reduce the speed of turning vehicles and provide additional protection for pedestrians.
- + Drainage calculations should account for potentially flush surfaces on the pedestrian route to ensure standing water does not become an issue. Likewise, the installation of medians may require adjusting the crown of the street to ensure water continues to drain towards the outer curbs, unless green stormwater infrastructure within the median island is provided. Median islands can serve as space for vegetation and landscaping, provided that it does not compromise the sightline of pedestrians and motorists.



Median Island in Charlotte, NC



Residential area median island in Sacramento, CA



Median island at a “T” intersection in Seattle, WA

ROUNDBABOUT

Roundabouts allow intersections to operate in more predictable ways, with each driver moving the same direction around a center island. This reduces conflicts for turning vehicles and can improve the efficiency of the intersection and reduce traffic delay by reducing waiting times at signals, especially at off-peak times of day. While roundabouts can be costly to implement, they have typically lower lifetime and maintenance costs compared to traditional intersections with signals.

PURPOSE

Roundabouts are designed to have traffic circulate counterclockwise around the intersection, eliminating left turning movements and reducing the number of conflicts at the intersection. The roundabout design also creates horizontal deflection due to the turning motion and reduces motorist speed.

DESCRIPTION

Built with a raised circular island, roundabouts are located at the intersection of two or more streets and take the place of a traditional intersection. Traffic entering the roundabout yields to traffic in the roundabout and there are no left-turn movements. Roundabouts allow for traffic to flow and merge slowly without having to come to a full stop, reducing speeds and facilitating increased motor vehicle yielding to pedestrian and bicyclists.

CRASH MODIFICATION FACTOR

There are several research studies showing that converting an intersection to a roundabout has reduced crashes. The following note crash reductions compared to the prior intersection design or type:

- 47-75% reduction across all intersections
- 72% reduction: single lane stop-controlled intersections
- 67% reduction: high-speed rural intersections
- 65% reduction: signalized intersections
- 44% reduction: minor road stop control

CATEGORY

Periodic Measure
Horizontal Deflection

ESTIMATED COST



APPLICABLE LOCATIONS

- + Roundabouts are appropriate in Downtown, Urban, Town Centers, Rural and Suburban Residential, and Rural areas.
- + A roundabout is appropriate at the intersection of two arterial streets or an intersection of an arterial street with a collector street.
- + A roundabout can be used in Transition Areas to signal a change in environment from a higher-speed roadway operation to a lower-speed operation where the community density may be higher with more pedestrian presence.

SAFETY BENEFITS

- + Substantial reduction in number of collisions (see CMF)
- + Reduced motorist speeds
- + Facilitates motorists yielding to pedestrians and bicyclists
- + Reduced frequency and severity of collisions

CONSIDERATIONS

- + General considerations include traffic volumes and speeds, number of travel lanes, pedestrian and bicycle volumes, and available rights-of-way.
- + Roundabouts are not appropriate at intersections near active, at-grade railroad crossings.
- + Roundabouts should not be placed on high-speed roadways.

REFERENCES

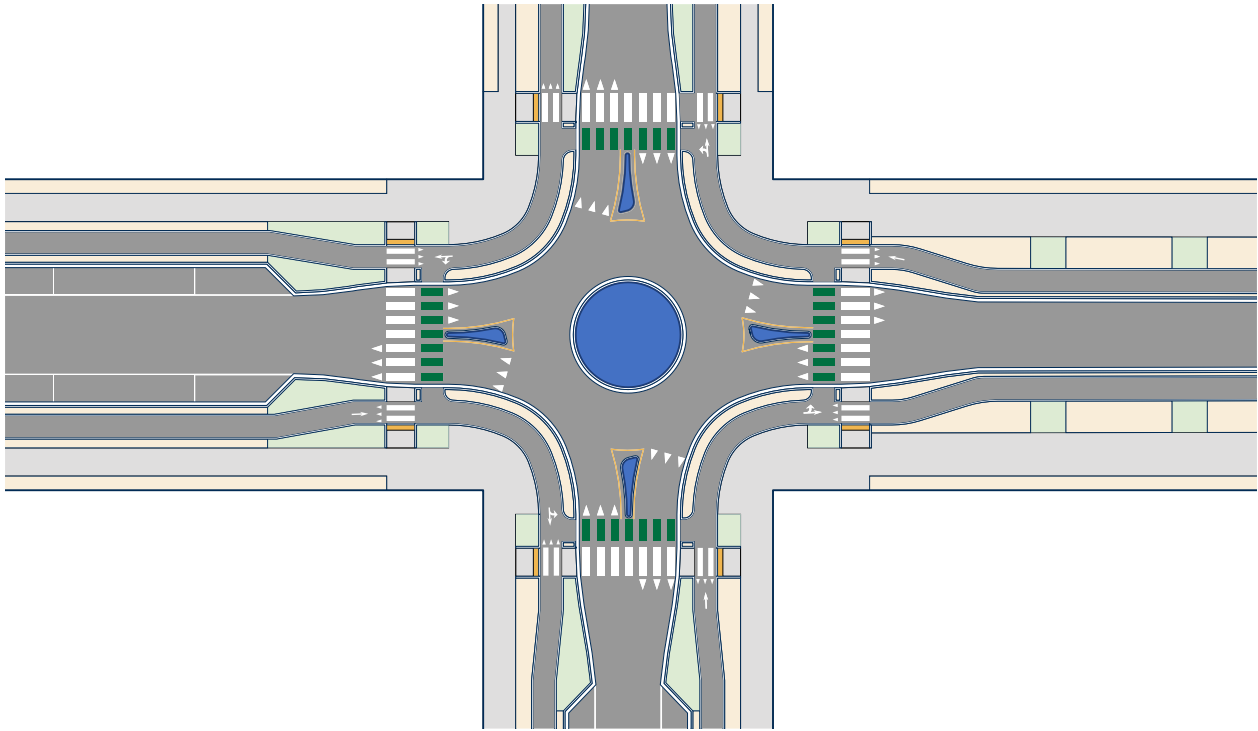
[FHWA Traffic Calming ePrimer](#)

[Manual on Uniform Traffic Control Devices](#)

[Roundabouts: An Informational Guide \(FHWA\)](#)

[NCHRP Research Report 1043: Guide for Roundabouts](#)

[CTDOT Design Guide for Signing and Pavement Markings for Roundabouts \(and other resources\)](#)



GUIDANCE

- + Traffic analysis of proposed layout with expected volumes is required to confirm feasibility of design.
- + The center island of the modern roundabout can be fully non-traversable or partially traversable. A partially traversable roundabout usually has a smaller non-traversable area as well as a mountable area with a truck apron depending based on the size and type of large vehicles that need to maneuver around the intersection.
- + Where there are higher pedestrian volumes, it may be beneficial to install crossing controls and wider crosswalks.
- + The intersection approaches to a modern roundabout should have a splitter island to slow and direct traffic entering the intersection. The splitter island may also be a pedestrian median island so that pedestrians have space to wait as they cross the street.
- + Raised crosswalks can be provided to further reduce motorist approaching speed and provide more visibility and better yielding to pedestrians.
- + Roundabouts should be designed for an entry speed of 15-18 MPH on each leg.
- + On a low speed and volume street, such as a local neighborhood street, consider installing mini roundabouts or neighborhood traffic circles.

LOCAL EXAMPLES



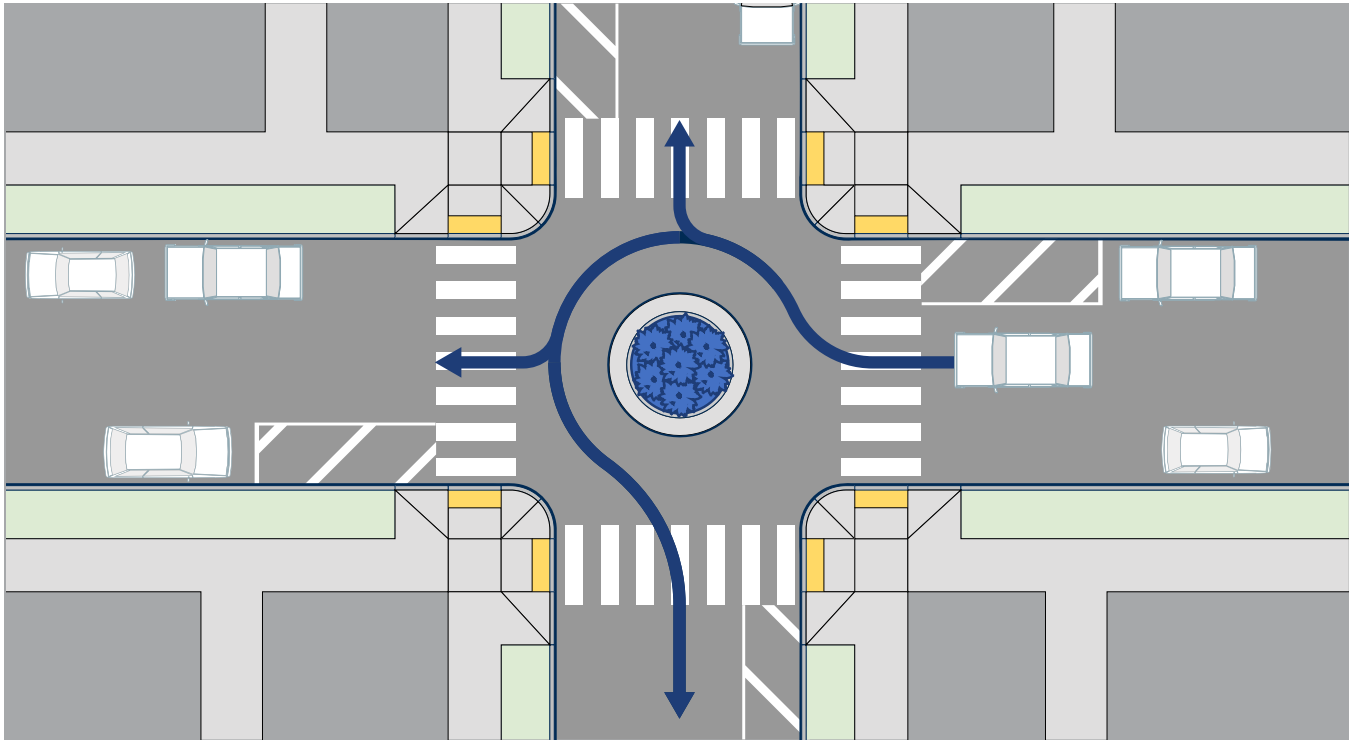
Roundabout at West Avenue and Stillwater Avenue in Stamford, CT (source: UCONN - CTI)



Roundabout Concept for Richards Avenue at W. Cedar Street in Norwalk, CT (source: UCONN - CTI)

MINI-ROUNDABOUT

Mini-roundabouts, also known as neighborhood traffic circles, can improve the safety of turning movements at uncontrolled or stop-controlled intersections, especially in residential contexts. These treatments are much smaller than traditional roundabouts and are often mountable to enable emergency and large vehicles to traverse the intersection and make left turns. Mini-roundabouts are popular pilot interventions, allowing movable planters or paint to demonstrate the effects of the concept on site.



APPLICABLE LOCATIONS

- + Neighborhood traffic circles and mini-roundabouts are appropriate in Town Centers and Rural and Suburban Residential areas.
- + A neighborhood traffic circle is appropriate at the intersection of two local roads, or where a local road and a collector road intersect if designed for larger vehicle use.

SAFETY BENEFITS

- + Reduces motorist speeds
- + Facilitates motorists yielding to pedestrians and bicyclists
- + Reduces risk of crashes
- + Reduces collision severity
- + May provide an opportunity for landscaping or plantings in the center island to capture stormwater runoff

REFERENCES

[*FHWA Traffic Calming ePrimer*](#)

[*Manual on Uniform Traffic Control Devices*](#)

[*Roundabouts: An Informational Guide \(FHWA\)*](#)

[*NCHRP Research Report 1043: Guide for Roundabouts*](#)



Mini-roundabout on a residential street (and bicycle boulevard) street in La Crosse, WI



An emergency vehicle traverses a mini-roundabout in Denver, CO

PURPOSE

A neighborhood traffic circle or mini-roundabout forces motorists to reduce their speed in order to maneuver counterclockwise around the intersection

DESCRIPTION

A neighborhood traffic circle or mini-roundabout consists of a raised circular island placed within an unsignalized intersection. It is smaller than a modern roundabout and typically does not have clearance for a left-turning truck, emergency vehicle, or bus to circulate counterclockwise unless the island is mountable.

CRASH MODIFICATION FACTOR

Mini-roundabouts have a CMF of .61, or an expected 39% reduction in crashes when a stop-controlled intersection is converted into a mini-roundabout.

CATEGORY

Periodic Measure
Horizontal Deflection

ESTIMATED COST



CONSIDERATIONS

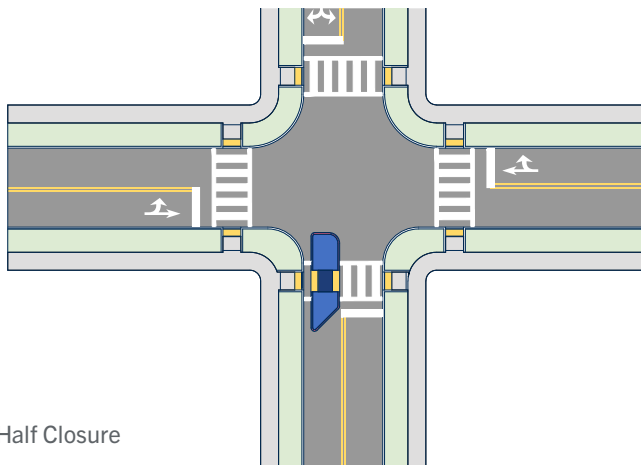
- + General considerations include traffic volumes and speeds, number of travel lanes, pedestrian and bicycle volumes, and available rights-of-way.
- + Neighborhood traffic circles and mini roundabouts are not appropriate at intersections of two multi-lane roads.
- + Not appropriate at intersections near active, at-grade railroad crossings and should not be placed on high-speed roadways.

GUIDANCE

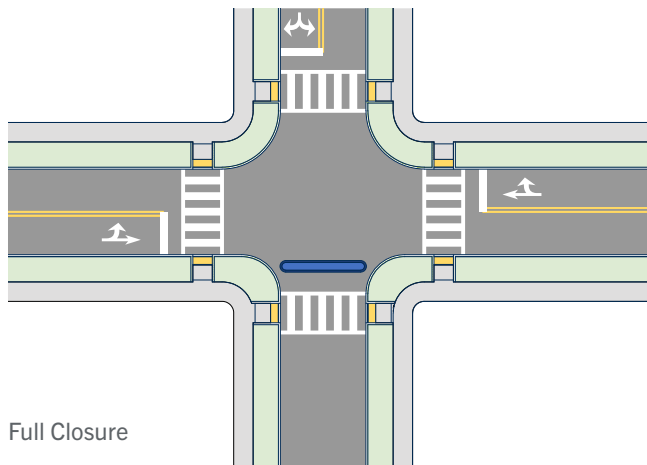
- + The center island of a neighborhood traffic circle or a mini-roundabout may be fully non-traversable, partially traversable, or fully traversable. They are most effective when defined by a raised curb and landscaping to reduce the open feeling of the street or intersection. It may also be a painted or mountable area if it needs to be traversable.
- + The approaches to a neighborhood traffic circle or mini roundabout do not require a splitter island or pedestrian median island but can include them where there is space. Splitter islands can be either mountable or at-grade depending on the need to accommodate large vehicles such as trucks, school buses, etc.
- + This treatment is more effective for slowing motorist speed when several are used in a series of intersections along a corridor.
- + Neighborhood traffic circles and mini-roundabouts can be designed to accommodate emergency vehicles where required using features such as mountable areas.
- + Generally, a transit route should not include a left turn at a neighborhood traffic circle or mini-roundabout.

CLOSURES (HALF/FULL)

Closures are designed to restrict through vehicle movement, such as converting a local street from two-way to one-way (half closure) or blocking vehicle access entirely (full closure). These measures may be used to reduce cut-through traffic while maintaining access for people traveling by foot or on bicycle, such as the measures deployed to establish bicycle boulevards. Decisions for closing a lane or a street must be carefully made to consider displacement of traffic onto adjacent streets.



Half Closure



Full Closure

PURPOSE

A closure restricts motorists from driving straight through the street. They are often used to prevent cut-through traffic on local and residential streets.

DESCRIPTION

A closure is a physical barrier that blocks motorists from entering a street. Closures can be designed as a half closure or full closure. In a full closure (also called a dead end), vehicle travel is completely blocked to vehicle traffic. In a half closure, entrance to a street is blocked for vehicles in one direction on a two-way street.

CRASH MODIFICATION FACTOR

CMF not available.

CATEGORY

Periodic Measure
Routing Network Changes

ESTIMATED COST



APPLICABLE LOCATIONS

- + Appropriate for local and collector streets in Downtown, Urban, Town Center, and Residential (Suburban) settings.
- + Typically implemented in areas with existing curbs.
- + Closures are not appropriate along a primary emergency vehicle route unless designed to allow emergency access (e.g., retractable bollards).
- + Closures are not appropriate along a transit route.

SAFETY BENEFITS

- + Reduces cut-through motor vehicle traffic on local and residential streets
- + Can be designed to maintain pedestrian and bicycle access

REFERENCES

[FHWA Traffic Calming ePrimer](#)

[Manual on Uniform Traffic Control Devices](#)

GUIDANCE

- + A half closure should be designed to be long enough to deter motorists from going in the wrong way. Typically, half closures extend to the street centerline, leaving a tight opening for motorist use in the correct direction.
- + Implementing a single half or full closure may shift traffic onto other local streets that may not be able to accommodate increased traffic. They should be implemented with the larger street network in mind and are most effective if installed in a group or a cluster of closures or other traffic calming treatments that encourage drivers to stay on major roadways.
- + Closures should be designed to accommodate people riding bicycles and pedestrians while restricting motorist access.
- + Closures are typically built with concrete curb extensions but can also be implemented using temporary materials in the short-term. Object markers and other signage are used to enforce the change in geometry.
- + Closures can be built with landscaping or plantings to capture stormwater runoff. They can also be designed to maintain existing drainage patterns.



