

Speed Feedback Radar Trailer

Residents are encouraged to contact the El Cerrito Police Department's Traffic Safety Unit to request the deployment of the Speed Feedback "Radar Trailer". The Radar Trailer is an effective visual reminder to drivers to stay within the speed limit. A computer inside the radar trailer tracks the speed and the time all of the vehicles that pass the trailer during the time it is deployed. This traffic flow and speed data is then reviewed by a police officer. As a follow-up to the request for the trailer, an officer will often conduct traffic enforcement at the same location.



Traffic Management Toolbox



REQUEST THE RADAR TRAILER ON YOUR STREET

To request the radar trailer, contact Officer John Molica jmolica@ci.el-cerrito.ca.us or call during business hours at (510) 215-4436. When sending an email or leaving a message, be sure to include the following:

- Your name
- Your address
- Your contact information (phone and or email)
- Location where you are requesting the trailer (must be a City street)
- Time of day when you are requesting the trailer
- Brief description regarding the problem (such as speeding vehicles, reckless drivers, etc.)

ADVANTAGES:

- Speeds may be reduced by 3 to 5 mph during short intervals where the radar trailer is located.
- An effective educational tool.

CONSIDERATIONS:

- Not effective on multi-lane roadways that have significant traffic volumes.

General Education

Education is a key component of a NTMP. Common driver behavioral issues that could be addressed through public education include speeding within school zones, red light running, violations of stop control, and violation of pedestrian right-of-way at crosswalks. Pedestrians also jaywalk and violate drivers' right-of-way. Some bicyclists, for example, choose to ride their bicycles on sidewalks, thereby endangering pedestrians' safety. Based on experience of some Bay Area cities, the following are sample of education initiatives that could be implemented.:

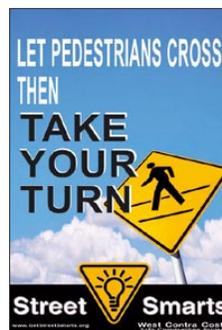
- Brochures/flyers for constituents, postings at bus shelters and on buses, newsletter articles and City website information.
- Presentations and circulation of information to neighborhoods, business groups, organizations and at community events.
- Media advertisements in radio, newspaper press releases and cable TV broadcasts.
- School safety education at elementary, middle and high schools. Safety education at elementary schools could consist of classroom and field training for students, as well as distribution of educational materials for parents. Generally these programs focus on pedestrian and bicycle safety, safety patrol training, proper student pick-up and drop-off practices, compliance with reduced speed limits in school zones, etc. For the middle and high school presentations, it could be undertaken by traffic safety officers, and are geared towards developing in new drivers a proper respect for traffic laws and understanding the dangers of inappropriate driving behavior.
- Partner with surrounding cities and other public agencies in educational initiatives.

Possible educational messages could be:

- For drivers to choose walking, bicycling, or riding transit as an alternative to driving.
- For drivers to slow down if they cannot see clearly because of poor lighting or weather conditions.
- For drivers to give the right-of-way for pedestrians crossings even if the crosswalk is not marked.
- For drivers to obey posted speed limits.
- For drivers to be especially attentive around schools and parks.
- For drivers to stop at red lights and stop signs.
- For pedestrians to cross only at intersections and marked crosswalks.
- For pedestrians to step into the street only after checking of upcoming traffic including turning vehicles.
- For pedestrians to walk facing vehicular traffic along roadways that do not have sidewalks.
- For pedestrians and cyclists to wear bright colors and carry a flashlight/bicycle light when walking or cycling in the dark.
- For pedestrians to watch for entering and exiting cars at parking lots.
- For pedestrians not start crossing at signalized intersections when a flashing "DON'T WALK" is displayed.
- For cyclists to share the road with vehicular traffic and not cycle on sidewalks or against traffic.



Traffic Management Toolbox



Neighborhood Pace Car/Pledge Program

The Neighborhood Pace Car/Pledge Program encourages residents to take responsibility for the impact of their own driving while setting the "pace" for safer streets and neighborhoods. The program was first developed in Boise, Idaho and is currently being implemented in many cities throughout the country and the Bay Area such as San Carlos, CA and Davis, CA. The purpose of the program is:

- to encourage drivers to drive the legal speed limit on neighborhood streets;
- to encourage driver awareness of the neighborhoods and not just the road through the neighborhoods;
- to raise awareness that motorists share the roads with people walking and biking, and to promote courteous habits.

Residents are asked to complete a pledge form committing to driving safely, courteously, and within the posted speed limit as follows:

- drive within the speed limit on all city streets;
- stop for pedestrians at marked and unmarked crossings;
- be courteous to all pedestrians and bicyclists and share the road safely with them;
- give myself enough travel time so that I'm not sacrificing courtesy or safety;
- devote my full attention to driving and avoid distractions such as cell phones;
- display the PACE CAR sticker on my vehicle, and encourage others to join.

