City of Simpsonville

TRAFFIC CALMING POLICY





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Simpsonville Traffic Calming Policy

INTRODUCTION

Traffic calming means many things to different people. To some, traffic calming is defined by speed limit reductions, to some it is the installation of traffic control devices, and to others traffic calming is an attempt to reduce traffic volume and the negative effects that large volumes of traffic can have on residential neighborhoods. Each of these perspectives may correctly define traffic calming. In the most basic terms, traffic calming is a programmatic response to inappropriate speeds or volumes on residential streets.

Neighborhood Traffic Issues

Identifying the real traffic problem for a neighborhood roadway is not always easy. Sometimes the perceived nature of a traffic problem is very different from the real problem. For example, residents often mention both "traffic volume" and "speeding" as problems on their streets, but in many cases the traffic problem is one or the other. It is important to identify the real traffic problem in order to select the appropriate measure. The traffic issues that this policy is intended to address include:

- **Speeding** A typical concern of residents is speeding along their neighborhood streets. The motorists that exceed the posted speed limit along neighborhood streets often include neighborhood residents and non-residents that use the street as a "cut through." While some motorists exceed the posted speed limit because they are irresponsible drivers, other motorists simply find themselves "invited" to exceed the posted speed limit because of the road's design features. These features can include excessively wide pavement, straight sections of the road, and the absence of landscaping. Speeding vehicles also portray the feeling that the street is dedicated to the motorist, instead of a multi-modal link that unifies the neighborhood.
- **Cut Through Traffic** Traffic is defined as "cut through" if neither the origin nor the destination is within the neighborhood. A motorist is considered "cut through" if he/she drives through the neighborhood on local streets, but has no relationship with the neighborhood itself. This traffic should be using arterial and collector streets. Unfortunately, motorists sometimes use neighborhood streets to avoid congestion on arterials and collector streets. These motorists travel through the neighborhood in order to shorten driving distances, decrease travel times, or avoid traffic signals.
- Real and Perceived Safety Excessive traffic speeds can threaten a neighborhood's feeling of safety. Residents may develop concerns about walking or biking on the street. Rather than allowing the street to be controlled by speeding vehicles, traffic calming provides a route for residents of the neighborhood to consider their streets as multi-modal links.

The City of Simpsonville continually strives to strengthen and protect its neighborhoods by improving the quality of life in residential areas. Traffic conditions on residential streets can greatly affect neighborhood livability. Speeding traffic in neighborhoods can create safety hazards on residential streets. When traffic problems become a daily occurrence, our sense of community and personal wellbeing are threatened.

Policy Objectives

The City of Simpsonville's *Traffic Calming Policy* was developed to guide City staff and inform residents about the processes and procedures for implementing traffic calming on residential streets. This policy incorporates **Education**, **Enforcement**, and **Engineering** into resolving traffic issues in neighborhoods. Residents can actively provide education and awareness of the issues and solutions available. Increased education, enforcement through spot speed checks, and increased police visibility effectively cause self-enforcement of speed regulations. Finally, where increased education and law enforcement have not reduced speeds, engineering measures (speed reduction through physical means) may be explored.

The intent of this policy is to encourage all motorists to drive in a responsible manner. However, it is impossible in practice to ensure all of the motorists drive close to the posted speed limit. Therefore, it is understood that the objectives of this policy are as follows:

- Reduction in speed for 85% of vehicles to a safe and legal speed limit.
- Encourage through traffic to avoid using local roads and to stay on collectors and arterials.
- Maintain and/or enhance emergency vehicle access and response time.
- Protect pedestrian and bicycle access and safety.
- Enhance safety for other drivers, including those entering/exiting roadways at intersections or driveways.
- Communicate clearly with and involve neighborhood associations and residents.
- Use effective, efficient, economical and environmentally sustainable traffic calming measures.
- Note: Traffic calming provides the opportunity to transform the streets into aesthetically
 pleasing infrastructure. Some traffic calming measures, while serving a separate primary
 purpose, can also improve the landscaping and provide a gateway/landmark within the
 neighborhood.

It is extremely important to realize that the approach taken by this policy is a systematic one. While each situation may be somewhat unique, the same definitions and criteria, as outlined in this policy, will be applied. Furthermore, the transportation system of the City must be considered as a whole. Solving one local problem should not create a problem at another location. Ideally, traffic calming measures should be seen as an amenity to the community.

Applicability

What streets will be addressed under this policy?

This policy applies only to public roads owned and maintained by the City of Simpsonville. Furthermore, this policy specifically applies only to local access roads in residential neighborhoods. A local access road is the lowest level road in the hierarchy of roadways as defined by the American Association of State Highway and Transportation Officials (AASHTO). The primary function of a local access road is to provide access to individual properties for motorized vehicles, bicycles, and pedestrians. It is intended to carry traffic that has either an origin or a destination on that road or from within the local neighborhood. This policy does not apply to collector roads or arterial roads. See the Simpsonville Zoning Ordinance for definitions of local, collector, and arterial roads.

TRAFFIC CALMING PROCESS

Step 1. Initiate a Request

The initial step of the process is to submit a completed "Traffic Calming Request Form" to the City of Simpsonville Planning Manager. Traffic calming should be requested for a particular road or, in the case of roads longer than a half-mile, for a specified section of a particular road.

Minimum Number of Signatures

A minimum of four signatures from properties owners of separate properties along the subject road and within the same neighborhood will be required to initiate a study. If there are less than 15 properties along the subject road, then the Traffic Calming Request Form shall contain signatures of property owners from at least 35% of the residences along the subject road. When calculating the number of signatures required, fractions shall be rounded up to the nearest whole number.

