A LIST OF TRAFFIC MANAGEMENT DEVICES

Traffic management: balancing modes

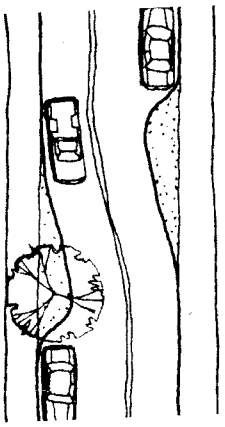
There are many competing demands placed on a city's streets. Each transportation mode places demands on the street system. Sometimes these demands conflict. For example, curb extensions shorten the crossing distance for pedestrians at an intersection. They also reduce the speed at which vehicles can turn at an intersection. For these reasons, curb extensions make intersections safer for pedestrians. Curb extensions also require buses or trucks to maneuver more slowly around turns. If the intersection you are examining is used by many turning trucks or buses, this will factor into how wide the extensions can be or if another type of treatment is more appropriate. The 19 devices described in this chapter can be used either alone or in combination to accommodate many users of our roadways. Keep in mind that traffic management programs are most successful when they have the involvement and support of local communities.

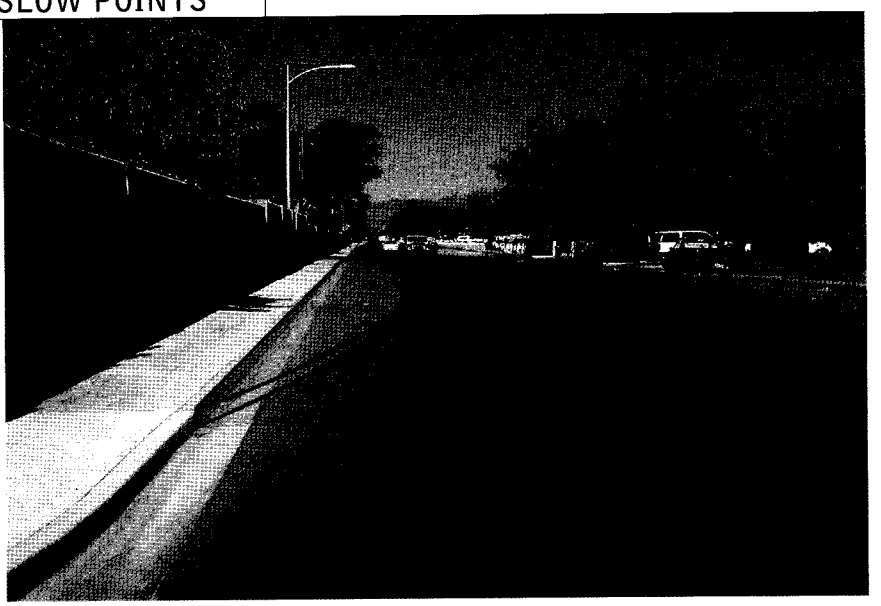
DEVICE	VEHICLE VOLUME	VEHICLE SPEED	NOISE
CHICANES AND ANGLED SLOW POINTS	↓	↓	↓
CHOKERS	↓	↓	↓
CROSSING ISLANDS		↓	↓
CROSSWALK MARKINGS			
CURB EXTENSIONS		↓	
DIVERTERS	↓	↓	↓
FULL STREET CLOSURE	↓	↓	↓
GATEWAYS	↓	↓	
INTERSECTION MEDIAN BARRIERS			
MODERN ROUNDABOUTS		↓	↓
ONE–WAY/TWO–WAY STREET CONVERSIONS	↑	↑	↑
PARTIAL STREET CLOSURE	↓		↓
RAISED MEDIANS		↓	↓
ROAD SIGNS			
SERPENTINE STREET	↓	↓	↓
SPEED HUMPS AND SPEED TABLES	↓	↓	↑
SPEED MONITORING TRAILER		↓	↓
TRAFFIC MINI–CIRCLES		↓	↓
TWO–WAY TURN LANES		↓	