Half closure in Vancouver, BC, Canada



Full closure in University Park, MD



Partial closure (location unknown)

DIAGONAL DIVERTER

Diagonal diverters are a form of routing network changes that support traffic calming and safety goals by restricting cut-through traffic on local, low-speed, residential streets. These devices are often seen in bicycle boulevard networks, where bicycles are prioritized with bicycle-only access (such as breaks in the physical median) to allow through-movement only for people traveling on foot or by bike. Measures such as diverters that will meaningfully change the street network require a deeper level of analysis than most other traffic calming measures.

PURPOSE

Diagonal diverters can reduce traffic volumes by restricting motorists from driving straight through an intersection. They are often used to prevent cut-through traffic on local and residential streets.

DESCRIPTION

A diagonal diverter is a physical barrier placed diagonally across a four-legged intersection.

CRASH MODIFICATION FACTOR

Diagonal diverters are not specifically designed to reduce conflict or crash risk, but rather to reduce traffic volume: Studies from Pennsylvania and Delaware average a 35% reduction in daily traffic.

CATEGORY

Periodic Measure
Routing Network Changes

ESTIMATED COST



Diagonal diverter on a residential street in Saint Paul, MN



Diagonal diverter with landscaping in Vancouver, BC, Canada

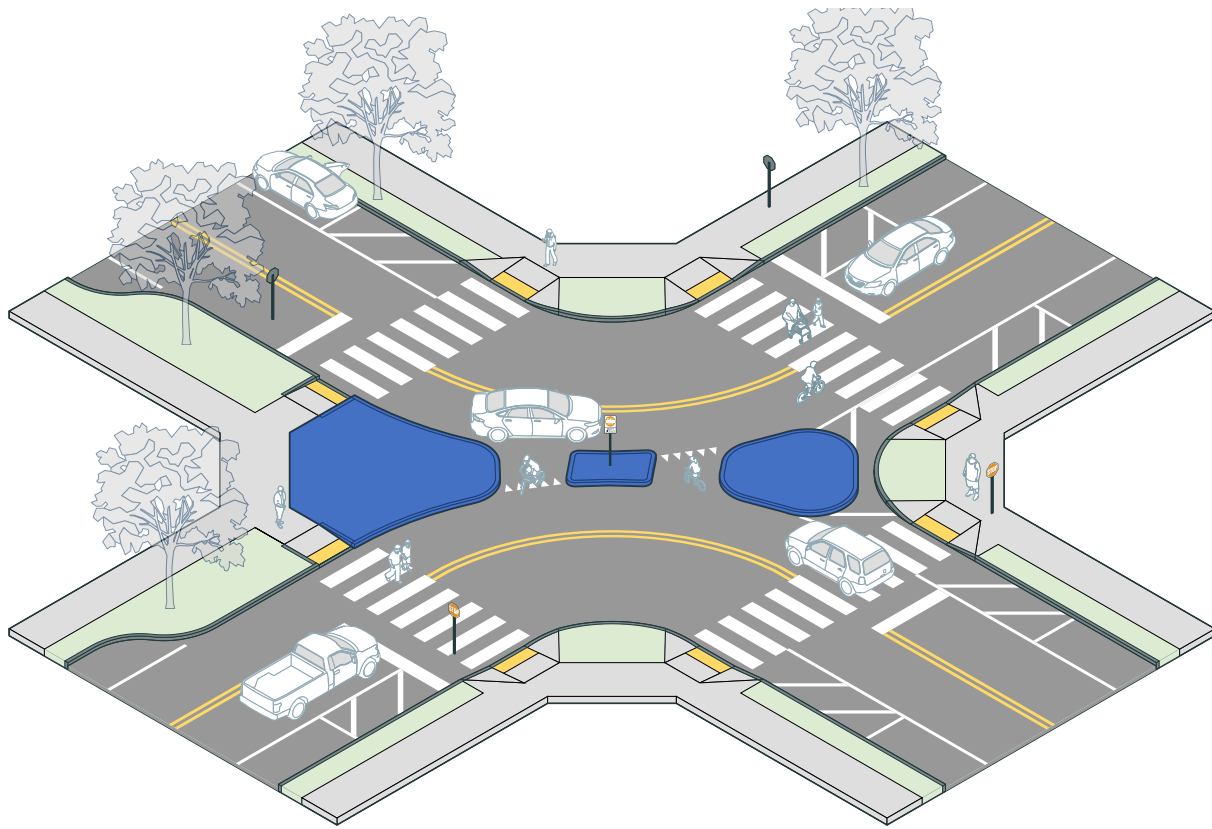
APPLICABLE LOCATIONS

- + Appropriate at local and collector streets in Downtown, Urban, Town Center, and Suburban Residential settings. They are typically implemented in areas with existing curbs.
- + Since diagonal diverters restrict access for vehicles, suitable candidates need to be evaluated for impacts to travel patterns and nearby intersections, as well as emergency access and other functions.

REFERENCES

[*FHWA Traffic Calming ePrimer*](#)

[*Manual on Uniform Traffic Control Devices*](#)



Diagonal diverters can be paired with landscaping and other treatments to support placemaking and streetscaping priorities

SAFETY BENEFITS

- + Reduces cut-through motor vehicle traffic on local and residential streets
- + Can be designed to maintain pedestrian and bicycle access

CONSIDERATIONS

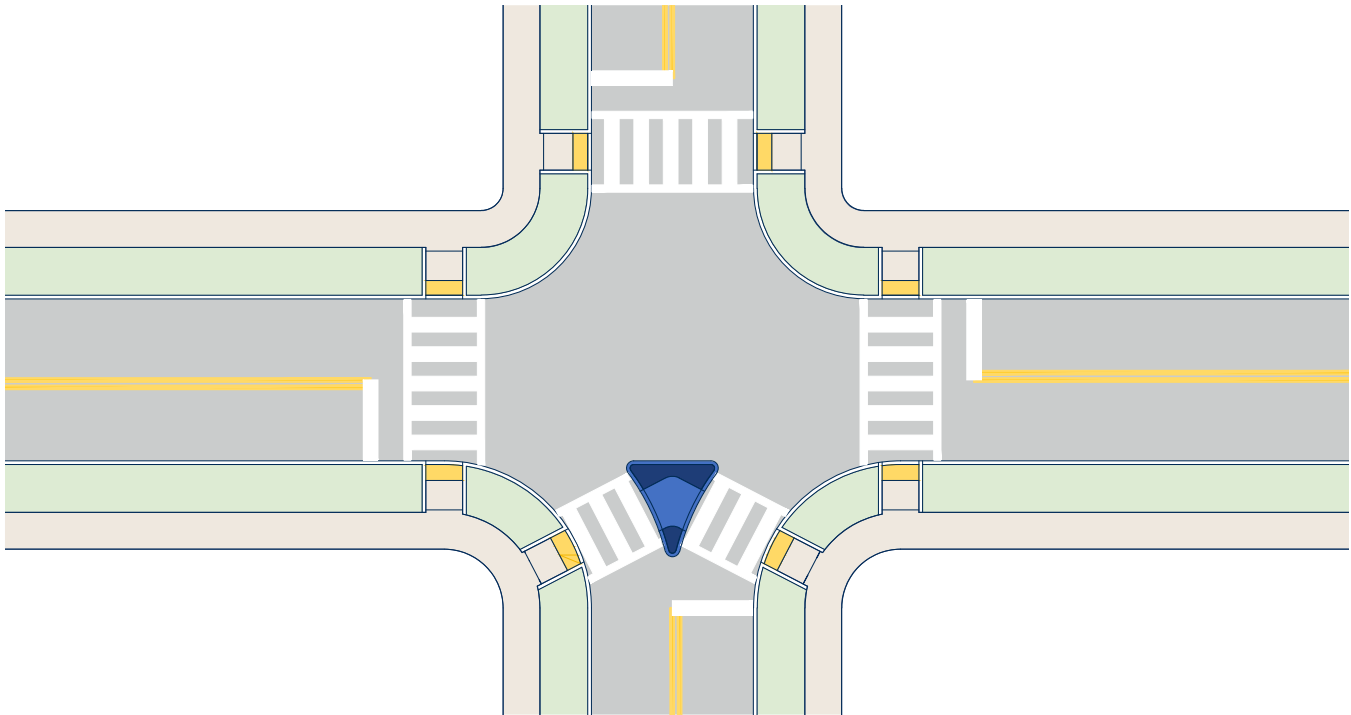
- + Diagonal diverters are not appropriate along a primary emergency vehicle route as it restricts movements through an intersection.
- + Diagonal diverters are not appropriate along a bus route that passes straight through an intersection without altering the transit route.
- + Municipalities may choose to pilot the impacts of a diagonal diverter by installing temporary pavement markings or physical barriers (e.g., delineators, planters, or cones). A demonstration pilot enables data on traffic volume, speed, and safety outcomes while also providing residents and key users (such as emergency services) an opportunity to share feedback on any benefits or unintended consequences.

GUIDANCE

- + Diagonal diverters are most effective when implemented in a group or cluster of other traffic calming treatments as a single diverter may just increase traffic to adjacent streets in the network.
- + A diagonal diverter can be designed with small gaps or openings to allow people riding bicycles to go through the intersection. Pedestrian access should also be provided through or around the diverter.
- + Diagonal diverters are typically built with concrete and curbing. Object markers and other signage are used to warn drivers of the obstruction and to reinforce the change in geometry.
- + Diverters can be built with landscaping or plantings to capture stormwater runoff, or can be designed to maintain existing drainage patterns.

FORCED TURN ISLAND

Forced turn islands, also known as median barriers, are a traffic calming tool to limit cut-through traffic on residential streets. By installing a physical barrier to prevent certain turning movements, this feature can lower vehicle volumes while maintaining local access and retain two-way traffic. Forced turn islands are similar to diagonal diverters in the outcomes they achieve, and are often used to establish networks of bicycle boulevards in residential neighborhoods.



APPLICABLE LOCATIONS

- + Appropriate at local and collector streets in Downtown, Urban, Town Center, and Suburban Residential settings.
- + Forced turn islands are typically implemented in areas with existing curbs.

SAFETY BENEFITS

- + Reduces cut-through motor vehicle traffic on local and residential streets
- + Can be designed to maintain pedestrian and bicycle access

CONSIDERATIONS

- + Forced turn islands are one of the tools available to support bicycle boulevards—creating slow, low-volume and comfortable connected networks for biking in residential areas.
- + Median barriers and forced turn islands are not appropriate if they would block access along a primary emergency vehicle route unless they are designed to be mountable.
- + Median barriers and forced turn islands are not appropriate along a bus route that passes straight through an intersection without altering the transit route.

REFERENCES

[*FHWA Traffic Calming ePrimer*](#)

[*Manual on Uniform Traffic Control Devices*](#)

PURPOSE

Median barriers and forced turn islands are often used as treatments to reduce cut-through traffic from major streets onto local or residential streets.

DESCRIPTION

A forced turn island is a triangular-shaped raised island implemented on a side street approach to only allow right-in or right-out movements to and from the side street. A median barrier is a raised island along the centerline of a street and continuing through an intersection that prevents left-turn movements from all intersection approaches and blocks motorists from traveling straight through the intersection from the side street.

CRASH MODIFICATION FACTOR

CMF not available.

CATEGORY

Periodic Measure
Routing Network Changes

ESTIMATED COST



Forced turn island with through-access for bicyclists in Kirland, WA



Forced turn island in Vancouver, BC, Canada

GUIDANCE

- + Median islands and forced turn islands are most effective when implemented in a group or cluster of other traffic calming treatments as a single treatment may just increase traffic to adjacent streets in the network.
- + Median barriers and forced turn islands should be designed to accommodate people riding bicycles and pedestrians while restricting motorist access.
- + Closures are typically built with concrete and curbing but can also be implemented using temporary materials in the short-term. Object markers and other signage are used to reinforce the change in geometry.
- + Median barriers and forced turn islands can include landscaping or plantings to capture stormwater runoff, or can be designed to maintain existing drainage patterns.



Median island with through-access for bicyclists on a bicycle boulevard in Portland, OR

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CROSS-SECTION CHANGES

- Horizontal Deflection
- Street Width Reduction
- Pedestrian/Bicycle Facilities

CURB EXTENSIONS

Curb extensions, also known as bulb-outs or bump-outs, are created by extending the sidewalk at intersections or mid-block. Curb extensions are intended to increase safety, calm traffic, and provide extra space along sidewalks for users and amenities. In addition to shortening crossing distances, curb extensions can be used to change the geometry of intersections resulting in smaller corner radii and slowing turning motor vehicles.

PURPOSE

Curb extensions narrow the roadway section by extending the sidewalk at intersections or crossings.

DESCRIPTION

Curb extensions extend the sidewalk into existing shoulders or curbside space at intersections, narrowing the pavement width. When applied mid-block on both sides of the street, curb extensions can also be called a “choker” as they visually narrow the roadway causing drivers to slow down.

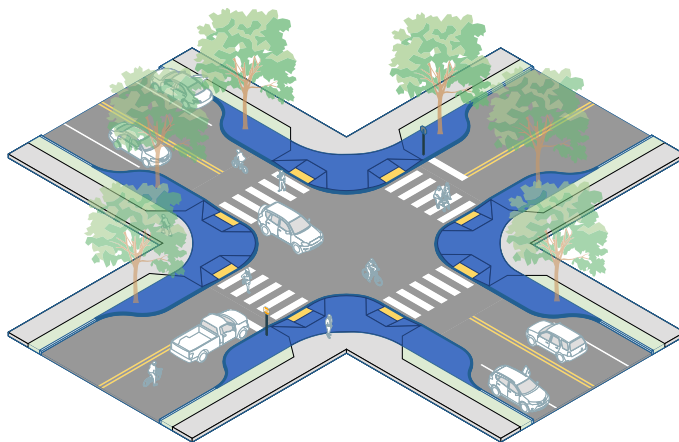
CRASH MODIFICATION FACTOR

CMF not yet available, though evaluations find an increase in driver yielding behavior and a decrease in crashes involving people walking or biking.

CATEGORY

Cross-section Change
Street Width Reduction

ESTIMATED COST



SAFETY BENEFITS

- + Reduces motorist speeds by reducing the roadway width at intersections and mid-block crossings.
- + When installed with a crosswalk, curb extensions can shorten pedestrian crossing distance and improve sightlines between pedestrians and motorists.
- + Curb extensions prevent motorists from parking too close to the crosswalk.

APPLICABLE LOCATIONS

- + Curb extensions are recommended in Downtown, Urban, and Town Center areas where there is a desire line for pedestrians to cross the street, especially where there is on-street parking present. They may also be suitable on local streets or rural contexts where space allows.
- + Curb extensions are a popular treatment in school zones or similar activity centers.

CONSIDERATIONS

- + Curb extensions can be elongated to serve transit stops and provide more space for amenities such as bus shelters. This can also allow buses to stop in-lane to serve stops, decreasing the time spent pulling into and out of a bus stop. Curb extensions should be designed to accommodate transit vehicle turning radii in accordance with established routing.

REFERENCES

[AASHTO Guide for the Development of Bicycle Facilities](#)

[NACTO Urban Street Design Guide](#)

[FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations](#)



Curb extensions in La Crosse, WI



Curb extensions in Stamford, CT (source: UCONN CTI)



Curb extensions in Ross, OH



Demonstrating curb extensions with art in Norwalk, CT (source: City of Norwalk)

GUIDANCE

- + Curb extensions are typically designed to prohibit parking too close to an intersection; notably, the spaces taken by curb extensions are not legal parking spaces per state statute.
- + Curb extensions may be applicable in many scenarios. They can be used as gateways to neighborhoods, or applied at a mid-block trail crossing. They are recommended for at-grade crosswalks where there is parking or other space available outside of travel lanes.
- + This treatment can bookend curbside uses such as parking and loading at crosswalks to improve sight lines between pedestrians and motorists.
- + The length of a curb extension can vary to accommodate various stormwater or landscaping components, furniture, or other features. The minimum length for a curb extension is the width of the adjacent crosswalk.
- + Curb extensions may provide space for new street trees, bioretention facilities, and landscaping. If building a curb extension will change existing drainage patterns or conflict with existing stormwater infrastructure, additional stormwater design will be needed.
- + In less dense or rural areas where streets do not have curbs, a similar treatment using paint, delineators, or other devices can narrow the right-of-way at intersections to improve visibility and reduce turning vehicle speeds.
- + Curb extensions are popular measures to use as demonstration or pilot projects for high-visibility, high-impact traffic calming treatments.
- + In the absence of a physical curb element, temporary protection may be provided through delineators, planters, or other vertical elements. The curb extension space may be painted, patterned, or have other creative features to incorporate placemaking into the design.

LANE NARROWING

Lane narrowing is a low-cost traffic calming treatment that typically uses pavement markings for implementation. Lane narrowing reduces the width of travel lanes (i.e., from a 12-foot to a 10-foot width) to encourage slower and more cautious driving without reducing available vehicle capacity. The narrower widths can potentially be reinforced with rumble strips or physical elements like delineators or planters, and the space made available from narrowing the lanes can be used to serve other mobility or community purposes.

PURPOSE

Reducing lane widths can reduce vehicle speeds as it visually narrows the roadway.

DESCRIPTION

Lane narrowing typically occurs by restriping existing roadways with narrower lanes to encourage slower speeds and to reallocate the additional pavement width for other uses.

CRASH MODIFICATION FACTOR

Lane narrowing can reduce crashes by 31% in lower density areas (i.e., 12-foot travel lanes narrowed in advance of intersections). 9-foot lanes, where feasible, have demonstrated crash reductions on roads with posted speeds of 30-35MPH.

