TRAFFIC CALMING GUIDELINES

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Hernando County Public Works
1525 East Jefferson Street
Brooksville, Florida 34601
352.754.4060

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY
BY Victoria Anderson
County Attorney's Office

Traffic Calming Guidelines (TCG)

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INTRODUCTION

The Hernando County Board of County Commissioners (BOCC) is aware that speeding and excessive traffic volume are two of the most common neighborhood traffic complaints reported to local law enforcement and traffic engineering officials.

Development in Hernando County has increased the number of vehicles on the road during peak commute hours. Frustrated commuters often resort to the use of local roads and streets to bypass congested highways and intersections. Usually in a hurry to get to work or home, commuters often ignore neighborhood speed limits. Consequently, this may result in an increased number of concerns from neighborhood areas over "safety" and "quality of life" issues.

Residents who live on these local roads perceive a danger to children playing outdoors, while others fear increased auto exhaust pollution, road noise, crime or hazards to walkers or joggers and bicyclist. Such concerns can lead neighborhoods to organize and convince elected officials to take action to alleviate these situations.

This document is created to guide residents to their neighborhood traffic concerns. Traffic calming could involve street alignment, installation of physical measure(s) to reduce traffic speeds and/or cut-through volume to improve the neighborhood safety, livability, or other public services. This improvement could be done on a small scale involving only one street or it could be done on a larger scale involving multiple streets treated at the same time using the same or different traffic calming devices. Consideration is given to a variety of neighborhood traffic concerns and to the characteristics of these concerns on a case-by-case basis. Each situation is reviewed with respect to the available traffic control measures that have been, or could be found, effective to alleviate undesirable neighborhood traffic conditions.

The remainder of this document outlines the guidelines and procedures, which can be used to develop the optimum solution or solutions to each situation. There are many factors taken into consideration when reviewing neighborhood traffic concerns to determine the selected traffic control measures. These factors include: the surrounding roadway network, resident and emergency vehicle access, speeds and /or volume of traffic, accident history and construction in

the nearby area.

The Hernando County Department of Public Works is committed to balancing the needs of neighborhoods with the operational and mobility needs of the County Road system.

PURPOSE

To establish a process for identifying and addressing problems on local streets related to speeding, cut-through traffic, and operational safety. The program is developed with authorization by the Board of County Commissioners through the direction of the County Engineer to administer the specifics of the program and develop administrative procedures for its implementation.

The intent of the program is to respond to the needs of neighborhood groups or individuals and consider traffic calming measures on local roads. These requests will be evaluated on a case-by-case basis. At any time during the process, the Traffic ~~Operations~~ Engineering Section may be authorized to take corrective action should a traffic safety problem be discovered. Sound engineering judgment should play a key role in enhancing the safety and quality of life of county residents in a sustainable manner. The Neighborhood Traffic Calming Project (NTCP) seeks to manage these components in a comprehensive way to foster sustainable, safer, and efficient traffic calming solutions.

DEFINITIONS

Impact Area Boundary – The area ~~as determined by study and engineering judgement~~ that will benefit or be affected by the installation of a traffic calming measures or geometrical change to a road as determined by the County Engineer or his/her designee.

Local Road or Street – are those which are used primarily for access to the abutting properties.

Municipal Service Benefits Unit (MSBU) – a special assessment district as established by authorizing ordinance to provide a variety of services and improvements including, but not limited to, residential household solid waste, collection and disposal services, residential street lighting, fire protection, road paving, drainage, and water and sewer infrastructure.

Neighborhood Traffic Calming (NTC) applies to local residential streets regarding traffic issues related to speeding and excessive cut-through traffic. The Traffic ~~Operations~~ Engineering Section works with residents within neighborhoods to evaluate the type and severity of the traffic problems. When the required concurrence by residents and approval is obtained, the County will install traffic calming measures on local streets to manage the pattern and flow of neighborhood traffic.

Neighborhood-Wide Area: - multiple roadways in the same neighborhood requested by the public for the study or potential installation of Traffic Calming. Staff may extend the area based on Engineering judgement and input by other departments/county agencies.

Traffic Calming Treatments – See Appendix A

TRAFFIC CONTROL MEASURE COSTS

Roadway changes intended to reduce speed and/or discourage non-local motorists can result in costly construction varying for each installation. If the traffic study associated with a residential concern positively identifies construction as the most desirable solution, 100% of all cost assessment will be paid solely by property owners. The Traffic Calming measures will be treated as a Municipal Service Benefit Unit (MSBU) project and the proportional shared assessment of affected property owners will be responsible for all costs that are related to the traffic calming device(s), plus a $250.00 application fee that is paid upfront to start the petition process.

WHO DO I CALL FOR HELP

To request traffic calming, contact Hernando County Department of Public Works (DPW) Customer Service:

Telephone:	352.754.4060
Fax:	352.754.4423
Email:	dresourceobject@co.hernando.fl.us
Online:	http://www.hernandocounty.us/dpw/

TRAFFIC CALMING GUIDELINES OBJECTIVES

1. To improve the quality of life to neighborhood livability by moderating motorists' driving behavior on residential neighborhoods streets;

2. To promote safe and pleasant conditions for motorists, bicyclists, and pedestrians on neighborhood streets;

3. To strongly encourage citizen involvement and participation in all phases of neighborhood traffic management activities,

4. To make efficient use of County resources by utilizing a rational approach to prioritizing Traffic Calming project requests and responses, and

5. To support the Traffic Circulation Element of the County's Comprehensive Plan to create and maintain traffic patterns that protect the livability of established residential neighborhoods.