VEHICLE CONFLICTS	TRAFFIC DIVERTED TO RESIDENTIAL STREETS	PEDESTRIAN/ BICYCLE SAFETY	EMERGENCY/SERVICE VEHICLE ACCESS	RECOMMENDED FOR
↓	↑	↓	↓	residential streets
↓	↑	↑	↓	residential streets
↓	↑	↑	↓	arterial streets
		↑		both
	↑	↓	↓	both
↓	↓	↑	↓	residential streets
↓	↑	↑	↓	residential streets
↓		↑	↓	both
↓	↑	↑	↓	both
↓		↑		arterial streets
↓	↑	↑	↓	arterial streets
↓	↑	↑		residential streets
↓	↑	↑	↓	both
↓				both
		↑	↓	residential streets
		↑	↓	residential streets
				both
↓		↑		residential streets
↓			↑	arterial streets

CHICANES AND ANGLED SLOW POINTS

The chicanes pictured here narrow this residential street to one lane and require traffic to move slowly.





Definition:

Chicanes and angled slow points usually consist of a series of bulb-outs or curb extensions, narrowing the street to two narrow lanes or one lane at selected points and forcing motorists to slow down to maneuver between them. Such treatments are intended for use only on residential streets with low traffic volumes. These treatments can be gentler or more restrictive depending on the design and the operational needs of the street. Angled slow points divert the path of travel plus restrict lanes (as described under Chokers).

Benefits:

Chicanes and angled slow points reduce vehicle speeds as long as the taper is significant enough so that motorists must slow down to travel through the device. Shifts in travelways can be created by shifting parking from one side to the other (if there is only space for one side of parking), or by building landscaped islands. If the device does not restrict the number of lanes, chicanes can be created on streets with higher volumes. Chicanes also provide an opportunity for landscaping.

Share the road:

As with all traffic management devices, chicanes and angled slow points must be designed to accommodate bicycles.

Consider this:

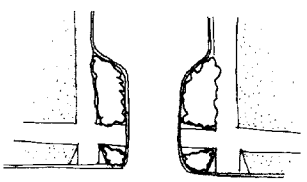
- Chicanes may reduce on-street parking.
- Maintain good visibility by planting only low shrubs or trees with high canopies. (Use the desert planting guide on pages 49-50.)

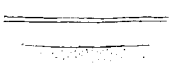
Estimated cost:

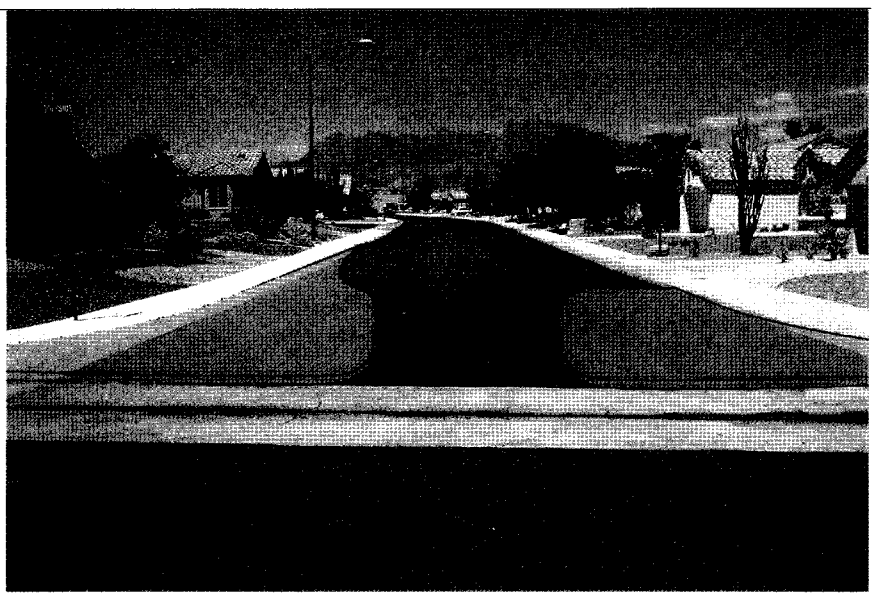
Costs for landscaped chicanes are approximately $40,000 (for a set of 3 chicanes) on an asphalt street and $60,000 on a concrete street. Drainage may represent the most significant cost consideration.