Citizen Representative

The completed application should designate one property owner who will serve as the "citizen representative". This property owner will be the primary contact with whom City staff will coordinate. The citizen representative will have a leading role in facilitating communication between City staff and other interested parties in the neighborhood, coordinating a neighborhood awareness campaign, and discussing traffic calming strategies with City staff. At the beginning of the process, the City's Planning Manager will meet with the citizen representative to review the process and the criteria of the program.

Project Study Area

The City's Planning Manager will review the request and establish the study area. The primary function of the study area is to serve as the focus area for education and awareness efforts and the participation area for the petition required by this policy. The study area will typically not span multiple neighborhoods or multiple subdivisions. Properties that meet any of the following criteria shall be combined to form the study area:

- Properties that front both sides of the subject road (or subject section of the road).
- Properties for which the shortest path of egress, or exit, out of the neighborhood or subdivision entails travel along the subject road (or subject section of the road).

Step 2. Collect Data

The City's Planning Manager will facilitate the collection of data related to the traffic issues. Data collection will be important to gauge the extent of the real traffic issues and to determine what traffic calming methods may be appropriate. Data collection may include, and shall not be limited to, any of the following:

- Volume count to determine peak hour traffic
- Volume count to determine average daily traffic
- Speed study to determine existing speed data
- Crash data for the most recent three years
- Emergency services routes and response times
- Study to quantify cut-through traffic
- Existing roadways conditions (e.g., pavement condition, signage, markings, sidewalk)
- Pedestrian and bicycle activity
- Geometric features of the roadway (e.g., lane width, shoulder width, sight distance, alignment, etc.)
- Other information/data that may be applicable to the roadway

This process may take approximately 60 days, depending on the traffic calming request backlog.

Step 3. Neighborhood Awareness Campaign

Speeding in residential areas is a bad habit and it takes a unified effort to help break it. "Speeders" sometimes consist of neighbors and friends who are committed to safe, peaceful neighborhoods. Neighborhood activity and awareness is vitally important. Neighbors should remind neighbors to pay attention to their driving habits and of their mutual responsibility to the residents living in the community.

During the data collection and analysis period, the applicants for the traffic calming request shall undertake a "Neighborhood Awareness Campaign." A minimum of **one activity** shall be completed. This campaign is entirely the responsibility of the HOA or neighborhood; no City funds will be used.

Neighborhood Awareness Campaign Activities

Several creative methods may be used to reduce traffic problems in neighborhoods. Such strategies may include:

- Hold a discussion at an advertised neighborhood or HOA meeting
- Publish an article in a neighborhood newsletter letting drivers know the threat posed by speeding on the sense of community and well-being
- Hold a "slow down" block party to get people to think about their driving habits
- Walk the neighborhood with door hangers and talk to neighbors about neighborhood traffic safety

These are just a few examples of ideas to assist residents in the education of neighborhood traffic issues. No matter the method used, the objective should be to encourage all drivers on neighborhood streets to obey existing traffic controls and laws and to improve safety and well-being for all.

Pre-approval and Report of Awareness Campaign Activities

The citizen representative shall receive preapproval from the City's Planning Manager for the activities they plan to undertake. City staff may be able to direct the citizen representative to appropriate resources to aid in the education of residents and the neighborhood. The City's Planning Manager will review the proposed activities to ensure that they include an appropriate educational component and that they adequately target property owners within the study area.

The citizen representative shall report on and provide evidence of each activity to the City's Planning Manager following completion.

Step 4. Evaluate Eligibility

The City's Planning Manager shall perform an evaluation of the pertinent data collected. To qualify for traffic calming, the following warrants must be met:

- The street must be classified as a local residential access road, as determined by the City's Planning Manager.
- The street's speed limit must be posted at 25 mph or less.
- The citizen representative must provide evidence of at least one activity part of an overall neighborhood awareness campaign.
- At least one of the following traffic issues must exist as prescribed below:
 - **Speeding.** A speeding issue exists when the 85th percentile speed along the subject roadway is at least six miles per hour above the posted speed limit.
 - Excess volume due to cut-through traffic. Excess volume due to cut-through traffic exists when the average weekday traffic volume or the peak hour traffic volume measured at the entrance(s)/exit(s) of the neighborhood or along the subject road exceeds the reasonable neighborhood traffic level estimated by City staff by at least ten percent using data, principles and practices published by the Institute of Transportation Engineers (ITE). Staff will generally use trip generation data published by the ITE in estimating the reasonable traffic level within a neighborhood.
 - **Safety.** A safety issue exists when three or more accidents have occurred at the same location on the subject roadway within the most recent 36 months for which accident data is available. Notwithstanding, if two or more accidents resulting in a fatal injury or a incapacitating injury have occurred at the same location on the subject roadway within the most recent 36 months, then City staff may likewise deem that a safety issue exists.

The Planning Manager will communicate to the citizen representative the results of this evaluation. Applications that do not meet the above criteria will not be considered for any formal traffic calming actions prescribed by this policy. The roadway will not be eligible for re-evaluation for at least 12 months.

Step 5. Consider Traffic Calming Alternatives and Implement Nonstructural Measures

If the criteria for traffic calming measures are met, City staff will consider appropriate responses and recommendations to address the issues identified. The following responses will be evaluated and considered *in order*. The consideration of structural traffic calming measures shall be viewed as a last step in a comprehensive plan for reducing vehicle speed and for discouraging cut-through traffic movements in a residential area.

- Phase 1. Police enforcement and citizen education.
- Phase 2. Signage and warning devices such as temporary driver feedback signage (Radar).
- Phase 3. Low cost traffic improvements (lane striping, speed legend, pavement markers, parking changes, etc.)
- Phase 4. Trial structural traffic calming measures.
- Phase 5. Constructed (permanent) structural traffic calming measures.

