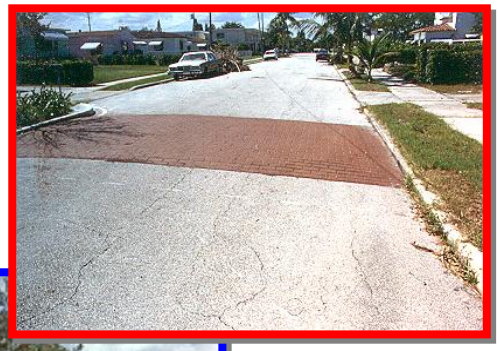
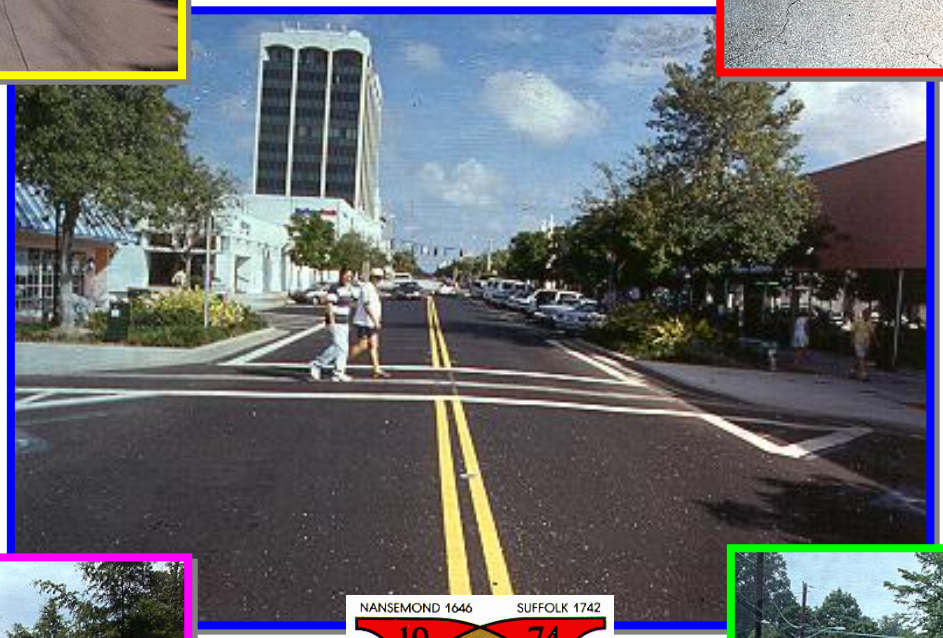
Traffic Calming Guide for Local Residential Streets





City of Suffolk
Dept. of Public Works
Traffic Engineering Division

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INTRODUCTION

"Traffic calming" is quickly becoming the common term for addressing a wide range of citizen concerns traffic engineers have grappled with for years. It seems there are as many definitions of traffic claming as there are people discussing it. Traffic calming includes a large number of tools used to achieve several specific objectives. These objectives include:

- Slow traffic
- Reduce cut-through traffic
- Increase safety for pedestrians, bicycles & vehicles
- Reduce traffic-related noise
- Improve aesthetics
- Maintain/enhance neighborhood livability
- Enhance the environment
- Promote alternative transportation modes
- Encourage public involvement

In simple terms, traffic calming addresses the "too many cars, going too fast past my house," concern expressed by an increasing number of residents. This concern includes the blatant disregard for posted speed limits on residential streets; drivers diverting off congested arterial streets onto neighborhood streets; safety concerns associated with speed and cut-through traffic issues; environmental impacts of increased speed and volume (primarily noise); and the desire to address these issues in a manger that will improve neighborhood quality of life.

Integrative Approach

The most successful approach to traffic calming integrates: Engineering, Enforcement, Education, and Enhancement. Traffic engineers and planners who have worked with neighborhood traffic issues over the years have learned the importance of an integrated approach that includes engineering, enforcement, and education; commonly referred to as the three "E's." More recently, however, it has become increasingly clear that effective traffic calming must also incorporate an enhancement element. This includes design and landscaping features that not only improve the aesthetics and liability of a neighborhood, but also increase the effectiveness of many of the devices by creating visual breaks in the streetscape, reducing the "race way" appearance of wide residential streets.

Because many of the traffic concerns addressed through traffic calming rest with residents' perceptions, it is essential that the devices we use enhance the neighborhood in addition to addressing the traffic issues. Each traffic calming device has appropriate applications, addresses one or more of the objectives outlined above, and has disadvantages or negative impacts. Very few devices are so effective, from a purely engineering perspective, and have so few negative aspects, that residents are willing to accept a device that does not enhance the neighborhood streetscape.

Project Selection

Application of traffic calming enhancements shall be limited to those neighborhood collector streets that are primarily residential, and to local service streets. To be classified as primarily residential, at least 75% of the properties with frontage on the street must be in residential zoning, and have 12 houses fronting per 1,000 feet of roadway. In addition, the 85th percentile speed should be at least eight m.p.h. over the posted speed limit of 25 m.p.h., have five or more accidents in a 12-month period, or have a high bicycle or pedestrian movement.

If a street section is selected for a project, the residents and business owners along the street will be surveyed to find out whether they support traffic calming procedures. The project would only be undertaken if the survey results are favorable (at least 60%).

Impacts on Emergency Response

A major consideration in developing a traffic calming program and associated policies is the potential many devices have for negatively impacting the operation and response of emergency vehicles, including fire trucks, ambulances, and law enforcement vehicles. It is important that any impacts on emergency response be identified and mitigated, if possible.

It is not always obvious to residents that efforts to reduce speed on their street many jeopardize emergency response in life threatening situations. Residents and communities need to be aware of the potential trade-offs when making policy decisions about the use of traffic calming devices or selecting devices for their streets. The more aggressive devices for slowing traffic will slow response vehicles as well, and in some cases may cause safety concerns for emergency responders.

Some devices, such as speed humps and raised intersections, may also cause damage to response vehicles and aggravate injuries to patients being transported. Fire engines responding regularly over speed humps have reported increased maintenance, increasing costs and out-of-service time. Ambulances transporting patients generally need to traverse such devices extremely slow to minimize complications to injuries or avoid injuring personnel providing patient care.

Implementation

When preparing a traffic calming plan, there are a number of considerations that may affect the successful implementation of the project. A thorough public process with interested stakeholders is critical. The following are some specific planning and design issues that should be carefully addressed:

- Emergency response agencies must be involved in the plan development. If emergency response agencies believe their mobility has been critically impaired without their input, it can become an emotional public debate, often in front of a city council or in the local press, where images of children being hit by cars are pitted against people dying in burning buildings or medical emergencies.

- Residents need to have a clear understanding of what the traffic calming measures will look like in their neighborhood before the contractor shows up. The use of photographic examples of similar installations and/or landscape architectural renderings of the

proposed streetscape are vital to ensuring that residents are not surprised at the time of implementation. Similarly, residents need to have a clear understanding of the traffic control signs that will be installed to support the selected devices. Signs are often viewed as a visual intrusion in the neighborhood if their need is not understood.

- Test installations are less attractive, and in some cases less effective, than final installations. In a test case, green landscaping is often substituted by something that either is made of concrete or painted some shade of orange or yellow. Test installations are important in many cases, but extra communication efforts are needed ahead of time to help local residents and political leaders endure the "ugly stage" of the test.