CHOKER

Chokers create a clear transition between a commercial and a residential area, narrow an overly wide intersection, add room along the sidewalk or planting strip for landscaping and reduce cut-through traffic.







Definition:

Chokers are curb extensions that create a pinch point along the street by widening the sidewalks or planting strips. Chokers can be created by bringing in both curbs, or they can be done by more dramatically widening one side at midblock locations. They can also be used at intersections, creating a gateway effect when entering a street.

Benefits:

Chokers can have a dramatic effect by reducing a two-lane street to one lane at the choker point, requiring motorists to yield to each other. In order for this to function effectively, the width of the travelway cannot be wide enough for two cars to pass.

Consider this:

- If two travel lanes are maintained on a two-way street and/or the travel lane widths are unchanged and do not narrow at the location of the choker, it will have a minimal effect on speed.
- This kind of design is usually only appropriate for low volume, low speed streets.

Estimated cost:

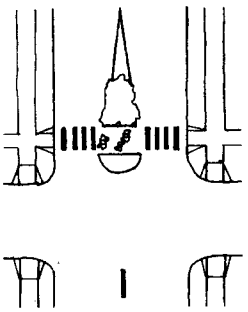
$10,000 to $40,000 depending on site conditions and landscaping. Drainage may represent a significant cost.

Share the road:

As with all traffic management tools, design chokers to allow bicycle access.

CROSSING ISLANDS

This crossing island in the Uplands neighborhood allows pedestrians to deal with only one direction of traffic at a time, stopping part way across the street and waiting for an adequate gap in traffic before crossing the other half of the street.



Definition:

Crossing islands—also known as center islands, refuge islands, or pedestrian islands—are raised islands placed in the center of the street at intersections or midblock. They highlight the crossing for both pedestrians and drivers, and create a safe refuge in the middle of the street for pedestrians particularly at unsignalized crossings.

Benefits:

Crossing islands have been shown to decrease the percentage of car-pedestrian crashes and casualties by 57%–82%. Benefits for pedestrian safety include reduced conflicts, reduced vehicle speeds approaching the island, greater attention called to the existence of a pedestrian crossing, opportunities for additional signage in the road, and reduced exposure time for pedestrians.

Consider this:

- Crossing islands are designed to deviate the travel lane around the island. The approach can be designed to force a greater or lesser slowing of cars, depending on how dramatic the curvature is. The deviation and roadway markings alert motorists that they are in a location where pedestrians may be crossing, and encourage them to reduce speeds.
- Curb extensions may be built in conjunction with crossing islands where there is on–street parking,
- Illuminate or highlight islands with signs and reflectors to ensure that motorists see them.
- Design islands to accommodate those in wheelchairs.
- Crossing islands at intersections or near driveways may affect left turn access.

Estimated cost:

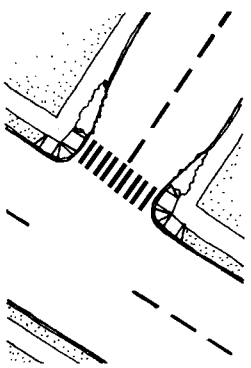
The cost for installing a raised concrete crossing island (with landscaping) is about $20,000 to $40,000. The cost is less for an asphalt island or one without landscaping.