CATEGORY

Cross-section Change
Street Width Reduction

ESTIMATED COST



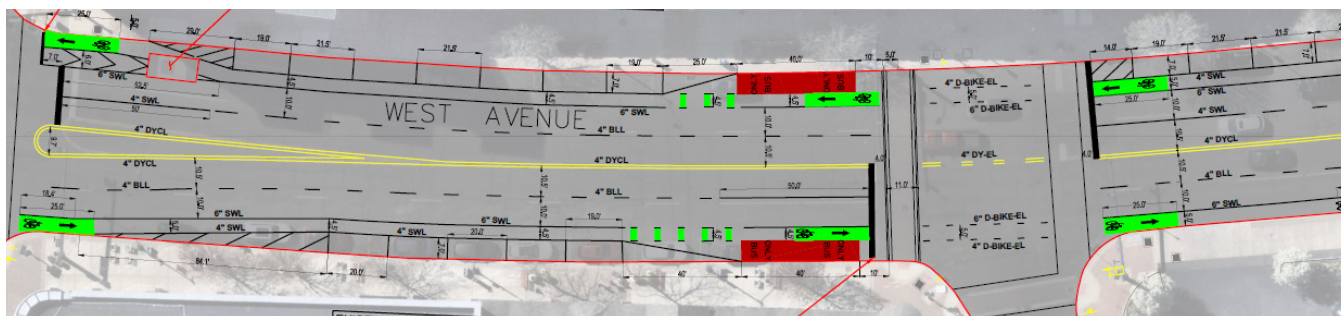
APPLICABLE LOCATIONS

- + Lane narrowing may be an effective tool at transition zones to communicate a sense of enclosure as drivers transition to a slower speed area.
- + Lane narrowing may be appropriate in all contexts, especially in Urban and Town Center areas where there are more pedestrians and bicyclists.

SAFETY BENEFITS

- + Narrower lanes and the sense of enclosure they elicit can encourage drivers to focus and pay more attention than in less constrained areas where drivers feel more confident at higher speeds.
- + Increase available space for safer pedestrian and bicycle facilities.

LOCAL EXAMPLE

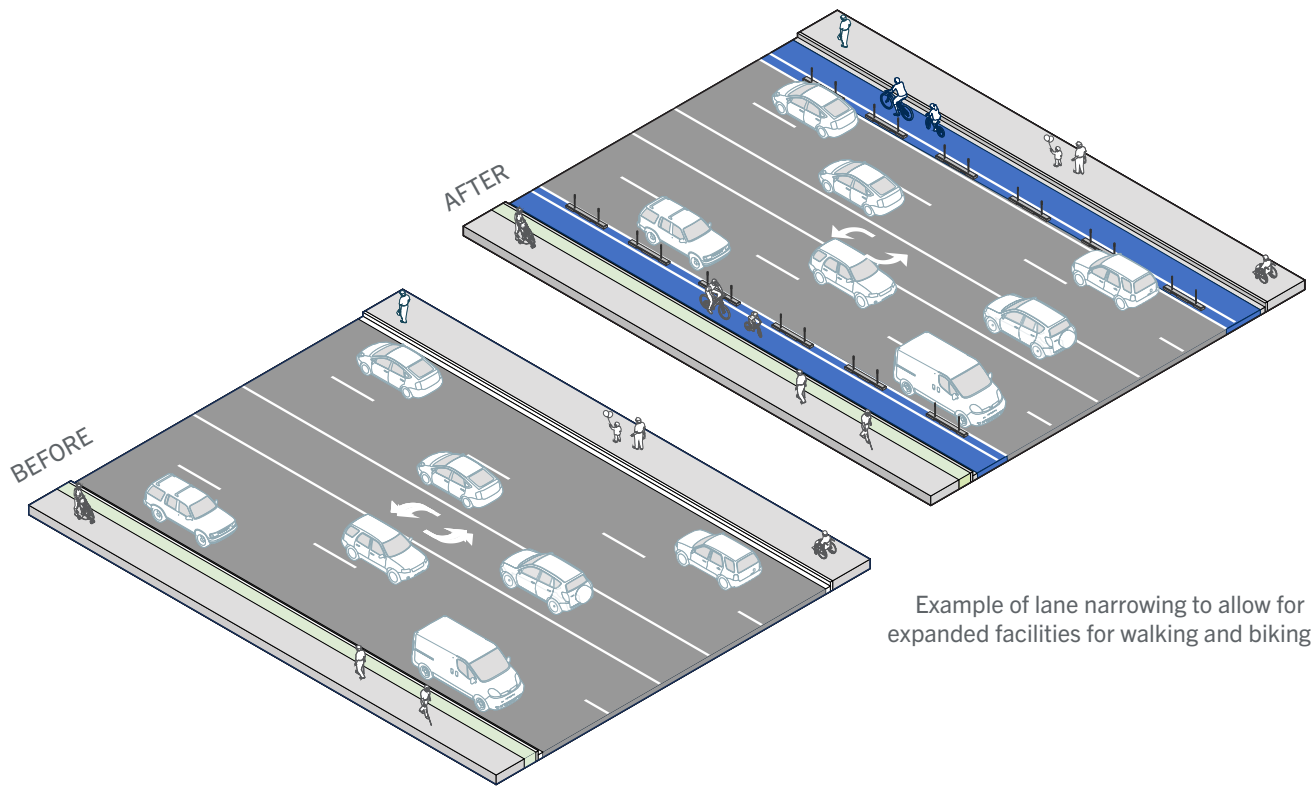


West Avenue - lane narrowing pavement marking plan in Norwalk, CT (source: City of Norwalk)

REFERENCES

[*FHWA Small Town and Rural Multimodal Networks*](#)

[*AASHTO Guide for the Development of Bicycle Facilities*](#)



Example of lane narrowing to allow for expanded facilities for walking and biking

GUIDANCE

- + Travel lanes should be narrowed to 10-feet where only passenger vehicles are expected to operate. A 9-foot lane width may also be considered in constrained areas as they have been studied in some urban environments and have shown beneficial safety effects.
- + 11-foot lanes are most common and accepted where buses and other heavy vehicles (e.g., freight trucks) operate.
- + Lane narrowing should be especially prioritized at intersections and on approach to crosswalks where more conflict is expected and slowing vehicle speeds is more important. Turning lanes can typically be 10-feet wide regardless of vehicle type.
- + Physical barriers similar to curb extensions can help reinforce narrowed lanes in key areas, encouraging drivers to slow down and providing a safe refuge for pedestrians if needed.
- + Presents an opportunity to reallocate hardscape surface and pavement with pervious surface or green infrastructure.
- + Lane narrowing should consider emergency vehicle access. Emergency vehicles typically need 20 feet of unobstructed space for access.
- + In most jurisdictions, 11-foot lanes are considered appropriate for bus access. With lane narrowing, there may be opportunities to expand curbside space for bus stops.



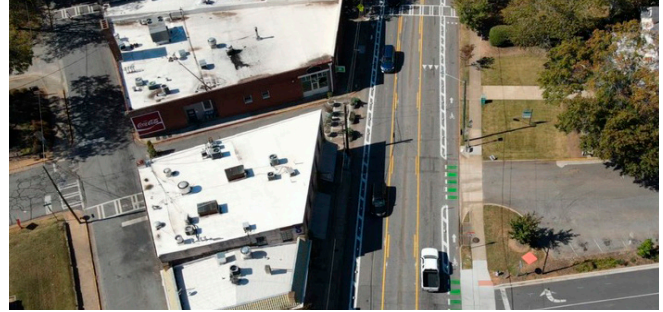
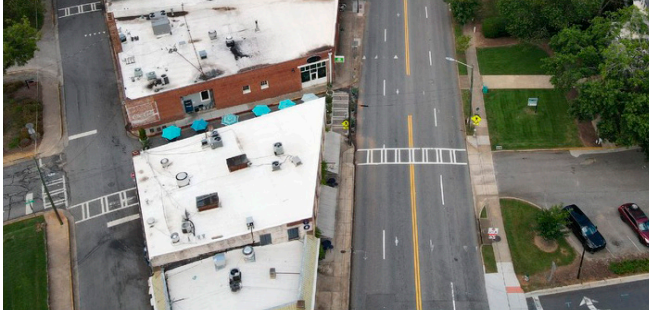
Lane narrowing paired with a physical bumpout in a School Zone in Bethesda, MD



Lane narrowing on a residential street in Denver, CO

LANE RECONFIGURATION

Lane reconfiguration, also known as a road diet, provides an opportunity to redesign the right-of-way for significant safety and traffic calming elements without major construction. These projects redesign the roadway to feature fewer but better organized travel lanes, and typically convert a four-lane roadway into a design with one lane in each direction and a center turn lane. The space made available by reducing and narrowing travel lanes can be reclaimed for pedestrian and bicycle infrastructure, transit, parking, or other streetscaping to support placemaking.



Before and after images of a lane reconfiguration project in Athens, GA

PURPOSE

Removing lanes and reconfiguring space reduces vehicle speeds by visually decreasing and narrowing the roadway.

DESCRIPTION

Lane Reconfiguration or Road Diet refers to the removal of motor vehicle lanes from a street's cross-section which opens up reallocated space to be used for various purposes (e.g., wider sidewalks, landscaped spaces, street trees, stormwater infrastructure, bike lanes, parking, etc.). The FHWA offers a Road Diet Informational Guide for recommended design treatments and configurations depending on the context of the street.

CRASH MODIFICATION FACTOR

In practice, for the typical case of a 4-lane to 3-lane conversion, a road diet has been shown to reduce crashes by 47% in suburban areas and

CATEGORY

Cross-section Change
Street Width Reduction

ESTIMATED COST

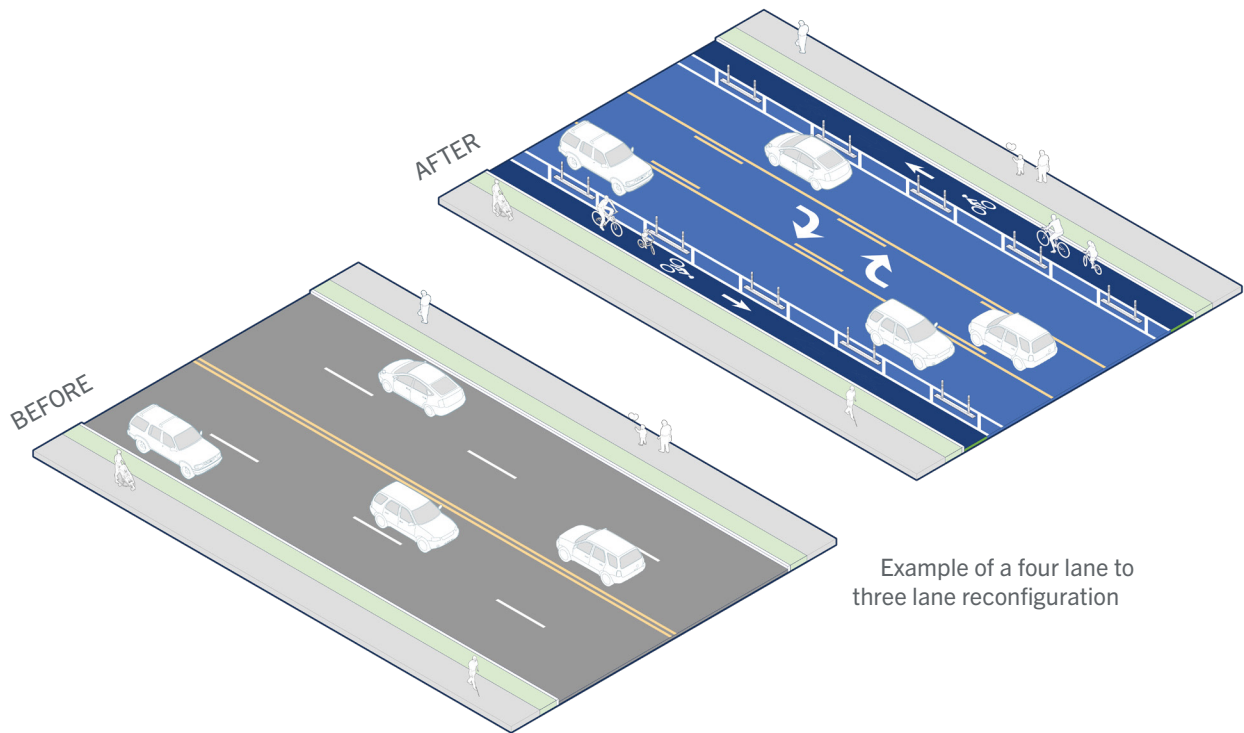


Lane Reconfiguration in Athens, GA

REFERENCES

[FHWA Road Diet Informational Guide](#)

[FHWA Achieving Multimodal Networks](#)



APPLICABLE LOCATIONS

- + Lane reconfiguration may be appropriate in all contexts, especially in Urban and Town Center areas where there are more people using multimodal options. In rural and transition zones, where design speeds may be higher, longer taper lengths are needed when transitioning from an area with multiple lanes to fewer lanes. Typically, a road diet is implemented on a roadway with average daily traffic of 20,000 vehicles or less.
- + Residential areas generally do not have multiple lanes and lane reconfiguration may not be needed. These areas may benefit from other street width reduction measures.

SAFETY BENEFITS

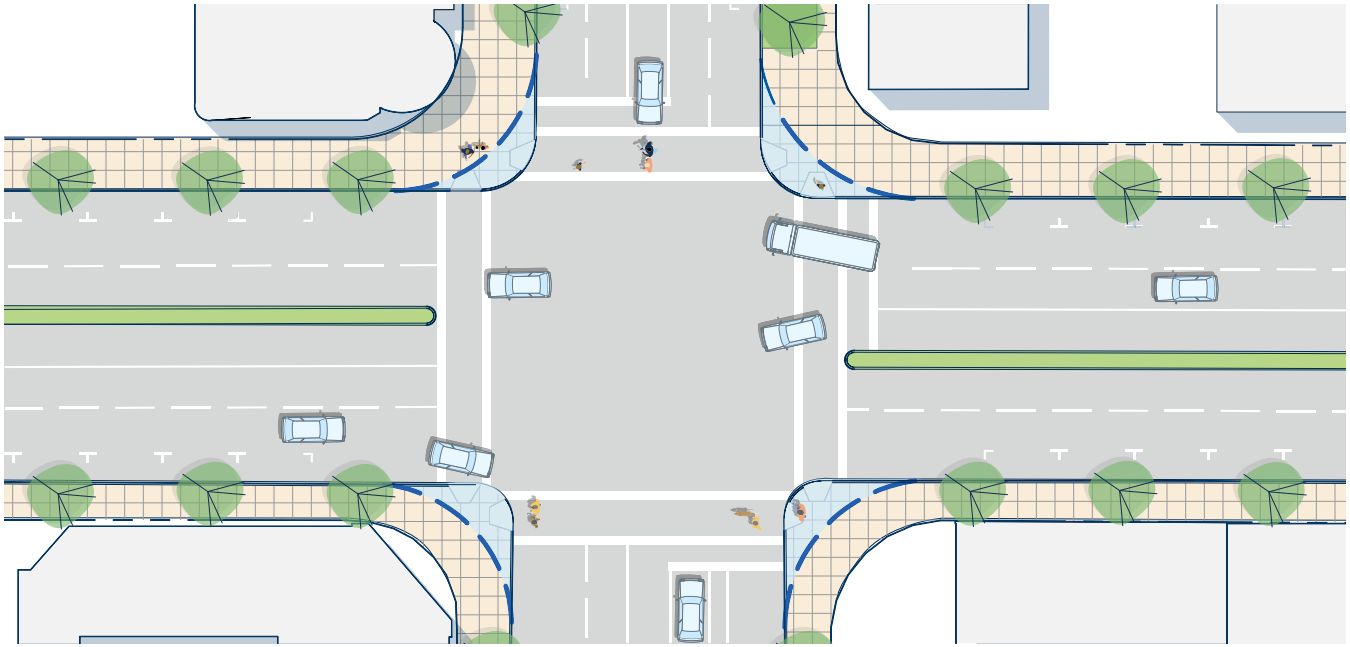
- + Lane reconfiguration has the benefit of reducing motorists' speed as it visually narrows and decreases the roadway.
- + Reducing lanes to one in each direction removes the ability for speeding drivers to pass those traveling at the posted speed.
- + Reallocation of space can support mobility goals through safer facilities for biking walking, and rolling and safer, shorter crossing distances.

GUIDANCE

- + Some agencies have had success with road diets at higher traffic volumes. The goals of the project should inform if road diets are recommended at higher volume roadways. E.g., if the project is primarily focused on making roads and intersections safer for pedestrians, the safety benefits for pedestrians and motorists should be weighed proportionally.
- + Consideration of the whole roadway network may also be needed when assessing these design decisions.
- + Opportunity to reallocate hardscape surface and pavement with pervious surface or green infrastructure.
- + Work with responders to understand their needs and ensure designs do not cause congestion that would severely impede access along a primary emergency vehicle route or street.
- + There may be opportunities to reallocate space for bus lanes, transit signal priority, and enhanced bus stops access.

LOW-SPEED CORNER RADII

Smaller curb radii improve pedestrian safety by shortening crossing distances and slowing turning vehicles. Low-speed corner radii can extend the physical curb or use flexible barriers or pavement markings to reduce the curb radius. However, designs need to safely accommodate larger vehicles like school buses, emergency vehicles, and delivery trucks while keeping the intersection as compact as possible. This measure requires design flexibility and engineering judgment for each intersection's unique context.



APPLICABLE LOCATIONS

- + Appropriate for intersections in all contexts and typically where there are curbs.
- + Implementation of low-speed corner radii with pavement markings and flexible materials is more appropriate in Urban and Town Center settings with maintenance capacity for these materials.
- + In less dense areas, corner radii can be effective for communicating a change in environment (i.e., turning from a rural roadway onto a local or residential street).



A quick-build example of low-speed curb radii in Bentonville, AR



Low-speed curb radii with delineators in Milwaukee, WI

REFERENCES

[*FHWA Small Town and Rural Multimodal Networks*](#)

[*AASHTO Guide for the Development of Bicycle Facilities*](#)

PURPOSE

Low-speed corner radii discourage drivers from turning quickly from one street to another. Slower turns provide better visibility for people crossing the street, people in bike lanes, and other drivers.

DESCRIPTION

When a curb radius at an intersection or driveway corner is narrowed or reduced, drivers are forced to slow down as they turn from one street to another. Low-speed corner radii can be achieved by reconstructing the curb radius itself or using pavement markings and other flexible barriers.

