Highways traveling through "main street" town centers provide both connectivity between communities and local access for pedestrians, bicyclists, and motorists. This dual role can result in traffic speeds and volumes that present safety concerns for all road users, particularly along the main streets. Context-sensitive main streets may be designed to control vehicle speeds and improve safety.

Historically, functional classifications and design speeds for highways have led to higher-speed designs that can negatively impact denser, small town main streets. Community character, adjacent land uses, and safety for all users should dictate the design criteria for a highway that serves as a main street.

Federal and State guidelines encourage the use of traffic calming and context-sensitive design to prioritize safety for all modes rather than designing based solely on functional classification. Designers have the flexibility to take land-use context into account to select lower design speeds, use narrower lane widths, add on-street parking, and provide geometric designs that balance the needs of all users.

2004 AASHTO Flexibility Guide recognizes that functional classification of highways may not always be compatible with the adjacent land use context:

“A roadway’s formal classification as urban or rural may differ from actual site circumstances or prevailing conditions. An example includes a rural arterial route passing through a small town. The route may not necessarily be classified as urban, but there may be a significant length over which the surrounding land use, prevailing speeds, and transportation functions are more urban or suburban than rural.”

FDAOT Flexibility Guide 2004, p. 12

"Functional classification does not dictate design; however, the two influence one another. There is a great deal of latitude in the design of a roadway relative to its functional classification.”

FHWA Highway Functional Classification Concepts, Criteria and Procedures 2013, p. 42

"Main streets typically are no wider than two travel lanes, provide on-street parking and may contain bicycle lanes.”

ITE Designing Walkable Urban Thoroughfares 2010, p. 72

"Speeds cannot be reduced simply by changing the posted speed limit. Geometric and cross-sectional elements, in combination with the context, establish a driving environment where drivers choose speeds that feel reasonable and comfortable.”

FHWA Mitigation Strategies for Design Exceptions 2007, p. 26

"There needs to be a distinct relationship between the community speed limit and a change in the roadway character. Emphasizing a change in environment increases awareness.”

NCHRP 737 Design Guidance for High-Speed to Low-Speed Transition Zones for Rural Highways 2012, p. 65
APPLYING DESIGN FLEXIBILITY

FUNCTIONAL CLASSIFICATION AND VARIABLE DESIGN SPEED

The functional classification of a roadway guides a designer to select a design speed based on a range of speeds. The AASHTO Green Book allows for flexibility with regard to design speed, providing a range between 40–75 mi/h (2011, p. 7-2) for rural arterial roadways, indicating that speeds between 60–75 mi/h are normally used in level terrain. By comparison, urban arterials are generally designed with a design speed ranging between 30–60 mi/h (2011, p. 7-27) and provide mobility of all users balanced with access to businesses, institutions, and residences (2011, p. 7-26).

Although a main street may exist along a rural arterial roadway, the design principles of a more urban environment apply due to increased population density, increased bicycle and pedestrian activity, and increased need for property access within a community. Therefore, design for a lower speed through a main street environment. The ITE Designing Walkable Urban Thoroughfares recognizes that State highways serve as main streets in smaller rural towns and suggests a design speed of 20–25 mi/h on main streets (2010, p. 78).

TRANSITION ZONES

The design speed for a rural arterial roadway should be reduced approaching a main street environment. The AASHTO Green Book provides flexibility regarding the design of the transition zone into a lower-speed environment stating that the introduction of a lower design speed should not be done abruptly but should be effected over sufficient distance to permit drivers to gradually change speed before reaching the lower design speed section (2011, p. 2-54). The highway features within this transition zone, such as curvature, superelevation, lane and shoulder widths, and roadside clearances should be designed to encourage slower speeds.

EXAMPLE TRANSITION ZONES AND GATEWAYS

The design treatments shown below can be utilized as transition zone treatments, gateway treatments or both. Both examples include a gateway sign 1, narrowing of lanes 2, the removal of the shoulder 3, and the introduction of curb, street trees 4, sidewalk buffer, and sidewalk. 5

EXAMPLE A:
This example provides horizontal deflection 6 entering and exiting main street.

EXAMPLE B:
This example provides a median 7 and should only be used in constrained environments.
Pavement markings, such as painted center islands, painted narrower lanes, on-pavement speed limit markings, or on-pavement SLOW markings, are not recommended as stand-alone treatments as they have been shown to be either not effective or only marginally effective at influencing motorist speeds. (FHWA. Traffic Calming on Main Roads Through Rural Communities. 2009, p. 13).  