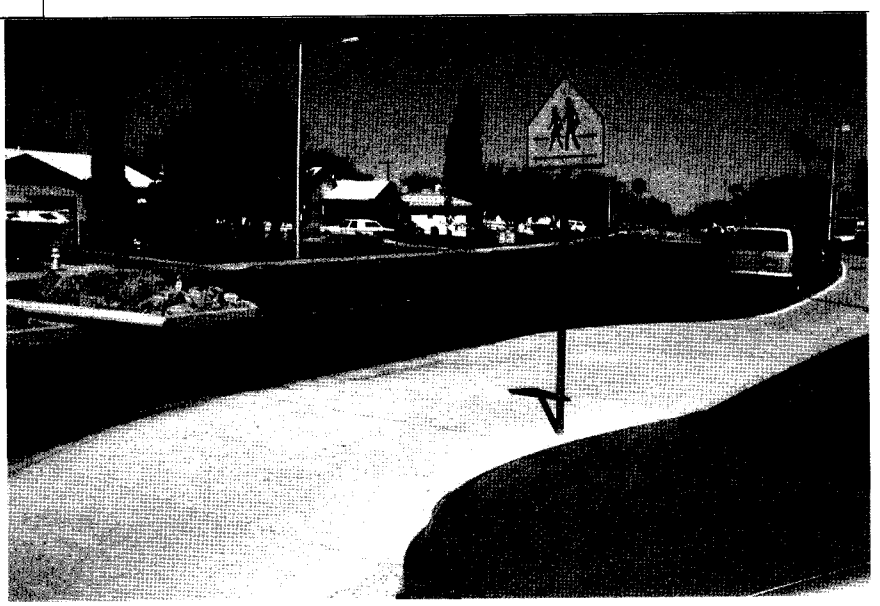
Share the road:

Bicycle lanes (or shoulders) must not be eliminated or squeezed in order to create the islands.

CURB EXTENSIONS

Curb extensions significantly improve pedestrian crossings by reducing the pedestrian crossing distance, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street.





Definition:

Curb extensions extend the sidewalk or curb line into the parking lane, reducing the effective street width. They can be used at intersections and at mid-block locations.

Benefits:

Curb extensions reduce turning speeds at intersections and encourage motorists to travel more slowly. They encourage pedestrians to cross at designated locations and increase the visibility between the pedestrian and driver by extending the curb and sidewalk further out into the street and in the driver's line of vision. Curb extensions at intersections prevent motorists from parking in or to close to a crosswalk, or from blocking a curb ramp. They can be used to place landscaping and street furniture, which is especially beneficial where sidewalks are otherwise too narrow.

Consider this:

- Curb extensions should be used where there is a parking lane.
- If street furniture and landscaping are used with a curb extension, they must not block motorists' views of pedestrians.

- Where intersections are used by significant numbers of trucks or buses, the curb extensions need to be designed to accommodate them. However, it is important to take into consideration that those vehicles should not be going at high speeds, and most can make a tight turn at slow speeds. Keep in mind that speeds should be slower in a pedestrian environment.
- Emergency access is often improved through the use of curb extensions, as intersections are kept clear of parked cars. Emergency vehicles can climb a curb where they would not be able to move a parked car. At mid-block locations, curb extensions can keep fire hydrants clear of parked cars and make them more accessible.

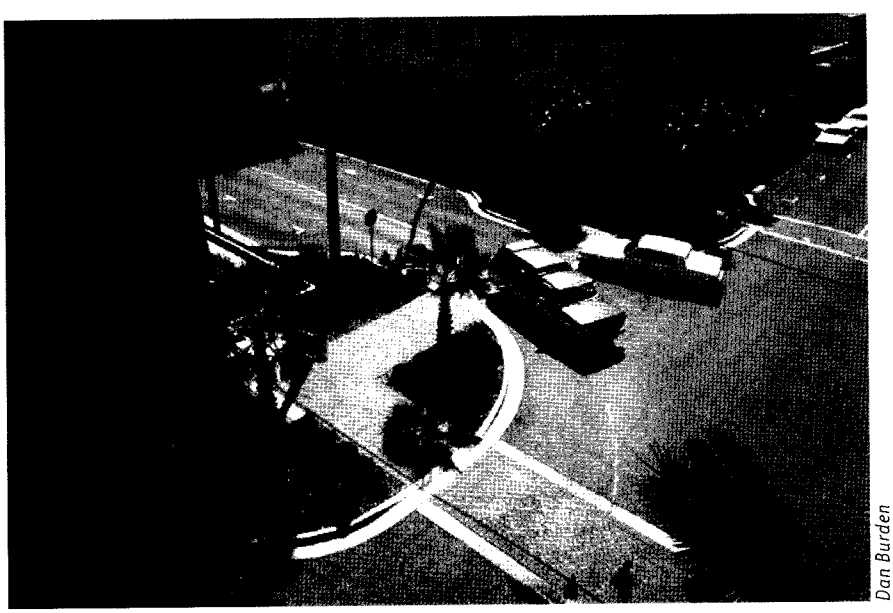
Share the road:

Curb extensions work best for bicyclists in locations where transit and cyclists travel outside the curb edge for the length of the street. They must not extend into travel lanes, bicycle lanes or shoulders.

Estimated cost:

Curb extensions cost from $10,000 to $40,000 per corner, depending on design and site conditions. Special paving, drainage and moving existing signal equipment to accommodate a curb extension contribute to the cost.

This curb extension at an intersection in Venice, Florida, makes the crossing shorter for pedestrians and creates a space for landscaping.



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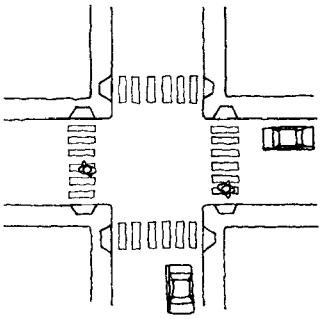
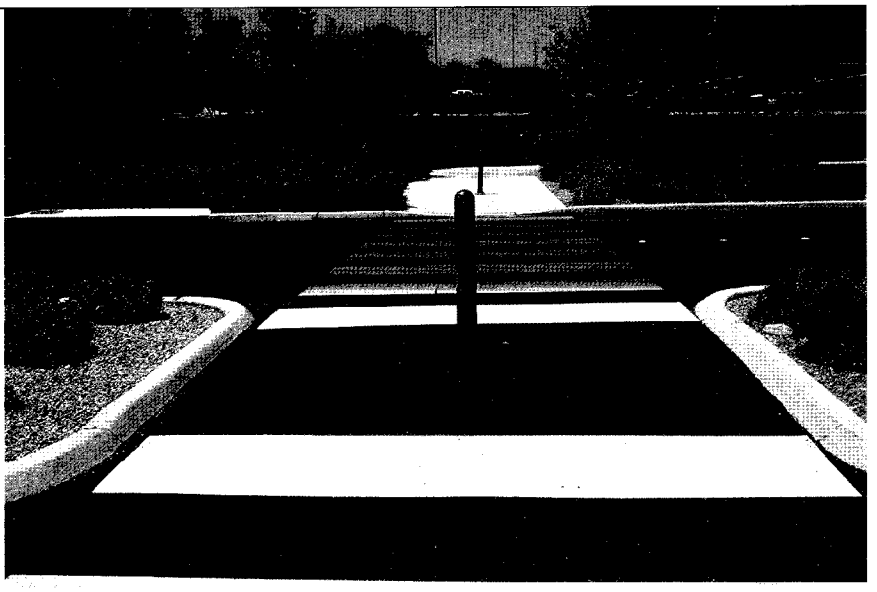
CROSSWALK MARKING





Definition:

Legal crosswalks exist at all intersections, but they are not always marked by signs or pavement markings. Crosswalks can be marked at intersections and at midblock locations. Crosswalks are usually marked lines, either two parallel lines or a ladder-type pattern. They can also be textured or made of colored concrete. Midblock crosswalks are accompanied by signs or flashing beacons.

Benefits:

Marked crosswalks alert motorists that they are approaching a high pedestrian location, and guide pedestrians to a safer crossing. A marked crosswalk also identifies a preferred crossing for the pedestrian, one that optimizes sight distance, reduces crossing distance, and reduces the potential for pedestrian/vehicle conflicts.