- The implementation of vertical traffic calming measures (humps, raised crossings, raised intersections, etc.) needs to be carefully designed and carefully constructed to ensure that the device meets the desired speed reduction goal. A constructed device that is too aggressive or too mild will not achieve the goals of the project, and will discredit the entire traffic calming program.

- The implementation of horizontal traffic measures (medians, traffic circles, curb extensions and neckdowns, etc.) also needs to be carefully designed and constructed. Drainage issues need to be addressed before the pond develops, and truck and service vehicle traffic needs to be carefully accounted for so that service can be provided and trucks are not re-routed to other neighborhood streets.

- The combination and spacing of traffic calming measures is critical to their successful implementation. Each neighborhood is unique, and the local considerations must be addressed when preparing the plan.

- Landscaping of the traffic calming measures often becomes an amenity to the local streetscape, but it needs to be carefully planned and implemented so that it does not become a safety hazard. Particular attention should be paid to the sight distance needs of pedestrians and motorists using the local transportation system. Low shrubs and deciduous trees with limbs trimmed up above six feet can be used near intersections and pedestrian crossings without compromising the safety of the traveling public.

- It is important to keep in mind that the success of the traffic calming project often depends on the system of devices that it includes. Any one device would not likely be effective in solving a traffic calming need. However, a system that includes a number of devices and types of devices that are carefully spaced in the neighborhood has a high probability for success, both from the perspective of measured engineering data and improved quality of life for the residents.

Neighborhood Level Planning

After a comprehensive program is developed, the actual planning of traffic calming devices should be undertaken at the neighborhood level. Planning on a neighborhood basis rather than on a site-by-site basis reduces the likelihood of solving a problem on one street by shifting it to another street. It also provides an opportunity to design a comprehensive series of devices that work together to improve the traffic operations and aesthetics of a neighborhood.

Involving the public is essential to an effective neighborhood planning process. The residents of the neighborhood should be involved, as well as other potentially affected parties. The first step in working with the neighborhood is to clearly define the problem. Because traffic calming addresses quality of life issues, it is important to consider a wide range of perspectives, observations, and perceptions as well as engineering data.

The next step is to examine the range of solutions available to address the problem(s) identified. As noted above, each traffic calming device has advantages, disadvantages, appropriate applications, and limitations on effectiveness. These need to be considered in selecting the tools for a neighborhood. It is also important to use a variety of tools, creating a system or series of device that work well together. For example, curb extensions are more effective when used alternately with medians or traffic circles, requiring drivers to change their travel path to negotiate around the devices. Similarly, one device is generally not as effective as a series of devices.

Once a plan is developed and funding has been established, it is important to continue to work with the neighborhood during the implementation phase to ensure that their expectations are realized in the design of the devices and impacts to the residents are minimized during the construction phase.

Before and after studies are critical to the evaluation of traffic calming efforts. The effectiveness of the devices should be monitored for each project to see if the problem(s) are addressed and to provide data for selecting devices on future projects.

Traffic Calming Tools

Traffic calming tools come in all shapes and sizes, from the subtle to the very aggressive. Each tool has appropriate applications, limitations on its use, advantages, disadvantages, and costs associated with it. The most important place to start in considering various traffic calming devices is to identify what problem you are trying to address and which tools are most appropriate to that issue. For example, speed humps are well suited for speed control, but may create increased traffic noise; therefore, if residents are concerned with both speed and noise in the neighborhood, the installation of speed humps may not be the best choice for that location. It is important to understand all of the issues associated with each tool to identify the most appropriate one for the circumstances.

Traffic calming tools include education, enforcement, engineering, and enhancement applications. Each agency should consider all of the aspects of these tools to develop a toolbox appropriate for their jurisdiction. What tools are appropriate and how traffic calming is implemented are generally more complex than understanding what tools are available. Traffic calming tools can generally be categorized into four (4) areas: enforcement, signing and marking, geometric changes, and other.

Enforcement

Targeted enforcement is used to address recurring traffic violations at specific locations or in specific neighborhoods. Targeted enforcement is useful when traffic studies or citizen observations indicate that there are recurring violations at certain times. These often include speeding, failure to stop at stop signs, and turn restriction violations.

Neighborhood speed watch programs can be implemented in a variety of ways, the most common train neighborhood residents to use radar guns to monitor and record vehicle speeds on their streets. The jurisdiction uses this information to generate letters to the owners of the speeding vehicles notifying them that their vehicle was observed speeding and requesting cooperation in observing the posted speed limit. These programs provide residents an opportunity to observe actual speeds on their streets at times they feel are most problematic. They also provide data to the local agency that can be used for additional speed reduction efforts or targeted enforcement.

Signing & Marking

Speed limit signs are commonly requested regulatory signs indicating the legal speed limit. Although these signs do little to change the observed speed of traffic on a given street, they can be combined with enforcement to address recurring speed concerns. They also provide some reassurance and perceived effects for residents.

Turn prohibitions are used to prohibit specific movements entirely or by time of day to address cut-through traffic concerns in neighborhoods.

One-way streets can be used to change the travel patterns in a neighborhood to discourage cut-through traffic or to narrow the street to accommodate other traffic calming devices, such as chicanes or curb extensions.

Marked pedestrian crossings identify locations where pedestrians are crossing. These are often used to clearly mark existing crosswalks or create additional crosswalks where there is focused pedestrian use.

Striped bike lanes provide a delineated area for bicycles on the street, giving them physical space for travel adjacent to the vehicle lanes. They also can be used to narrow the lane widths for vehicles.

Truck restrictions are often implemented on residential streets where truck traffic is problematic. These are generally local streets experiencing cut-through traffic or diversion of truck traffic from the arterial system.

Parking control can be used as a traffic calming option by restricting the use of neighborhood streets as parking lots for adjacent traffic generators such as schools or businesses. These restrictions reduce the number of cars circulating through the neighborhood in search of parking.

Geometric Changes

Much of what is thought of as traffic calming includes physical changes to the roadway to reduce travel speeds and/or discourage cut-through traffic from using neighborhood streets.

Roadway narrowing is used to reduce speeds and discourage cut-through traffic. It can also be used to improve pedestrian safety and provide enhancement opportunities. Neckdowns, chokers, and curb-extensions are constructed at intersection or mid-block to narrow the street. Medians can also be used to narrow each side of the street; and one-lane sections allow extensive narrowing opportunities.

Diverters are physical devices that divert traffic from continuing through a neighborhood. Diagonally diverters restrict through and left-turn movements, and can be used to eliminate cut-through traffic or divert it out of a specific area. Semi-diverters are less restrictive than full diverters, and are also used to restrict movements into or through a neighborhood.

Closures are used to completely restrict traffic at the point of closure. Semi-closures, like closures, restrict traffic and eliminate cut-through traffic.

Traffic circles are used to reduce speeds and discourage cut-through traffic. They are generally installed at intersections, but can be installed mid-block, right-of-way permitting.

Channelized forced turns are similar to semi-diverters in their ability to restrict movements and eliminate cut-through traffic.

Speed humps are probably the most commonly used geometric change traffic calming tool. They are used to slow traffic and discourage cut-through traffic on residential streets. Raised crossings are basically flat-toped speed humps or speed tables located at, and signed for, pedestrian crossings.