Once the pledge form has been signed and submitted to the Police Department, the residents are given a sticker which is displayed in the rear window of their vehicle. The sticker identifies the resident as a "Pace Car." By setting the example for proper driving, the vehicle sets the pace or speed for other vehicles on the road by requiring cars behind the pace car to also drive within the speed limit.



Traffic Management Toolbox



Neighborhood Speed Watch Program

A neighborhood speed watch program, a traffic-related variation of a neighborhood watch/crime watch program, encourages citizens to take an active role in changing driver behavior on their neighborhood streets by helping raise public awareness about speeding. Residents can borrow a hand-held radar unit from a City Department (typically Police, but Public Works can also be involved). A resident or a group of residents meet with City staff to obtain instructions on use of the radar unit and information regarding speed limits and speeding. Residents observe and record the speed of motor vehicles in their neighborhoods to determine the amount of speeding in their neighborhood. Residents obtain first-hand knowledge regarding on how fast vehicles are traveling on their street and can interact with each other as part of a neighborhood effort. As part of a broader educational campaign to the motoring public, the radar speed trailer can be placed on the street before and/or after the residents conduct their survey.

ADVANTAGES:

- Residents become aware of local traffic issues.
- City staff gain additional information regarding problems.

CONSIDERATIONS:

- Needs City staff to work with neighborhoods.
- Requires hand-held radar units or other measurement equipment.



Traffic Management Toolbox



Striping and Markings

DESCRIPTION: Streets can be restriped and marked in various ways to alter driver behavior. This can include yellow centerlines, edge/shoulder striping or bike lane striping, cross-hatching, high-visibility crosswalks (ladder markings), advance warning symbol markings, delineators/Botts' dots, and generally restriping lanes to have narrower widths or reducing the total number of lanes.

APPLICATION: On wide roadways, it may be desirable to narrow the travel lanes. For example, 12-foot travel lanes can be narrowed to 10-foot travel lanes using striping. If appropriate, bicycle lanes or markings can be added to a street resulting in reductions in width of other travel lanes. Narrower lanes may give drivers the impression of a narrower street with less room for maneuvering, thereby potentially reducing speeds. Impacts to emergency vehicles would be minimal.

LIMITATIONS: The lack of physical limitations results in substantially less impact on driver behavior than other physical measures. Use of striping to achieve traffic calming can be considered a passive measure, since drivers are not physically forced to change their behavior. Enforcement may be required to produce effective results.

ADVANTAGES:

- May have slight impact on reducing vehicle speeds
- Minimal impact on emergency vehicles
- May provide facilities for bicyclists

DISADVANTAGES:

- Requires voluntary compliance.
- May require enforcement

Impact on Speed:

Low

Impact on Volume:

Low

Typical Cost: Construction and maintenance costs range from \$2.00 to \$5.00 per linear foot of striping.



Traffic Management Toolbox



Turn Restriction Signs



Traffic Management Toolbox

DESCRIPTION: Turn restriction signs are regulatory signs that prohibit left or right turns at an intersection. They can be in effect at all times or only during specified hours.

APPLICATION: The objective is to reduce a particular pattern of through movements, such as cut through traffic, by forcing through traffic to take other more appropriate routes. Turn restriction signs are best when used with specific, peak period, time of day limits to target commuter traffic. They are typically located on perimeter of neighborhoods on collector and arterial streets at entrances to local streets.

LIMITATIONS: The lack of physical limitations results in substantially less impact on driver behavior than other physical measures. Use of signing to achieve traffic calming can be considered a passive measure, since drivers are not physically forced to change their behavior. Enforcement is usually required to produce effective results. Requires City Council resolution for each location.

ADVANTAGES:

- Effectively reduces through traffic volume
- Redirects traffic to collector or arterial streets
- May reduce "speeders" who cut through
- Offers flexibility in time of day restrictions
- Has minimal impact on emergency response times
- Inexpensive to install

DISADVANTAGES:

- Requires voluntary compliance
- May require ongoing police enforcement
- May increase trip length for drivers
- May divert traffic to parallel local streets
- May increase congestion/queues on collector and arterial streets

Impact on Speed:

Low

Impact on Volume:

Moderate to High

Typical Cost: Construction and maintenance costs range from \$300 to \$400 per sign.