TCG DESIGN AND ENGINEERING PRINCIPLES

The following list of principles will be used when designing Neighborhood Traffic Calming Projects (NTCPs):

1. To ensure emergency services personnel and equipment have reasonable access to the public street system, the Public Safety Department shall be consulted in the design of all NTCP projects. The Traffic Operations Section will work with Public Safety staff to determine

main routes that cannot have conventional vertical traffic calming features installed.

2. Neighborhood Traffic Calming Projects should be designed in a manner that encourages and enhances pedestrian, bicycle, and transit access to/from neighborhood destinations.

3. Traffic calming measures shall be planned and designed in keeping with sound engineering practices. The Institute of Transportation Engineers (ITE) guidelines and best practices and the Florida Greenbook will be used in the development and implementation of these features~~. The Traffic Operations~~ Engineering Section shall direct the installation of all traffic calming/control measures as needed to accomplish the objective in compliance with applicable standards.

4. "Horizontal" traffic calming measures (See Appendix A-Section D2). Engineering judgment shall determine the extent of such measures as a function of traffic volumes, operating speeds, and adjacent land use. Standard Designs will be used to provide a standard/guideline for the County Engineer to implement the appropriate traffic calming feature(s).

5. The Traffic ~~Operations~~ Engineering Section shall process Neighborhood Traffic Calming requests according to applicable sections of the Policy and related administrative procedures and within the limits of available resources.

6. The Traffic Calming Guidelines (TCG) shall:

    - Encourage the submittal of study requests;
    - Provide for the evaluation of such requests by County staff;
    - Encourage citizen participation in plan development;
    - Require the communication of any test results and specific findings to area residents and affected neighborhood organizations before the installation of permanent traffic calming measures;
    - Ensure that alternative plans are developed should area residents not ratify the original plan or consider the "No build" alternative; and
    - Require that the BOCC approval be granted prior to implementation of any TCG plan (subject to required funding).

NOTE: "Stop" signs are NOT considered traffic calming features. These traffic control devices

are used exclusively to provide right-of-way control under specific design criteria.

ELIGIBILITY REQUIREMENTS FOR LOCAL STREETS

1. Must be classified as a local street and have a daily traffic volume less than 3,000 vehicles per day.
2. Must not be designated as a primary emergency service response or evacuation route.
3. Must not provide for more than one moving traffic lane in each direction.
4. Must not have a speed limit greater than 30 MPH.

DATA COLLECTION AND APPLICABLE TRAFFIC CALMING STUDIES

The TCG has been developed to manage Local Street Studies and/or neighborhood-wide area studies on a prioritized ranking basis.

- Local Street Studies are intended to respond to intersection problems, speeding and through traffic on one local street in a given neighborhood.

- Neighborhood-Wide Area Studies:

  a) Respond to excessive cut-through traffic, speeding and problem intersections on more than one local street in a neighborhood;
  b) Generally, require more time for completion than Local Street Studies as these study areas are larger and the traffic concerns are more complex;
  c) Require more research and analysis, and greater involvement by the neighborhood; and
  d) Generally, follow the boundaries of established residential/business neighborhoods.

TCG PROGRAM REQUEST AND PROCESSSING PROCEDURE

The TCG provides specific steps that assist Hernando County, in partnership with its residents, to develop practical and sustainable solutions to speeding and excessive cut-through traffic volume concerns. The following steps have been developed to streamline the design and implementation of a traffic calming plan.

It is recommended that a neighborhood traffic advisory committee be formed to work with the County during the traffic study process. The committee should include representation from each street within the impact area boundary. Tenants shall be required to notify and receive approval from their landlord to participate in the group as a neighborhood resident. Note: Only property-owners in the impact area boundary may "vote" on any traffic calming plan. The traffic committee's role is to provide neighborhood input into the Neighborhood Traffic Calming process. The committee's functions include:

- reviewing the study data with County staff;
- defining the neighborhood traffic problem(s) and petition study area boundaries; and
- assisting staff in developing options for solving the problem.

Step 1: Petition for Inclusion in The TCG Program

Requests for traffic calming from ~~five (5) homes on the subject street is required and/or~~ the President of the Homeowner's Association (HOA) signed on appropriate letterhead (if applicable) or if there isn't an established HOA in the area of the traffic calming request, a minimum of five (5) homes on the subject street must petition for inclusion into the TCG program. Once the HOA President or five (5) homeowner requests are received, a warrant study will be scheduled. If minimum warrants are not met, a petition will not be processed. A fee of $250.00 will be required.

Step 2 – Specific Project Plan Development

First Public Meeting

The Traffic ~~Operations~~ Engineering Section shall call a public meeting of the local residents within the project area. At the meeting:

1. Staff will provide procedures, data, the traffic calming "toolbox", and program information.
2. Residents will provide staff with their specific issues and concerns regarding traffic speed and/or volume within the project limits.

Staff, with the input of the area residents, will establish an impact area boundary for the project.

Second Public Meeting

The Traffic ~~Operations~~ Engineering Section shall call a second public meeting of the local residents within the project area. At this meeting, staff will present:

1. the comments of the first public meeting;
2. a draft conceptual traffic calming plan for the project; and
3. a draft impact area boundary.

Staff will hear comments from the residents on these three elements and will utilize these new comments to develop an impact area boundary and develop a final traffic calming plan.