Curved alignments include chicanes, offsets, and curvilinear streets used to slow the speed of traffic.

Other Tools

Landscaping is used not only to enhance the aesthetics of traffic calming devices, but also to increase their effectiveness. Landscaping softens the environment and can be used to break up the driver's line of sight, reducing the comfortable speed of travel.

Public education can be an important element of a comprehensive traffic calming program. Public education can include efforts to make the public more aware of their own driving behavior and the impact it has on others. Driver safety information and education on existing laws can help improve driver behavior.

Street furniture, like landscaping, can be used to enhance streetscape aesthetics, soften the feel of the street, and accentuate the presence of pedestrians.

Tools NOT Recommended for Traffic Calming

Stop signs, though one of the most commonly requested devices by neighborhood residents, are not considered traffic calming devices. Stop signs are used to assign right-of-way at intersections. Although many citizens believe that stop signs help reduce speeds on their street, studies have shown that by mid-block, speeds are as high or higher than those locations without stop signs. Compliance is also a concern with implementing unwarranted stop signs. Again, studies have shown a significant violation rate for unwarranted multi-way stop signs, with as few as 7% of all vehicles coming to a complete stop at 3-way stops.

Unwarranted stop signs delay all motorists, whether they are traveling the speed limit or exceeding it. This delay penalizes all drivers rather than targeting violators. Additionally, they can create noise and emissions impacts to the adjacent residents.

Although commonly requested, it is often helpful to explore alternative options with neighborhood residents, as stop signs generally do not provide the relief they are looking for as well as other traffic calming devices do.

Children at Play signs are also commonly requested by citizens concerned with traffic safety in their neighborhoods. These signs have not been found to be effective.

Speed dips, though not commonly recognized as a traffic calming tool, are sometimes requested by citizens who observe the effects of drainage cross pans on traffic speed. The installation of dips for speed control is generally not effective for most general purpose vehicles, and has been found to have significant negative impacts on emergency response vehicle.

Speed bumps have a similar effect as speed dips. These short, round bumps in the road can be negotiated at high speeds by many general purpose vehicles, but result in significant problems for emergency response vehicles. They have been found to have a number of safety and liability limitations.

Roundabouts are generally not considered to be traffic calming devices. Modern roundabouts are installed at intersection in lieu of signals, and accommodate high volumes of traffic. Modern roundabouts are intended to increase the capacity of intersections rather than calm traffic.

Application of Tools

Each tool has appropriate applications and uses. Each addresses the various objectives of traffic calming more or less effectively than others. Although the application of each device varies by conditions, the following is a general list of traffic calming devices by objective:

Reduce Speed

- Chokers
- Deviations
- Diverters
- Enforcement
- Landscaping
- Medians
- Neckdowns
- Photo Radar
- Raised Crosswalks
- Raised Intersections
- Realigned Intersection
- Speed Humps
- Speed Trailer
- Traffic Circles

Mitigate Cut-Through Traffic

- Barrier Medians
- Closures
- Diverters
- Gateways/entry ways
- Identification Islands
- One-Way Sections
- Partial Closures
- Physical Turn Restrictions
- Raised Crosswalks
- Raised Intersections
- Signed Turn Restrictions
- Speed Humps
- Traffic Circles
- Truck Restrictions

Increase Safety

- Bike lanes
- Enforcement
- Medians
- Neckdowns
- Raised Crosswalks

Improve Aesthetics

- Deviations
- Identification Islands
- Landscaping
- Medians
- Neckdowns
- Pavement Treatments
- Street Furniture
- Traffic Circles

Selection of Tools

The first step in selecting which traffic calming device(s) to use is to identify what the existing problems are and which problem(s) can be addressed through traffic calming. Once the problem is clearly defined, the next step is to identify which tools are best suited for the problem. This avoids installing devices that may not address the actual problem and may, in fact, create new problems.

Selecting the best tool requires considering costs, including construction and maintenance costs. For example, landscaping generally improves both the effectiveness and aesthetics of a device, but may be more expensive to install and maintain.

Negative impacts of potential devices should be considered. Each device in the toolbox has both positive and negative impacts. These should be carefully considered to ensure that the proposed device will provide a net positive impact on the roadway or system.

It is also important to consider the feasibility of each device, including geometric or right-of-way limitations, available funding, political limitations, and public acceptance. Feasibility considerations will limit the range of tools realistically available.

Define the Problem

In defining the problem, it is important to consider resident perceptions and observable data to determine the severity and priority of problems. It is critical that this process include affected members of the public, as they live with the situation on a daily basis and are often intimately familiar with the specific issues. Residents' perspectives can be verified through traffic studies, but traditional traffic studies rarely provide the depth of knowledge of the situation that daily observations do.

City staff needs to work closely with affected residents to mutually define the problem(s) to be addressed in a given neighborhood. Without this step, the professionals may work to solve a problem the residents to not believe is important, or overlook a primary concern of the residents.

Traffic Studies

Traffic studies help clarify the specific nature and extent of traffic problems and evaluate the effectiveness of devices that are installed. The types of studies used to determine the nature of traffic problems include: volume, accident, speed, cut-through, and follow-up.

Volume studies are used to record the volume of traffic that passes a given point on the street. These are generally conducted over a minimum of 24 hours mid-week, or for up to a 7-day period. If volume concerns exist at specific times or days of the week, the studies should be sure to include these times. For example, if a neighborhood has a concern with traffic associated with a church or recreational facility that generates most of its traffic on the weekend, mid-week studies would not adequately reflect these volumes.

Accident studies are conducted to evaluate the nature and frequency of accidents at a given location or along a street. Accident studies help identify locations where traffic calming applications can be used to address safety concerns by classifying speed, right-of-way, pedestrian

or bicycle related accidents. Accident studies may also identify locations where safety could be improved by restricting specific movements or reconfiguring the existing street.

Speed studies are almost always conducted in conjunction with traffic calming efforts. Most often, the number one concern of residents involved in a traffic calming study is the speed of traffic on their residential street. Speed studies are conducted to identify the range and frequency of speeds on the street. There are a number of ways to look at speed data. The most commonly used number is the 85^{th} percentile speed, representing the speed at which or below 85% of the traffic is traveling. The top speed and range are also important in determining how extreme the speed problem is. Another statistic to watch is the 10 m.p.h. pace speed, which indicates the 10 m.p.h. range with the highest frequency of occurrences, and the percent of observations in the pace. This indicates the behavior of the greatest number of drivers and the variation among vehicles. Speed studies can be used to determine time of day, day of week, or directional speed violation problems. If speeding occurs over a limited time period, targeted enforcement may be a cost effective solution. If the problem is observed over longer periods of time or occurs randomly, targeted enforcement may be less effective than physical traffic calming devices.

Cut-through studies are used to determine the extent of cut-through traffic in a neighborhood. These are conducted at specific times of day when cut-through traffic is most likely to occur and record the vehicles entering and exiting the neighborhood. Cut-through traffic studies are very helpful in determining whether traffic is actually cutting through a neighborhood or traveling to and from a destination within the neighborhood.

Follow-up studies, used in conjunction with studies conducted prior to installation of traffic calming devices, are used to determine the effectiveness of the devices. These are not only important to individual projects, but also serve as the basis for selecting devices on future traffic calming efforts by providing data on the effects of devices, or combinations of devices, on traffic behavior.