R33A (CA)

Residential Street Multi-Way Stop Signs

The primary purpose of multi-way stop sign is to assign right-of-way. Multi-way stop signs are the most effective when the volumes on all the approaches to the intersection are near equal. The greater the difference between the traffic volumes on the major street compared to the traffic volume on the minor street, the less effective the signs will be. Safety concerns associated with multi-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. There are specific local conditions that are not reflected in the State's (Caltrans') criteria for multi-way stop signs that occur within the City of El Cerrito and that should be considered for multi-way stops. The following outlines the proposed criteria for the installation of multi-way stops on residential streets (which are defined as having residential frontage, two lanes, and existing 25 mph speed limits) in the City of El Cerrito:

1. Traffic and Pedestrian Volumes

The combined pedestrian, bicycle and motor vehicle volume entering the intersection from all approaches must equal at least 300 units per hour for any eight hours of an average day, and the combined pedestrian, bicycle and motor vehicle volume from the minor street must equal at least 1/3 of the total volume entering the intersection (100 units per hour) for the same eight hours; or

2. Collisions

The total number of reported collisions of a type susceptible to correction by multi-way stop signs has averaged three (3) or more per year for the past two years.

3. Visibility

There is a significant restricted visibility problem that limits the pedestrians', bicyclists', or motorists' views of opposing/conflicting movements for a travel distance of less than 150 feet and it cannot be corrected by normal maintenance activity (vegetation trimming) or the installation of parking restrictions.

4. Neighborhood Circulation

Volume warrants are reduced to 60% of the values above if ALL of the following conditions are met:

- (a) Neither street is an arterial street.
- (b) No existing stop sign or signal is located on the more heavily traveled street within a distance of 600 feet.
- (c) Installation of a multi-way stop is compatible with overall traffic circulation needs for the neighborhood.

5. Special Conditions

Volume warrants are reduced to 60% of the values above where other measures have not been effective or are judged not feasible in regulating crossing safety for pedestrian, bicyclists, or motorists within 600 feet of a school, park/playground or community facilities, or near steep grades or curves.



Traffic Management Toolbox



Application of new stop sign criteria first requires City Council adoption of an ordinance and, then separate resolution for each location.

Textured Intersections and Crosswalks



Traffic Management Toolbox

DESCRIPTION: Crosswalks or intersections can be textured by means of special pavers or decorative concrete.

APPLICATION: In commercial districts, there may be an integrated design concept that includes special pavement for intersections and crosswalks. Such treatment calls attention to a junction or crosswalk. The intention may be to alert the driver that the area being traversed has some special identity, such as where pedestrian traffic is frequent or that requires special attention.

When used as part of a larger traffic management project, the primary intention is to impart a message to the driver that the area being traversed has some special identity, such as an area where pedestrian traffic is frequent, and/or that requires special driving attention.



LIMITATIONS: There may be reductions in speed. Generally, special textured pavement has a minimal effect on traffic flow and should be used primarily as an enhancement of the more effective management devices on collectors and arterials. By themselves, textured crosswalks are not particularly effective traffic calming devices. They are best used in conjunction with other traffic calming measures, such as bulbouts, raised crosswalks and raised intersections.

ADVANTAGES:

- May enhance driver attention
- May enhance the streetscape

DISADVANTAGES:

- May not be effective in reducing vehicle speeds
- May increase noise as vehicles traverse the textured surface

Impact on Speed:

Low

Impact on Volume:

Low

Typical Cost:

Costs range from \$10,000 to \$25,000, depending upon the surface treatment. Annual maintenance cost is \$300.

In-Pavement Lights Crosswalks



Traffic Management Toolbox

DESCRIPTION: Studies show that a greater proportion of drivers yield the right-of-way to pedestrians in these specially-equipped crosswalks. The lights can be activated either by the pedestrian, or passively through detection. The lights are an application of aircraft runway landing lights embedded in the pavement and are very bright, even in direct sunlight.

APPLICATION: This device can be used to enhance pedestrian safety at a crossing location with a high number of pedestrians, such as in front of a school or in a commercial district. These devices may be coupled with bulb-outs, medians and other devices for even greater pedestrian crossing notification.

LIMITATIONS: There are no long term studies of whether drivers become used to these lights and revert to more typical behavior of not yielding to pedestrians in crosswalks. The City will be evaluating the recently installed in-pavement lighted crosswalks to determine their long term effectiveness. These devices shall not be installed in locations already controlled by other traffic control devices, such as at stop signs or traffic signals. Caution should be used when determining if the use of in-pavement lighted crosswalks are an appropriate application.

ADVANTAGES:

- Effective in enhancing pedestrian visibility

DISADVANTAGES:

- Additional studies are needed to determine long term effects
- May not be appropriate under certain circumstances

Impact on Speed:

Low to Moderate

Impact on Volume:

Low

Typical Cost:

Typical costs range from \$35,000 to \$50,000. Annual maintenance cost is \$1000.



Medians and Gateways



Traffic Management Toolbox

DESCRIPTION: A median is a raised island in the center of the roadway with one-way traffic on each side. A gateway consists of an architectural or roadway feature on each side and/or in the center of a roadway used primarily to indicate to drivers that they are entering a special area. In the case of traffic calming, it is usually a residential neighborhood or commercial district.