Preparation/ Distribution of a Formal Ballot Petition

The Traffic ~~Operations~~ Engineering Section shall prepare a document outlining on a property data map, the traffic calming plan with a brief explanation of the plan and voting procedures. Utilizing the official County property data listings, all property owners in the impact area boundary shall receive this document via US mail, including a postage paid return ballot. The property owner shall have 30 days to return the ballot by mail or in person at the Traffic ~~Operations~~ Engineering Section. Only property owners in the impact area boundary may "vote" on any traffic calming plan.

Ballot Tabulation

Each property owner is entitled to one vote per single family residential unit. Tenants may not vote. Multi-family property owners get one vote. The following tabulation shall be followed:

1. all properties (100%) in the impact area boundary shall receive a ballot document;
2. at least 30% of all County-mailed ballots must be returned and appropriately marked as per instructions on the ballot; and
3. a minimum of 50% plus one (1) of the returned ballots must be affirmative in order for the County to consider the plan further, including implementation of the Municipal Services Benefit Unit (MSBU) to fund the installation of the calming devices.
4. The ballot shall include the estimated cost per assessable unit for the installation of traffic calming devices.

Step 4 – Formal Plan Consideration

The Traffic ~~Operations~~ Engineering Section shall confirm that all of the program procedures and balloting methodologies have been complied with. If confirmed, staff shall prepare a report to the BOCC with the appropriate recommendation regarding the traffic calming plan.

Step 5 – Design and Implementation

Upon approval of the traffic calming plan by the BOCC, county staff shall provide the appropriate engineering designs for the project and formulate a construction/inspection plan in accordance with established County procedures.

Step 6 – Project Evaluation

The Traffic Engineering ~~Department~~ Section shall conduct an evaluation study of the implemented traffic calming plan to determine its effectiveness in terms of operational speed, safety, volume, and other specific objectives that may have been identified by the project team.

Implementation of Traffic Calming (TC) – installation of traffic calming measures shall be made in accordance with the approved plan, state law, and county ordinance.

Removal of Traffic Calming - no petition for removal shall be considered until devices have been in place for a minimum of three (3) years. The procedure for petitioning is the same as that for installation.

Reinstallation Following Removal – once devices have been removed, no petition for re-installation shall be permitted for five (5) years. Reinstallation shall follow the procedures outlined in the Traffic Calming Guidelines for installation.

EXCEPTIONS AND AUTHORIZATION

Nothing in this policy shall be interpreted to restrict or prohibit Hernando County from implementing measures to improve traffic safety, correct accident-causing situations, or mitigate

traffic operational problems within and around residential neighborhoods. The authority outlined in County Code shall remain intact. Staff may make recommendations to the BOCC to amend to the program from time-to-time depending on operational, citizen-based needs, and budgetary issues.

NON-ENGINEERING MEASURES

Other options may be considered by the Traffic Engineering ~~Department~~ Section inclusive of but not limited to:

Road striping - it is a permanent marking on asphalt to guide motorists and make them aware of certain road conditions. It is an inexpensive tool that shows slight improvement in speed reduction.

Speed monitoring - Set up a speed management trailer at the site where there is excessive speeding, it acts as an educational tool to driver, warning them about their high speed.

Neighborhood flyers - For an alternative option to address neighborhood speeding concerns, a "Neighborhood Awareness Program" has been developed whereby the distribution of flyers increases the awareness of residents for speed control. The flyers are generally distributed through a subdivision's Neighborhood Watch Program, through Homeowner's and Civic Association groups, or through volunteer efforts by residents.

Enforcement - it is a periodic monitoring by law enforcement to check for speeding and other violations. It is a good temporary public relations tool. It serves to inform public that speeding is undesirable behavior for which there are consequences.

APPENDIX A
CHAPTER 15 – TRAFFIC CALMING
From the
Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways

CHAPTER 15

TRAFFIC CALMING

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CHAPTER 15

TRAFFIC CALMING

A INTRODUCTION

As Florida continues to grow, more and more of the major highways in its communities are becoming congested. This has caused many drivers to seek less crowded local residential streets as alternatives to get to their destinations. In many cases, this has meant the use of local residential streets as bypasses. The increase in traffic intrusion, volume, and speeds on residential streets has degraded the livability standards of various neighborhoods in Florida and as a result many residents complain about their environment (noise, air pollution), livability (quality of life, traffic intrusion, excessive volume, and speed of traffic), safety (as well as safety of their children, pets, and property) and physical characteristics (absence of sidewalks, etc). This chapter provides some guidance to Florida roadway planners, designers, and traffic engineers on how to address concerns about maintaining or enhancing the quality of life in residential neighborhoods by balancing the need for safety for all roadway users and adjacent property owners of the street network and maintaining the integrity of the highways networks as a whole.

B PLANNING CRITERIA

Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users.

Communities undertaking a traffic calming program shall have a procedure for planning which neighborhoods and roadways qualify for participation in the program. Specifics of these methods shall be developed by the local jurisdictions. The methods will likely vary from locality to locality. However, some issues should be addressed in all communities:

- Through the public involvement process, adjacent residents and road users who are impacted by the situation should be included in identifying the concern(s).
- The need for traffic-calming measures should be confirmed by appropriate studies (license plate survey, speed, volume, crash analyses) studied.
- Once the concerns are clearly identified and confirmed by traffic studies, and documented, it will provide the focus for possible solution, prioritizing, and development of appropriate traffic calming measures. It will also help determine the best approach to address the concerns.
- When developing traffic calming measures, in addition to the affected property owners, emergency response, transit, school, and sanitation officials and any other entities impacted by the installation of such devices should be included in the review process.

Traffic calming may not be the appropriate method in all cases to address vehicle speeds, volumes, and safety. Alternative solutions or educational tools may be considered, as well as coordinated effort with law enforcement.