Cut-through Traffic Calming Strategies

In the case of excess volume due to cut-through traffic, City staff will examine whether congestion on adjacent arterials or collectors is causing motorists to shortcut through the neighborhood. There may be some low-cost options available to improve traffic flow on the arterials or collectors, including fine-tuning signal timings, adding turn bays, and implementing turn prohibitions and parking restrictions. These strategies will be examined before structural traffic calming measures are considered.

Re-evaluation

The City's Planning Manager may elect to collect follow-up data after the implementation of any traffic calming strategy in order to gauge the effectiveness of that strategy. At a minimum, follow-up data collection and analysis should be conducted before trial structural traffic calming measures are considered. If at any point before trial structural traffic calming measures are installed the data collected for the subject roadway no longer meet the criteria for traffic calming, then structural traffic calming measures will not be considered.

Step 6. Create a Traffic Calming Plan with Structural Traffic Calming Measures

If, after evaluating the follow-up data after non-structural traffic calming alternatives have been implemented, the criteria for traffic calming are still met, then structural traffic calming measures will be examined. A description of these device types can be found in Appendix A.

City staff will meet with affected departments, the citizen representative, and the neighborhood to review and discuss appropriate structural traffic calming alternatives. Following these meetings, City staff will design a recommended traffic calming plan using structural traffic calming measures. The traffic calming plan will specify the type, number, and location of the proposed traffic calming measures. City staff will make their best effort to incorporate the feedback received at various meetings, but most importantly the traffic calming plan will be designed using sound planning practices and engineering judgment. In addition to the specified objectives of this policy, the traffic calming plan shall be carefully designed such that traffic is not inadvertently diverted on to other local access roads. The City's Planning Manager will meet separately with affected departments and the citizen representative to review the proposed traffic calming plan.

Coordination with City Departments and the Citizen Representative

The City's Planning Manager will first meet with affected City departments, including police, fire, and public works, to review, discuss and identify appropriate structural traffic calming measures. The Planning Manager will next meet with the citizen representative to review and discuss appropriate structural traffic calming measures as identified by the affected City departments.

Neighborhood Meeting

The City's Planning Manager and the citizen representative will schedule a neighborhood meeting for the primary purpose of reviewing and receiving feedback on appropriate traffic calming measures. City staff will provide notice of the meeting to each property owner within the study area. At the neighborhood meeting, City staff will present the advantages, disadvantages, and cost estimates for various measures under consideration. Staff will also explain the petition process.

Placement and Design Guidelines

Placement of structural traffic calming measures will conform to the following as practicable as possible:

- Positioned a minimum of 200 feet apart
- Provide a stopping sight distance of 200 feet or more
- Be located a minimum of 200 feet from an intersection
- At or near a street light (if applicable)
- Be located a minimum of 20 feet from any driveway
- Be located a minimum of 25 feet from any manhole, drain inlet, water valve, street monument, and other similar appurtenances
- Be located a minimum of 50 feet from any fire hydrant
- The grade of the approach within 200 feet of the device and from all directions must be less than seven percent

Step 7. Approve the Traffic Calming Plan via Petition

After the plan has be designed, City staff will prepare a petition for the citizen representative and his/her helpers to circulate among the study area. To show awareness and consensus for the proposed traffic calming plan, at least 65% of the residences within the study area must approve the plan via petition.

Petition Guidelines

The petition shall be administered by the following standards:

- Only property owners or occupants of a property within the study area that can be verified through tax notice records or voter registration records will be counted in the petition.
- Only one person from the same property within the study area will be counted in the petition.
- A dwelling that sits on multiple adjacent properties will only be counted once (in other words, each property is not entitled to additional votes).
- Properties without any dwelling thereon (i.e. undeveloped properties) will not be counted in the petition.
- Any property without a property owner or occupant (verified as indicated above) responding to the petition will be counted as a "no" vote.

- The City shall allow 30 calendar days for the petition to be returned. Day zero is the date on which City staff deliver the traffic calming petition to the citizen representative.
- If the applicant needs additional time to complete the petition, they have an option to request a 30-day extension in writing to the City's Planning Manager. Extensions must be requested prior to the expiration of the previously prescribed due date. Only one extension may be granted.

Unsuccessful Petitions

If a petition fails to achieve the necessary 65% approval within the specified time, the location may begin anew at Step 6, "Create a Traffic Calming Plan with Structural Traffic Calming Measures," of this policy. If a separate petition fails a second time, the location shall not be reconsidered for traffic calming for a period of at least two years from the date the signature period of the second petition expired and the process must begin anew.

Step 8. Install Trial Structural Traffic Calming Measures

Once the petition is received by the City's Planning Manager and at least 65% of the property owners have voted yes and have been verified by staff, the petition, the traffic calming plan, and the cost estimates will be presented to the City Administrator for review. The City Administrator shall consider whether to authorize staff to install trial structural traffic calming measures that closely resemble the measures contained in the traffic calming plan. When possible and where available, inexpensive trial measures should be installed to ensure that traffic calming measures will achieve the intended results prior to constructing permanent measures. A trial installation also provides an opportunity to alter the geometrics of a measure or make other changes prior to permanent installation. Trial measures should resemble permanent measures as much as possible.

Duration of Trial Measures

Trial traffic calming measures shall be installed for 180 days. Due to the temporary nature of the trial measures, they may be removed at any time after 180 days. Notwithstanding, if the trial measures have proven effective, they are not needed for another project, and the funding for permanent measures is making progress toward approval, the City Administrator may allow for the trial measures to remain until the funding for permanent traffic calming has been approved and the permanent measures are ready to be constructed. The City of Simpsonville reserves the right to remove the trial measures for any reason and at any time, including during the 180-day trial period.

