

Traffic Calming

6.1 Introduction

6.1.1 What is Traffic Calming?

Traffic calming deals with neighborhood traffic issues comprehensively using the “three E’s,” Education, Enforcement, and Engineering, to slow or reduce motor vehicle traffic and improve safety for pedestrians and bicyclists. A fourth “E,” enhancement, is used to improve area aesthetics and soften the look of physical installations.

According to the Institute of Transportation Engineers, 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.”

Education provides neighbors with information about how they as motorists can help to ease traffic impacts in their community through changes in behavior and attitudes, and informs them about neighborhood traffic management activities and opportunities.

Enforcement enlists the assistance of the Police Department to focus enforcement efforts in key areas.

Engineering and planning encompasses both traditional traffic management measures as well as newer approaches, such as traffic calming. All three are important components in dealing effectively with neighborhood and community-wide traffic issues.

Modern traffic calming began as a grassroots movement in the late 1960’s which started with the Woonerf developments in the City of Delft, the Netherlands. Woonerven, or “living streets,” are residential streets where speeds are drastically reduced through reconstruction and space is shared between vehicles and pedestrians.





In the United States, Seattle, Washington was an early pioneer in area-wide traffic calming with neighborhood-wide demonstrations in the early 1970's. Berkeley, CA, was one of the first communities to establish a comprehensive area-wide program of traffic calming, when it adopted a citywide traffic management plan in 1975.

The City of Norwalk has implemented traffic calming measures in several neighborhoods throughout the City in recent years. Using lessons learned from these projects, a traffic calming program was developed as part of the City-Wide Traffic Management Plan (TMP) to provide a process for selecting appropriate traffic calming measures and prioritizing project funding. The traffic calming program is a resident-driven process that ensures safety and livability for all road users. The Norwalk Traffic Calming Program is discussed in Section 2-3.

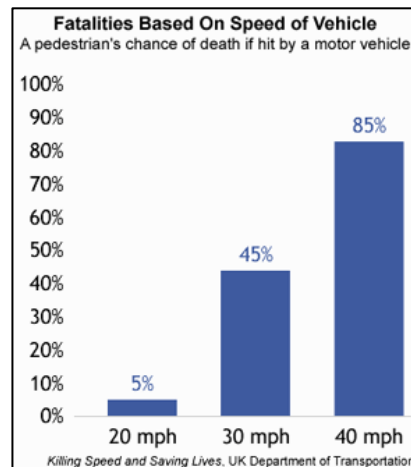
6.1.2 Goals and Benefits

The main goal of traffic calming is to reduce vehicle speeds and cut-through volumes through residential neighborhoods, providing livable environments that are safe for pedestrians and bicyclists. Reduced vehicle speeds can mean fewer, less severe collisions, especially when an incident involves a pedestrian. Desired speeds typically range from 15 to 30 miles per hour in residential settings and 20 to 35 miles per hour in commercial settings, with an appropriate design speed selected for each location based on existing operating speeds and the desired characteristics of the roadway environment.

While the negative effects of automobile traffic cannot be completely eliminated, traffic calming can encourage automobile drivers to operate safely and with increased consideration for other road users. Benefits to pedestrians and bicyclists include:

- ◆ Increased driver attentiveness to the presence of pedestrians and bicyclists
- ◆ Increased space for bicycle lanes and pedestrian facilities
- ◆ Buffering from motor vehicle traffic by use of trees, landscaping, parked vehicles and bicycle lanes.
- ◆ Fewer opportunities for pedestrian/vehicle conflicts

In addition to the benefits for road users, traffic calming has the added advantage of reduced noise and air pollution.



6.1.3 How to Use the Traffic Calming Toolbox

Traffic calming is a relatively new concept, and many people do not know about the wide variety of tools and strategies that are available to their communities. This chapter serves as a resource for residents and neighborhood groups seeking to effect change in their communities. It is also intended for use by developers in order to support the establishment of more livable, walkable communities in Norwalk.

Norwalk residents and neighborhood groups may use the Traffic Calming Toolbox to learn about the various traffic calming tools and resources, begin thinking about the roadway classification and characteristics of their neighborhood, and create a plan for garnering support for traffic calming in their neighborhood. The steps involved in the Norwalk Traffic Calming Program are discussed in detail in Section 2, Chapter 3.