Select Appropriate Devices

The process of selecting traffic calming devices starts with clarifying the specific problems to be addressed, as each device has different strengths and weaknesses in managing traffic. The other critical consideration is whether a device is acceptable to the stakeholders. This includes those who will have to live with the device on their streets, as well as those who will pay for it, maintain it, and maneuver around it. Don't wait until you have installed a series of devices to find out that a critical stakeholder, like the fire department or street maintenance department, can't meet their obligations to the citizens with the devices in place.

In considering which devices are appropriate for a specific street, consider the desired objective of the device, the function of the street, the advantages and disadvantages of the device, and the effectiveness and cost of the device. This can be done in an informal manner or through a more formalized matrix evaluation process. The important thing is that each of these issues is considered and discussed with the stakeholders.

Public Involvement Process

The process used to involve the public should be clearly understood by all participants, and considered to be a fair and open process. As previously mentioned, it is essential to involve all potentially affected parties, not just those who initiated the traffic calming request. The process should focus on mutually defining the problem(s) to be addressed, and involve the stakeholders in the decision-making process.

Working with the Stakeholders

Working with the stakeholders should include the following steps: identify the stakeholders, design the decision-making process, define and prioritize the problems, identify desired outcomes, review alternatives, design the plan, implement the plan, and evaluate the results.

Identify the stakeholders at the beginning of the process to ensure that all affected parties are involved in the process to the extent they desire or need to be. Stakeholders include the residents of the street(s) to be studied, service providers who use or maintain the street, agencies or parties with a financial or fiduciary interest, and others in the community affected by the operation of the street. This could be a very long list and may seem overwhelming at the beginning. In fact, parties that are involved early and self select out of the process once they find they are not affected or their interests are adequately represented, are not problematic. On the other hand, those who come to the process late in the game, whose interests have not been included or addressed can in fact derail the effort. Therefore, you should attempt to identify all potentially affected parties and involve them in the process to the extent they feel is necessary.

Define and prioritize the problems so there is a mutually agreed to problem to be addressed, and if there is more than one problem, the priority of problems are agreed to.

Identify desired outcomes so there is consensus on the objective(s) of traffic calming. This is important in identifying and evaluating potential tools or approaches. This also provides a basis for evaluating the results of the traffic calming effort once implemented.

Review alternatives that address the problem and achieve the desired outcomes. This should be a dialogue among the stakeholders, ad an opportunity to share data and observations about various alternatives. This is the time to ensure residents' and stakeholders' understanding of devices. This should include photographs, drawings, information, and field visits as appropriate.

Design the plan to meet the needs of the stakeholders. There are generally a number of different plans that would be effective in most circumstances, and the recommended plan must balance the priorities and needs of the stakeholders. In designing the plan, consider the spacing of devices, what combination or system of devices most effectively addresses the problem, and the aesthetic impacts of the plan. The best plan is the one that meets the needs best and can be supported by the stakeholders.

Implement the plan as soon as possible with as little impact as possible. Plans that are left on the shelf for a while will need to be revisited by the stakeholders prior to implementation. Therefore, it is recommended that implementation be undertaken as quickly as is feasible to ensure that the plan does not become obsolete.

Evaluate the results of the traffic calming project to determine if the stated objectives of the plan are being met. Results should be gathered to determine the effectiveness of the implemented

traffic calming plan, and provide information for selecting various devices in the future. In reviewing results, remember to include resident satisfaction, as the original problem definition included the perceptions of the neighborhood.

Construction Guidelines

1. The contractor shall notify the Department of Public Works 48 hours in advance of any street closure.
2. Maintenance of traffic plans shall be furnished to the City Traffic Engineer seven (7) days in advance of construction for approval.
3. The contractor shall maintain access to all properties at all times.
4. The contractor shall check all temporary traffic control devices at the beginning and end of each day to ensure proper placement during construction.

Traffic Calming Toolbox

Traditional Police Enforcement

Description: Police presence to monitor speeds and issue citations

Application:

- Streets with documented speeding problems & need for quick mitigation
- Locations where restrictions are being violated

Advantages:

- Effective while officer is actually monitoring speeds
- Flexible measure that can be implemented in almost any location at short notice

Disadvantages:

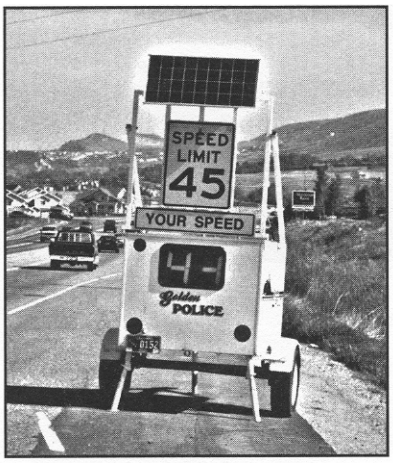
- Not self-enforcing; temporary measure
- Fines do not typically cover cost of enforcement
- Disrupts efficient traffic flow on high volume streets
- Short “memory effect” on motorists when enforcement office no longer present

Special Considerations:

- Often helpful in school zones
- May be used during “learning period” when new devices or restrictions first implemented

Cost: High cost primarily due to the staffing requirements

Speed Monitoring Trailer



Description:

Mobile trailer mounted radar display that informs drivers of their speed

Application:

Any street where speeding is a problem

Advantages:

- Educational tool
- Good public relations
- Effective for temporary speed reduction needs

Disadvantages:

- Some motorists may speed up to try to register a high speed
- Duration of effectiveness may be limited
- Not self-enforcing

Special Considerations:

Should not be used in remote areas

Cost:

- Moderate cost to use due to staffing requirements
- Expensive to enforce

Speed Limit Sign

Description:

Signs that define the legal driving speed under normal conditions

Application:

Any street where speeding is a problem

Advantages:

- Provides clear definition of legal speed limit
- Provides context for enforcement efforts
- Provides goal for traffic calming efforts

Disadvantages:

- Typically not effective in and of itself
- Not self-enforcing
- Requires on-going police enforcement
- Unrealistically low speed limits are difficult to enforce & tend to be disregarded
- More visual pollution from signs in the neighborhood

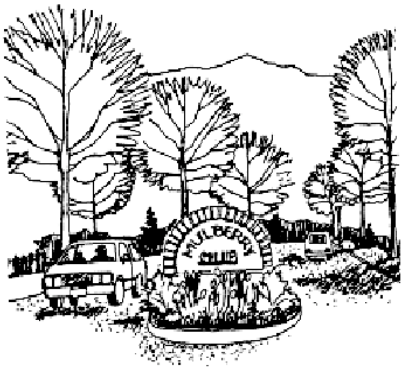
Special Considerations:

Speed limits set by an engineering analysis tend to be higher than limits set by political pressures

Cost:

- Low; inexpensive to install
- High; expensive to enforce

Entry Island (Neighborhood Identification Island)



Description:

A raised island in the center of a 2-way street that identifies the entrance to a neighborhood

Application:

Placed in a roadway to define the entry to a residential area and/or to narrow each direction of travel & interrupt sight distance along the center of the roadway

Advantages:

- Notifies motorists of change in roadway character
- Helps slow traffic
- Opportunity for landscaping and/or monumentation for aesthetic improvements
- May discourage cut-through traffic