Evaluation of Trial Measures

The City's Planning Manager will review the effectiveness of trial traffic calming measures 180 days after installation. If the measures prove to be ineffective or should traffic conditions change, the City Administrator may direct City staff to remove the trial measures. Trial measures shall be considered effective if follow-up data demonstrate that traffic volumes and/or speeds have decreased below the thresholds prescribed herein (see section on eligibility). If the follow-up data still exceeds the thresholds prescribed herein, the trial measures may still be deemed effective if traffic volume or the 85th percentile speed along the subject roadway has decreased by at least 10%.

Diversion to Other Residential Roads

Trial measures may be considered ineffective if the follow-up data shows that traffic issues (speeds, volume, and/or safety) have been inadvertently diverted to other local residential access roads. City staff may determine that traffic issues have been diverted to other local residential access roads if the following is observed:

- (1) Before and after data demonstrate that traffic volumes and/or speeds on other local residential access roads—where the before data shows that the traffic volumes and/or speeds were previously below the thresholds prescribed herein—have increased above the thresholds prescribed herein (see section on eligibility) and the cause for this increase can reasonably be connected to the installation of the trial traffic calming measures; or
- (2) Before and after data demonstrate that traffic volumes and/or speeds on other local residential access roads have increased by at least 10% and the cause for this increase can reasonably be connected to the installation of the trial traffic calming measures.

Where traffic has been diverted to any local residential access road within the study area, City staff may revise the traffic calming plan to incorporate additional traffic calming measures accordingly. The revised traffic calming plan shall be circulated for petition approval in accordance with Step 7.

Step 9. Funding and Construction of Permanent Structural Traffic Calming Measures

Where trial traffic calming measures have been installed for at least 180 days and the traffic data shows that they have been effective, City staff shall present to City Council cost estimates for implementing permanent structural traffic calming measures during the City's annual budgeting process. Permanent structural traffic calming measures are subject to the appropriation of available funds in the City's annual budget.

If funds have been appropriated in the City's annual budget for the construction of the permanent structural traffic calming measures, then construction may commence. Construction will be performed by City of Simpsonville employees or by parties contracted by the City to perform the work. Contract construction by private associations or citizens will not be allowed.

Lack of Funding Approval

If funds have not been appropriated for the project after two consecutive annual budget cycles, the project is considered to be denied. No further consideration shall be given to the project. However, nothing herein shall prevent a new request from being initiated and the process beginning anew at Step 1.

Private Funding

If funds are not appropriated in the City's annual budget for a particular project, neighborhoods may raise funds to cover the full cost of the project. City Council shall consider whether to accept or reject an offer of private funding for the project.

Removal

If the neighborhood decides that they no longer want previously installed structural traffic calming measures, they must follow the same procedure to obtain 65% approval via petition as listed above for installation. The City of Simpsonville reserves the right to remove measures, including trial measures, for any reason and at any time.

Appendix A. Description of Traffic Calming Measures

Non-structural Measures

Non-structural traffic calming measures do not require construction of physical modifications to the roadway. These measures often result in lower costs and prevents constructing a more-permanent change to the roadway.

Education

Activities that change people's perceptions and help alter driver behavior are most preferred. Meetings and workshops with neighbors and the City can help implement and direct traffic calming applications. Most traffic problems are a result of human behavior. Through outreach programs and neighborhood watch programs, residents can play a big part in spreading the information.

Advantages:

- Flexible in duration of meetings, workshops, etc.
- Inexpensive compared to other alternatives

Disadvantages:

- Difficult to measure the effectiveness
- May take time and repetition to be effective
- Can be challenging to generate citizen participation



Speed Limit Enforcement

The City can provide targeted speed limit enforcement in response to citizen concerns. Targeted speed limit enforcement may be considered for evaluating the level of speed reduction possible with more permanent measures. Targeted enforcement can also be used in conjunction with new structural traffic calming measures to help drivers become aware of the new traffic calming restrictions. This measure typically only provides a temporary benefit, since speed limit enforcement typically is not performed on a regular, on-going basis.

Advantages:

- Inexpensive if used temporarily
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in a short timeframe

- Effectiveness may be temporary
- Expensive to maintain a continued program of enforcement



Additional Signs

Signs are an effective tool for advising drivers of the numerous situations encountered on roadways. For example, residential roadways should not act as cut-through routes for trucks and heavy vehicles. If the amount of cutthrough traffic is deemed unacceptable, NO TRUCKS signs can be installed to regulate the number of heavy vehicles that travel along the residential roadway.

Advantages:

- Inexpensive
- Turn restrictions can reduce cut through traffic
- Does not slow emergency vehicles

Disadvantages:

- Ineffective if not accompanied by speed enforcement
- Speed must be set at a reasonable value for drivers to follow
- Has not been shown to significantly reduce travel volume or speeds



Radar Trailer Placement

A radar trailer is a temporary device that measures an approaching vehicle's speed and displays it next to the posted speed limit. This can serve as a reminder to the driver of both the vehicle's speed and the posted speed limit. In order to be most effective, the placement of the trailer should be in the clear view of the oncoming driver's line of sight. These trailers can be easily placed on a roadway for a limited amount of time and then relocated to another roadway, allowing a single trailer to be effective in many locations. Like targeted speed limit enforcement, the placement of a radar trailer provides a temporary benefit for reduction of vehicular speeds; speeds tend to increase after the trailer is moved.