The application of traffic calming measures should consider possible network and access issues. A system impact analysis should be performed as part of the development process. Vehicular and pedestrian counts, speed data, and crash history of the streets under evaluation should be reviewed. Storm water and environmental impacts also need to be addressed, as well as facility type, urban and rural design factors, and driveway densities.

Design details for each traffic calming measure may vary depending on local conditions. Factors to be considered include both horizontal and vertical deflection, ease of use, emergency vehicle accessibility, ease of maintenance, and facility type. Operational considerations and geometrics are critical factors to consider as well. A list of references and resources to consider in providing more detailed design factors and information can be found at the end of this section. It may be desirable to begin with less restrictive measures and progress to more restrictive ones in stages.

Listed below are some "Do's" and "Don'ts" of the planning process for traffic calming which may be helpful in working through the design process.

Do's and Don'ts of the Planning Process

Do the following:

- Install temporary traffic calming features and monitor them for a period of time before installing the permanent features. Testing features on site prior to permanent installation will relieve resident anxiety about the impact on their own driving patters and driving behaviors will adjust to the new route circumstances.
- Have an organized program including public involvement. Plans and policies should be approved and supported by the local government. Emphasize the selected treatments(s) will be initially in a "test" mode, with permanency pending the outcome measurement. Be able to describe what is being done to keep traffic off residential streets.
- Channel public resources by prioritizing traffic calming request according to documentable criteria, setting thresholds of volume, speed, etc., to merit treatment.
- Involve the local service agencies, including fire, police, and emergency medical services personnel, from the start.
- Consult with fire department and EMS personnel to develop the preferred design, particularly with speed humps and traffic circles. Set up traffic circles with cones and have fire trucks and other emergency vehicles drive around them; this will help determine what radius is best for the vehicles used in a given area. The same process can be used in the design of speed humps.
- Review traffic patterns in the neighborhood as a whole. Avoid solving the problem on one neighborhood street by just shifting the traffic to another neighborhood street.
- Consider appropriate landscape treatments as part of the traffic calming design and implementation.

- Make certain that all signing, pavement markings, and channelization is in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), the AASHTO Policy on Geometric Design of Highways and Streets, and Roundabouts: An Informational Guide, Second Edition, National Cooperative Highway Research Program (NCHRP 672).
- Check sight distances for vehicles, pedestrians, and bicyclists. Sight distance should be consistent with the dimensions shown in Chapter 3 – Geometric Design or Chapter 16 – Residential Street Design.
- Become familiar with the traffic calming features used in other communities and assemble references so that residents can be directed where to see them.
- Decide on a safe design speed beforehand and in consultation with neighborhood residents.
- Check sight distances by visiting the site before and after installation. Do parked cars obstruct sight distances? Do landscaping or other features obstruct sight distance?
- Review the illumination at night. Are additional street lights needed? Does landscaping block the light? Is there a shadow on one side of a median or traffic circle that might hide pedestrians from view?
- Review the channelization during the day and night. Is it a clear approach from all directions? Can it be seen at night? Watch the traffic: Is the driving public confused by the signing and channelization? Make adjustments as needed.
- Review the site for utility conflicts. Is there a fire hydrant? Does it need to be moved? Are there existing utilities in the way?
- Check the storm water drainage. Will the storm drain system need to be moved or revised? Can the runoff flow through or around the device?
- Review on-street parking. Will parked cars block the access of emergency vehicles through or around the proposed neighborhood traffic control devices? Add additional no parking zones where needed. Additional enforcement of parking restrictions may be required to keep the traveled path clear.
- Include weekends in traffic counts, as residential streets may have unique travel patterns and high use periods.

Don't do the following:

- Install neighborhood traffic calming features without a well-engineered program supported by the local government and public.
- Install neighborhood traffic calming features on arterial streets (See Section 1.C.2 for a discussion of roadway classifications). Typically, physical devices are not installed on streets with volumes greater than 3,000 vehicles per day, or with posted or operating speeds of greater than 30 MPH.
- Install neighborhood traffic calming features on streets without curbs unless supplemental features or other design considerations are included to keep vehicles within the traveled way.
- Install neighborhood traffic calming features on street with grades of greater than 10 percent.
- Install neighborhood traffic calming features on major truck routes.
- Install neighborhood traffic calming features on primary emergency routes. Contact local fire, emergency service, and police departments to determine these routes. Secondary access routes should be considered on a case-by-case basis.
- Install neighborhood traffic calming features on curving or winding roads with limited sight distance, unless reduced speed limits and adequate warning signs are used in conjunction with the devices.
- Place neighborhood traffic calming features in front of driveways.
- Neglect to check for conflicting utilities or drainage considerations.
- Install physical features on adjacent parallel routes, unless feasible design alternatives have been agreed upon, as this prevents or hinders emergency response.

C INAPPROPRIATE TRAFFIC CALMING TREATMENTS

C.1 Stop Signs

Unwarranted stop signs should not be used for traffic calming for the following reasons:

- Increase midblock speeds along the street because of drivers trying to make up for lost time
- Increase noise because of quick accelerations and decelerations
- Increase pollution
- Reduce drivers' expectation of a uniform flow
- Relocate the problem
- Cause disrespect for stop signs by drivers and bicyclists

Stop signs shall be used only when warranted per the ***MUTCD***.

C.2 Speed Bumps

Speed bumps shall not be used on public streets. Speed bumps are severe treatments 3 to 6 inches high and 1 to 2 feet long that slow drivers to speeds of less than 10 mph. Due to their abrupt rise and required low speed they can be a hazard to motorists and bicyclists. Speed *humps*, as described in Section D under vertical deflection, should not be confused with speed *bumps*.