Disadvantages:

- Need for maintenance (and irrigation)
- May necessitate removal of parking

Variations:

Can incorporate neighborhood identification signing & monumentation

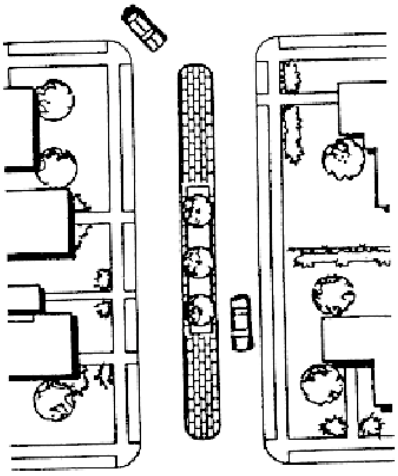
Special Considerations:

Care should be taken not to restrict pedestrian visibility at adjacent crosswalk

Cost:

Low to medium cost to install, landscape & maintain

Median



Description:

A raised island in the center of the roadway with 1-way traffic on each side

Application:

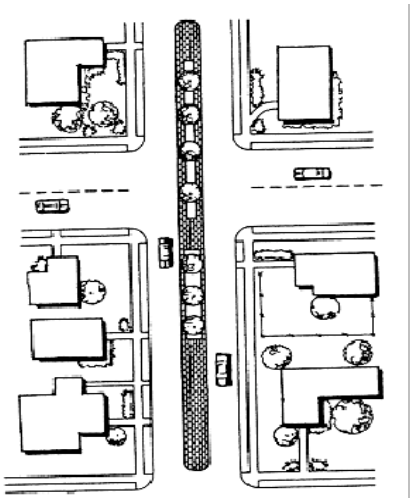
Used on wide streets to narrow each direction of travel & to interrupt sight distances down the center of the roadway

Advantages:

- Narrowed travel lanes provide "friction" & can slow vehicle speeds
- Significant opportunity for landscaping & visual enhance of the neighborhood
- Can utilize space which otherwise would be "unused" pavement
- Can be used to control traffic access to adjacent properties if desired

Disadvantages:

- Long medians may impact emergency access & operations
- May interrupt driveway access & result in U-turns
- May require removal of parking



Variations:

- Medians of various lengths can be constructed
- Can be constructed mid-block only to allow all turning movements at intersection
- Can be extended through intersections to preclude left turns or side street throughs

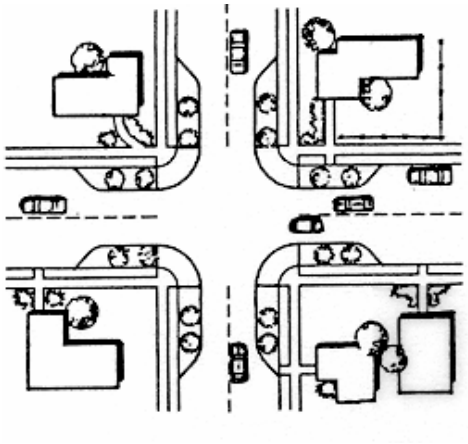
Special Considerations:

- Vegetation should be carefully designed not to obscure visibility between motorists, bicyclists & pedestrians at intersection & pedestrian crossing areas
- Maintain 12-foot wide lane minimum on each side
- Maximum length between access points should be 200' to accommodate emergency response – turning radii for a fire truck should be maintained at these breaks

Cost:

High cost to construct, landscape & maintain

Neckdown or Curb Extension

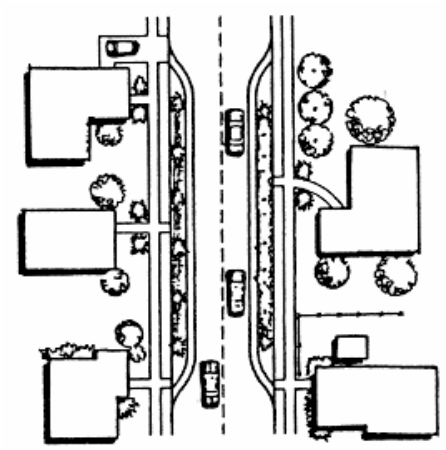


Description:

Segments of roadway narrowing where curbs are extended toward the center of the roadway

Application:

- Typically used adjacent to intersections where parking is restricted
- Can be used to narrow roadway & shorten pedestrian crossings
- Can be used on road with volumes less than 8,000 vehicles per day (VPD)



Advantages:

- Pedestrian visibility increased & crossing distance reduced
- Narrowed roadway section may contribute to vehicular speed reduction
- Can "reclaim" pavement for pedestrian & streetscape amenities
- Breaks up drivers' line-of-sight

Disadvantages:

- Creates drainage issues where curb & gutter exist
- May create a hazard for bicyclists

Variations:

Mid-block neckdowns often used in conjunction with pedestrian crossing treatments

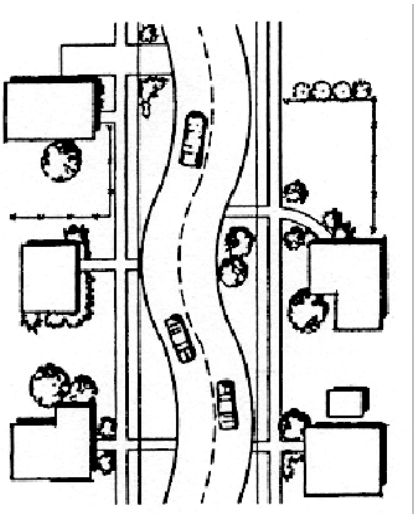
Special Considerations:

Curb extensions should not extend into bicycle lanes where present

Cost:

Medium to high cost depending on landscaping, pavement treatments & storm drainage Considerations

Curvilinear Street



Description: A curved street alignment can be designed into new developments or retrofitted in existing right-of-ways; the curvilinear alignment requires additional maneuvering & reduces drivers' line-of-sight

Application:

- Any street where speed control is desired
- Any street where reduced line-of-sight is desired

Advantages:

- Little to no impact on snow removal
- Aesthetically pleasing
- Provides landscaping opportunities
- Minimal impact on emergency response

Disadvantages:

- Expensive
- May have little or no impact on cut-through traffic
- Needs to be combined with narrowing or other traffic calming tools to have significant impact on speeds
- May require additional right-of-way to be effective

Variations:

- Chicanes
- Off-set curb extensions
- Systems of devices alternating from the center to curbside of the road

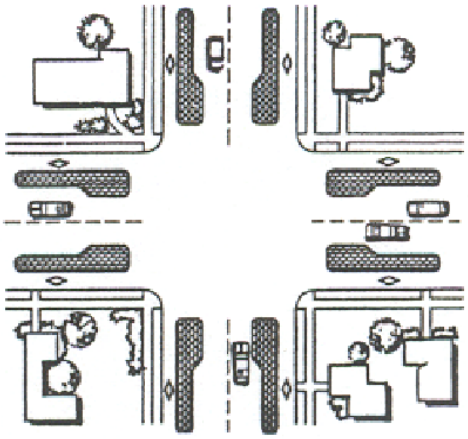
Special Considerations:

- Cannot be used where right-of-way is limited
- May require removal of on-street parking

Cost:

High

Chokers



Description: Raised island built to narrow the roadway; the islands are detached from the curb line, allowing drainage or bike lanes to continue behind the choker

Application:

- Typically used adjacent to intersections where parking is restricted
- Can be used to narrow roadway & shorten pedestrian crossings

Advantages:

- Pedestrian crossing distance reduced
- Narrowed roadway section may contribute to vehicular speed reduction
- Breaks up drivers' line-of-sight

Disadvantages:

May cause hazard for bicyclists who are less visible to cross street & turning traffic

Variations:

- Mid-block chokers
- 1-lane chokers that narrow the street to create a short 1-lane, 1-way section

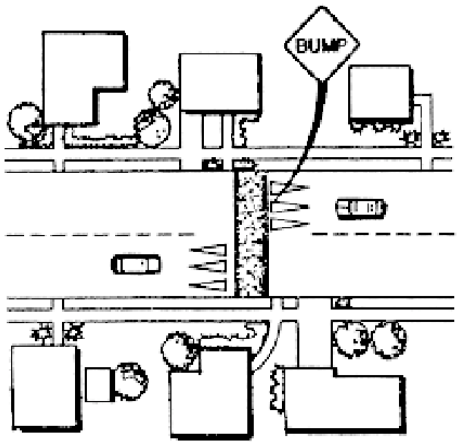
Special Considerations:

- Significant problems with maintenance & snow removal
- Debris builds in bike lane between the choker & the curb line, creating hazard for bicyclists

Cost:

Moderate

Speed Hump



Description: Speed humps are areas of pavement raised 3" in height over a minimum of 7 feet; the combination of different heights, lengths & approach ramps will vary the speed a vehicle can comfortably go over the hump; they are marked with signs & pavement markings

Application:

- Local streets where speed control is desired
- Local streets where cut-through traffic is to be discouraged

Advantages:

- Slows traffic
- Self-enforcing
- Requires minimum maintenance; pavement markings must be maintained
- Minimal impact on snow removal

Disadvantages:

- Increases emergency response times
- May damage emergency response vehicles if not carefully designed
- May increase traffic noise in vicinity of hump

Special Considerations:

- Should not be used on critical emergency response routes
- Needs to be used in series or in conjunction with other traffic calming devices to control speeds
- Longer designs can minimize impact on long wheelbase vehicles

Cost:

Low to moderate

Design Requirements:

Twenty-two feet long in the direction of travel & 3" tall at their highest point. This corresponds to the "Seminole County" design with a 6' parabolic curve up to the 3" height, a 10' platform & a 6' parabolic curve back to the natural grade. This has a design speed of 25-30 m.p.h. (see Figure 1). The City of Suffolk prefers a 22' hump with a raised brick crosswalk at certain locations (see Figure 2). A 14' speed hump is also acceptable with a 7' parabolic curve & no platform (see Figure 3). The design speed for the 14' speed hump is 15-20 m.p.h. The humps are placed on top of the existing roadway, constructed of asphalt concrete, and inlaid with chevron markings. Speed humps may be used on roads with an average annual daily traffic (AADT) of up to 15,000 VPD. The optional spacing for the 14' hump is 500'-700' & for the 22' hump, 400'-600'. Speed humps may be installed on street sections with a grade equal to or less than 5%. Engineering evaluation should be conducted to assure speed humps placed along a horizontal curve allow safe vehicle passage at the design speed of the curve. In addition, warning signs for the speeds humps should be placed in such a manner as to be clearly visible by approaching motorists according to the MUTCD. Speed humps should not be placed at a driveway location. Tolerance for the speed hump height is +/- 0.5". Final design will be determined by the Department of Public Works.

Figure 1

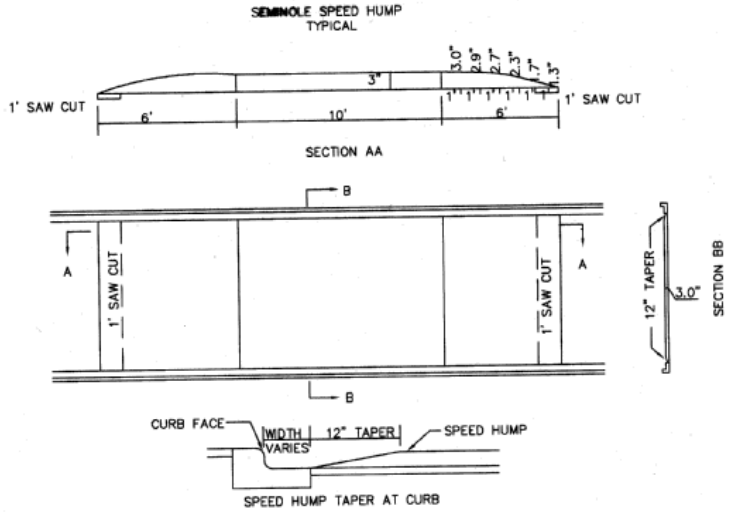


Figure 2

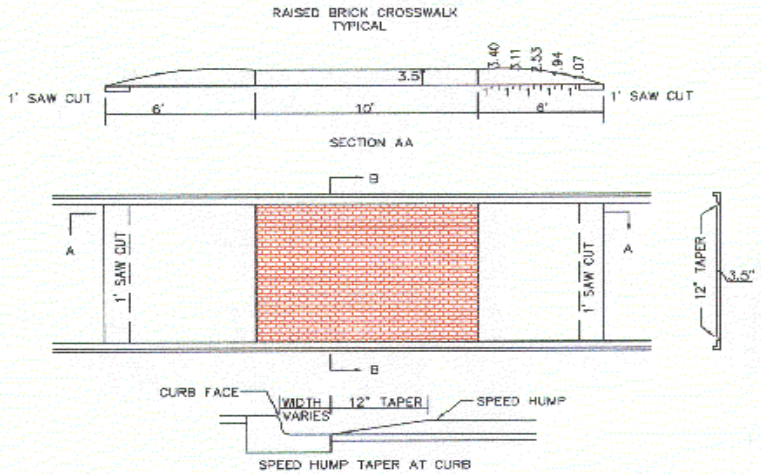
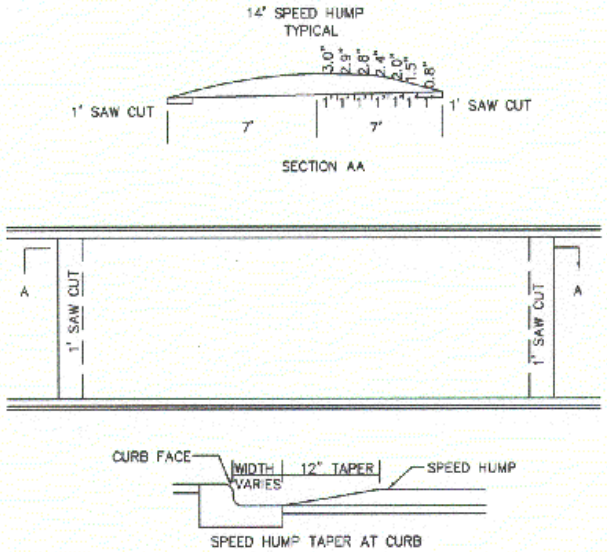
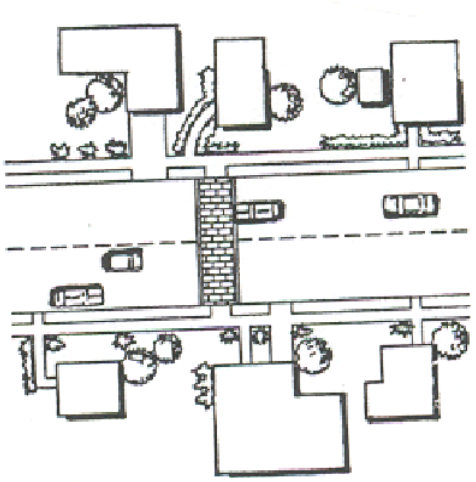