Advantages:

- Inexpensive if used temporarily
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in a short timeframe

- Effectiveness may be temporary
- Aesthetics are not pleasing
- Only effective for one direction of travel
- Subject to vandalism



Dynamic Speed Display Sign

A dynamic speed display sign performs the same function as a radar trailer, but is meant to be installed as a permanent device. Real-time speeds are relayed to drivers and flash when vehicle speeds exceed the posted speed limit. Dynamic speed display signs are typically mounted on or near the posted speed limit signs. This reminds drivers to slow to the appropriate speed. While intended for permanent use, these can also be established as mobile units.

Advantages:

- Inexpensive
- Does not require time for design
- Does not slow emergency vehicles
- Can mount to existing poles
- Effective in reducing speeds in a short timeframe

Disadvantages

- Requires power source
- Only effective for one direction of travel
- Long-term effectiveness is uncertain
- Subject to vandalism



Lane Striping

Lane striping can be used to create dedicated bicycle lanes, parking lanes, or pavement edge lines. Pavement markings can be implemented to narrow the vehicular travel lanes, giving the perception of a higher speed to encourage drivers to reduce their speed. Lane striping typically has a relatively low cost for design and construction. However, the reduction in speed has not been conclusively demonstrated based on past evidence. The increase in the maintenance required may offset the benefits derived from the installation of new lane striping.

Advantages:

- Inexpensive
- Can be used to create bicycle lanes or delineate on-street parking
- Does not require much time for design
- Does not slow emergency vehicles

- Increases regular maintenance
- Has not been shown to significantly reduce travel speeds



Speed Legends

Speeds legends are numerals painted on the roadway, indicating the current speed limit in miles per hour. They are usually placed near speed limit signposts. Speed legends can be useful in further communicating the posted speed limit, and can be placed at major entry points into a residential area.

Advantages:

- Inexpensive
- Helps reinforce the posted speed limit
- Does not require time for design
- Does not slow emergency vehicles

Disadvantages:

• Has not been shown to significantly reduce travel speeds



Optical Speed Bars

Optical speed bars are a series of pavement markings spaced at decreasing distances perpendicular to the pavement edge lines and centerlines. These markings have been used in construction zones to provide drivers with the impression of increased speed. Lane striping typically has a relatively low cost for design and construction. However, although they are initially effective, the speed reduction diminishes over time.



Raised Pavement Markers (RPMs)

RPMs are reflectors which are installed on the roadway to help drivers visually identify the centerline, lane lines and pavement edge lines on roadways during inclement weather and nighttime hours. RPMs can also be arranged in a rectangular array across the thru lanes of a roadway to create a rumble strip. These rumble strips can be effective in reducing travel speeds, but also considerably increase the roadway noise. As a consequence of the noise created by RPM rumble strips, they are usually only placed in locations with a very low density of residential structures.

Advantages:

- Inexpensive
- Does not slow emergency vehicles
- May help drivers stay in lane on curves and during poor visibility

Disadvantages:

- Noise caused by RPMs
- Constant maintenance/replacement



Delineators

Delineators are similar to RPMs except the reflectors are placed on a vertical plastic break away pole along the roadway edge to further define a centerline or pavement edge line of a roadway. Delineators help to add a vertical element to the pavement and are often used with other physical traffic calming measures to improve their visibility and effectiveness. Delineators usually do not require a large expenditure for design and can help in reducing the driver speeds when used to delineate physical devices. The cost for delineators, as well as possible replacement and pavement costs, can cause this measure to be relatively expensive. Motorists and citizens may not consider delineators to be visually attractive, especially as they begin to experience "wear and tear."



High Visibility Crosswalk

High visibility crosswalks can use pavement markings and colorless RPMs to enhance visibility. The pavement markings are typically solid white in color, eight feet long, and 12 inches wide. Drivers tend to be more aware of the high visibility crosswalks and usually slow down when they are approached. However, due to the higher cost, this measure should be restricted to locations that have both high vehicular volumes and pedestrian volumes.



Textured Pavement

Textured pavement and stamped asphalt can be used alone as a traffic calming measure or in combination with other physical measures. Drivers typically slow down when crossing textured pavement due to vibration created by the pavement surface. However, this also creates considerable noise that may be a disadvantage for neighbors.

Advantages:

• Pleasing visual aesthetics

- Noise pollution
- Higher cost
- Not as effective in reducing speeds



Vertical Speed Control Measures

Vertical speed control measures provide an obstruction that vehicles are able to drive over. The change in pavement height (and sometimes pavement materials) can cause discomfort to the occupants of vehicles that are exceeding the design speed of the traffic calming measure. It should be noted that most vertical speed control measures are not preferred along roadways that are emergency vehicle routes or transit routes.

Vertical speed control measures typically perform better when they are installed in a series, as opposed to a single isolated measure. The deceleration and acceleration of a vehicle, while negotiating a series of vertical speed control measures, is dependent on the number and spacing of the installations.

The implementation of vertical traffic calming measures can result in some traffic diverting onto parallel streets. This essentially moves the cut-through problem instead of solving it. Consideration should be placed on the concept of improving the neighborhood (not just improving the street).

Speed Humps

Speed humps are raised areas of pavement (or other textured materials) in the street that are rounded and parabolic or sinusoidal (i.e., gradual) in shape. They extend fully across the roadway but are tapered on each side to allow unimpeded water flow in curb and gutter system. Speed humps typically measure between three and four inches in height and 12 feet in length. The height and length of the speed hump determines how fast it can be navigated without causing discomfort to the driver. Discomfort increases as the speed of the vehicle traveling over the hump increases.