The Traffic Calming Toolbox is a resource for developers seeking to create streets which are livable and accessible to all residents and tenants. The matrix in Appendix is a quick reference for determining which traffic calming measures may be appropriate for a given location, and the Standard Specifications and Details in the Appendix are provided to assist in designing traffic calming measures.

6.2 Traffic Calming Toolbox (The Nuts and Bolts)

The following presents a summary of the various Tier 1 and Tier 2 traffic calming measures which may be implemented in the City of Norwalk. A traffic calming summary matrix outlining the cost, best use and other considerations for these tools is provided in Appendix.

6.2.1 Tier 1 Measures

The following Tier 1 implementation measures are low cost tools, intended to respond quickly to neighborhood traffic concerns. They consist of primarily education, enforcement and some engineering measures.

6.2.1.1 Education

The primary purpose of education initiatives is to provide information that increases driver awareness and motivates people to alter their behavior.

Pros :: Inexpensive, somewhat effective on high-volume collectors and arterials ~ where traditional engineering measures are restrictive.

Cons :: Little evidence that long-term benefits can be achieved.



6.2.1.2 Neighborhood Newsletter

This mailer contains information about the neighborhood's safety concerns, explains the results of speed and volume studies and recommends ways to slow traffic in the neighborhood. In addition, traffic and pedestrian safety basics are covered.

Pros :: inexpensive, can target specific residents.

Cons :: Does not reach non-local travelers, limited evidence that this approach can be effective.

6.2.1.3 Radar Speed Display Sign

These signs, which may be portable, use radar to provide motorists with an electronic display, alerting them if they are exceeding acceptable speeds.



Pros :: speeds can be reduced by up to 25%¹ when used in short periods of time and on low volume roadways. Good public relations for neighborhoods. Educational tool for motorists.

Cons :: Residual effects of speed sign placement are negligible when removed. Long-term placement has been met with mixed results.

6.2.1.4 Signage

Signs may be installed where appropriate and in accordance with the Manual of Uniform Traffic Control Devices (MUTCD). The MUTCD has established specific warrants for installation of Stop Signs, including multi-way Stop Signs. The City of Norwalk does not install "Stop" signs for speed control. Speed limit signs are installed for school zones (20 miles per hour) and at points where drivers tend to enter neighborhoods. The speed limit on residential streets is 25 miles per hour. Pedestrian crossing, school crossing, and bike route signs may also be used to warn motorists of bicycle or pedestrian activity and can help to reduce vehicle speeds.



Pros :: inexpensive, when coupled with Enforcement (see below), can be effective over time. Increases driver awareness along certain streets.

Cons :: Unwarranted and/or unjustified signage can lead to non-compliance and create safety challenges. Signage is not 'self-enforcing'.

6.2.1.5 Enforcement

When appropriate, the DPW will work with the Norwalk Police Department to target specific areas identified during the data collection process to enforce speed limits and

¹ T. Mazzella and D. Godfrey, "Building and Testing a customer Responsive Neighborhood Traffic Control Program", in 1995 Compendium of Technical Papers, ITE, Washington DC, 1995.

other traffic laws in neighborhoods. By sharing key traffic data, officers can focus their patrols on the times and places where speeding most often occurs.

Pros :: Long-term periodic daytime speed enforcement on certain problem corridors may result in driver changes over time; Can be used in areas that do not qualify for engineering solutions to traffic challenges; Targets violators without unnecessarily impacting normal traffic flow.

Cons :: Without long-term dedication of law enforcement personnel to a specific corridor, targeted enforcement has been shown to be disappointing.

6.2.1.6 Striping and On-street Parking

Wide travel lanes allow for faster vehicle speeds. Narrowing the travel lane through the use of pavement markings can create a subtle traffic calming effect without introducing physical barriers that may slow down emergency response vehicles. Narrowing lanes through the use of pavement markings may be achieved by creating wider shoulders or striping for on-street parking on one or both sides of the road.



Pros :: Inexpensive. Easy to install and modify, as needed. Some experiences have indicated that modest speed reductions can be achieved. Can also provide for improved bicycle and pedestrian safety, if properly implemented.

Cons :: Studies have shown that by better defining travel lanes sometimes has the reverse impact and may increase speeds on certain corridors. May reduce on-street parking.