C.3 Other Inappropriate Treatments

There are some other treatments that have been shown to be ineffective at reducing the speed and volume of traffic on local roadways. While a temporary improvement may result, long-term improvement is not likely; consequently, their use is discouraged. These treatments include the following:

- Novelty signs -While signs such as CHILDREN AT PLAY, SENIORS CROSS HERE and SLOW DEAF CHILD may make an infrequent roadway user aware of a specific local population, most regular users of the roadway are unaffected by the signs.

- Odd speed limit - NEIGHBORHOOD SPEED LIMIT 23 MPH and other odd speed limit signs place a high dependence on police to monitor speeders and are not consistent with the national practice required by the ***MUTCD*** of posting speeds limits in 5 mph increments.
- Crosswalks – Standard crosswalks marked only with signs and pavement markings do not affect motorists' speeds and should not be used by themselves as traffic calming treatments.
- Bicycle lanes – Standard bicycle lanes are not traffic calming treatments. They can be used to provide space for bicyclists between the sidewalk and travel lanes but should not be used by themselves for traffic calming.
- Speed trailers – While speed trailers can be used as part of a traffic calming program for educational awareness, they have no lasting effect on motorists' behavior.
- Reduced speed limit signs – Reduced speed limits without physical traffic calming measures do not slow drivers and should not be used for traffic calming.
- Rumble strips – These applications have high maintenance requirements and can cause severe noise problems. Also, they can be an obstacle to bicyclists.

D APPROPRIATE TRAFFIC CALMING TREATMENTS

The following sections describe some of the available traffic calming strategies. This list is not exhaustive, nor do the treatments necessarily fall exclusively into only one category.

In a typical traffic calming plan various types of treatments will be used. These plans will be based upon neighborhood preferences combined with engineering judgment.

Design details for traffic calming treatments will vary with application. Specific designs will need to be determined based upon the objective of the installations.

D.1 Vertical Treatments

Vertical treatments are those that depend upon a change in vertical alignment to cause drivers to slow down. When properly used, these treatments can be effective in reducing speeds and crashes. However, consideration should be given to impacts on emergency responders, buses, and, to some extent, bicyclists and motorcyclists.

Traffic calming features that alter the vertical alignment should not be installed near fire hydrants or mailboxes.

Information on signing and pavement markings for vertical deflections can be found in the ***Manual on Uniform Traffic Control Devices (MUTCD)***.

Table 15 – 1 Vertical Treatments

Treatment	Description	Effect	Concerns	Cost
Raised Intersection	A raised plateau where roads intersect. Plateau is generally 4 inches above surrounding street.	Slows vehicles entering intersection and improves pedestrian safety.	Increases difficulty of making a turn.	Medium to High
Raised Crosswalk	Raised pedestrian crossing used in mid-block locations. Crosswalks installed on flat-top portion of speed table. See Figure 15 - 1	Reduces speed and is an effective pedestrian amenity makes pedestrians more visible.	May be a problem for emergency vehicles and vehicles with trailers.	Low to Medium
Speed Humps	Speed humps are parabolic, curved, or sinusoidal in profile, 3 to 4 inches in height and to 14 feet long. Comfortable speeds limited to 15 to 20 mph. See Figure 15 - 2.	Reduces speed.	May cause delays for emergency vehicles and impact patient comfort. May have greater impacts on longer wheelbase cars.	Low
Speed Tables	Speed tables are flat-topped speed humps, also 3 to 4 inches high but with a sloped approach taper on each side of a flat top. They are generally 20 to 24 feet long. Comfortable speeds limited to 20 to 25 mph.	Reduces speed.	May cause delays for emergency vehicles and impact patient comfort.	Low
Speed Cushions/ Pillows	Signed speed humps as described above.	Reduces speed.	May not slow all vehicles.	Low

Figure 15 – 1 Raised Crosswalk

Suwannee Street, Tallahassee, Florida

Figure 15 – 2 Speed Hump

Inside Loop Road, Orange County, Florida

D.2 Horizontal Treatments

Horizontal deflection treatments are often more expensive than vertical deflection treatments. However, they have less of an impact on emergency responders and large vehicles with multiple axles. They generally do not create problems for bicyclists and motorcyclists. Because pavement area is usually reduced, additional landscaping may be possible, making horizontal deflection treatments useful as part of neighborhood beautification projects.

Information on striping and signing roundabouts can be found in the ***MUTCD***.