Advantages:

- Low cost
- Effective in reducing vehicle speed

- Increases response time for emergency vehicles
- Increases noise and air pollution in neighborhood



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Speed Cushions

Speed cushions are narrower, modular speed humps that are typically installed in the center of each travel lane. Speed cushions typically are six feet in width. Speed cushions typically range in length between seven and ten feet. The most common height of speed cushions is three inches. Passenger vehicles will traverse the speed cushions in the same manner as a speed hump. However, emergency vehicles are able to straddle the speed cushions due to their wider wheel track. Thus, response times for emergency vehicles are not increased as much (if at all).

Pre-manufactured units should be installed on roads with adequate pavement structure to allow for anchoring. The number of modules necessary is determined by the street width.

Advantages:

- Less expensive than speed humps
- Effective in reducing vehicle speed
- Does not impact emergency vehicle response time as much as speed humps
- Cyclist travel is unimpeded

- Increase noise and air pollution in neighborhood
- Passenger vehicles with larger axle widths may be able to straddle the speed cushions



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Speed Tables

Speed tables are flat-topped speed humps. Speed tables typically measure between three and four inches in height and 22 feet in length, with the flat portion being ten feet in length. Speed tables are typically long enough for the entire wheelbase of a passenger car to rest on the flat top. Their long flat fields give speed tables higher design speeds than speed humps. Brick or other textured materials are usually used on the flat top to improve the appearance of speed tables, draw attention to them, reduce speed, and may enhance safety. Like speed humps, discomfort increases as the speed of the vehicle traveling over the hump increases. Speed tables are good for locations where low speeds are desired but a somewhat smooth ride is needed for larger vehicles. Careful design is needed for drainage.

Advantages:

- Quicker response time for emergency vehicles than speed humps
- Effective in reducing vehicle speed, but not as well as speed humps
- Addition of brick or textured materials can improve aesthetics

- More expensive than speed humps
- Increases response time for emergency vehicles
- Increases noise and air pollution in neighborhood
- Adverse impact on cyclists



Raised Crosswalks

Raised crosswalks have a similar shape to a speed table, but the flat top contains a marked pedestrian crosswalk. These measures should be elevated to a height that matches the adjacent sidewalk, such that the raised crosswalk is flush with the curb or top of sidewalk elevation at each end.

Advantages:

- Provides a more visible pedestrian crossing
- Quicker response time for emergency vehicles than speed humps
- Effective in reducing vehicle speed, but not as well as speed humps
- Addition of brick or textured materials can improve aesthetics

Disadvantages

- More expensive than speed humps
- Increases response time for emergency vehicles
- Increases noise and air pollution in neighborhood
- May change or restrict drainage



Raised Intersections

Raised intersections can be used as a traffic calming measure while also alerting drivers to the potential for pedestrians or vehicles at an intersection. The physical attributes are similar to a speed table in that each intersection approach elevates to a height of three inches over a length of six feet. The flat top, also similar to a speed table, is provided throughout the entire intersection. If there is a concern about loss of on-street parking, raised intersections are a more acceptable traffic calming measure.

Advantages:

- Provides a more visible pedestrian crossing
- Provides traffic calming along two roads
- Quicker response time for emergency vehicles than speed humps
- Effective in reducing vehicle speed, but not as well as speed humps
- Addition of brick or textured materials can improve aesthetics

- Very expensive compared to speed humps and speed tables
- Increases response time for emergency vehicles
- Increases noise and air pollution in neighborhood
- Less effective in slowing travel speed
- May change or restrict drainage



Horizontal Speed Control Measures

Horizontal speed control measures are altered segments of roadway, where the straight line of travel has been altered in order to require a vehicle to slow.

Neighborhood Traffic Circles

Neighborhood traffic circles are raised islands placed in intersections, forcing traffic to circulate around the raised island. The traffic circle is typically circular in shape and can include landscaping within the raised island. The raised island in the center of the intersection typically measures between 16 and 24 feet in diameter. Neighborhood traffic circles can be controlled by YIELD signs on all approaches, STOP signs on all approaches, or a combination of free-flow conditions along the major street and STOP signs along the minor street. Traffic circles prevent drivers from speeding through intersections by impeding the through movement. Neighborhood traffic circles are most effective when there is vertical planting material in the center. This adds to its visibility to the driver and provides aesthetics to the neighborhood. Landscaping needs to be designed to allow adequate sight distance.

Traffic circles should only be used where one lane enters the intersection in each direction. Traffic circles are not typically used at intersections with high volumes of large trucks and buses turning left. Care must be taken to avoid routing vehicles through unmarked crosswalks on side-street approaches.

Advantages:

- Breaks up sight-lines on straight street
- Effective in reducing vehicle speed
- Can reduce severity of motor vehicle collisions
- Opportunity for landscaping and improved aesthetics

- Area of influence tends to only include a couple hundred feet upstream and downstream of the intersection
- Difficult for left-turning emergency vehicles
- Can result in bicycle/auto conflicts at intersections because of narrowed travel lane
- Possible need for right-of-way, depending on the size of the raised island
- May require modifications to curb, gutter and sidewalks
- Increased cost/labor for maintenance of landscaping





Chicanes

Chicanes are curb extensions or edge islands that alternate from one side of the street to the other, creating S-shaped travel patterns. Raised landscape islands or delineators are usually provided at both ends of a chicane in order to enhance the driver's awareness of the need for a lateral shift. Along a section of roadway that contains a chicane, off-street parallel parking may be restricted along property frontages due to curb and gutter.

Chicanes can also be formed by alternating onstreet parking from one side of the roadway to the other. Parking bays can be created using striping or by installing landscaped islands at each end.