APPLICATION: Medians are used on wide streets to narrow each direction of travel and to interrupt sight lines down the center of long straight streets. Neighborhood gateways can include a median island to identify entry into a neighborhood. The most effective gateways include vertical elements such as trees or columns. Gateways may be formed by curb bulb-outs, fences, poles, signs, artwork, and other features that can be combined with each other. Medians can also reduce the occurrence of head-on collisions by separating two-directional traffic. Speed reduction depends on the amount of horizontal deflection and the width of the travel lanes. Traffic diversion is expected to be minimal.

LIMITATIONS: Long medians may adversely impact emergency vehicle access and operations. Medians may also disrupt driveway access. To accommodate a median, it may be necessary to remove on-street parking and/or narrow travel lanes. Since medians tend to narrow travel lanes, it may force bicyclists and motor vehicles to share the same space. If this is being considered on a major bikeway, design consideration should be made to accommodate the bicyclist, however this usually negates the effectiveness of reducing vehicle speeds.

ADVANTAGES:

- May be slightly effective in reducing vehicle speed
- May provide an opportunity for enhanced landscaping or decorative hardscaping
- Can be used to control access and turning movements

DISADVANTAGES:

- May reduce emergency vehicle access
- May require on-street parking removal
- May disrupt driveway access

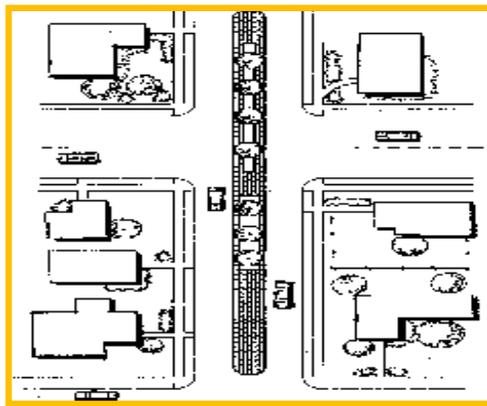
Impact on Speed:

Low to Moderate

Impact on Volume:

Low to Moderate

Typical Cost: Costs range greatly depending upon the length and design of the median. A typical 40-foot median may cost \$25,000 for construction and annual maintenance cost is \$200.



Raised Crosswalks or Speed Tables



Traffic Management Toolbox

DESCRIPTION: A raised crosswalk is a flat-topped speed hump built as a pedestrian crossing with a maximum height of 3 inches over a distance of 22 feet in the direction of travel. The central 10-foot section of the table is flat.

APPLICATION: They may be used singly for a raised crosswalk, or in a series of two or more for the purpose of speed reduction; similar to a speed hump. The raised crosswalk should extend all the way to the curb, possibly requiring new storm drainage construction, thus increasing the cost considerably. The design application is similar to a speed hump. This design is appropriate for heavily used crosswalks near schools and recreation facilities. Raised crosswalk and speed tables are fairly effective in reducing vehicle speed similar to that of speed humps. However, due to longer crossing distance, it results in less abrupt speed reduction. If an alternate travel path is available, traffic diversion may occur.

LIMITATIONS: All traffic calming/management plans must be approved by the Fire Department. Typically, raised crosswalks may delay emergency vehicles up to 10 seconds. In order to be effective in reducing vehicle speeds, it should be used in conjunction with other traffic calming devices. Raised crosswalk may not be used on non-residential roadways.

ADVANTAGES:

- Effective in reducing vehicle speeds
- Enhances pedestrian visibility in the crosswalk
- Clearly designates crosswalks

DISADVANTAGES:

- Increases emergency response times
- May increase vehicle noise in the vicinity of the raised crosswalk or speed table
- May require extensive signing

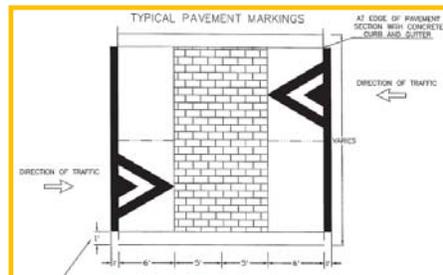
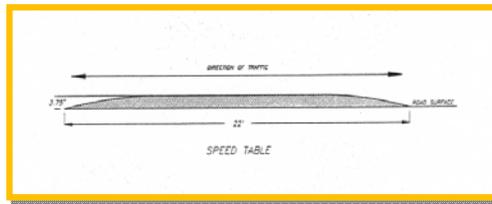
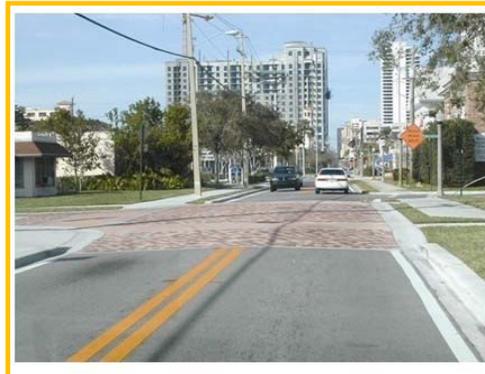
Impact on Speed:

Moderate to High

Impact on Volume:

Moderate

Typical Cost: Typical costs range between \$5000 and \$12,000, depending upon drainage issues. Annual maintenance cost is approximately \$250.