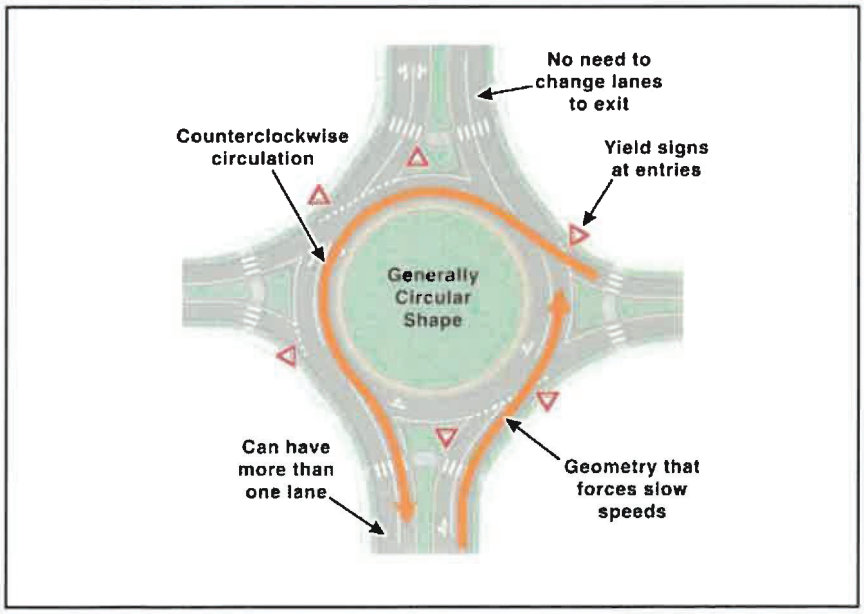
Table 15 – 2 Horizontal Treatments

Treatment	Description	Effect	Concerns	Cost
Angled Slow Point	Angled deviation to deter the path of travel so that the street is not a straight line	Reduces speed and pedestrian crossing distance.	Landscaping must be controlled to maintain visibility. Conflicts may occur with opposing drivers.	Medium to High
Chicanes	Mainline deviation to deter the path of travel so that the street is not a straight line. See Figure 15 - 3.	Reduces speed and pedestrian crossing distance.	A chicane design may warrant additional signing and striping to ensure that drivers are aware of a slight bend in the roadway. Increases the area possible for landscaping.	Medium to High
Mini-Circles	A raised circular island in the center of an existing intersection, typically 15 to 20 feet in diameter. May have mountable truck apron to accommodate large vehicles.	Reduces speed and both the number and severity of crashes.	May restrict larger vehicles. May cause some confusion when not signed properly. Some communities have documented increased crashes when mini-circles replaced all-way stop intersections.	Low to Medium
Roundabouts	A circular intersection with specific design and traffic control features, including yield control of all entering traffic, channelized approaches, geometric curvature. May be appropriate at locations as an alternative to a traffic signal. See Figure 15 - 4.	Reduces vehicle speeds and reinforces a change in the driving environment in transition areas.	May require more space at the intersection itself than other intersection treatments. While Roundabouts have sometimes been considered traffic calming features, they are primarily traffic control measures.	High

Figure 15 – 3 Chicanes

NACTO Urban Street Design Guide, National Association of City Transportation Officials

Figure 15 – 4 Key Roundabout Characteristics



NCHRP Report 672: Roundabouts: An Informational Guide, Second Edition

D.3 Neighborhood Entry Control

Neighborhood entry control treatments include partial street closures and gateway type tools. They are used to reduce speeds and volume at neighborhood access points and may be used in conjunction with neighborhood beautification or enhancement projects and residential area identification.

Table 15 – 3 Neighborhood Entry Control

Treatment	Description	Effect	Concerns	Cost
Chokers	Midblock reduction of the street to a single travel lane for both directions.	Reduces speed and volume.	Costs increase if drainage needs to be rebuilt.	Medium to High
Gateway Treatment or Entrance Features	Treatment to a street that includes a sign, banner, landscaping, and roadway narrowing or other structure that helps to communicate a sense of neighborhood identity.	Reduces entry speed and pedestrian crossing distance. Discourages intrusion by cut through vehicles and identifies the area as residential.	Maintenance responsibility. May lose some on street parking.	Medium to High
Curb Extensions or Bulb-outs	Realignment of curb at intersection or mid-point of a block to decrease pavement width. See Figure 15 - 5.	Visually and physically narrows the roadway, shortens pedestrian crossing distance, increases space for plantings, street furniture.	May impact sight distance, parking, and drainage.	Medium to High
Midblock Median, Slow Point	An island or barrier in the center of a street that separate traffic.	Provides refuge for pedestrians and cyclists.	Landscaping may impede sight distance.	Varies
Lane Narrowing	Street physically narrowed to expand sidewalks and landscaping areas. Could include median, on street parking etc.	Improved pedestrian safety.	May create conflict with opposing drivers in narrow lanes.	Medium to High
One-Way In or One-Way Out Channelization	Intersection reduction of the street to single travel lane with channelization. Also called half road closure.	Reduces speed and traffic.	Costs increase if drainage must be rebuilt. Transfers additional vehicles to other ingress/egress points.	Medium to High
Textured Pavement	A change in pavement texture, and color (e.g., asphalt to brick), that helps make drivers aware of a change in driving environment.	Enhances pedestrian crossings, bike lanes, or on street parking.	Increase maintenance. May increase noise.	Low to Medium

Figure 15 – 5 Curb Extension or Bulb Out

First and Lee Streets, Ft. Myers, Florida

D.4 Diverters

A diverter consists of an island or curbed closure, which prevents certain movements at intersections, and reduces speeds and volumes. By diverting motorists within a neighborhood they can significantly reduce cut through traffic.

Diverters must be planned with care because they will impact the people who live in the neighborhood more than anyone else. Trip lengths increase, creating inconvenience to residents. Emergency responders must also be considered when diverting traffic.

Bicyclists and pedestrians should be provided access through traffic diverters.

Table 15 – 4 Diverters

Treatment	Description	Effect	Concerns	Cost
Diagonal Diverters	Barrier placed diagonally across an intersection, interrupting traffic flow forcing drivers to make turns.	Eliminates through traffic.	May inhibit access by emergency vehicles and residents and increase trip lengths.	Medium
Forced Turn Barrier/Diverters	Small traffic islands installed at inter-sections to restrict specific turning movements.	Reduces cut through traffic.	Could impact emergency vehicles response time.	Low to Medium
Road Closures, Cul-de-sac	One or more legs of the intersection closed to traffic.	Eliminates through traffic improving safety for all street users.	May increase volumes on other streets in the area. Access restriction may cause concerns for emergency responders. Additional right of way for proper turnaround at dead ends may be required.	Low to Medium
Median Closures	Small median islands installed at cross streets to prevent through movements and restrict left turns.	Reduces cut through traffic.	Could impact emergency vehicle responses, inhibit access, and increase trip lengths or transfer volumes to other streets.	Low to Medium

D.5 Other Treatments

These treatments are most effective when used in combination with other physical traffic calming features, and should be used as supplements.