Chicanes are typically appropriate for midblock locations only. They are most effective with equivalent volumes on both approaches. Unless they are well-designed, chicanes may still permit speeding by drivers cutting straight paths across the center line. European manuals recommend shifts in alignment of at least one lane width, deflection angles of at least 45 degrees, and center islands to prevent drivers from taking a straight "racing line" through the feature.

Advantages:

- Discourages high speeds by forcing horizontal deflection
- Easily negotiable by emergency vehicles
- Opportunity for landscaping and improve aesthetics

- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Curb realignment and landscaping can be expensive, especially if there are drainage issues
- Can impact parking and driveway access
- Increased cost for maintenance of landscaping
- Street sweeping may need to be done manually



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Lateral Shifts

Lateral shifts can be described as one half of a chicane. Curb extensions or pavement markings are provided on otherwise straight streets that cause travel lanes to bend one way and then bend back the other way to the original direction of travel.

Advantages:

- Can accommodate higher traffic volumes than many other traffic calming measures
- Discourages high speeds by forcing horizontal deflection
- Easily negotiable by emergency vehicles
- Opportunity for landscaping and improved aesthetics

- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Curb realignment and landscaping can be expensive (pavement markings are less expensive)
- Increased cost for maintenance of landscaping
- Potential loss of on-street parking



Narrowing Measures

Narrowing measures are short roadway segments that are narrower than the typical roadway section.

Neckdowns

A neckdown consists of curb extensions which reduce the roadway width at intersections, thereby reducing speeds when drivers experience the physical perception of a narrow roadway. The curb extensions may consist of concrete curbing, a line of bollards, or any other obstruction deemed appropriate. When using bollards or any other obstruction, the spacing of these objects should be between four and six feet such that the opening is smaller than the width of a vehicle. Intersection treatments reduce vehicle travel speeds by tightening the curb radii. Neckdowns improve pedestrian safety by providing a refuge and shortening the crossing distance.

Intersection treatments can be retrofitted into an existing intersection without modifying the existing drainage, or they can be designed to provide additional sidewalk width for increased pedestrian use or street furniture. The effects are increased pedestrian comfort and safety at the intersection.

Advantages:

- Encourages a safer pedestrian environment by providing a shorter crossing distance
- Through and left-turn movements are easily negotiable by large vehicles
- Prevents parking too close to intersections
- Can create protected on-street parking
- Opportunity for landscaping and improved aesthetics

- Effectiveness is limited by the absence of vertical deflection
- Difficult for right-turning emergency vehicles
- Increased cost for maintenance of landscaping
- May require bicycles to briefly merge with vehicular traffic
- May change or restrict drainage



Chokers

Chokers are curb extensions at mid-block locations, whereas neckdowns are at intersection locations. Chokers reduce the roadway width by widening the sidewalk or planting strip. The presence of curb extensions reduces speeds when drivers experience the physical perception of a narrow roadway. The curb extensions may consist of concrete curbing, a line of bollards, or any other obstruction deemed appropriate. When using bollards or any other obstruction, the spacing of these objects should be between four and six feet such that the opening is smaller than the width of a vehicle. If chokers are marked/striped as crosswalks, they are also called safe crosses. Chokers cause the roadway section to be narrower than the normal cross section. One-lane chokers rely on regulatory signs and driver courtesy to work.

Chokers are typically designed to narrow the road to 20 feet for two-way traffic; widths between 13 and 17 feet should be avoided. Adequate drainage is a key consideration. Some applications use an island which allows drainage and bicyclists to continue between the choker and the original curb line. Chokers work well in combination with speed humps, speed tables, raised intersections, textured crosswalks, curb radius reductions, and raised median islands.

Advantages:

- Reduces pedestrian crossing width and increases visibility of the pedestrian
- Easily negotiable by emergency vehicles
- If designed well, can have a positive aesthetic value
- Opportunity for landscaping and improved aesthetics

- Effectiveness is limited by the absence of vertical deflection
- May require bicyclists to briefly merge with vehicular traffic
- Can impact parking and driveway access
- Increased cost for maintenance of landscaping



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Center Island Medians

Center island medians are raised islands located along the centerline of a street that narrow the travel lanes at that location. The presence of a median, resulting in a smaller roadway width, reduces speeds when drivers experience the physical perception of a narrow roadway. The medians are often landscaped to provide visual amenity; they can also contain curb extensions that consist of concrete curbing, a line of bollards, or any other obstruction deemed appropriate. When using bollards or any other obstruction, the spacing of these objects should be between four and six feet such that the opening is smaller than the width of a vehicle. The median island can act as a "gateway" when placed at the entrance to a neighborhood. A median island of adequate width can also be referred to as a "pedestrian refuge" if located at a crosswalk and the median is accommodating for pedestrians.

Advantages:

- If designed well, can have a positive aesthetic value
- Opportunity for landscaping and improved aesthetics
- Reduces pedestrian crossing width

- Effectiveness is limited by the absence of vertical deflection
- May interrupt driveway access to adjacent properties
- Increased cost or maintenance of landscaping
- May require bicyclists to briefly merge with vehicular traffic
- Potential loss of on-street parking
- If center island is too long, channelized traffic may increase travel speed





Traffic <mark>Calming</mark> Policy

Volume Control Measures

Full Closures

Full-street closures are barriers placed across a street to close the street completely to through traffic. Sidewalks or bicycle paths typically remain open. The barriers may consist of landscaped islands, walls, gates, side-by-side bollards, or any other obstructions that leave an opening smaller than the width of a passenger car.