CRASH MODIFICATION FACTOR

Research suggests that changing right-turn lane geometry to increase line of sight by sharpening the approach angle, reducing the corner radius and adjusting stop/yield bars, can improve safety by increasing the line of sight of approaching traffic by 59%

CATEGORY

Cross-section Change

ESTIMATED COST



GUIDANCE

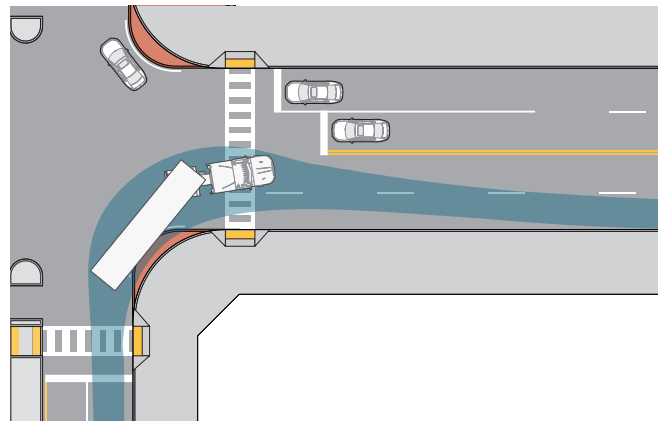
- + Corner radius can be as narrow as 2 feet (usually in urban settings) to be feasible for construction.
- + If vehicles are not turning from or to a lane directly adjacent to the curb, the effective radius will be larger and should be used to understand potential turning speeds. Physical radii may be built to a smaller dimension than the effective radius in this case, or a curb extension can be provided to expand the pedestrian area.
- + Appropriate design and control vehicles should be considered in setting the corner radius. Mountable truck aprons may be used to accommodate the design vehicle while still encouraging slower speeds for personal vehicles.
- + If transit vehicles are making turns around the corner, a low-speed corner radius should be designed to accommodate appropriate transit vehicles.
- + In some cases, it may be possible to allow a large turning vehicle to encroach on the adjacent travel lane on the departure side (on multi-lane roads) to make the turn.
- + Intersection design should strive for the minimum curb radius that accommodates a frequent design vehicle.

SAFETY BENEFITS

- + Reduces the speed of vehicles when making turns
- + Shortens pedestrian crossing distances and makes pedestrians more visible
- + May reduce the risk of pedestrians in collisions or conflicts with right-turn vehicles

CONSIDERATIONS

- + Low-speed corner radii can be achieved as a pilot demonstration through the use of paint, planters, or delineators.



Larger design vehicle interaction with low-speed corner radii

REALIGNED INTERSECTION

Strategies to realign intersections focus on adjusting the geometry to incorporate 90-degree turning movements. Historically, municipal requirements and industry materials have recommended wider-than-necessary turning radii to accommodate the largest possible design vehicle, but this added space leads to drivers making turns at higher more dangerous speeds. At 90-degree angles, drivers must slow down and be intentional about their turning movement; pedestrians benefit from shortened crossing distances and increased rates of yielding by drivers.

PURPOSE

Skewed approaches to an intersection can create horizontal deflection and promote slower motorist speeds through the intersection.

DESCRIPTION

A realigned intersection is the reconfiguration of an intersection with perpendicular angles to have skewed approaches or paths.

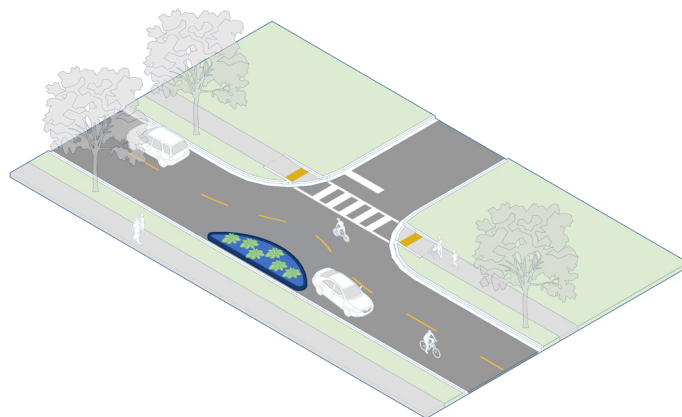
CRASH MODIFICATION FACTOR

CMF not available

CATEGORY

Periodic Measure
Horizontal Deflection

ESTIMATED COST



SAFETY BENEFITS

- + Can improve pedestrian safety: Improved geometry can reduce conflict points and improve visibility between users.
- + Can reduce speed within the intersection
- + Provides opportunity for landscaping

GUIDANCE

- + Emergency response needs are often one of the rationales used to justify oversized turn radii and swooping curves. Engage first responders early and often in the process to ensure and demonstrate adequate turning movements and minimal response time impacts.
- + A realigned intersection should be designed to accommodate people riding bicycles and pedestrians comfortably through the geometry.
- + Intersections can be realigned to provide opportunity for landscaping or plantings to capture stormwater runoff. They can be designed to maintain existing drainage patterns.

APPLICABLE LOCATIONS

- + Appropriate at local and collector streets in Urban, Town Center, Suburban Residential and select Rural Residential settings.
- + Typically implemented in areas with existing curbs.
- + Intersection realignment projects often adjust curb radii to be 90 degrees to reduce turning speeds and conflicts.
- + May be appropriate for buses if adequate curb radii is provided.

REFERENCES

[*FHWA Traffic Calming ePrimer*](#)

[*ITE Traffic Calming Fact Sheets*](#)

[*Manual on Uniform Traffic Control Devices*](#)

YIELD STREETS

Yield streets are low speed and low-volume narrow, two-way streets without a marked centerline. Due to the constrained width, two vehicles traveling in opposite directions must negotiate passing more intentionally than on a wider conventional street: drivers must yield to one another in order to move. Yield streets can function as a shared space with all users sharing the narrow right-of-way. On-street parking may be available on alternating sides in some instances.

PURPOSE

Yield Streets are narrow streets on which users must yield to one another to travel along the street or pass.

DESCRIPTION

Yield Streets are low volume and slow speed streets that allow bidirectional travel but are designed with a single travel lane. As a result, any oncoming vehicles must yield to one another as they travel the street and pass each other. All users share the street, allowing the street to function as a shared space.

To allow for this negotiation of movement, the *NACTO Urban Street Design Guide* recommends that there is limited on-street parking and the availability of frequent driveways or other spaces to pull over and pass.

CRASH MODIFICATION FACTOR

CMF not available

CATEGORY

Cross-section Change
Street Width Reduction

ESTIMATED COST



Yield Street in Denver, CO

REFERENCES

[*FHWA Small Town and Rural Multimodal Networks*](#)

[*Manual on Uniform Traffic Control Devices*](#)

[*NACTO Urban Street Design Guide*](#)

APPLICABLE LOCATIONS

- + Yield streets are appropriate on a low-volume local or residential road where on-street parking utilization is low

SAFETY BENEFITS

- + At low-volume and low-speed, pedestrians and bicyclists may comfortably maneuver within the yield street. This is especially true in contexts where there are no curbs or sidewalks.

GUIDANCE

- + In urban settings, a yield street with parking on both sides can function most effectively at 24-28 feet, while a yield street with parking on just side can be a minimum of 16 feet.
- + On more rural settings, the total traveled way may vary from 12 feet to 20 feet. Regular passing or pull-out areas should be considered on yield streets narrower than 15 feet in width. The recommended spacing pullout areas is every 200-300 feet. Pull-out spaces may be within an on-street parking lane, a roadside area such as a shoulder, or within the clear space in-front of a driveway.
- + A yield street should not be marked with a center line to emphasize ambiguity and slow-speed environment.
- + Emergency vehicles typically need 20 feet of unobstructed space for access. Coordination with Fire and Emergency Services is recommended when considering yield streets that are narrower than 20 feet.
- + Yield Streets will typically not support transit service due to the constrained width.

BICYCLE LANES

Bicycle lanes provide a dedicated lane for people traveling on bicycles that is separate from vehicles and other users. Bicycle lanes may be separated by a single marked line or with a buffer space to provide more clearance from nearby travel lanes. In some instances, the buffer area may include physical elements to protect the lane from vehicle intrusion - these are known as protected bicycle lanes.

PURPOSE

Buffered and conventional bike lanes provide exclusive space for people riding bikes using pavement markings. Bike lanes also alert other road users to be on the lookout for people biking.

DESCRIPTION

Buffered and conventional bike lanes are on-street bikeways delineated from the vehicular travel lane using pavement markings. Buffered bike lanes use buffer striping while conventional bike lanes are delineated with a single edge line. Both facilities are marked with bicycle symbols to reinforce their designation. Buffered bike lanes are preferred over conventional bike lanes to provide more separation for cyclists.

CRASH MODIFICATION FACTOR

Installing bicycle lanes reduces crashes by 31-57%

CATEGORY

Cross-section Change
Pedestrian and Bicycle Facilities

ESTIMATED COST



APPLICABLE LOCATIONS

- + Buffered and conventional bike lanes may be appropriate in most contexts, especially in Downtown, Urban, and Town Center areas where there are more people using active modes. They may also be implemented in residential areas where space allows.

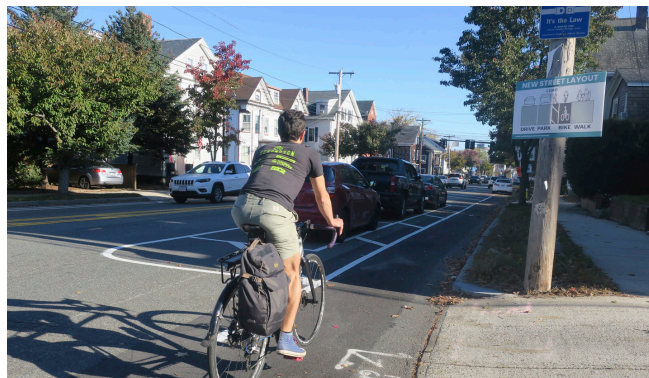
REFERENCES

[AASHTO Guide for the Development of Bicycle Facilities](#)

[FHWA Small Town and Rural Multimodal Networks](#)



Conventional Bicycle Lane in San Francisco, CA



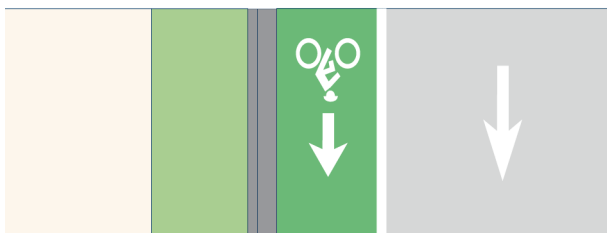
Buffered bicycle lane with on-street parking protection in Salem, MA



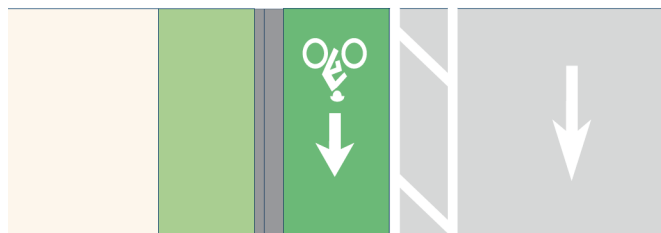
Buffered bicycle lane in Portland, OR



CONVENTIONAL BICYCLE LANE



BUFFERED BICYCLE LANE



GUIDANCE

- + Appropriate on streets where bicycle use is expected, or where a bicycle network connection has been identified.
- + Buffered or conventional bike lanes can be implemented:
- + On streets with 2000-6000 vehicles/day and ≥ 25 MPH operating speeds.
- + On streets with minimal curbside activity and a single lane in each direction.
- + On street segments with high turnover parking, a buffer should be provided between the bike lane and the parking lane to mitigate dooring risk.
- + On street segments with low turnover of parking or no parking, the buffer should be placed between the bike lane and vehicle lane to increase separation.
- + For higher speed and volume streets, consider fully separated bike lanes. For lower volume and speed streets, a bicycle boulevard treatment may be appropriate.

Bicycle Lane Dimensions

	Minimum Dimension	Recommended Dimension
Bicycle Lane	5 feet	6 feet
Buffer	2 feet	3-6 feet

SAFETY BENEFITS

- + Implementing buffered or conventional bike lanes may require reallocating roadway space away from motor vehicles through lane narrowing, road diets, or a reduction in parking space. Both lane narrowing and road diets have the benefit of reducing motorists' speed as they visually narrow and decrease the roadway width.

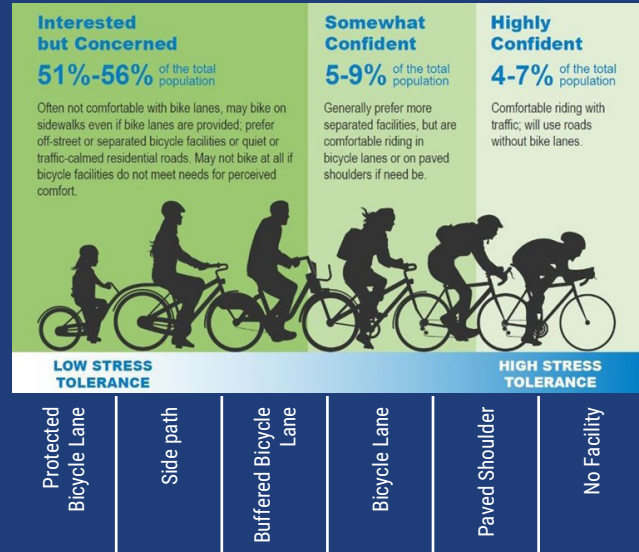
DETERMINING THE APPROPRIATE BICYCLE FACILITY

Bikeway designs vary in the level of separation or protection offered from other roadway users. This results in varying levels of comfort when using the bicycle lane, and specifically when considering the different types of users.

Studies suggest more than half of people are "interested but concerned" bicyclists, who are unlikely to ride unless there is a separate and safe option such as a side path or protected bicycle lane. On the other side of the spectrum are the highly confident riders, who comprise around 5% of the total population, and will ride without any facilities.

Too often, bicycle networks are designed for the highly confident, rather than focusing on connected and high-quality bikeways. When selecting designs, municipalities should aim to maximize comfort for the all users and prioritize less confident bicyclists.

This Toolbox refers to the CTDOT Bicycle Facility Selection Guide to determine the appropriate bicycle facility given the context (e.g., Rural Residential or Urban areas) and roadway characteristics such as volume and speed. The tables below present selection criteria for different bicycle facility types.



Bicycle User Types and examples of the facilities that typically would feel comfortable for each

DOWNTOWN, URBAN, SUBURBAN AND RURAL TOWN CENTER CONTEXTS

Consideration		Protected Bicycle Lane	Side path	Buffered Bicycle Lane	Bicycle Lane	Paved Shoulder
Traffic Volume (ADT)	0-5,000	★	★	★	●	●
	5,000 - 10,000	★	★	●	◐	◐
	10,000 - 18,000	●	●	●	◐	◐
	18,000 - 20,000	●	●	◐	—	—
	20,000 - 25,000	●	●	◐	—	—
	25,000+	●	●	—	—	—
Posted Speed (MPH)	<25	★	★	★	●	●
	30	★	★	★	●	●
	35	★	★	●	◐	◐
	40	●	●	●	◐	◐
	45	●	●	◐	○	○
	>45	●	●	○	—	—

★ = Premium Facility, ● = Recommended Facility, ◐ = Acceptable Facility, ○ = Provisional Facility, — = not recommended

SUBURBAN RESIDENTIAL, RURAL RESIDENTIAL, AND RURAL CONTEXTS

Consideration		Protected Bicycle Lane	Side path	Buffered Bicycle Lane	Bicycle Lane	Paved Shoulder
Traffic Volume (ADT)	0-5,000	—	★	★	●	●
	5,000 - 10,000	—	★	●	◐	◐
	10,000 - 18,000	—	★	●	◐	◐
	18,000 - 20,000	—	★	●	—	—
	20,000 - 25,000	—	★	●	—	—
	25,000+	—	★	●	—	—
Posted Speed (MPH)	<25	—	★	★	●	●
	30	—	★	★	●	●
	35	—	★	●	●	●
	40	—	★	●	◐	◐
	45	—	★	●	◐	◐
	50+	—	★	●	—	—

★ = Premium Facility, ● = Recommended Facility, ◐ = Acceptable Facility, ○ = Provisional Facility, — = not recommended

ADVISORY BICYCLE LANES

On streets where there may not be enough available width to accommodate a conventional bicycle lane, municipalities can apply for a Request to Experiment and install advisory bicycle lanes. Advisory Bicycle Lanes use a dashed line to note bicycle access and often provide an unmarked center area for vehicles (i.e., no striped centerline).

PURPOSE

Advisory bike lanes provide space for people biking in constrained conditions on low-volume, low-speed streets that are too narrow for conventional bike lanes.

DESCRIPTION

Advisory bike lanes are marked with continuous dashed lines. Vehicles may temporarily enter the advisory bike lanes when there are no bicyclists present to allow oncoming traffic to pass safely.

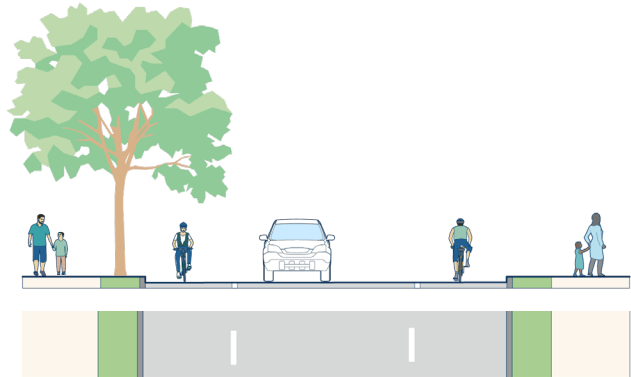
CRASH MODIFICATION FACTOR

CMF not available

CATEGORY

Cross-section Change
Pedestrian and Bicycle Facilities

ESTIMATED COST



GUIDANCE

- + Preferred width of advisory bike lanes: 6 feet.
- + Minimum width of advisory bike lanes is 4 feet when no curb and gutter is present.
- + A two-way center lane width should have a preferred width between 13.5-16-feet wide. 10 feet is the practical minimum while 18 feet is the absolute maximum width.

APPLICABLE LOCATIONS

- + Advisory bike lanes are considered experimental and require a Request to Experiment from FHWA
- + If experimental approval is granted, advisory bike lanes can be considered for constrained conditions on low-volume, low-speed streets that are too narrow for conventional bike lanes.