Table 15 – 5 Other Treatments

Treatment	Description	Effect	Concerns	Cost
Pavement Markings	Highlighting various area of road to increase driver's awareness of certain conditions such as bike lanes or crosswalks. See Figure 15 - 6.	Inexpensive and may reduce speed.	May not be as effective as a structure such as curb.	Low
Traversable Barriers	A barrier placed across any portion of a street that is traversable by pedestrians, bicycles, and emergency vehicles but not motor vehicles.	Eliminates cut-through traffic.	Inconvenience to some residents.	Medium
Colored Bike Lanes or Shoulders	A bike lane or shoulder painted, covered with a surface treatment or constructed of a pigmented pavement designed to contrast with the adjacent pavement.	Visually narrows the roadway and may reduce speeds.	May not be effective on roadways with 12 foot lanes.	Low to medium

Figure 15 – 6 Bicycle Lane, Advance Yield Bar and Crosswalk

Franklin Blvd, Tallahassee, Florida

E REFERENCES FOR INFORMATIONAL PURPOSAES

The publications listed below are additional sources, of information related to topics presented in this chapter. Search the Internet Web for up-to-date resources using "traffic+calming" as key words.

- Manual on Uniform Traffic Control Devices, with Revisions 1 and 2, May 2012 (MUTCD). US Department of Transportation, Federal Highway Administration http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm

- Code of Practice for the Installation of Traffic Control Devices in South Australia, July 2013. Traffic and Operational Standards Section, Department Transportation, P.O. Box. 1, Walkerville, South Australia, 5081. (updated in 2013)

- National Cooperative Highway Research Program (NCHRP) Report 672, Roundabouts: An Informational Guide, Second Edition, (2010) http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_672.pdf

- The Florida Intersection Design Guide. Florida Department of Transportation, http://www.dot.state.fl.us/officeofdesign/publicationslist.shtm

- Traffic Calming Measures - Speed Hump, Institute of Transportation Engineers, http://www.ite.org/traffic/

- New York State Supplement (2001) to the Manual of Uniform Traffic Control Devices, 2009. Transportation Planning, Highway Safety, and Traffic Engineering Division, New York State Department of Transportation, 1220 Washington Avenue, Albany, NY 12232-0204. https://www.dot.ny.gov/divisions/operating/oom/transportation-systems/repository/B-2011Supplement-adopted.pdf

- New York State Vehicle & Traffic Law, (latest edition). New York State Department of Motor Vehicles, Swan Street Building, Empire State Plaza, Albany, NY, 12228.

- Roundabout Design Guidelines, Supplement to the NCHRP 672 (October 2012). Maryland Department of Transportation, State Highway Administration http://sha.md.gov/OHD2/MDSHA_Roundabout_Guidelines.pdf

- Traffic Control Systems Handbook, Revised Edition, 2005, Federal Highway Administration, DC 20590. (Updated in 2013) http://ops.fhwa.dot.gov/publications/fhwahop06006/

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APPENDIX B
EXAMPLES OF TRAFFIC CALMING DEVICES

From the
Institute of Transportation Engineers

Traffic Calming Site

Traffic Calming Fact Sheets

May 2018 Update

Speed Hump

Description:

- Rounded (vertically along travel path) raised areas of pavement typically 12 to 14 feet in length
- Often placed in a series (typically spaced 260 to 500 feet apart)
- Sometimes called road humps or undulations

Applications:

- Appropriate for residential local streets and residential/neighborhood collectors
- Not typically used on major roads, bus routes, or primary emergency response routes
- Not appropriate for roads with 85th-percentile speeds of 45 mph or more
- Appropriate for mid-block placement, not at intersections
- Not recommended on grades greater than 8 percent
- Work well in combination with curb extensions
- Can be used on a one-lane one-way or two-lane two-way street

(Source: City of Boulder, Colorado)

(Source: PennDOT Local Technical Assistance Program)

ITE/FHWA Traffic Calming EPrimer: https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm

Design/Installation Issues:

- ITE recommended practice - "Guidelines for the Design and Application of Speed Humps"
- Typically 12 to 14 feet in length; other lengths (10, 22, and 30 feet) reported in practice in U.S.
- Speed hump shapes include parabolic, circular, and sinusoidal
- Typically spaced no more than 500 feet apart to achieve an 85th percentile speed between 25 and 35 mph
- Hump heights range between 3 and 4 inches, with trend toward 3 - 3 ½ inches maximum
- Often have associated signing (advance warning sign before first hump in series at each hump)
- Typically have pavement markings (zigzag, shark's tooth, chevron, zebra)
- Taper edge near curb to allow gap for drainage
- Some have speed advisories
- Need to design for drainage, without encouraging means for motorists to go around a hump

Potential Impacts:

- No impact on non-emergency access
- Average speeds between humps reduced between 20 and 25 percent
- Speeds typically increase approximately 0.5 to 1 mph midway between humps for each 100 feet Beyond the 200-foot approach and exit of consecutive humps
- Traffic volumes diversion estimated around 20 percent; average crash rates reduced by 13 percent

Emergency Response Issues:

- Impacts to ease of emergency-vehicle throughput
- Approximate delay between 3 and 5 seconds per hump for fire trucks and up to 10 seconds for ambulances with patients

Typical Cost (2017 dollars):

- Cost ranges between $2,000 and $4,000

Traffic Calming Fact Sheets

May 2018 Update

Speed Table/Raised Crosswalks

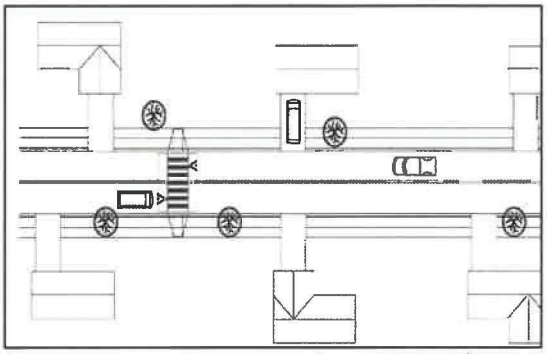
Description:

- Long, raised speed humps with a flat section in the middle and ramps on the ends; sometimes constructed with brick or other textured materials on the flat section
- If placed at a pedestrian crossing, it is referred to as a raised crosswalk
- If placed only in one direction on a road, it is called an offset speed table

Applications:

- Appropriate for local and collector streets; mid-block or at intersections, with/without crosswalks
- Can be used on a one-lane one-way or two-lane two-way street
- Not appropriate for roads with 85th percentile speeds of 45 mph or more
- Typically long enough for the entire wheelbase of a passenger car to rest on top or within limits of ramps
- Work well in combination with textured crosswalks, curb extensions, and curb radius reductions
- Can be applied both with and without sidewalks or dedicated bicycle facilities
- Typically installed along closed-section roads (i.e. curb and gutter) but feasible on open section

(Source: Google Maps, Boulder, Colorado)



(Source: Delaware Department of Transportation)

ITE/FHWA Traffic Calming EPrimer: https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm

Design/Installation Issues:

- ITE recommended practice – "Guidelines for the Design and Application of Speed Humps"
- Most common height is between 3 and 4 inches (reported as high as 6 inches)
- Ramps are typically 6 feet long (reported up to 10 feet long) and are either parabolic or linear
- Careful design is needed for drainage
- Posted speed typically 30 mph or less

Potential Impacts:

- No impact on non-emergency access
- Speeds reductions typically less than for speed humps (typical traversing speeds between 25 and 27 miles per hour)
- Speeds typically decline approximately 0.5 to 1 mph midway between tables for each 100 feet beyond the 200-foot approach and exit points of consecutive speed tables
- Average traffic volumes diversions of 20 percent when a series of speed tables are implemented
- Average crash rate reduction of 45 percent on treated streets
- Increase pedestrian visibility and likelihood of driver yield compliance
- Generally not appropriate for BRT bus routes

Emergency Response Issues:

- Typically preferred by fire departments over speed humps, but not appropriate for primary emergency vehicle routes; typically less than 3 seconds of delay per table for fire trucks

Typical Cost (2017 dollars):

- Cost ranges between $2,500 and $8,000 for asphalt tables; higher for brickwork, stamped asphalt, concrete ramps, and other enhancements sometimes used at pedestrian crossings

Traffic Calming Fact Sheets

March 2019 Update

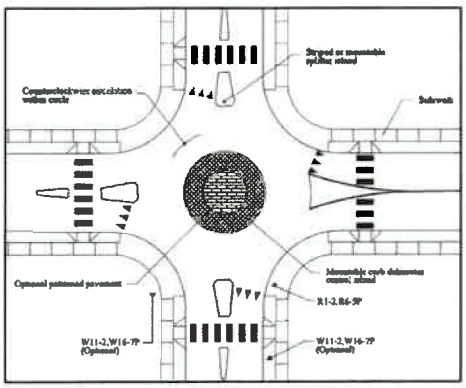
Mini Roundabout

Description:

- Raised islands, placed in unsignalized intersections, around which traffic circulates
- Motorists yield to motorists already in the intersection
- Require drivers to slow to a speed that allows them to comfortably maneuver around them
- Center island of mini roundabout is fully traversable, splitter islands may be fully traversable

Applications:

- Intersections of local and/or collector streets
- One lane each direction entering intersection
- Not typically used at intersections with high volume of large trucks or buses turning left
- Appropriate for low-speed settings



(Source: Delaware DOT)

(Source: Gary Schatz)

ITE/FHWA Traffic Calming EPrimer: https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm

Design/Installation:

- See NCHRP Report 672 for design details
- Typically circular in shape, but may be an oval shape
- Controlled by YIELD signs on all approaches with pedestrian crosswalks, if included, one car-length upstream of YIELD bar
- Preferable for roadway to have urban cross section (i.e., curb and gutter)
- Can be applied to road with on-street parking
- Can be applied to roads both with and without a bicycle facility. Bicycle facilities, if provided, must be separated from the circulatory roadway with physical barriers; cyclists using the circulatory roadway must merge with vehicles. Bicycle facilities are prohibited in the circulatory roadway to prevent right-hook crashes.
- Key design features are the fastest paths and path alignment.

Potential Impacts:

- Slight speed reduction
- Little diversion of traffic
- Bicycle and motorist will share lanes at intersections because of narrowed roadway
- Large vehicles/buses usually drive over the center island for left turns

Emergency Response:

- Emergency vehicles maneuver using the center island at slow speeds

Typical Cost

- Cost is similar to bulb-outs because pedestrian ramps and outside curb lines usually have to be relocated