Bulb-Outs, Chokers, and Curb Extensions



Traffic Management Toolbox

DESCRIPTION: Bulb-outs, chokers, curb extensions and neckdowns are synonymous for an extension of the curb into the formerly paved street area, typically for the width of a parallel parking space.

APPLICATION: Bulb-outs may be installed at intersections or mid-block, on one or both sides of the street. They usually do not impede or redirect traffic flow; rather they reduce the width of the traveled way to the minimum required for two-way traffic. They may be used for numerous purposes including:

- Reducing curb radii at intersections to slow turning traffic
- Enhance pedestrian safety at pedestrian crossings
- Provide extra space for landscaping and sidewalk amenities
- Possibly reducing speeds by creating a sense of narrowness
- Create a neighborhood gateway feature

Bulb-outs can be combined with small medians between them to further restrict the driver's path, and to slow the speed of turning traffic, especially at intersections that are angled greater than 90°.

LIMITATIONS: The low-cost version of the curb bulb may be less expensive to construct, but may be more expensive to maintain due to debris accumulating between the original curb line and the new island. The narrowed travel way may present challenges to bicyclists by forcing bicyclists and motorists to share the same space. Minimum corner radii requirements for small trucks and emergency vehicles may reduce the effectiveness of this option in slowing vehicles. Overall effects on vehicle speeds can be fairly modest.

ADVANTAGES:

- May enhance pedestrian safety
- May provide the opportunity for decorative hardscaping or landscaping
- May reduce vehicle speeds slightly

DISADVANTAGES:

- May need to consider design impacts on bicyclists and emergency vehicles
- May require removal of on-street parking

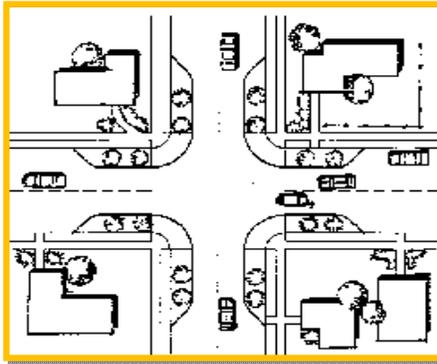
Impact on Speed:

Low to Moderate

Impact on Volume:

Low to Moderate

Typical Cost: Costs typically range from \$25,000 to \$50,000 per pair of bulbs, depending upon design and extent of landscaping and/or hardscaping and drainage. Annual maintenance cost is \$400 each intersection.



Traffic Circles



Traffic Management Toolbox

DESCRIPTION: As used for traffic calming or management purposes, traffic circles are relatively small circular or oval median islands (usually landscaped with raised curbs) placed at the center of intersections of local and/or residential collector streets.

APPLICATION: Their primary purpose is to reduce speeds through an intersection or, if used in a series, reduce speeds for several blocks. They reduce speeds by forcing motorists to negotiate horizontal curves and also by reducing long straight lines of sight on long straight roadways by providing landscaping in the intersection. Traffic circles reduce speeds within 100 to 200 feet of an intersection, and if used between 300 feet and 600 feet apart, can effectively reduce average speeds on a street to below 30 mph, and eliminate all speeds above 40 mph. Circles may reduce traffic volumes based on the traffic circulation and the availability of alternate routes. Depending upon their design, traffic circles can also reduce conflicts at intersections. Caution must be applied when using traffic circle on roadways with more than 6,000 average daily trips.

LIMITATIONS: Depending upon the design, traffic circles may delay emergency equipment from 6 to 12 seconds. Traffic circles may create conflicts for pedestrians if the vehicle is forced to drive in the path of the pedestrian crosswalk. Vehicles are forced to share the lane with bicyclists since the travel lane is narrow through the intersection. Also, large trucks (i.e., moving trucks) may not be able to negotiate left turns around the traffic circle. It may be necessary for these trucks to turn the wrong way around the circle, which is generally acceptable as long as special consideration is taken by the driver.