6.2.1.7 Landscaping

Landscaping may be used in conjunction with other traffic calming measures such as medians and islands, chicanes, and gateway areas to enhance the pedestrian environment while helping to provide a neighborhood identity.



Pros :: Generally well received by the public in residential neighborhoods. Can, and should, be used in conjunction with other traffic calming elements to soften their appearance.

Cons :: Long-term maintenance costs need to be considered. Careful consideration to sight lines and other safety elements should also be planned.

6.2.2 Tier 2 Measures

When possible, the aim of Tier 2 measures should be to inherently alter the street environment in a way that makes lower speeds more comfortable for drivers and



increases their awareness of the presence of bicyclists and pedestrians. Only where other measures are not feasible should more intrusive devices such as speed humps and road closures be used.

6.2.2.1 Textured and Colored Pavement

Textured and colored pavements may be used to announce entry into a traffic calmed area. Materials such as brick, cobbles, stamped concrete and concrete pavers may be used along the entire roadway, in limited sections, or along the pavement edges to signal to drivers that they are in a pedestrian zone.



Pros :: Changes the driver perspective and can be effective in alerting drivers to change in setting. Textured pavement can slow drivers down, much like cobblestones would.

Cons :: Long-term maintenance costs need to be considered. Textured pavement may present difficulties for pedestrian and bicyclists, particularly in wet conditions.

6.2.2.2 Traffic Circle

Raised circular islands constructed in the center of intersections. This design requires vehicles to keep right and travel through the intersection in a counter-clockwise direction around the island. Traffic circles can be placed at both four-way and three-way intersections.



Pros :: Slows traffic as drivers approach circle; Improves access from side street; Breaks up sight lines on straight streets; changes the context of the street and can make the corridor more aesthetically pleasing in neighborhood settings.

Cons :: Introduces possible driver confusion as to who has the right-of-way. Possible impacts to large vehicles turning left; Could potentially impact emergency response times; bicyclists must merge with traffic around traffic circle.

6.2.2.3 Modern Roundabout

A modern roundabout is a large raised circular island installed in the center of an intersection. The design requires vehicles to slow down and navigate around the island in a counter-clockwise direction. Unlike a traditional traffic circle, a modern roundabout requires vehicles to yield to vehicles already in the



roundabout and the geometry is specifically designed to restrict speeds. Modern roundabouts may be used in place of traffic signals at higher volume roads.

Pros :: Slows traffic as drivers approach circle; Improves access from side street; Breaks up sight lines on straight streets; changes the context of the street and can make the corridor more aesthetically pleasing in neighborhood settings.

Cons :: May require right of way from adjacent properties; Introduces possible driver confusion as to who has the right-of-way; Could potentially impact emergency response times; bicyclists must merge with traffic around traffic circle.

6.2.2.4 Curb Extension

Also known as bulb-outs, curb extensions extend the sidewalk or curb line out into the parking crossings by reducing the pedestrian crossing distance, visually and physically narrowing the roadway, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street.



Pros :: Pedestrian crossing distances are reduced; Narrowed roadway section can contribute to reduced speeds; Breaks up driver sight lines; Introduces opportunity for landscaping and visual enhancements for the neighborhood.

Cons :: May reduce visibility for bicyclists; May require loss of on-street parking; Expensive to construct; May increase emergency response times; can interfere with snow removal operations; May impact drainage along gutter lines.

6.2.2.5 Edge Treatment

Edge treatments, such as raised curbs, provide uniform cross sections with identifiable edges along an entire corridor. They often signal a lower design speed to drivers. Raised curbs also allow placing roadside objects such as trees and street furniture closer to the roadway, producing a traffic calming effect. Where curbs are impractical, pavement markings or changes in pavement texture may be used to create a similar effect.

Pros :: May slow traffic along certain corridors; Easy to install; May have positive impact on storm water management.

Cons :: Not self-enforcing; May have negative impact on utilities and storm water management if not properly considered.

6.2.2.6 Median Island

Raised islands placed in the center of a roadway to separate opposing traffic. They can be placed mid-block or at entrances into neighborhoods. Medians narrow the roadway, displacing a vehicle to the right which tends to slow traffic. These can be oval or



elliptical shaped. Those islands used at a crosswalk to provide a pedestrian refuge increase pedestrian safety by allowing pedestrians to cross one direction of traffic flow at a time. Typically, medians are landscaped to provide visual enhancement.