Figure 3



Raised Crosswalk



Description:

Flat-topped speed hump built as a pedestrian crossing

Application:

- Local streets where speed control & pedestrian crossing designation are desired
- Local streets where cut-through traffic is to be discouraged

Advantages:

- Slows traffic
- Increases pedestrian visibility in the crosswalk
- Clearly designates the crosswalk
- Requires minimum maintenance; pavement markings must be maintained
- Minimal impact on snow removal

Disadvantages:

- Increases emergency response times
- May damage emergency response vehicles if not carefully designed
- May increase traffic noise in vicinity of crosswalk
- May create drainage issues where raised crossing extends from curb to curb

Variations:

Pavement treatment without the raised hump to create a pedestrian crossing focal point

Special Considerations:

- Appropriate near schools & recreation facilities
- Should not be used on critical emergency response routes
- Needs to be used in conjunction with other traffic calming devices to control speeds
- If a new crosswalk location, may reduce available on-street parking
- May require extensive signing

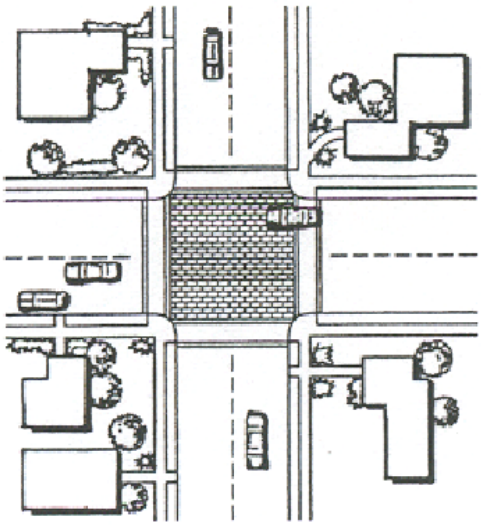
Cost:

Moderate

Design Requirements:

See Speed Hump Design Requirements

Raised Intersection



Description: A raised section of roadway at an intersection where the pavement is elevated to be flush with the top of the curbing & the approaches are ramped like speed bumps

Application:

- Streets where speed reduction is desired
- Streets where discouragement of cut-through traffic is desired

Advantages:

- Effective speed mitigation
- Opportunity for attractive pavement treatments
- Improved pedestrian safety at intersection

Disadvantages:

- Requires storm drainage
- May require bollards to define the corners of the intersection
- May reduce emergency response time

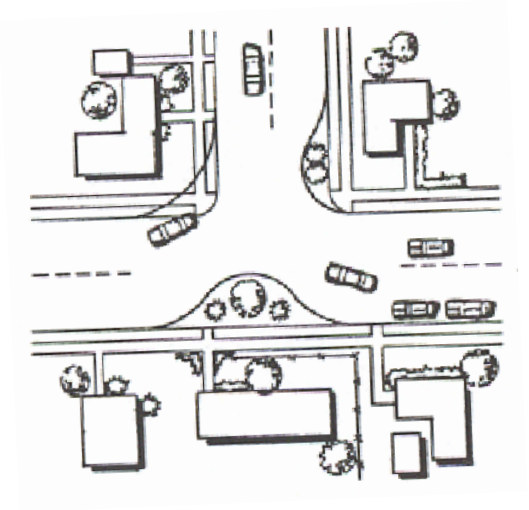
Special Considerations:

- Special signing required
- Should not be used on critical emergency response routes

Cost:

High cost of construction & storm drainage

Realigned Intersection



Description:

Realigns T-intersection to make the "through movement" a turning movement

Application:

- Streets where it is desired to redirect traffic to another facility
- Streets where slowing traffic as it enters the neighborhood is desired

Advantages:

- Provides landscaping opportunities
- Discourages traffic from continuing through a neighborhood
- Slows traffic as it enters a neighborhood
- Breaks up sight-lines on straight streets

Disadvantages:

- May redirect traffic to another local street
- Fairly expensive

Variations:

- Stop sign control on one leg
- Stop sign control on all three legs
- Neckdowns in the intersection

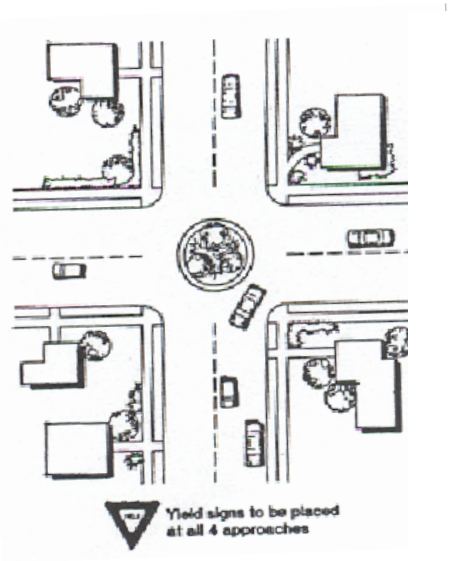
Special Considerations:

- Drainage
- Potential for redirecting traffic to adjacent local streets
- May change stop configuration & affect emergency response times

Cost:

High

Traffic Circle



Description: Traffic circles are raised circular medians in an intersection with counter-clockwise traffic flow; vehicles must change their travel path to maneuver around the circle & are typically controlled by "Yield to Entry" on all approaches

Application:

- Streets where speed control is desired
- Intersections where improved side-street access is desired

Advantages:

- Provides increased access to street from side street
- Slows traffic as it drives around circle
- Breaks up sight-lines on straight straights
- Opportunity for landscaping in the intersection

Disadvantages:

- Definition of right-of-way is contrary to the "yield to the vehicle on the right" rule
- May impede emergency response
- Relatively expensive if curb extensions are required
- May impede left turns by large vehicles
- On streets with bicycle facilities, bikes must merge with traffic around circle

Variations:

- With or without neckdowns
- With or without diverter islands
- Different sizes & dimensions
- Barrier curb & gutter face or tapered/mountable face

Special Considerations:

- Need to be used in series or in conjunction with other traffic calming devices
- Should not be used on critical emergency response routes
- May require extensive signing
- Maintenance concerns associated with plowing, sweeping & asphalt maintenance around circle
- May require educational campaign & learning period

Cost:

High

Design Requirements:

Must be designed in conformance with Federal Highway Administration Publication No. 7HWA-RD-00-067, "Roundabouts: An Informational Guide."