ADVANTAGES:

- Effective in reducing vehicle speeds
- Breaks up sight-line on long straight streets
- Opportunity for enhanced landscaping

DISADVANTAGES:

- May reduce emergency response time
- May impede left turns by large trucks
- May pose conflicts for pedestrians and bicyclists
- May require removal of on-street parking

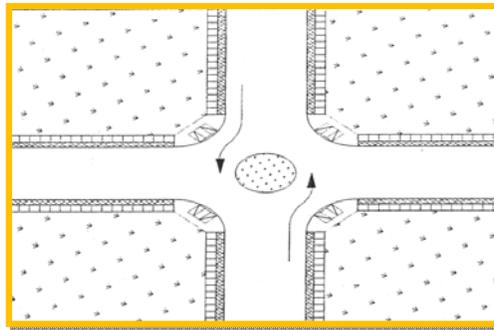
Impact on Speed:

Moderate

Impact on Volume:

Low to Moderate

Typical Cost: Typical construction costs range between \$25,000 and \$40,000. Annual maintenance cost is approximately \$2,000.



Speed Humps



Traffic Management Toolbox

DESCRIPTION: Speed humps are a gradual rise and fall in the pavement surface, usually with a circular profile, to a maximum height of 3 or 4 inches over a distance of 12 to 14 feet in the direction of travel.

APPLICATION: They are usually used in controlling maximum speeds. Typical average speeds within 100 feet of the humps are not higher than 22 mph, and if positioned no further than 600 feet apart, they usually control average speeds to less than 30 mph and eliminate all speeds above 40 mph. They also may reduce traffic volumes by about 10 to 20 percent if there is an alternate travel path. They should be installed at 300 to 600 foot spacing and properly signed with a 15-mph advisory speed. The preferred marking for humps is similar to the “zebra-striped” crosswalk. Speed humps may be appropriate on local residential roadways and residential collectors with traffic volumes less than 4,000 average daily trips.

LIMITATIONS: All speed hump plans must be approved by the City's Fire Department. Typically, speed humps delay emergency response vehicle approximately 10 seconds. Speed humps cannot be placed within roadway curves due to sight distance issues and they cannot be installed within 200 feet of an intersection. Additionally, speed humps cannot be installed on grades steeper than 8%. Speed humps are for local streets only.

ADVANTAGES:

- Effective in reducing vehicle speeds
- Requires minimum maintenance

DISADVANTAGES:

- Increases emergency response times
- May increase traffic noise in vicinity of hump
- Several humps are required on long blocks in order to be effective

Impact on Speed:

High

Impact on Volume:

Moderate

Typical Cost:

\$4,500 per hump. Typical annual maintenance cost is \$400 per hump.



Chicanes

DESCRIPTION: A serpentine street or chicane is an artificially created, curving, two-way street on a naturally straight road section. The curvilinear alignment requires additional maneuvering and breaks up long straight sight lines for motorists.

APPLICATION: The curves can be created by offset centerline striping, a series of bulb-outs or parking areas installed on alternating sides of the street, or by varying the size or shape of a series of median islands. The length of the curve and the amount of side-to-side offset can be varied to obtain more or less reductions in speed. They may be used at both midblock and at intersections. In addition to the forced speed reduction, a serpentine alignment that is created by landscaped islands gives the appearance that a street may not be a convenient shortcut. Chicanes may reduce traffic volumes depending upon the traffic circulation and the availability of alternate routes. Travel lanes usually need to be narrowed in order to further reduce the ability of drivers to straighten the curves.

LIMITATIONS: If raised islands do not force the lane offsets, many drivers will easily "straighten the curves" by not staying in the proper lane in the transition area, thus reducing the effectiveness of this measure. Any chicane must be designed to permit travel by emergency equipment. Because the designs are so diverse, it is not possible to generally describe the added delays to emergency equipment. Chicanes tend to be ineffective on roadways with more than two lanes due to the tendency to cut a straight path. This measure is for local streets only.

ADVANTAGES:

- Provides for landscape opportunities
- Minimal impact on emergency vehicles

DISADVANTAGES:

- Relatively expensive
- Needs to be combined with narrowing lanes
- May require on-street parking removal

Impact on Speed:

Moderate

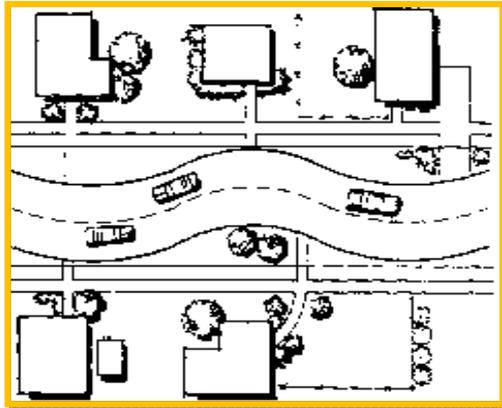
Impact on Volume:

Moderate

Typical Cost: Costs are highly dependent upon the design and may range from \$15,000 to \$30,000. The annual maintenance cost is approximately \$250 per block.



Traffic Management Toolbox



Diagonal Diverter/Forced-Turn Channelization



Traffic Management Toolbox

DESCRIPTION:

Physical feature at intersection approaches to force traffic to make or forego certain movements.