SAFETY BENEFITS

- + Advisory bike lanes involve providing a narrow central lane which has the benefit of reducing motorists' speed as it visually narrows and decreases the roadway width.

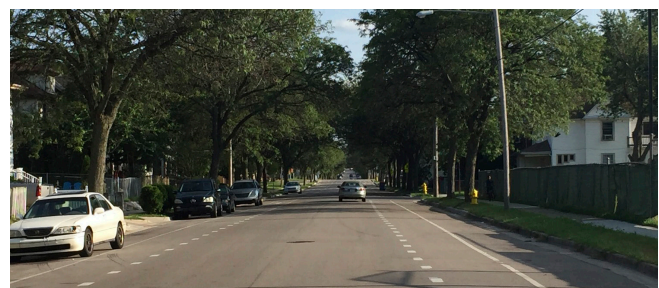
REFERENCES

[FHWA Small Town and Rural Multimodal Networks](#)

[AASHTO Guide for the Development of Bicycle Facilities](#)



Advisory Bicycle Lanes in Amsterdam, NL



Advisory Bicycle Lanes in Grand Rapids, MI

BICYCLE BOULEVARDS

Bicycle Boulevards, also referred to as Neighborhood Bikeways or Neighborhood Greenways, are low-volume, low-speed streets prioritizing the safety and comfort of people riding bicycles. Instead of relying on separated and defined bicycle facilities, bicycle boulevards use traffic calming measures to create a comfortable environment, and rely on wayfinding as a tool to create fully connected networks of boulevards where bicycles have priority over vehicles. Beyond bicyclists, these improvements support safety and comfort of all users and especially pedestrians.

PURPOSE

Bicycle Boulevards support low traffic volumes and speeds to create a comfortable shared bicycling experience.

DESCRIPTION

Bicycle Boulevards are low-volume, low-speed streets designed to prioritize bicycle travel using wayfinding signage, pavement markings, and traffic calming measures.

CRASH MODIFICATION FACTOR

Installing a bicycle boulevard can reduce crashes by 63%

CATEGORY

Cross-section Change
Pedestrian and Bicycle Facilities

ESTIMATED COST



SAFETY BENEFITS

- + Bicycle Boulevards can be a high comfort bicycle facility for streets with lower volumes and speeds. They can facilitate connections between busier routes where separated bike lanes are recommended.
- + Bicycle Boulevards often include traffic calming treatments such as speed humps, medians, and chicanes to reduce motorists' speed. Reducing speeds along a bike boulevard helps to improve the comfort and safety of bicyclists using the corridor.

GUIDANCE

- + At minimum, design elements for bicycle boulevards should include route identification tools such as signage, and shared lane markings.
- + Signage may include wayfinding signage (MUTCD D and M series) as well as "Bicycles May Use Full Lane" sign (MUTCD R4-11) to emphasize bicycle priority on a bike boulevard.
- + Though placing shared lane markings in the center of the travel lane is preferred to encourage motorists to yield to bicyclists, the following guidance can also be used in their placement:
 - + If used in a shared lane with on-street parallel parking, shared-lane markings should be placed so that the centers of the markings are a minimum of 12 feet from the face of the curb, or from the edge of the pavement where there is no curb.
 - + If used on a street without on-street parking that has an outside travel lane that is less than 14 feet wide, shared-lane markings should be placed so that the centers of the markings are a minimum of 4 feet from the face of the curb, or from the edge of the pavement where there is no curb.
- + Traffic calming measures such as speed humps, curb extensions, chicanes, and medians may also be applied on bicycle boulevard routes. Refer to individual design guidance for those treatments.

APPLICABLE LOCATIONS

- + Bicycle Boulevards should be implemented on local streets with ≤ 2000 vehicles/day and ≤ 25 MPH operating speeds.
- + Where vehicular traffic volumes are greater than the threshold, consider strategies to reduce traffic volumes including diagonal diverters or partially closing the roadway to vehicles while maintaining full bicycle access. These strategies maintain local motor vehicle traffic access while improving bicycle and pedestrian mobility.

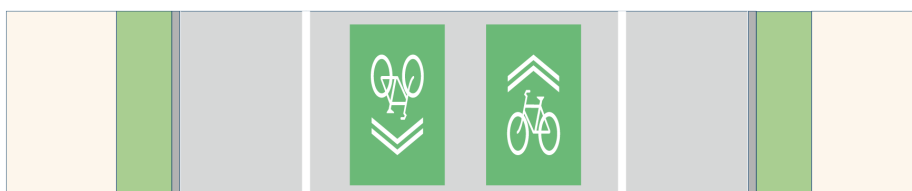
REFERENCES

[*AASHTO Guide for the Development of Bicycle Facilities*](#)

[*Manual on Uniform Traffic Control Devices*](#)



BICYCLE BOULEVARD - SHARING THE ROADWAY



Bicycle Boulevard Traffic Conditions			
	Hourly Traffic Volume (Peak) - vehicles/hour	Average Daily Traffic -vehicles/day	Operating Speed -MPH
Preferred	150	1,000	15
Acceptable	300	2,000	20
Maximum	450	3,000	25



Examples of wayfinding signage on Bicycle Boulevards

PROTECTED BICYCLE LANES

Protected bicycle lanes, also known as separated bicycle lanes, provide dedicated space for bicycles. Protected bicycle facilities can include shared-use paths which are shared by people walking and biking, which are typically separated from the roadway by a landscaped buffer. Protected bicycle lanes combine the safety and comfort benefits of a trail or shared-use path with the on-street connectivity and infrastructure of a bicycle bike lane.

PURPOSE

Protected bicycle facilities provide dedicated space for cyclists and vertical separation between people riding bikes and motorists, creating a high comfort biking experience for people of all ages and abilities.

DESCRIPTION

There are generally two types of protected bike facilities: *Shared-Use Path/Sidepath*

A shared-use path is a two-way, off-street facility that is physically separated from vehicular traffic for people of all ages and abilities using various active modes (e.g. riding bikes, walking, or using a mobility device). They are typically implemented within parks, or along waterways and railway corridors. When implemented along a roadway, they are referred to as sidepaths.

Separated Bike Lane

A separated bike lane provides exclusive space for people biking along or within a street that is separated from vehicular traffic using vertical elements. It may be designed as one-way bike lane on either side of the street or two-way bike lane on one side of the street. Separated bike lanes may be constructed with curbed buffer islands at street level or at sidewalk level. They may also be implemented at street level using paint and temporary vertical buffer elements such as flexible delineator posts, concrete barriers, or planters.

CRASH MODIFICATION FACTOR

Separated bike lanes using different types of barriers or parking configurations can reduce crashes by 54%

CATEGORY

Cross-section Change
Pedestrian and Bicycle Facilities

ESTIMATED COST



APPLICABLE LOCATIONS

- + Appropriate on all streets where a bicycle network is a priority
- + Protected bike facilities are more important on streets with higher vehicular volumes and speed to protect people biking:
 - Streets with volumes higher than 6,000 vehicles/day and/or 25 MPH operating speed
 - Areas with high curbside activity, more than one lane in each direction, high percentage of heavy vehicles, and/or high concentrations of children or seniors

SAFETY BENEFITS

- + Separated facilities are more comfortable for broader selection of user types — people with less confidence or experience and bicyclists of all ages and abilities feel comfortable using the facility.
- + Improved protection from vehicles and other roadway users.
- + Dedicated space reduces risk of bicyclists needing to swerve into a travel lane to avoid an obstacle.
- + Buffers and islands included in the design can double as pedestrian refuge islands or other streetscaping features to support community goals.

Design Guidance: Preferred and minimum dimensions

Bicycle Lane Dimensions		
	Minimum Dimension	Recommended Dimension
Shared-Use Path	10-11 feet	*See SUPLOS
One-way Separated Bicycle Lane	5 feet	6 feet
Two-way Separated Bicycle Lane	8 feet	10 feet

Buffer minimum 2 feet; 3 feet if adjacent to parking. Preferred buffer minimum 3-6 feet.

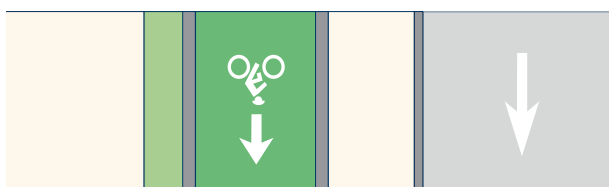
REFERENCES

[*AASHTO Guide for the Development of Bicycle Facilities*](#)

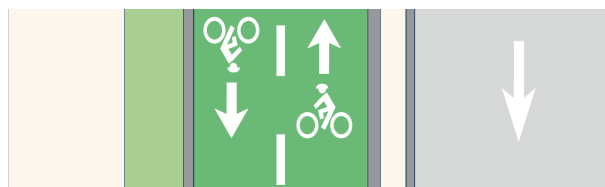
[*NACTO Urban Bikeway Design Guide*](#)



PROTECTED BICYCLE LANE



TWO-WAY PROTECTED BICYCLE LANE



GUIDANCE

- + Appropriate on streets where bicycle use is expected, or where a bicycle network connection has been identified and specifically for higher speed and higher volume streets.
- + Separated bike lanes may be implemented with different vertical elements that may create an enclosure effect to decrease speed. Similarly, shared-use paths and sidepaths may be implemented with landscaped buffers including trees to create enclosure and reduce speed.
- + Implementing protected bicycle facilities may require reallocating space away from motor vehicle travel via lane narrowing or a road diet, or by removing on-street parking.
- + Both lane narrowing and road diets have the benefit of reducing motorists' speed as it visually narrows and decreases the roadway.
- + Where space allows, parking lanes can also provide separation for separated bicycle facilities if enough buffer space is provided for the door-zone.



Protected bicycle lane in Salt Lake City, UT



Shared-use path with separated lanes based on direction and mode (walking or biking) in Bergen, Norway

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TRAFFIC CONTROL DEVICES

- Signs and Markings
 - Signals
 - Enforcement

REDUCING THE POSTED SPEED LIMIT

While traffic calming efforts to physically alter the design speed of a street can have significant direct impact on the speed drivers are operating on the street. However, lowering the posted speed limit to the target speed, such as 20 MPH, and reinforcing this through signs and markings is an effective tool. Lowered speed limits may be enforceable or advisory (i.e., recommended safe speeds that are not enforceable by law).

PURPOSE

A lower speed limit is the first step to achieving lower speeds, reducing the number and severity of crashes.

DESCRIPTION

Speed limit reduction is a policy tool that can be applied to individual streets, street typologies (all residential or local roads), or areas (school zones, neighborhood slow zones). Lower speed limits signal appropriate driver behavior, which can be particularly impactful in higher risk areas and in those where the road design speed might imply higher speeds are safe.

CRASH MODIFICATION FACTOR

A 15% reduction in mean speed can reduce crashes by 15% to 44%.

CATEGORY

Signs and Markings

ESTIMATED COST



SAFETY BENEFITS

- + Communicate safe speeds to drivers
- + Encourage slower driving
- + Create roadway environments more compatible with non-driver safety
- + Establish a legal basis for other traffic calming tools

REFERENCES

[CTDOT Speed Limit Certificates and Listings \(website\)](#)

[Manual on Uniform Traffic Control Devices](#)

[NACTO City Limits: Setting Safe Speed Limits on Urban Streets](#)

[NCHRP Report 504 – Design Speed, Operating Speed, and Posted Speed Practices](#)

APPLICABLE LOCATIONS

- + Appropriate at local and collector streets in Downtown, Urban, Town Center, and Residential (Rural and Suburban) settings, particularly where local land use is not aligned with high speed throughways.
- + Lower speed limits should be paired with signage, other traffic calming tools, and roadway reconstruction where design speed encourages faster travel.
- + Compliance is unlikely on higher speed arterials where speed limits and signage are less likely to dictate speeds than the road design speed.
- + Some jurisdictions have implemented blanket speed limit reductions to areas, such as the densely settled area speed limit reduction in Massachusetts.
- + Speeds of 25 MPH or less are recommended for streets with high pedestrian activity.

GUIDANCE

- + The most recent MUTCD endorsed a context-sensitive approach to speed limit setting, moving away from the 85th percentile approach.
- + New engineering approaches to speed limits, inclusive of road context, consider conflict density and activity level.
- + Operating speeds should be close to the posted speed limit. Other traffic calming tools should be used to close the gap if this is not the case.
- + CTDOT should be consulted before pursuing changes to speed limit. Petitions to reduce speed limits require approval from the Local Traffic Authority of the municipality (LTA) and from the Office of the State Traffic Administration (OSTA), unless the roadway is private or fully within the limits of the municipality.

SPEED FEEDBACK SIGNS

Speed feedback signs use radar technology to capture the speed of approaching vehicles; this real-time information is then presented on a feedback sign. In some instances, the feedback sign will flash the real-time speed if the driver is traveling faster than the posted speed limit, to bring awareness to this discrepancy and urge drivers to slow down. Feedback signs are often placed in transition zones, especially near School Zones or similar areas with high activity.

PURPOSE

Speed feedback signs provide awareness to motorists of their speed and can help motorists better comply with posted speed limits. Speed feedback signs are particularly useful in situations where traffic is less congested in order to draw attention to speeding.

DESCRIPTION

A speed feedback sign is a dynamic message sign that uses radar or laser technology to determine the speed of an approaching vehicle and then displays the speed to the motorist.

CRASH MODIFICATION FACTOR

Speed feedback signs have shown to reduce the number of expected crashes by around 5%

CATEGORY

Signs and Markings

ESTIMATED COST



LOCAL EXAMPLE



Speed feedback sign in a school zone (source: City of Norwalk)



W13-20



W13-20aP

MUTCD standards for speed feedback signs (W13-20 and W13-20aP; source: MUTCD)

SAFETY BENEFITS

- + Speed feedback signs can reduce speeds and speed-related crashes by alerting drivers when they are traveling above the posted speed limit.

GUIDANCE

- + Per the 11th Ed. of the MUTCD Section 2c.13, the signs should be black text on a yellow background.

APPLICABLE LOCATIONS

- + Speed feedback signs may be appropriate in transition zone settings where there is a change in speed limit or land-use expected.
- + Signs are appropriate at locations where speeding is observed however, signs should be paired with other traffic calming measures to ensure longer-term compliance.
- + Speed feedback signs may also be appropriate in locations where there are changes to the posted speed limit during specific times and days of the week (i.e. during school hours).

SPEED LIMIT PAVEMENT MARKINGS

Speed limit pavement markings reinforce the posted speed limit to drivers in a highly visible way. With pavement markings noting the speed limit, drivers are alerted to the appropriate driving speed. These markings are typically used in transition zones to encourage drivers to adapt their driving behavior to the surrounding context.



Speed limit pavement marking in Mountain View, CA

PURPOSE

Speed Limit Pavement Markings provide a visual cue for motorists to slow down to a desired design speed fitting the context of the roadway.

DESCRIPTION

In-lane pavement markings that communicate to motorists to slow to a posted speed or a speed fitting the context of the roadway.

CRASH MODIFICATION FACTOR

CMF not available, however, a study in Arlington, VA found a 47% reduction in drivers traveling more than 30 MPH after installing "20 MPH" pavement markings in school slow zones.

CATEGORY

Signs and Markings

ESTIMATED COST

\$

\$\$

\$\$\$

APPLICABLE LOCATIONS

- + Speed Limit Pavement Markings may be appropriate in transition zone settings where there is a change in speed limit or land-use expected.

SAFETY BENEFITS

- + Increases driver awareness to posted speeds and/or changes to posted speeds along a corridor.

GUIDANCE

- + Speed limit pavement markings are meant to supplement other advisory signs such as posted speed limit signs and/or speed feedback signs.
- + Speed limit pavement markings will require coordination and approval from Office of the State Traffic Administration (OSTA).

REFERENCES

[*NACTO City Limits: Setting Safe Speed Limits on Urban Streets*](#)

[*Manual on Uniform Traffic Control Devices*](#)

TRANSVERSE RUMBLE STRIPS

Traditionally, rumble strips are most recognizable as grooved or raised lane departure treatments applied only at the edges of a travel lane to alert drivers if they drift outside of the lane; however this form of rumble strip does not offer traffic calming benefits. When applied across the full width of a travel lane and paired with markings, transverse rumble strips get drivers' attention through the vibration and noise created as vehicles travel over them. This encourages drivers to slow down quickly. Transverse rumble strips are especially effective in areas where upcoming changes to the context or roadway require significantly reduced speeds, such as transition zones.

PURPOSE

Rumble strips alert motorists to slow down as a response to change in environment.

DESCRIPTION

Transverse rumble strips are a series of grooves cut across a lane into the pavement to act as an advanced warning device.

CRASH MODIFICATION FACTOR

Transverse rumble strips have a CMF of 0.66

CATEGORY

Signs and Markings

ESTIMATED COST



APPLICABLE LOCATIONS

- + Transverse rumble strips may be appropriate in transition zone settings where there is a change in speed limit or land-use expected.
- + Since transverse rumble provides auditory signal, these strips should not be implemented in densely populated areas due to the anticipated noise pollution.

SAFETY BENEFITS

- + When driven over, the transverse rumble strips produce sounds and vibrations to warn motorists to slow down.

REFERENCES

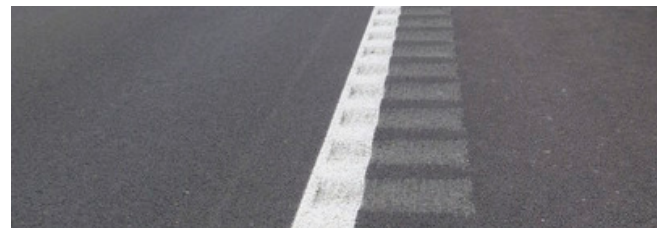
[*FHWA Traffic Calming ePrimer*](#)

[*ITE Traffic Calming Fact Sheets*](#)

[*Manual on Uniform Traffic Control Devices*](#)



Transverse rumble strips and markings in Cottage City, MD



In contrast, a more common application of rumble strips along the edge of the lane (i.e., centerline or shoulder) on higher-speed roads to reduce lane departures by alerting drivers that they have exited the travel lane; a safety treatment that does not offer traffic calming benefits

GUIDANCE

- + Transverse rumble strips should be placed perpendicular to the direction of traffic. They may be placed in a series with typical spacing of 100-200 feet between strips on the approach to a change in environment or traffic control.
- + Milled rumble strips are preferable over raised rumble strips as raised rumble strips may make snow plow operations difficult.