**GATEWAY TREATMENTS**  
A gateway treatment is a visual and physical feature to communicate to motorists that they are entering a slower speed environment. Physical changes in the roadway alignment or width are the treatments most likely to affect driver behavior and reduce speeds; driver speeds will decrease as roadway deflection increases (NCHRP. Speed Reduction Techniques for Rural High-to-Low Speed Transitions. 2011, p. 11), so designers should consider changes in the roadway alignment to physically slow motorists.  
Gateway treatments, such as roundabouts (a Proven Safety Countermeasure) 8, chicanes, raised medians 9, reduced lane widths 10, shoulder removal 11, providing a curbline 12 and/or including tall vegetation (e.g., hedges, trees), have been shown to be effective at reducing travel speeds approaching a main street (NCHRP. Speed Reduction Techniques for Rural High-to-Low Speed Transitions. 2011, p. 6). Bicycle facilities, where present, should be carried through gateway treatments.  
Roundabouts slow motorists and serve as traffic control at intersections, and also may be installed where signals or stop signs are not warranted. They can provide an ideal solution to incorporate deflection as a gateway treatment and slow motorists at the start of a main street. Where right-of-way is insufficient, chicanes, changes to horizontal alignment, or raised medians should be considered as gateway treatments.  

**TRAVEL ALONG MAIN STREET**  
While transition areas and gateway treatments can reduce speeds approaching and exiting main street environments, motorists may resume higher speeds unless additional visual and physical cues are provided along the route through town. Traffic calming measures such as landscaping, street trees, curb extensions, on-street parking 13, and narrower lanes 14 should be considered along the main street. For more information, refer to the design topics on Traffic Calming and Design Speed and Design Criteria and Lane Width.
CASE STUDIES

TRAFFIC CALMING MEASURES RTE. 50
ALDIE, MIDDLEBURG AND UPPERVILLE, VA

In the foothills of the Blue Ridge Mountains, the U.S. 50 traffic calming corridor begins in the village of Lenah in southeastern Loudoun County and extends westward to the intersection of U.S. 17 near the Clarke County border. It includes the rural communities of Aldie, Middleburg, and Upperville. The roadway’s 50 mi/h speed limit reduces to 25 mi/h approaching each main street area. The communities along U.S. 50 participated in a traffic calming plan as an alternate to building a four-lane bypass. Several projects have been implemented and some are underway. Roundabouts were a major element of the traffic calming measures. Other elements include raised medians, curb extensions, high visibility crosswalks, on-street parking, street trees, and raised intersections. Gateway treatments include stamped concrete bands placed at increasing intervals approaching town, curbing, lane and shoulder narrowing, and introduction of a median.

CASCADES AVENUE IMPROVEMENT PROJECT
SISTERS, OR

In 2014, the Oregon Department of Transportation and the City of Sisters reconstructed a portion of U.S. 20 which operates as both a freight route and a main street. U.S. 20 has an average annual daily traffic of 12,000 vehicles/day and passes through a business district that attracts tourists. Initially, the project’s goal was to repave the quickly deteriorating roadway and replace the sidewalk, but it quickly turned into a revitalization effort. To create a safer pedestrian environment, the project incorporated traffic calming measures such as curb extensions, on-street parking, landscaping, and widening the sidewalk to 8 feet. One intersection was widened to allow freight trucks to more easily navigate turns, while other intersections were improved to reduce turning speeds and crossing distances.

DANVILLE TRANSPORTATION ENHANCEMENT PROJECT
DANVILLE, VT

In 2012, U.S. 2 in Danville, VT, was reconstructed to create a pedestrian-focused main street. Outside of Danville, U.S. 2 is a truck route and approximately 11 percent of its daily traffic is heavy vehicles. As the roadway transitions from countryside to town, speed limits change from 50 mi/h to 30 mi/h. Geometric design changes reinforce this reduction in speed: lane widths are narrowed from 12 to 11 feet, and the 5- and 6-foot shoulders are narrowed to 3 feet to make room for a sidewalk. Gateway treatments, such as signs, fence posts, and traffic islands signal the change in environment. Finally, a flashing yellow light—located at the central intersection and surrounded by local businesses and community spaces—was converted to a full traffic signal to facilitate pedestrian crossings.