APPLICATION: The objective is to reduce cut through traffic by forcing through traffic to take other more appropriate routes. Residents must adopt a new driving route to access the affected street. Bicycle and pedestrian access is usually maintained. Similar restrictions in traffic movements may be accomplished by regulatory signing only, but the raised islands provide a physical deterrence that signing by itself cannot provide.

LIMITATIONS: They are typically located on perimeter of neighborhoods on collector and arterial streets at entrances to local streets. They reduce accident potential in the immediate vicinity, but may shift the potential to other streets. If an opening in the barrier provides emergency access with a raised block in the center ("pan basher"), fire and paramedic vehicles will encounter minimal delay, but police vehicles may be more impacted. A forced turn channelization island for right-turns only requires a relatively wide street width for effective implementation. On narrow streets, half closures may be more appropriate. This measure is for local streets only.

ADVANTAGES:

- Eliminates through traffic
- May reduce "speeders" who cut through
- Provides area for landscaping
- Reduces intersection conflicts
- Increases pedestrian safety
- Can allow bicycle through movements
- **Self-enforcing**

DISADVANTAGES:

- Inconvenient for residential access and on-street parking
- May increase trip length for drivers
- May impact emergency vehicle response times
- May shift traffic to other nearby local streets
- May increase congestion/queues on collector/ arterial streets
- Some loss of on-street parking
- Increase in long-term maintenance needs

Impact on Speed:

Low to Moderate

Impact on Volume:

Moderate to High

Typical Cost: \$15,000 - 40,000. High range includes landscaping and irrigation.



Raised Intersections



Traffic Management Toolbox

DESCRIPTION: A raised intersection is a raised section of roadway at an intersection where the pavement is elevated to be flush with the top of curbing and the approaches are ramped like speed humps.

APPLICATION: This technique has been used extensively in Europe. Raised intersections control speeds in similar fashion to raised crosswalks. They are much more expensive, but they can be used on both local streets and residential arterials and in commercial areas. In the U.S., they have more often been used as enhancements for pedestrian safety and aesthetics in shopping areas, rather than for neighborhood traffic management. The raised intersection may be given a special pavement treatment. The ramp is 10 to 12 feet along the path of the vehicle. Raising the intersection to 3 inches, results in a gentle grade of only 2.1% which can be easily negotiated by emergency equipment.

LIMITATIONS: Raised intersections slow emergency equipment from 3 to 9 seconds, depending upon the height of the intersection. Raised intersections are relatively expensive, especially if changes in drainage, manholes or other utilities are required, and if decorative pavement treatments are used. Due to the lack of curb separation at the corners of the intersection, some motorists may tend to cut corners. Therefore, a design feature such as bollards may be necessary to keep motorists from driving onto the sidewalk.

ADVANTAGES:

- Effective in reducing vehicle speeds
- Opportunity for attractive pavement treatments
- Improved pedestrian safety at intersections

DISADVANTAGES:

- May reduce emergency vehicle response times
- May require bollards to define corners of the intersection
- Relatively expensive

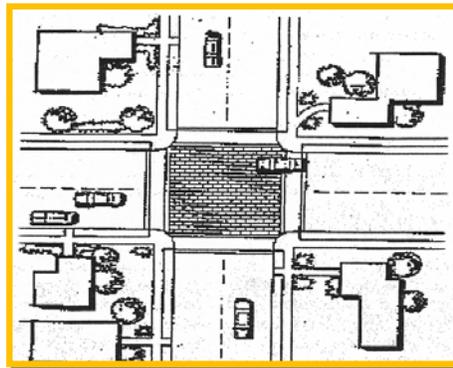
Impact on Speed:

Moderate to High

Impact on Volume:

Moderate

Typical Cost: Costs range from \$25,000 to \$150,000, depending upon the specific design and size of the intersection and drainage issues. Annual maintenance cost is \$1,000.



Half Closure



Traffic Management Toolbox

DESCRIPTION:

A half closure is a physical barrier at an entrance to a street that restricts turns into a street. Unlike a one-way street, the half closure maintains full access and movement within a street.

APPLICATION: The objective is to reduce cut through traffic by forcing through traffic to take other more appropriate routes. Ideally, through traffic will be mostly rerouted to streets intended for that purpose (arterials and, to a lesser degree, collectors). Access for emergency vehicles can be provided across the closure. Bicycle and pedestrian access is maintained.

LIMITATIONS: This is one of the most extreme traffic management measure. Residents must adopt a new driving route to access the affected street. This measure is for local streets only.