PROTECTED TURN SIGNAL PHASING

Protected turn signal phasing provides drivers with a dedicated green arrow while restricting other movement and crossing at the intersection. The dedicated phasing improves predictability for turning drivers and can reduce conflicts with opposing traffic or crossing pedestrians and bicyclists. While most commonly applied in areas with high pedestrian activity and areas with high demand for turns, protected turn signal phasing can be applied in less dense areas where topography or other contexts and constraints limit sight distance.

PURPOSE

Protected turn signals eliminate conflicts between left and right turning motor vehicles, opposing through motor vehicles and crossing pedestrians.

DESCRIPTION

Protected turn signals provide an exclusive phase for left or right turns, prohibiting conflicting through movements and pedestrian crossings.

CRASH MODIFICATION FACTOR

Updating signals to feature a protected turn phase can reduce crashes by more than 55% (CMF of 0.452 when changing from permissive to protected turn signal phases)

CATEGORY

Signals

ESTIMATED COST

\$

\$\$

\$\$\$

APPLICABLE LOCATIONS

- + Community cores such as Town Centers and areas of high pedestrian activity, where turning vehicles create frequent conflict with crossing pedestrians
- + Signal phasing may be an effective measure in areas with notable turn queuing, however, dedicated phases may lead to overall travel time increases by reducing the overall throughput capacity in each signal cycle

SAFETY BENEFITS

- + Reduced conflict points between motor vehicles and other modes, which may reduce crashes
- + Increased clarity in intersections for drivers

GUIDANCE

- + Protected turn signal phasing is appropriate on streets with high pedestrian or bicycle activity and high (or disproportionate compared to through-traffic) volumes of vehicle turning movements, especially left turns
- + Implementation may include variable plans to allow permissive turn phasing in off-peak times, such as removing the protected turn signal cycle overnight
- + Clear pedestrian signals, and especially paired with leading pedestrian intervals, are effective to reduce confusion for crossing pedestrians to avoid crossing during the turn phase
- + For most cases, FHWA recommends protected turn signal phasing measures at intersections with more than 5,500 pedestrians per day



Protected turn signal phasing in Cambridge, MA

REFERENCES

[NACTO Urban Street Design Guide](#)

[NCHRP Report 812: Signal Timing Manual](#)

[FHWA Safety Evaluation of Protected Left-Turn Phasing and Leading Pedestrian Intervals on Pedestrian Safety](#)

RECTANGULAR RAPID FLASHING BEACONS (RRFB)

RRFBs are highly visible warning beacons that alert drivers to crossing pedestrians at uncontrolled crossings locations, typically where desire lines make crossing convenient but otherwise unsafe. These signals are user-activated and feature flashing lights and signage on both sides of the road.

PURPOSE

Used in combination with warning signage, rectangular rapid flashing beacons (RRFB) provide a high-visibility warning to drivers when pedestrians are using a marked crosswalk.

DESCRIPTION

RRFBs are a pedestrian safety countermeasure that improve safety at uncontrolled, marked crossings. Different from a pedestrian hybrid beacon (PHB), RRFBs consists of two rectangular-shaped yellow indicators with an LED light source that flashes with high frequency when activated. RRFBs are often placed at locations with significant pedestrian safety issues but may also be located at a school or trail crossing.

CRASH MODIFICATION FACTOR

RRFBs have been found to reduce pedestrian crashes by up to 47%.

CATEGORY

Signals

ESTIMATED COST



APPLICABLE LOCATIONS

- + RRFBs are appropriate in a range of contexts and environments, most often found in community or village areas where pedestrian crossing activity is expected
- + School zones, trail crossings, and mid-block crossings are typical use cases for RRFBs

LOCAL EXAMPLE



RRFB on Union Avenue in Norwalk, CT (source: City of Norwalk)

SAFETY BENEFITS

- + Increased rates of motorist yielding.

GUIDANCE

- + An RRFB should not be used without a pedestrian crossing sign.
- + Advance warning signs or pavement markings can be used to supplement RRFBs.
- + Solar-power panels may eliminate the need for a power source.
- + RRFBs should only be used at locations with significant pedestrian safety issues. The overuse of RRFBs can diminish their effectiveness.
- + If a pedestrian refuge or other kind of median is present, an RRFB should be installed in the median.
- + Installing an RRFB on a State-owned road requires an encroachment permit and completion of the CTDOT RRFB Checklist.



AUTOMATED SPEED ENFORCEMENT

Automated speed enforcement allows municipalities to enforce speeding and other traffic violations without relying on human interaction to identify violations and issue citations. Often sited at intersections or in slow areas, such as school zones, automated speed enforcement uses cameras or other recording devices and sensors to capture evidence of drivers violating signals (e.g., red light running) or traveling above the posted speed limit. Citations are issued by mail alongside this visual evidence.

PURPOSE

Automated speed enforcement allows municipalities to continuously track and enforce traffic violations through the use of cameras and other recording devices.

DESCRIPTION

Automated speed enforcement, such as speed cameras or red-light cameras, use cameras to capture and record vehicles that are traveling above the posted speed or violating red light signals. Citations are issued by mail.

CRASH MODIFICATION FACTOR

ASE has been shown to reduce speeding violations by up to 75%, and to reduce the amount of injury-related crashes by 15-25%

CATEGORY

Signals

ESTIMATED COST



APPLICABLE LOCATIONS

- + Automated speed enforcement is suitable in Downtown, Urban, and Town Centers, as well as less dense areas where speeding presents a critical safety issue.
- + Automated speed enforcement is well-suited for areas with high pedestrian activity, school zones, and other safety priority areas (e.g., areas with a notable crash history or identified on a high-injury network).

SAFETY BENEFITS

- + Improves compliance with posted speed limits
- + Reduces crash frequency and severity

GUIDANCE

- + Siting of automated enforcement is contingent on local policies and legislation. In Connecticut, Automated Speed Enforcement was legalized by Act 23-116.
- + Locations must be vetted by CTDOT: Municipalities submit a request to install cameras in specific contexts, such as school zones, pedestrian safety zones, and other safety-sensitive areas.
- + Approved locations have to first post a warning to drivers of the enforcement before they may begin issuing fines.



Photo-enforced School Speed Sign

REFERENCES

[*FHWA and NHTSA Speed Safety Camera Program and Planning Operations Guide*](#)

[*FHWA Proven Safety Countermeasures*](#)



SOFTENING THE STREET

- Surface Changes
- Enclosure Effects

TEXTURED SURFACE AND PAVING

Pavement materials, textures, and designs can help craft a sense of place and alert drivers to a new environment. When applied to the full roadway, textured pavement creates a tactile and visual experience for all users. When used in specific areas, such as crosswalks, gateways, or intersections, the textured surface alerts drivers to operate with caution and slower due to the pedestrian-friendly surroundings. Textured surface treatments are very common tools for defining the unique environments of shared and curbless streets.

PURPOSE

Textured surfaces and paving are a gateway treatment that indicates a change in the environment, signifying a transition point and creating a zone that heightens motor vehicle awareness and reduces speed.

DESCRIPTION

A deliberate change in pavement surface material, color or texture (e.g., stamped asphalt, concrete pavers, bricks, resin/thermoplastic) to serve as a visual cue for drivers entering a new environment.

CRASH MODIFICATION FACTOR

Transverse rumble strips have a CMF of 0.66

CATEGORY

Surface Change

ESTIMATED COST



APPLICABLE LOCATIONS

- + Appropriate in Downtown, Urban, Town Centers, Residential areas, and within transition zones
- + Within intersections and crosswalks
- + Shared streets, plazas
- + School approaches or frontages

SAFETY BENEFITS

- + Heightened driver awareness and yielding
- + Reduced motorist speed

GUIDANCE

- + Surfaces must be firm, stable and smooth for ADA access.
- + Must remain within transverse crosswalk lines and must not reduce the contrast/legibility of legal markings.
- + Encourages speed reduction paired with other measures (e.g., curb extensions, gateway signs).



Surface texture and pavement designs in Denver, CO and Sulfur Springs, TX

TREE COVERAGE

Consistent tree coverage creates a sense of enclosure and visual narrowing of the right-of-way that makes a street feel more comfortable for walking, biking, or rolling, and also encourages drivers to operate more slowly and carefully. To be most effective, trees should be placed evenly to create a consistent rhythm of the environment.

PURPOSE

Tree coverages create a separation of space between road users and pedestrians. Trees add comfort and safety to pedestrians, provide more aesthetic appeal to the environment, and improve cooling (shade) in the warmer months.

DESCRIPTION

Tree coverages are placed on the edge of streets and medians.

CRASH MODIFICATION FACTOR

While CMF for tree coverage is not available, studies suggest reduced crashes associated with a defined street edge (e.g., tree barriers and coverage near the roadway)

CATEGORY

Enclosure Effect

ESTIMATED COST

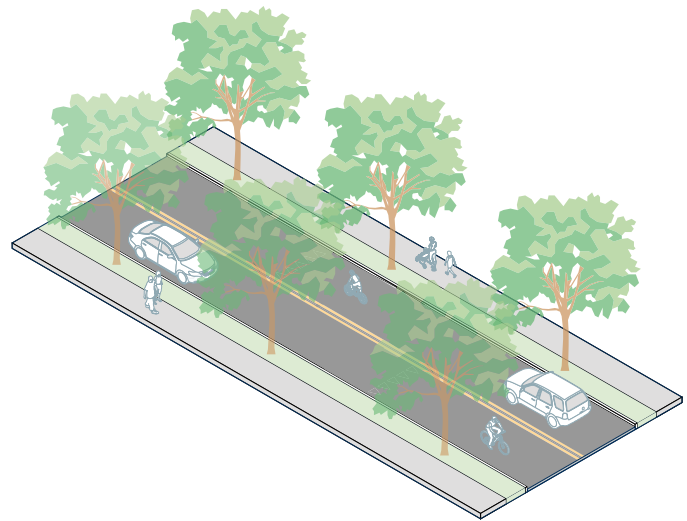


APPLICABLE LOCATIONS

- + Suitability and context depend on right-of-way and space availability, but all street types are suitable for tree coverages.

SAFETY BENEFITS

- + Narrows motor vehicles field of vision and creates a sense of enclosure, which may reduce vehicle speeds.
- + Tree size may provide a physical barrier between the street and sidewalks.



GUIDANCE

- + Tree coverages are healthier in areas with permeable surface access.
- + Requires space to be able to grow healthy, and to avoid damaging sidewalks and other infrastructure as they grow.
- + Trees are diverse so selecting the right tree species based on the climate and maintenance costs is necessary.
- + Consult with the municipal tree warden or other responsible party on preferred species and installation processes and schedules.
- + Prioritize native and drought-tolerant tree species.
- + Tree planting and maintenance along State-owned roads requires a DOT encroachment permit.
- + WestCOG published a Tree Canopy Analysis that provides tree guidance related to species, maintenance, and regions with potential for increased tree canopy. The study is available online at: [Tree Canopy Analysis for the Western Connecticut Region](#)

PEDESTRIAN SCALE LIGHTING

Pedestrian scale lighting, in contrast to cobra head lights that line many roadways, help to create a well-lit, attractive, and comfortable environment for walking, biking, or gathering in the street. Lighting at a pedestrian scale can also make traffic calming features such as bumpouts or crossings more visible to drivers, as well as helping to illuminate pedestrians and others in the right-of-way. Lighting design can doubly serve placemaking goals and reflect the local character or identity.

PURPOSE

Pedestrian-scale lighting enhances the environment for all users, increasing the comfort and security for pedestrians and bicyclists and enhancing visibility for drivers.

DESCRIPTION

Pedestrian-scale lighting includes fixtures designed to illuminate sidewalks, bicycle facilities, and pedestrian pathways and are generally lower to the ground than standard streetlights.

CRASH MODIFICATION FACTOR

CMF not available.

CATEGORY

Enclosure Effect

ESTIMATED COST



APPLICABLE LOCATIONS

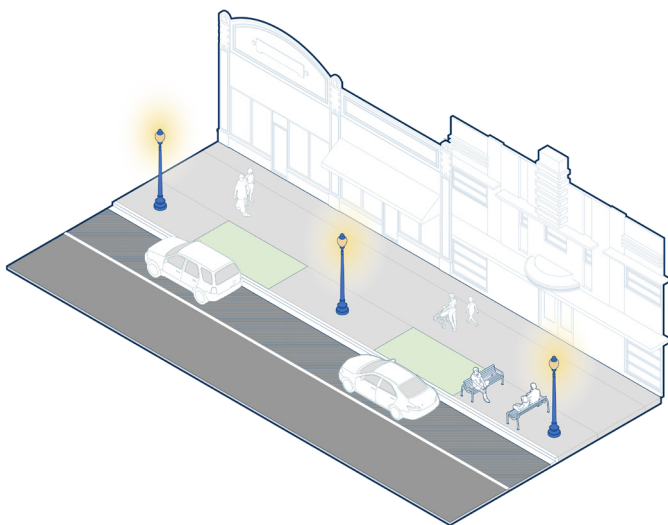
- + Pedestrian-scale lighting is suitable for many if not all roadway types with pedestrian activity present in municipalities (arterials, collectors, local roads).
- + Particularly effective in commercial and residential districts (i.e., Town Centers).
- + Pedestrian-scale lighting should be provided on both sides of the roadway.

SAFETY BENEFITS

- + Increased sense of personal safety and security for pedestrians and bicyclists (especially at night)
- + Increased visibility for all roadway users
- + Increased yielding from drivers at crossings

GUIDANCE

- + Pedestrian-scale lighting can vary based on the fixture, manufacturer, roadway width, utility service, and other project-related factors. They are generally 8 to 18 feet tall, spaced between 50 and 60 feet apart.
- + Lighting installed on State-owned roads must feature breakaway coupling (an approximately 1-foot tall base).
- + Lights should be placed in advance of a mid-block or intersection crosswalk in both directions to illuminate the pedestrian in the front and avoid a silhouette. Lighting should also be present to illuminate the pedestrian crossing or crosswalk area as well.
- + It is important to provide uniform lighting levels along an entire corridor.
- + Lighting that is on a State-owned road or installed using State or Federal funding sources requires a Master Municipal Agreement (MMA) with CTDOT.





PROGRAMS AND PLANNING

- Site Planning and Policies
 - Programs

SITE PLANNING AND POLICIES

ADOPT A COMPLETE STREETS POLICY

Any jurisdiction can adopt a Complete Streets policy, but as of 2026, only two WestCOG municipalities have done so. Adopting a Complete Streets policy is an important step in meaningfully advancing safety initiatives, as it reinforces the commitment to multimodality and prioritizing safety of all users. An official policy also creates the legal prerogative to incorporate traffic calming measures into projects and processes. Municipalities interested in drafting a Complete Streets policy should include the following elements:

- + A clear statement of intent and definitions of users, modes, and vulnerable populations (e.g., “people walking, biking, rolling, using transit; seniors, children, people with disabilities or mobility limitations, people without access to a personal vehicle, etc.)
- + When/to whom the policy applies (e.g., Construction, maintenance; public projects, private development that interacts with the public right of way or intends to be turned over to public authorities in the future)
- + Intent to use recent regulatory and design guidance (NACTO, ITE, AASHTO, ADA/PROWAG)
- + A statement of cooperation (“All departments, boards, and committees shall work together...”)
- + Any exemptions to the policy (e.g.: contrary to public safety, cost is disproportionate to use/benefit, etc)
- + Implementation controls, such as establishment of an advisory committee and performance metrics
- + A Complete Streets Committee to guide implementation may be independent or part of an existing body or committee.

Municipalities can benefit from model ordinances, templates, and other advisory support through both national and local groups. Nationally, Smart Growth America’s Complete Street Coalition has both guidance and examples of best practices from a compilation of Complete Streets Policies across the U.S. In Connecticut, the State’s Bicycle & Pedestrian Advisory Board offers a Model Ordinance for municipal review, and the Tri-State Transportation Campaign (TSTC) has an online “Complete Streets in a Box Toolkit.

ZONING REGULATIONS AND STREETSCAPE GUIDELINES

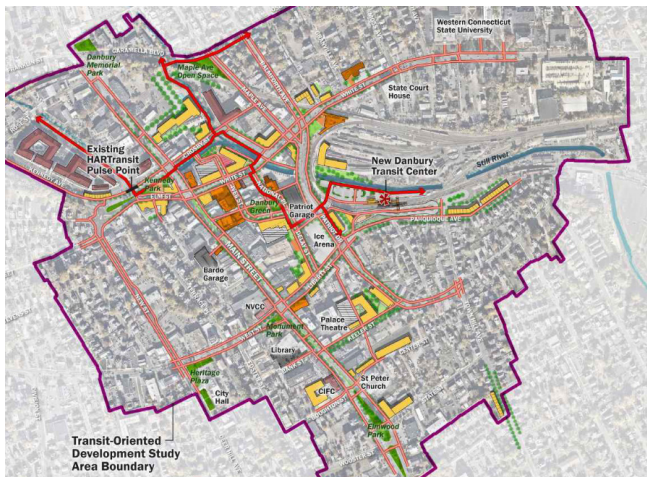
ZONING REGULATIONS

Local zoning regulations and streetscape guidelines can facilitate traffic calming in certain areas. Parking location and lot requirements establish where vehicles are permitted to park. By requiring parking in the rear of buildings, in addition to appropriate setbacks, an area can become more pedestrian-oriented and less auto-oriented. This can also be achieved by limiting curb cuts at the front of lots and requiring rear or side access if possible. Parking lot standards can include traffic calming measures, such as raised crosswalks, changes in pavement materials, landscaping, etc.

These regulations can also help with maintaining the rhythm of buildings, beyond the street. Setbacks establish a consistent build-to line which can help create a more uniform feel along the street and sidewalk. Requiring parking to be in the rear of buildings instead of between them and the right-of-way is a form of traffic calming. Frontage regulations at the street level, such as transparency standards, support a pedestrian-oriented streetscape. Other relevant zoning regulations and guidelines include building types, heights, and bulk, permitted uses, façade articulation, and materials and color.