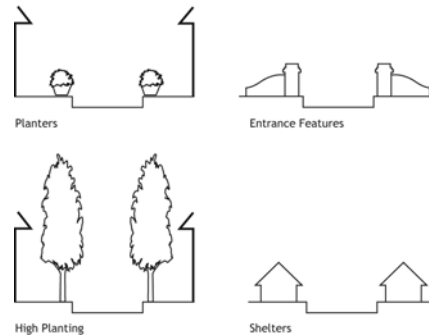
Pros :: Narrowed lanes can slow vehicle speeds; Provides shorter distances in certain instances for pedestrians to cross; Opportunity for landscaping and visual enhancements to neighborhood.

Cons :: May interrupt driveway access and result in U-turns at the end of medians; Possible loss of on-street parking; high cost to construct; possible impact to storm water management; may interfere with snow removal operations.

6.2.2.7 Gateway Treatment

A gateway is a physical or geometric landmark that indicates a change in environment from a higher speed arterial or collector road to a lower speed residential or commercial district. They often place a higher emphasis on aesthetics and are frequently used to identify neighborhood and commercial areas within a larger urban setting. Gateways may be a combination of street narrowing, medians, signing, archways, roundabouts, or other identifiable features.

Gateways should send a clear message to motorists that they have reached a specific place and must reduce speeds.



Pros :: Alerts drivers to the transition from high-speed roadways to lower-speed settings; Can be aesthetically pleasing and better define neighborhoods. Most effective on infrequent users of the corridor.

Cons :: Long-term maintenance costs for landscaping should be considered; may only be effective in slowing drivers as they transition into neighborhood; not shown to be effective for frequent commuters.

6.2.2.8 Chicane

Chicanes consist of a series of curb extensions that narrow the street at selected points and force motorists to slow down to maneuver between them. They alternate from one side of the street to the other to form S-shaped curves. Chicanes create a park-like environment and encourage additional greenery and plantings, but must be designed carefully to avoid drivers from deviating out of the appropriate lane.



Pros :: May slow drivers and reduce cut-through traffic; Changes the look of the street; Has minimal impact on emergency response.

Cons :: Requires design and expensive implementation; Likely to require modifications to storm water drainage; may impact on-street parking; may impact snow removal operations; Without proper planning, can have little to no impact on cut-through traffic.

6.2.2.9 Choker or Neckdown

Chokers are similar to curb extensions that narrow a street by creating a mid-block pinch point along the street. Chokers can be created by bringing both curbs in, or by installing planting strips. They can be done more dramatically by widening one side at a mid-block location. They can also be used at intersections, creating a gateway effect when entering a street.



Pros :: Narrowed lanes can slow vehicle speeds; Breaks up driver sight lines; Increases pedestrian and motorist visibility.

Cons :: Possible loss of on-street parking; Narrow lanes direct bicyclists into vehicular travel lanes; Impacts to storm water drainage; high cost to construct; may impact snow removal operations.

6.2.2.10 Diverter or Partial Closure

A diverter is an island built at a residential street intersection that prevents certain through and/or turning movements. Partially or fully closing access to a neighborhood street will certainly increase traffic on surrounding streets. These should be used as measures of last resort and only considered if other less restrictive physical measures have failed.



Pros :: Reduces cut-through traffic; Channels traffic flow, thus eliminating vehicular conflicts at some intersections; can be designed to accommodate emergency



vehicles; presents opportunities for landscaping and visual enhancements to a neighborhood setting.

Cons :: Will redirect traffic to other local streets; causes increased travel times for local residents; high cost to construct; is a permanent measure that may only address problems during certain times of the day; may require removal of on-street parking; needs significant warning and guidance signage; may affect snow removal operations.

6.2.2.11 Reduced Corner Radii

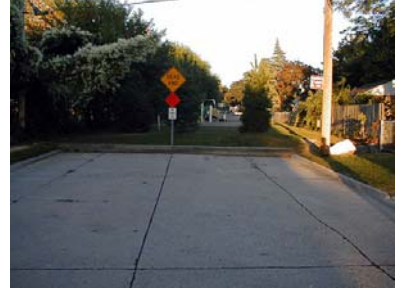
Reducing the curb radii at an intersection forces drivers to slow down to make tighter turns. Care should be taken when using this traffic calming approach as reduced radii can limit the turning movements of trucks, buses and emergency response vehicles.