Restricted Movement Signing

Description:

Sign that prohibits certain movements at an intersection

Application:

Streets where reducing cut-through traffic is desired

Advantages:

- Redirects traffic to main streets
- Reduces cut-through traffic
- Addresses time-of-day problems

Disadvantages:

- Not self-enforcing
- May increase trip length for some drivers
- More visual pollution from signs in the neighborhood

Special Considerations:

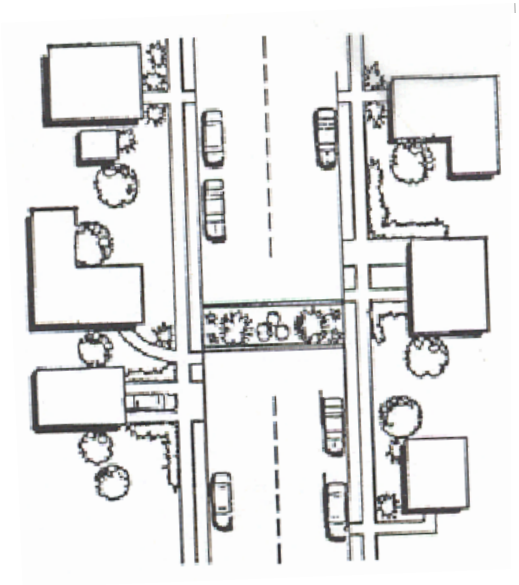
- Can be used on a trial basis
- Has little or no effect on speeds for through vehicles

Cost:

Low – high: inexpensive to install, expensive to enforce

STREET CLOSURES, ONE-WAY STREETS & TRAFFIC DIVERTERS PROHIBIT ONE OR MORE TRAFFIC MOVEMENTS AND WILL ONLY BE CONSIDERED AFTER OTHER TECHNIQUES HAVE BEEN USED & FAILED.

Street Closure



Description:

Full closure of a street

Application:

Local streets where cut-through traffic is the major concern

Advantages:

- Restricts all through traffic
- Self-enforcing

Disadvantages:

- May redirect traffic to other local streets
- May increase trip length for some drivers
- May increase emergency response times

Variations:

- Mid-block closure
- Intersection closure
- Pocket parks
- Maintain emergency access
- Provide bicycle & pedestrian access

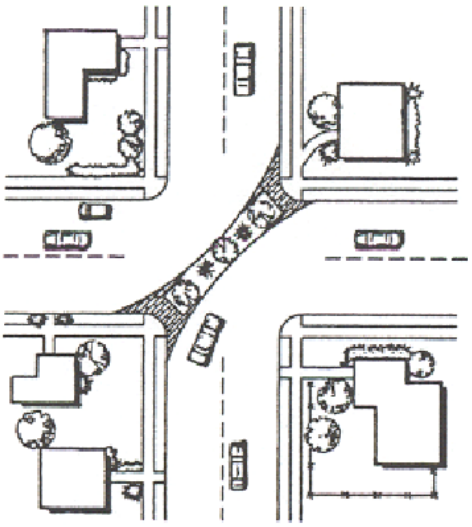
Special Considerations:

- Should not be used on critical emergency response routes
- Consider impact to adjacent streets
- Consider emergency response requirements

Cost:

Moderate to high

Diagonal Diverter



Description:

Raised areas placed diagonally across a 4-way intersection that restricts through movements in all directions

Application:

Local streets where cut-through traffic is a problem

Advantages:

- Reduces cut-through traffic
- Self-enforcing
- Maintains continuous routing opportunities
- Not as restrictive as street closure

Disadvantages:

- May redirect traffic to other local streets
- May increase trip length for some drivers
- In effect at all times – even if cut-through problem exists only at certain times of day

Variations:

Traversable diverters that allow access for emergency response vehicles

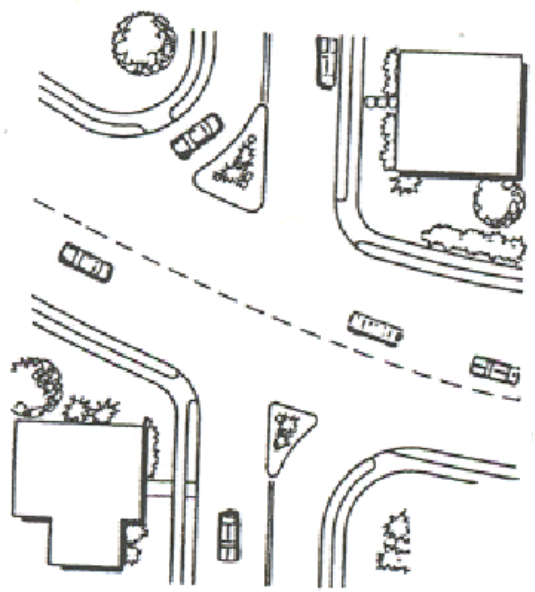
Special Considerations:

- Provide pedestrian & bicycle access through barriers
- Should not be used on critical emergency response routes
- Consider how residents will gain access to street
- Has little or no effect on speeds for local traffic

Cost:

Moderate to High

Restricted Movement Barrier



Description:

Barrier island that prevents certain movements at an intersection

Application:

Streets where reducing cut-through traffic is desired

Advantages:

- Redirects traffic to main streets
- Reduces cut-through traffic
- Increases opportunity for landscaping in the roadway

Disadvantages:

- May negatively affect emergency response
- May increase trip length for some drivers

Variations:

Medians on main street that allow left & right turns in but restrict left turns out or straight across movement from side street

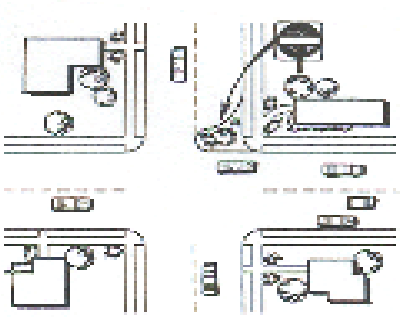
Special Considerations:

- Should not be used on critical emergency response routes
- Has little or no effect on speeds for through vehicles

Cost:

Moderate

Entrance Barrier



Description:

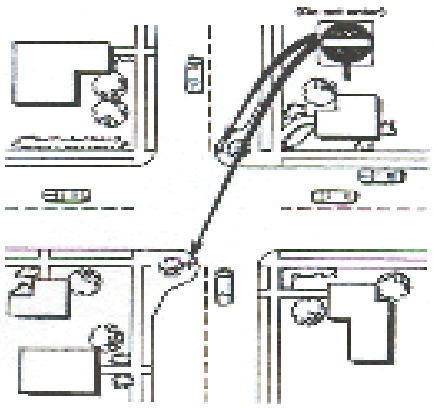
Physical barrier that restricts turns into a street; creates a 1-way segment at the intersection while maintaining 2-way traffic for the rest of the block

Application:

- Local streets where cut-through traffic is common
- Local streets where vehicles from nearby facilities circulate looking for parking

Advantages:

- Restricts movements into a street while maintaining full access & movement within the street block for residents
- Reduces cut-through traffic
- Opportunity for increased landscaping
- More self-enforcing & aesthetically pleasing than turn restriction signing



Disadvantages:

- May redirect traffic to other local streets
- May increase trip length for some drivers
- In effect at times; even if cut-through problem exists only a certain times of the day

Variations:

Can be used in pairs to create a semi-diverter, restricting turns onto the street & movements across the intersection

Special Considerations:

- Should not be used on critical emergency routes
- Has little or no effect on speeds for local traffic
- Consider how residents will gain access to street

Cost:

Moderate to high