OVERLAY DISTRICTS

Overlay districts are special zoning districts that supplement the underlying base zoning regulations. There are many types of overlay districts, such as historic preservation, pedestrian and bicycle, gateway, complete streets, neighborhood traffic calming, transit-oriented development, among others. They are geographically applied to a specific area through legislation by municipalities. Overlay districts to encourage walkable development can include streetscape standards that define the types of materials, treatments, and amenities to include within a defined area to make the experience of the area feel safer, more comfortable, and attractive.



Desired Downtown Pedestrian Network (source: [Downtown Danbury Transit-Oriented Development Study](#))

PAYMENT IN LIEU OF SIDEWALKS

Typically, developers are required to install sidewalks along the frontage of their property. However, this does not take into account the context of the project and broader sidewalk network, leading to instances of “sidewalks to nowhere” and a patchwork of sidewalks that are installed inconsistently.

In instances where the surrounding context limits the utility of a new sidewalk, municipalities can adopt a payment-in-lieu-of-sidewalks (PILOS) program. With a PILOS program, sites or projects exempted from requiring sidewalks would contribute to the PILOS fund, which would be reallocated to sidewalk projects in higher pedestrian priority areas. For example, PILOS contributions from a cul-de-sac project could be redirected to critical gaps in the sidewalk network in one of the region's Town Centers. Important to the success of PILOS programs is establishing a pedestrian or sidewalk master plan to identify the priority gaps in the existing pedestrian network, and to direct funds towards the highest impact projects.

PARKING STRATEGIES

Parking reduction strategies can be found in zoning codes and streetscape guidelines as well. Zoning code regulations often require minimum parking standards for certain uses or development types. These requirements can be updated in ways that will alleviate the need to develop large surface parking lots to meet the code. Parking reduction strategies can come from shared parking, providing underground or structured parking options and/or on-street parking. On-street parking can be a key traffic calming element, helping narrow perceived lane widths and reducing speeds. Scaling parking to reflect local context and demand, leveraging shared parking, and reducing parking minimums are strategies that support walkable environments and support land use goals.

TRANSIT-ORIENTED DEVELOPMENT

Transit-oriented development (TOD) is an approach that establishes a dense mix of uses near transit stations and hubs, typically within a half-mile radius or reasonable walking distance. It can benefit the local tax base with increased housing and additional transit ridership. The Federal Transit Administration notes that the success of transit systems in rural, suburban, and urban settings is critical to the economic health and sustainable growth of communities.

- + In Danbury, a TOD study was conducted in the immediate watershed of the Danbury Train Station to identify strategies for leveraging development and improving multimodal connectivity. It recommends improving bicycle and pedestrian connectivity between the station, the TOD study area, and the broader community, such as adding or improving sidewalks, crosswalks, bicycle lanes or facilities, lighting, pavement markings, and off-road facilities. The study also recommends including amenities such as bicycle parking and bus shelters, as well as opportunities to introduce car sharing programs or smart parking strategies.
- + In Ridgefield, a TOD plan was commissioned by WestCOG for the Branchville Station Area. It includes strategies to improve pedestrian crossings at key intersections, realigning intersections (i.e., from wide turn radii to 90-degree connections), and expanding pedestrian facilities to create a consistent network and link community destinations. This plan is to support higher density development within a half mile radius around the station.
- + CTDOT is working towards a TOD/Joint Development Project at the Stamford Transportation Center (STC). The STC is a major transit hub serving over 5 million annual passengers connecting the City of Stamford to New York and key points along the eastern seaboard. The site consists of 11 acres and is seeking to transform into a multimodal public transportation hub with TOD in the coming years.



Concept for the Corbin District Plan in Darien, CT (source: <https://thecorbindistrict.com>)

SPECIAL DISTRICTS AND IMPROVEMENT PROGRAMS

BUSINESS IMPROVEMENT DISTRICT (BID) PROGRAMS

Business Improvement Districts (BIDs) are typically utilized in downtowns, main streets, or commercial corridors. The private property owners within the established boundary of a BID tax themselves to raise funds to provide improvements and services. Typically, they are authorized by state law and have a management structure such as a board of directors to allocate the funds in strategic ways. Services can include wayfinding, cleanliness/litter removal, marketing and promotion, safety enhancements, and ambassador programs. Capital improvements can include landscaping, storefront renovations, streetscape enhancements, and other beautification projects. They can also include transportation initiatives aimed at improving access to and around the BID for all road users. BIDs are often viewed as tools to revitalize aging commercial corridors or promote placemaking in downtown areas.

- ✦ Several cities in the WestCOG region have established BIDs, including the City of Stamford's Downtown Special Services District where they focus on managing, promoting, and improving the experiences of residents and visitors within its boundary

SPECIAL SERVICES DISTRICTS (SSDS)

Connecticut authorizes Special Services Districts (SSDs) under CGS §7-339m–339t, enabling commercial areas to self-fund improvements through district assessments. SSDs support activities such as public-realm maintenance, wayfinding, events, safety ambassadors, marketing, and small-scale streetscape upgrades. Regional examples include CityCenter Danbury and the Stamford Downtown SSD, both providing sustained investment in their commercial cores. Additional SSDs operate in Bridgeport, Hartford, Manchester, Middletown, New Haven, New London, and West Hartford, showing how communities statewide use SSDs to strengthen walkability and support local business districts.

STREETSCAPE AND STOREFRONT IMPROVEMENT PROGRAMS

There are many examples of streetscape and storefront improvement programs that can help main streets and communities with beautification, safety, and overall economic wellbeing in commercial areas. These programs often provide some sort of financial assistance or incentives through grants or other means. Some examples include façade improvements, storefront renovations, street furniture, street trees, landscaping, safety, and accessibility compliance improvements. Typically, these types of programs are implemented in commercial corridors and main streets.

- ✦ The City of Norwalk has a Storefront Improvement Program that provides \$50,000 annually (split amongst grantees), a Small Business and Main Street Program that includes \$150,000 annually (also split), and a South Norwalk Improvement Program offering grants for exterior façade improvements and interior repairs to eligible projects located within the MLK Drive Corridor.

Connecticut communities use a mix of state and local programs to deliver streetscape and storefront improvements. Key state funding sources include LOTCIP (multimodal corridors and safety improvements), STEAP (village and downtown streetscape projects), the Community Connectivity Grant Program (pedestrian, ADA, and access-to-transit upgrades), DECD's Urban Acts grants, and CDBG funds for a façade updates, accessibility upgrades, and signage. Recent capital examples include Danbury's \$4M Streetscape Renaissance Phase II (via LOTCIP), advancing wider sidewalks, lighting, and pedestrian-friendly roadway changes downtown.



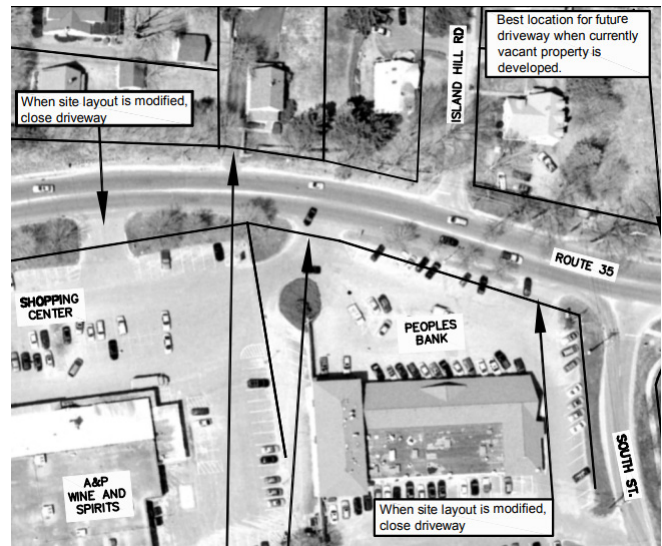
Traffic Calming and Streetscape Improvements in New Milford, CT

ACCESS AND NETWORK MANAGEMENT

ACCESS MANAGEMENT

Every driveway, side street, alley, and curb cut into a business is a potential conflict point for turning vehicles and people walking, biking, and driving; each one creates a break in the sidewalk. Access management is a process for minimizing these conflict points while still maintaining access for parking and deliveries. Access management strategies such as consolidating and minimizing the width of these openings are used to increase safety. Many of the measures used for access management support traffic calming also by reducing the speed of turning vehicles and providing priority to people walking and bicycling.

Access management strategies can include minimum spacing between driveways, zoning regulations, and turning restrictions. Spacing requirements for driveways help reduce the frequency of curb cuts and turning movements along a corridor. Zoning regulations can require consolidation of access so that motorists enter at one point but can access multiple properties by foot or vehicle without re-entering the roadway. Turn lanes and turning restrictions (both in policy and in design) can reduce the conflicts between roadway users. Each of these strategies helps reduce the frequency of turning movements and can support more attentive interactions between motorists and other roadway users.



Sample recommendations from the Ridgefield, CT Curbcut Plan

NETWORKS AND “A-SIDE” FRONTAGES

Many traditional downtowns use public lots and side- or rear-lot parking to keep storefronts and sidewalks continuous on their primary streets. When buildings have minimal front setbacks and most vehicle access is from side streets or shared lots, the result is a more walkable main street with fewer driveways and a clearer pedestrian realm. This approach can be supported in zoning by allowing shared off-street parking, encouraging rear or side-lot access where feasible, and limiting new curb cuts on key main streets.



Example of connecting network design and land use to strengthen the pedestrian experience and promote “A-side” Frontages

PROGRAMS

SAFETY EDUCATION PROGRAMS

MOTORIST EDUCATION AND BEHAVIOR CHANGE CAMPAIGNS

Training drivers about safe speeds, impaired driving, and yielding to people walking, bicycling, and rolling helps reduce risky driving behavior. These campaigns can improve safety for all road users, especially pedestrians and bicyclists. The National Highway Traffic Safety Administration (NHTSA) provides many resources to improve behavior.

PEDESTRIAN AND BICYCLE SAFETY EDUCATION PROGRAMS

There are many resources available through the Federal Highway Administration (FHWA) that teach students, youth, parents/caregivers, and community members about pedestrian and bicycling safety through presentations, videos, quizzes, and activities. Education programs help people develop good safety habits, choose safer routes to and from school (and other places such as libraries, community centers, etc.), and increase awareness of hazards.

- + “Watch For Me CT” is an example in Connecticut led by the CT Department of Transportation (CT DOT) and the CT Children’s Injury Prevention Center whose mission is to increase the visibility of pedestrian and bicyclist safety issues through public service messages and community engagement.
- + City of Stamford created pedestrian awareness educational materials and videos as part of the “Street Smart” Initiative. Video topics include pedestrian awareness, bicycle safety, Safe Routes to School, and how to use Leading Pedestrian Intervals (LPI) and High-Intensity Activated Crosswalks (HAWK) treatments.
- + When the Town of Greenwich installed a new flashing yellow arrow, the Town paired the new signal with a social media campaign to build driver awareness and education.



Example of a “Watch For Me CT” Safety Campaign Graphic (source: <https://watchformect.org/resources/>)



Stamford Street Smart pedestrian safety video (source: <https://www.stamfordct.gov/government/operations/transportation-traffic-parking/complete-streets/stamford-street-smart-initiative>)



Town of Greenwich social media campaign for a new signal (source: <https://www.cti.uconn.edu/>)



Bicycle Safety Skills Education Program through CTDOT
(source: <https://portal.ct.gov/dot/programs/saferoutes>).

SafeRoutes

Connecticut Safe Routes to School



Connecticut Department of Transportation

SAFE ROUTES TO SCHOOL (SRTS)

SRTS initiatives have an overall goal to make it safer for students to walk, bicycle, and roll to and from school. The National Center for Safe Routes to School has a toolbox of innovative, creative, fun, and practical strategies to achieve this goal. Some of these practical tools include bike buses, pedestrian and bicycle safety education, engaging youth, understanding school travel patterns, changing infrastructure, improving school zone safety, getting to school buses, supporting students with disabilities, and building on the Federal Safe Routes to School program.

SRTS in Connecticut is managed at the state level, and there are many examples of local communities in the WestCOG region planning and implementing various SRTS programs. The following examples focus on SRTS projects that incorporated traffic calming elements:

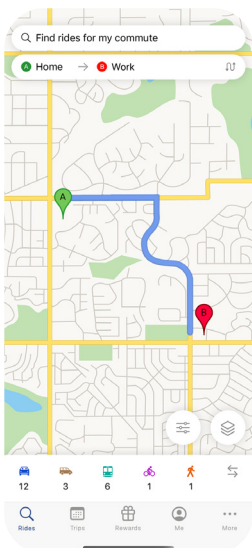
- + In Bethel, CT, one SRTS project focused on visibility improvements and crosswalk upgrades near a local elementary school.
- + City of Stamford made improvements at KT Murphy school as part of their SRTS work to create a safer environment for students. Improvements include high-visibility drop-off/pick-up zone, high visibility crosswalks, ADA curb ramps, school zone flashers, curb extensions, and yield to pedestrian stanchions.
- + The Town of Weston is completing more than a mile of pedestrian paths connecting schools (elementary, intermediate, and high schools) with other community campuses and commercial areas.
- + Schools in the City of Danbury have been recently implementing mid-block crosswalk and pedestrian safety improvements.

MULTIMODAL PROGRAMS

TRANSPORTATION DEMAND MANAGEMENT

The Federal Highway Administration (FHWA) defines transportation demand management (TDM) as strategies aimed at maximizing traveler choices. There are a variety of tools, including incentives, disincentives, policies, and education.

- + Incentives can include employer circulators, carpooling programs, employers offering transit pass discounts or subsidies, bicycle share programs, and more.
- + Disincentives can include parking charges, for example.
- + Policies can include passing legislation that requires TDM plans for certain types of new developments.
- + Education can include informational campaigns about alternative transportation options, such as transit or park and rides for example. This can also include marketing and outreach by employers that offer incentives or other options.
- + In Connecticut, a public website and mobile app (CTRides) provides users with real-time trip planning and ride sharing (e.g., carpool opportunities) to promote higher efficiency options. Trips are recorded and linked to incentives directly in the program.
- + There are examples throughout Connecticut and the WestCOG region related to active transportation microgrant programs, supporting policies in WestCOG's Bike Plan, and employer-based incentives.



Connecticut's "CTRides" is an app-based program for individual trip planning that incorporates incentives directly (source: <https://ctrideres.agilemile.com>)

BICYCLE PARKING PROGRAMS

Installing visible, convenient, and secure bicycle racks and storage options at businesses, libraries, community centers, schools, employers, etc. encourage people to choose bicycling for daily trips. Reliable bicycle parking reduces theft concerns, supports connections to transit, and fosters a culture of active transportation.

Bicycle parking requirements can also be included in local zoning codes, especially for new developments. This ensures that there will be places for bicyclists to safely store their bicycles, whether visiting a business, restaurant, library, place of employment, residence (such as in larger apartment buildings or condominiums for example), or other locations.



Bike parking doubling as placemaking in Grand Rapids, MI

NEIGHBORHOOD TRAFFIC CALMING REQUEST PROGRAM

Fairfield offers a structured program allowing residents to petition for neighborhood-scale traffic calming, including speed feedback signs, selective curb extensions, and parking-based narrowing. The Town uses a transparent point system, based on crash history, roadway classification, and observed speeds to prioritize requests. This predictable framework helps manage expectations, ensures equitable distribution of treatments, and builds public support for data-driven decisions. Fairfield's process is a good example for communities looking to formalize how resident requests translate into built traffic-calming improvements.

STORMWATER MANAGEMENT

Traffic calming measures can be reinforced with green infrastructure to capture runoff and reduce flooding and ponding. These reinforcements can contribute to longevity and resilience to larger weather events. Green infrastructure projects should use native, non-invasive, and drought-tolerant vegetation. It is also important to select plants that can tolerate snow when designing for snowy climates.

Some strategies to incorporate green infrastructure for specific traffic calming measures are described below:

- + Where there are opportunities to narrow lanes or implement a road diet, reallocated space may be used for bioretention facilities and pervious surfaces. Tree canopy can further buffer pedestrians from motor vehicle traffic.
- + Plantings may be integrated with curb extensions and chicanes to provide stormwater retention and/or infiltration areas. Stormwater can be directed into these features by curb inlets or scuppers, or via the crowning of the street when curbs are not present.
- + Traffic circles and roundabouts are traffic calming measures and can include low-maintenance, native plantings and stormwater infiltration to control stormwater runoff and filter pollutants through the soil and plant root uptake.
- + Street trees and ground cover plants can be used to prevent soil erosion and preserve the soil's permeable qualities. Rain gardens and vegetated bioswales can be planted along paths to collect rainwater using local plants.
- + Broader strategies to integrate stormwater management into new developments, public projects, or other construction can be written into municipal plans such as the Town of Brookfield's Stormwater Management Plan.



Green Stormwater Infrastructure





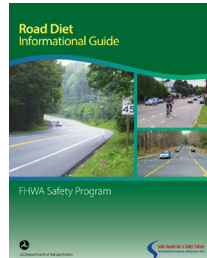
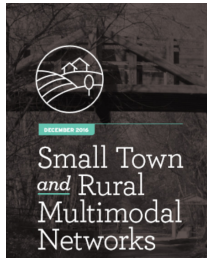
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RESOURCES

This section provides a list of resources and materials to help support individual planning and design projects in the WestCOG region. Please refer to the guidance, reports, and policies outlined in this section for additional details and specifications related to design standards, identifying and evaluating suitable candidates for traffic calming measures, and other context-sensitive considerations.

NATIONAL STANDARDS AND RESOURCES

The following publications, guides, and resources provide standards and recommendations related to the planning and design of traffic calming measures and active transportation facilities in a variety of environmental contexts.