Pros :: Self enforcing; potentially reduces the crossing distance for pedestrians.

Cons :: May negatively impact the ability of large vehicles to negotiate turns; may impact emergency response times.

6.2.2.12 Roadway Closure

A full roadway closure completely cuts off traffic to through vehicles, leaving only pedestrian and bicycle access. These closures are typically used only as a last resort after other traffic calming methods to reduce cut-through traffic have failed. A street may be closed at an intersection or mid-block through the use of walls, bollards, landscaped islands, or gates that allow emergency vehicle access.



Pros :: Self enforcing; Restricts all through traffic; Effective at volume and speed control; May Improve the aesthetic quality of the street; Can allow for continued pedestrian and bicycle flow,

Cons :: May redirect drivers to other streets; High cost to construct and maintain; could result in right of way takings as the ability for vehicles to turn-around needs to be provided; May increase trip lengths for drivers; may impact on-street parking; Impacts to emergency response routes.

6.2.2.13 Turn Restriction

Turn restrictions can in some cases be a low-cost method of reducing cut-through traffic, but they require enforcement.

Pros :: Inexpensive. Reduces cut through traffic; Effective at volume and speed control.

Cons :: May redirect drivers to other streets; May increase trip lengths for drivers;

6.2.2.14 Speed Hump

Speed humps are raised sections in the roadway approximately 3 inches high at their center and extending the full width of the street, tapering near the drain gutter to allow unimpeded bicycle travel. The traditional hump ranges from 14 feet to 22 feet in length. The longer humps, also known as speed tables, are much gentler for larger vehicles. Speed humps are typically placed 200 to 600 feet apart.



Speed humps are different than speed bumps, which are commonly seen in parking lots or on private streets. The City of Norwalk does not allow speed bumps on public streets.

Speed humps can help control speeding and cut through traffic on local neighborhood streets.





Unlike traditional police enforcement, speed humps provide continuous service. Speed humps are most useful when speeds are in excess of 35 mph in the immediate vicinity of the speed hump. They are less effective, however, in between installations.

Speed humps can be very effective if used appropriately. There are, however, some negative impacts they may have:

- ◆ Residents living near speed humps must tolerate increased noise levels as vehicles traverse speed humps day and night.
- ◆ Vehicles may drive on sidewalks or through front yards to avoid speed humps.
- ◆ Traffic may be diverted to other streets in the neighborhood.
- ◆ Police, fire and emergency medical service response times suffer.
- ◆ Motorized street sweeping equipment cannot be used at speed hump locations.
- ◆ Speed humps interfere with street repaving, decreasing the effectiveness of both the speed hump and the new pavement surface.
- ◆ Speed humps block the flow of drainage water on some streets and can cause flooding problems.
- ◆ Speed humps require signing and striping, which some residents consider unattractive.

Pros :: Self enforcing; May decrease traffic volumes; requires minimal maintenance.

Cons :: Likely to increase noise in the vicinity of the hump; potential to impact drainage; may increase emergency response times; difficult to replace.

6.2.2.15 Raised Intersection

A raised intersection is essentially a speed table for the entire intersection. Construction involves providing ramps on each vehicle approach, which elevates the entire intersection to the level of the sidewalk. They can be built with a variety of materials, including asphalt, concrete, stamped concrete, or pavers. The crosswalks on each approach are also elevated as part of the treatment to enable pedestrians to cross the road at the same level as the sidewalk, eliminating the need for curb ramps.

Pros :: Self enforcing; Provides clear crossing location for pedestrians; Increases driver awareness.

Cons :: Likely to increase noise in the vicinity of the intersection; potential to impact drainage; may increase emergency response times; difficult to replace; may impact snow removal operations.

6.2.2.16 Raised Crosswalk

A raised pedestrian crossing is also essentially a speed table, with a flat portion the width of a crosswalk, usually 10 to 15 ft. Raised intersections and crosswalks encourage motorists to yield.



Pros :: Self enforcing; May decrease traffic volumes; requires minimal maintenance.

Cons :: Likely to increase noise in the vicinity of the crosswalk; potential to impact drainage; may increase emergency response times; difficult to replace; may impact snow removal operations.