ADVANTAGES:

- Effectively reduces through traffic volume
- May reduce "speeders" who cut through
- Self-enforcing
- Provides opportunity for landscaping
- May reduce pedestrian crossing distance
- Can include bicycle connection

DISADVANTAGES:

- Inconvenient for residential access and on-street parking
- May increase trip length for drivers
- May impact emergency vehicle response times
- May shift traffic to other nearby local streets
- May increase congestion/queues on collector and arterial streets.
- Some loss of on-street parking
- Increase in long-term maintenance needs

Impact on Speed:

Moderate

Impact on Volume:

High

Typical Cost:

\$15,000 - \$50,000. High range includes street reconstruction, landscaping and irrigation for permanent installation.



One-Way Street



Traffic Management Toolbox

DESCRIPTION:

One-way streets legally limit travel on a street to one direction only. It can be implemented through signs and markings only.

APPLICATION: The objective is to reduce cut through traffic volume by discouraging a particular direction of through movement. Conversion to one-way is best on narrow streets because wider streets are more subject to deliberate violation and mistaken use. On wider street, physical measures, such as curb bulb-outs may be desirable to change the way the street space is used.

LIMITATIONS: This is one of the most extreme traffic management measure. Residents must adopt a new driving route to access the affected street. This measure is for local streets only.

ADVANTAGES:

- Effectively reduces through traffic volume
- May provide opportunity for landscaping

DISADVANTAGES:

- Inconvenient for residential access
- May increase trip length for drivers
- May increase traffic speeds on wide streets
- May impact emergency vehicle response times
- May shift traffic to other nearby local streets
- May increase congestion/queues on collector and arterial streets.

Impact on Speed:

Low

Impact on Volume:

High

Typical Cost:

See signing and striping costs.



Full Closure



Traffic Management Toolbox

DESCRIPTION:

Barriers placed across the roadway to close the street completely, usually leaving only the sidewalk or bicycle access open.

APPLICATION: Its primary purpose is to eliminate shortcutting or through traffic on the local street on which it is installed. Ideally, through traffic will be mostly rerouted to streets intended for that purpose (arterials and, to a lesser degree, collectors). Access for emergency vehicles can be provided across the closure. Bicycle and pedestrian access is maintained.

LIMITATIONS: This is the most extreme traffic management measure in that it requires a complete detour for all drivers. Street closures are discouraged in the City's General Plan. Street closures are controversial because (i) unless carefully sited, they unbalance the traditional traffic street grid, easily diverting large volumes of traffic onto other residential streets; and (ii) they impose significant detours for local residents. This measure is for local streets only.

ADVANTAGES:

- Effectively reduces through traffic volume
- May reduce "speeders" who cut through
- Self-enforcing
- Provides opportunity for landscaping
- May reduce pedestrian crossing distance
- Can include bicycle connection

DISADVANTAGES:

- Inconvenient for residential access and on-street parking
- May increase trip length for drivers
- May impact emergency vehicle response times
- May shift traffic to other nearby local streets
- May increase congestion/queues on collector/arterial streets
- Some loss of on-street parking
- Increase in long-term maintenance needs

Impact on Speed:

Moderate

Impact on Volume:

High

Typical Cost:

\$15,000 - \$100,000. High range includes street reconstruction, landscaping and irrigation.



Internet NTMP Sources

Traffic Management Toolbox



<http://www.ite.org/traffic/>

The Traffic Calming Library contains a searchable database of reports, articles and other documents related to traffic calming. In some cases the full publication is available online and in others only a source listing or abstract is available. All full-text material in the library is provided with permission of the copyright owner.

<http://www.bicyclinginfo.org/index.cfm>

The Pedestrian and Bicycle Information Center (PBIC) is a national clearinghouse for information about health and safety, engineering, advocacy, education, enforcement, access, and mobility for pedestrians (including transit users) and bicyclists. The PBIC serves anyone interested in pedestrian and bicycle issues, including planners, engineers, private citizens, advocates, educators, police enforcement, and the health community.

<http://www.walkinginfo.org/>

The Pedestrian and Bicycle Information Center (PBIC) is a national clearinghouse for information about health and safety, engineering, advocacy, education, enforcement, access, and mobility for pedestrians (including transit users) and bicyclists. The PBIC serves anyone interested in pedestrian and bicycle issues, including planners, engineers, private citizens, advocates, educators, police enforcement, and the health community.

<http://www.roundaboutsusa.com/>

The site dedicated to free traffic flow through the design and use of roundabouts. This site provides the most recent news and information about the progress of roundabouts in the USA. This roundabout site is provided to people interested in learning more about roundabouts: what they are, where they are currently located, how effective they are, and how they operate.

<http://www.fhwa.dot.gov/environment/tcalm/>

This web sit is dedicated to all the known and/or electronically publicized transportation programs and studies that pertain to traffic calming.

<http://www.trafficlogix.com/press-releases-details.asp?id=46>

Show cased a full line of traffic calming products, all of which meet ITE (Institute of Transportation Engineers) safety specifications. Hundreds of these solutions have already been installed in cities across the United States and Canada. Our offices are located in Spring Valley, New York.