FEDERAL HIGHWAY ADMINISTRATION

Traffic Calming and Multimodal Design

- + Traffic Calming eprimer
<https://highways.dot.gov/safety/speed-management/traffic-calming-eprimer>
- + FHWA Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/fhwahep16055.pdf
- + FHWA Road Diet Informational Guide
<https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/rdig.pdf>
- + FHWA Small Town and Rural Multimodal Networks
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf
- + Context Sensitive Design/ Context Sensitive Solutions
https://www.fhwa.dot.gov/resourcecenter/teams/safety/saf_1CSD.pdf
- + FHWA Systemic Safety User Guide
<https://highways.dot.gov/safety/data-analysis-tools/systemic>
- + Manual on Uniform Traffic Control Devices
<https://mutcd.fhwa.dot.gov/>
- + Crash Modification Factors Clearinghouse
<https://cmfclearinghouse.fhwa.dot.gov/>

Bicycle and Pedestrian Facilities

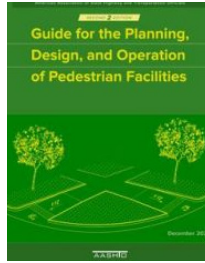
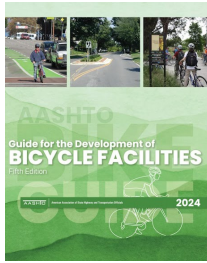
- + FHWA Bikeway Selection Guide
<https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-07/fhwas18077.pdf>
- + FHWA Accessible Shared Streets
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/accessible_shared_streets/fhwahep17096.pdf

Intersections

- + Roundabouts: An Informational Guide (FHWA)
<https://www.fhwa.dot.gov/publications/research/safety/00067/00067.pdf>
- + Safety Evaluation of Multiple Strategies at Stop-Controlled Intersections
<https://www.fhwa.dot.gov/publications/research/safety/17087/>
- + FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations
https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/docs/STEP-guide-improving-ped-safety.pdf

Speed Management

- + FHWA and NHTSA Speed Safety Camera Program and Planning Operations Guide
<https://ops.fhwa.dot.gov/publications/fhwahop24063/fhwahop24063.pdf>
- + Proven Safety Countermeasures
<https://highways.dot.gov/safety/proven-safety-countermeasures>
- + Speed Management Toolkit
https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/speedmanagementtoolkit_final.pdf
- + Speed Management ePrimer for Rural Transition Zones and Town Centers
<https://highways.dot.gov/safety/speed-management/speed-management-eprimer-rural-transition-zones-and-town-centers>



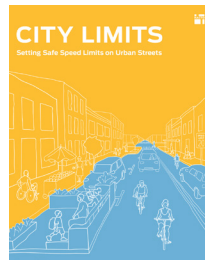
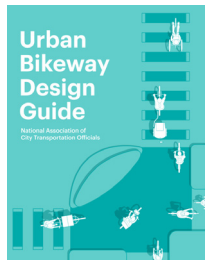
AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

Bicycle and Pedestrian Facilities

- + Guide for the Development of Bicycle Facilities
<https://aashtojournal.transportation.org/aashto-releases-5th-edition-of-comprehensive-bicycle-guide/>
- + Guide for the Development of Pedestrian Facilities
<https://store.transportation.org/Item/CollectionDetail?ID=224>

U.S. ACCESS BOARD

- + Accessibility Guidelines for the Public Right-of-Way
<https://www.access-board.gov/prowag/>



NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS (NACTO)

Traffic Calming and Multimodal Design

- + Urban Street Stormwater Guide
<https://nacto.org/publication/urban-street-stormwater-guide/>
- + Urban Street Design Guide
<https://nacto.org/publication/urban-street-design-guide/>

Bicycle and Pedestrian Facilities

- + Urban Bikeway Design Guide
<https://nacto.org/publication/urban-bikeway-design-guide/>

Speed Management

- + City Limits
<https://nacto.org/publication/city-limits/>

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)

Traffic Calming and Multimodal Design

- + NCHRP 737: Design Guidance for High-Speed to Low-Speed Transition Zones for Rural Highways
<https://nap.nationalacademies.org/catalog/22670/design-guidance-for-high-speed-to-low-speed-transition-zones-for-rural-highways>
- + NCHRP 880: Design Guide for Low-Speed Multimodal Roadways
<https://nap.nationalacademies.org/catalog/25248/design-guide-for-low-speed-multimodal-roadways>
- + NCHRP 480: A Guide to Best Practices for Achieving Context Sensitive Solutions
https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_480.pdf

Intersections

- + NCHRP 1043: Guide for Roundabouts
<https://nap.nationalacademies.org/catalog/27069/guide-for-roundabouts>
- + NCHRP Report 812: Signal Timing Manual
https://transops.s3.amazonaws.com/uploaded_files/Signal%20Timing%20Manual%20812.pdf

SMART GROWTH AMERICA

- + Complete Streets Policy Framework
<https://wordpress.smartgrowthamerica.org/wp-content/uploads/2024/08/Complete-Streets-Policy-Framework.pdf>



INSTITUTE FOR TRANSPORTATION ENGINEERS (ITE)

Traffic Calming and Multimodal Design

- + Traffic Calming Fact Sheets
<https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures/>

Intersections

- + Unsignalized Intersection Improvement Guide
<https://toolkits.ite.org/uiig/>

Speed Management

- + Measures for Managing Speed
<https://www.ite.org/technical-resources/topics/speed-management-for-safety/measures-for-managing-speed/>

LOCAL PLANS AND RESOURCES

The following documents are local resources, plans, policies, and documents from the State and WestCOG member municipalities.

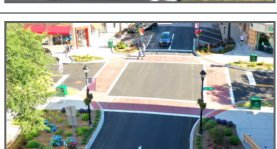
DATA RESOURCES

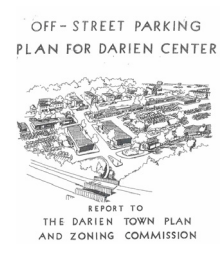
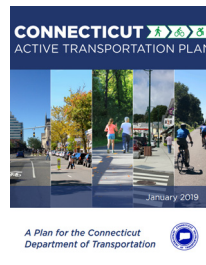
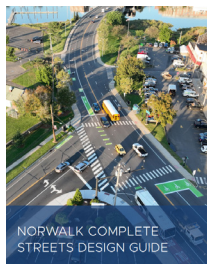
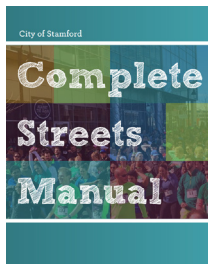
Local Open Data	Website
CTDOT Open Data Crashes, Traffic, Roadways, Transit, Assets (e.g., signals), Projects	https://maps-ctdot.hub.arcgis.com
Connecticut Open Data Transportation, Land Use, Housing, Environmental Justice, Public Safety, etc.	https://data.ct.gov
Connecticut Crash Data Repository Crashes	https://ctcrash.uconn.edu
Subscription Data Resources	Website
Replica Traffic, Demand	https://www.replicahq.com
Streetlight Traffic, Demand	https://www.streetlightdata.com
INRIX Traffic, Speed	https://inrix.com/

Connecticut benefits from robust resources, research, and training opportunities through the University of Connecticut. This includes the T2 Training and Technical Assistance Center at the CT Transportation Institute and the Connecticut Transportation Safety Research Center (CTSRC). These Centers feature publications, data, resources, and a clearinghouse of safety improvement projects and initiatives in the state.

- T2 Center:
https://www.cti.uconn.edu/cti/T2Center_Home.asp
- CTRSC:
https://www.cti.uconn.edu/cti/CTSRC_Home.asp

LOCAL PROJECT EXAMPLES

Measure	Location
Curb Extension - Quick-build Stamford (Grey Rock Place)	
Curb Extension Norwalk (Morton Street)	
Raised Crosswalk Norwalk (Highland Avenue)	
Raised Intersection Norwalk (Water Street)	
Roundabout New Milford (Still River Drive)	
Mini-roundabout New Canaan (Conrad and Whiffle Tree)	
Lane Reconfiguration Greenwich (Greenwich Avenue at East Elm Street)	
Intersection Realignment Norwalk (Hospital Hill Village)	
Placemaking Brookfield (Downtown)	



COMPLETE STREETS POLICY

- + Connecticut Complete Streets Legislation (CT Gen Stat § 13a-153f)
<https://law.justia.com/codes/connecticut/title-13a/chapter-238/section-13a-153f/>
- + CTDOT Complete Streets Policy
<https://portal.ct.gov/dot/travel-gateway/bicycle-and-pedestrians>
- + CTDOT Complete Streets Directive
https://portal.ct.gov/dot/-/media/dot/aec/ecd-2023-8_complete_streets_controlling_design_criteria_final_sah.pdf
- + CTDOT Quickbuild Directive
<https://portal.ct.gov/dot/-/media/dot/policy/quick-build---complete-streets-june-2024.pdf>
- + City of Norwalk Complete Streets Design Guide
<https://www.norwalkct.gov/DocumentCenter/View/34784/NCS-Design-Guide-121224-DFT?bidId>
- + City of Stamford Complete Streets Manual
<https://www.stamfordct.gov/government/operations/transportation-traffic-parking/complete-streets>

SPEED MANAGEMENT

- + Connecticut Automated Traffic Enforcement Safety Device (ATESD) Guidance for Municipalities
<https://portal.ct.gov/dot/-/media/dot/programs/automated-traffic-enforcement/final-atesd-guidance.pdf>
- + Connecticut Office of the State Traffic Administration (OSTA)
<https://portal.ct.gov/dot/osta>
- + Stamford Speed Cameras Information
<https://www.stamfordct.gov/government/stamford-vision-zero/speed-safety-cameras>

+ BICYCLE AND PEDESTRIAN FACILITIES

- + WestCOG Regional Bicycle Plan
<https://westcog.org/wp-content/uploads/2023/06/Final-Bike-Plan-Formatted.pdf>
- + Connecticut (CTDOT) Bicycle Facility Selection Guide
<https://portal.ct.gov/dot/-/media/dot/bike-ped/ctdot-bicycle-facility-selection-guide>
- + Connecticut Active Transportation Plan
http://www.ctbikepedplan.org/documents/CTActiveTransPlan_01-09-2019.pdf
- + City of Norwalk 2012 Pedestrian and Bikeway Transportation Plan
<https://www.norwalkct.gov/1156/Pedestrian-Bikeway-Transportation-Plan>
- + City of Stamford Vision Zero Action Plan
<https://www.stamfordct.gov/government/stamford-vision-zero/vision-zero-action-plan>
- + City of Stamford Bicycle and Pedestrian Plan
https://westcog.org/wp-content/uploads/2019/07/Stamford_Bicycle_Ped_Plan_compress.pdf
- + City of Danbury Trail Routing Study
<https://www.danbury-ct.gov/547/City-of-Danbury-Trail-Routing-Planning>

- + Stamford Washington Blvd Roadway Safety Study
<https://www.stamfordct.gov/government/operations/transportation-traffic-parking/projects/washington-blvd-roadway-safety-study>

STREETScape AND DESIGN PLANS

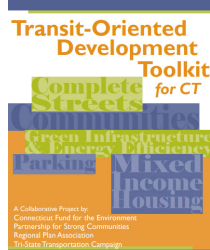
- + Mobility, Walkability and Parking Improvement Plans for Downtown Bethel
https://www.bethel-ct.gov/vertical/Sites/uploads/Bethel_Mobility_Study_Slide_presentation.pdf
- + Darien Plan for Sidewalks, Walkability, and Parking
<https://darienct.gov/DocumentCenter/View/4103/Sidewalks-Walkability-and-Parking-Plan>
- + Town of Brookfield Streetscape Sidewalk and Amenity Specifications
<https://www.brookfieldct.gov/DocumentCenter/View/309/TCD-Sidewalk-and-Amenity-Specifications-PDF>

- + Four Corners Brookfield Town Center District Revitalization Plan
<https://www.brookfieldct.gov/DocumentCenter/View/287/Four-Corners-Town-Center-District-Revitalization-Plan---September-2012-PDF>
- + Town of New Canaan Design Standards
<https://cms3.revize.com/revize/canaan/Departments/Land Use/Town of New Canaan Right-of-Way - Construction Material Standards.pdf>
- + City of Norwalk North 7 Design Guidelines
<https://www.norwalkct.gov/DocumentCenter/View/29367/North-7-Design-Standards-220707>

CITY OF NORWALK, CT
South Norwalk TOD Redevelopment Plan



Prepared for the Norwalk Redevelopment Agency
by THE UCCS GROUP - FIRM ASSOCIATES



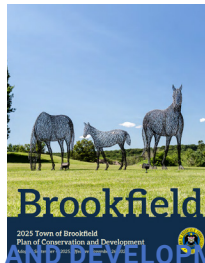
TRANSIT ORIENTED DEVELOPMENT

- + Downtown Danbury Transit-Oriented Development Study
<https://www.danbury-ct.gov/256/Transit-Oriented-Development>
- + South Norwalk TOD Redevelopment Plan
<https://www.norwalkct.gov/DocumentCenter/View/9659/TOD-Redevelopment-Plan-Draft-Zoning-August-2016-8-12-2016-final-for-email?bidId=>
- + East Norwalk Village TOD Design Guidelines
<https://www.norwalkct.gov/DocumentCenter/View/25881/Design-Guidelines-11421>
- + City of Norwalk Rowayton Avenue District Overlay Design Guidelines
https://www.norwalkct.gov/DocumentCenter/View/32281/O-RAVD-Design-Guidelines_Approved
- + Town of Ridgefield Branchville Transit Oriented Development Plan
<https://www.ridgefieldct.gov/Documents/Boards%20Committees%20and%20Commissions/Planning%20and%20Zoning%20Commission/Branchville%202024%20P&Z%20Review/branchvilletodplan-031417-compressed.pdf?t=202506130903010>
- + Wilton Center Form-Base Code/Overlay District
https://www.wiltonct.gov/sites/g/files/vyhlf10026/f/uploads/231023_wc_fbc_final_-_10.23.2023.pdf
- + RPA Transit-Oriented Development Toolkit for Connecticut
<https://s3.us-east-1.amazonaws.com/rpa-org/pdfs/TOD-Toolkit-for-Connecticut.pdf>

Stamford
Neighborhood
Traffic Calming
Final Report



- + Bethel Forward Master Plan
<https://bethel-ct.gov/vertical/sites/%7B90B1B948-C443-4CA6-8B88-90B1EEA9B1E2%7D/uploads/1517-Bethel-Forward-Master-Plan.pdf>
- + Town of Brookfield Pavement Management Plan
<https://www.brookfieldct.gov/DocumentCenter/View/515/Brookfield-Pavement-Management-Plan-PDF>
- + Downtown New Canaan Strategic Plan
<https://cms3.revize.com/revize/canaan/Departments/Land Use/Historic Studies/Downtown Strategic Plan, 2007.pdf>
- + Town of New Milford Route 7 and Route 202 Curb Cut and Access Management Plan
https://www.newmilford.org/filestorage/7526/19046/35748/Rt_7_%26_202_CurbCut_%26_Access_Mngmnt_Plan_8.5x11.pdf
- + New Milford Transportation Management Plan
https://www.newmilford.org/filestorage/3088/3752/NewMilford-Final_TMP-102813.pdf
- + City of Norwalk 2023 Transportation Master Plan
<https://arcg.is/CXHzy>
- + City of Norwalk West Avenue – Wall Street Neighborhood Plan
<https://www.norwalkct.gov/DocumentCenter/View/14260/Final-Wall-West-Neighborhood-Plan-Approved-3-13>
- + Stamford Neighborhood Traffic Calming Final Report
<https://www.stamfordct.gov/home/showpublisheddocument/168/637343945516430000>
- + CTDOT Design Guide for Signing and Pavement Markings for Roundabouts (and other resources)
<https://portal.ct.gov/dot/-/media/dot/highway-design/roundabout/signing-and-marking-plan>



PLANS OF CONSERVATION AND DEVELOPMENT

- + Town of Bethel POCD
https://bethel-ct.gov/vertical/sites/%7B90B1B948-C443-4CA6-8B88-90B1EEA9B1E2%7D/uploads/Final_Bethel_POCD.pdf
- + Town of Bridgewater POCD
<https://www.bridgewater-ct.gov/1315/2022-Plan-of-Conservation-and-Development>
- + Town of Brookfield POCD
https://www.brookfieldpocd.com/_files/ugd/8aa7de_3ecc8b0c39ef4e11ad9ebb551fd6913e.pdf
- + City of Danbury POCD
<https://www.danbury-ct.gov/DocumentCenter/View/1268/City-of-Danbury-2023-Plan-of-Conservation-and-Development-As-Adopted>
- + Town of Darien POCD
<https://darienpocd.com/the-2016-pocd/>
- + Town of Greenwich POCD
<https://www.greenwichct.gov/DocumentCenter/View/42562/2023-POCD-Update>
- + Town of New Canaan POCD
<https://cms3.revize.com/revize/canaan/Departments/Land%20Use/Pending%20P&Z%20Commission%20Applications/New%20Canaan%20POCD%202024.pdf?t=202411011101210&t=202411011101210>
- + Town of New Fairfield POCD
https://cms3.revize.com/revize/fairfield/Document%20Center/Service/Town%20Plan%20and%20Zoning/Fairfield%20POCD_ADOPTED%2020251202.pdf?t=202512091448390&t=202512091448390
- + Town of New Milford POCD
https://www.newmilford.org/filestorage/7526/19046/34820/37505/2021-2031_POCD%2C_single-page_spread.pdf
- + Town of Newtown POCD
https://www.newtown-ct.gov/sites/g/files/vyhlif12216/f/uploads/final_draft_2025-02-10.pdf
- + City of Norwalk POCD
<http://norwalkct.gov/DocumentCenter/View/31461/Norwalk-Citywide-Plan-2019-amended-2020>
- + Town of Redding POCD
<https://townofreddingct.org/wp-content/uploads/2020/06/Redding-TPCD-2018-Final-Version2.pdf>
- + Town of Ridgefield POCD
<https://www.ridgefieldct.gov/pocd-2020>
- + Town of Sherman POCD
https://municipal-documents.s3.amazonaws.com/uploads/sherman-ct/planning-zoning/subpages/654/rich_text_field_file/17122559591/
- + Town of Weston POCD
<https://www.westonct.gov/government/municipal-departments/planning-and-zoning>
- + Town of Westport POCD
<https://www.westportct.gov/government/departments-a-z/planning-and-zoning-department/2017-plan-of-conservation-and-development>
- + Town of Wilton POCD
https://www.wiltonct.gov/sites/g/files/vyhlif10026/f/pages/adopted_pocd_effective_10-01-2019.pdf



TOOLE
DESIGN