Advantages:

- Able to maintain pedestrian and bicycle access
- Reduces traffic volumes on that street
- Opportunity for landscaping and improved aesthetics

- May require the City to enact an ordinance (possible 90-day process)
- Will increase traffic volumes along adjacent streets
- Causes longer travel time and distance for local residents and emergency vehicles
- May be expensive
- Increased cost for maintenance of landscaping





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Half Closures

Half-street closures are barriers that block travel in one direction for a short distance on otherwise two-way streets. Half closures are the most common volume control measure after full-street closures. Half closures are often used in sets to make travel through a grid network of neighborhood streets circuitous rather than direct, with the intent of being to reduce traffic volume in the neighborhood. The through movement should remain possible, but less attractive than alternative routes.

Advantages:

- Able to maintain pedestrian and bicycle access
- Does not affect emergency vehicles
- Removes specific through traffic
- Opportunity for landscaping and improved aesthetics

- May require the City to enact an ordinance (possible 90-day process)
- Causes longer travel time and distance for local residents and emergency vehicles
- Drivers may disobey the half closure and proceed the wrong way through the measure
- May be expensive
- Increased cost for maintenance of landscaping





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Diagonal Diverters

Diagonal diverters are barriers placed diagonally across an intersection, blocking through movement and/or turning movements. Like half closures, diagonal diverters are usually staggered to create circuitous routes through neighborhoods.

Advantages:

- Able to maintain full pedestrian and bicycle access
- Removes specific through traffic

- May require the City to enact an ordinance (possible 90-day process)
- Causes longer travel time and distance for local residents and emergency vehicles
- May be expensive
- May require construction of corner curbs





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Median Barriers

Median barriers are raised islands that are located along the centerline of a street and continue through an intersection. This blocks the through movement for vehicles at a cross street.

Advantages:

- Can improve safety at an intersection of a local street and a major street by prohibiting dangerous turning movements.
- Can reduce traffic volumes on a cutthrough routes that crosses a major street

- Requires available street width on the major street
- Limits turns to and from the side street for local residents and emergency vehicles
- May limit access for emergency vehicles





Forced Turn Islands

Forced turn islands are raised islands that block certain movements on approaches to an intersection. Designs can vary significantly depending on the installation location. Forced turn islands are best when used on residential streets at intersections with larger streets. The larger street can accommodate the diverted traffic and will cut down on the number of vehicles that might attempt to circumnavigate the measure. Occasionally additional center line barriers or channelization may be required to keep drivers from circumventing islands.

Advantages:

- Can improve safety at an intersection of a local street and a major street by prohibiting dangerous turning movements
- Reduces traffic volumes

- If designed improperly, drivers can maneuver around the island to make an illegal movement
- May simply divert a traffic problem to a different street
- May limit access for local residents



"Stop" Signs

Unjustified STOP signs may reduce speed near the signs, but they typically increase speeds along the roadway immediately after the signs. This is caused by motorists "making up for lost time." Inappropriate STOP signs also increase air pollution, waste fuel, and create more traffic noise. When confronted with an unreasonable and unnecessary restrictions (such as inappropriate STOP signs), motorists are more likely to violate them and develop contempt for all traffic signs. When STOP signs are installed as "speed breakers", the number of intentional moving violations may increase.

Appendix B. Inappropriate Traffic Calming Measures

not considered to be appropriate for traffic calming purposes.

"Children at Play" Signs

Many signs in residential areas, which are installed to "warn" people of normal conditions, fail to improve safety. Warning signs can be effective tools if used sparingly and only to warn motorists of uncommon hazards that are not apparent to drivers. CHILDREN AT PLAY signs can give parents a false sense of security since drivers often disregard these signs. These signs may incorrectly imply that playing on the street is acceptable. Since children live on nearly every residential block, CHILDREN AT PLAY signs would need to be placed on every roadway. Residential blocks with no signs might imply that no children live there, so it is acceptable to exceed the posted speed limit.

"Speed Limit" Signs

The posted speed limits for roadways are typically established based upon recognized engineering criteria related to the roadway design. For this reason, additional signage and/or adjusting the posted speed limit of a roadway are not considered to be traffic calming measures.

Rumble Strips

These measures are raised pavement sections that can be closely spaced along a roadway at regular intervals. Rumble strips are a road safety feature used to caution inattentive motorists of potential danger. As the motorist travels over the rumble strips, the vehicle experiences both noise and vibration to alert the motorist.

They are typically installed along freeways and higher speed roadways to alert motorists that may begin to veer from the travel lane to the shoulder. Their purpose is to reduce the number of vehicles that depart the roadway; this is a common example of rumble strips used to enhance safety. Rumble strips can also be installed across the travel lane itself when unusual conditions exist ahead. They can be installed along the travel lanes of a higher speed roadway that contains an isolated all-way stop controlled intersection. A motorist may grow accustomed to traveling at a certain speed and otherwise may not expect to stop; the purpose of the rumble strip is to alert the driver. This is a common example of rumble strips to alert motorists of a condition that is unusual to a specific roadway.

Rumble strips should not be used as traffic calming measures. These measures become less effective over time as the motorists grow accustomed to them. Rumble strips also increase noise levels for nearby residents and commonly require additional maintenance.

Speed Bumps

These measures should not be confused with speed humps. Speed bumps are vertical obstructions often found in privately-owned parking lots (shopping centers, schools, churches, parks, etc.). Speed bumps typically measure between three and four inches in height and 12 inches in length, and are often designed for a design speed that is much lower than a typical posted speed limit along a public roadway. In contrast, a speed hump is typically 12 feet in length. Traffic calming measures should be designed and implemented with the purpose that vehicles will be able to comfortably travel at the posted speed limit. In contrast, speed bumps require vehicles to travel much slower to attain a comfortable travel speed. The necessary braking and slow speeds can create a safety hazard, possibly causing rear-end collisions.