Consider this:

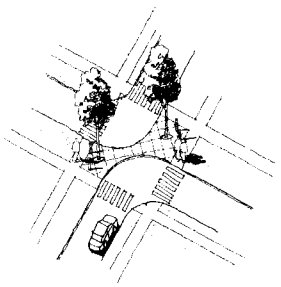
- Marked crosswalks work best if they are used by a high number of pedestrians at intersections.

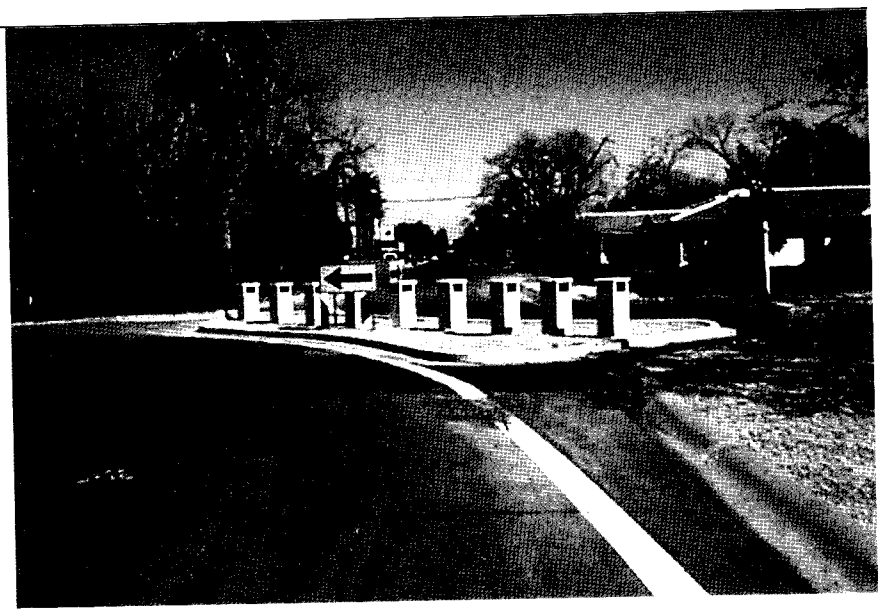
Estimated cost:

The cost for a regular striped crosswalk is $100, $300 for a ladder crosswalk, and $3,000 for a patterned concrete crosswalk.

DIVERTERS

By eliminating direct passages through a neighborhood, communities can ensure that through traffic remains on the appropriate roadways. This treatment is best used as part of an overall neighborhood traffic management plan.





Definition:

A diverter is an island built across a residential street intersection that prevents certain through and/or turning movements. A diagonal diverter breaks up cut-through movements and forces right or left turns in certain directions. A star diverter consists of a star-shaped island placed at the intersection which forces right turns from each approach. A truncated diagonal diverter is a diverter with one end open to allow additional turning movements.

Share the road:

Design diverters to allow bicycle access. If this cannot be done and the street is a major bicycle corridor, a diverter should not be used.

Benefits:

The main benefit of diverters is to discourage traffic from cutting through a neighborhood. Diverters must be used in conjunction with other traffic management devices. Any of these diverters can be designed for bicycle and pedestrian access.

Consider this:

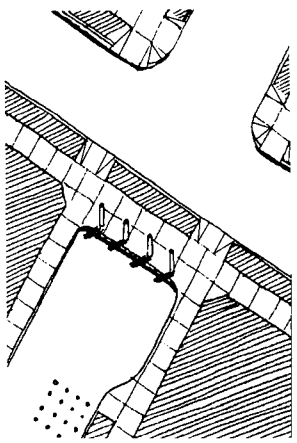
- Diverters impact residents more than through traffic, so they must have strong neighborhood support to be successful. Consider less restrictive measures first.
- Evaluate traffic patterns to determine whether other streets would be adversely affected.
- Diverters generally do not effectively address midblock speeding problems.
- Consideration should be given to diverters' effect on emergency and service vehicles.

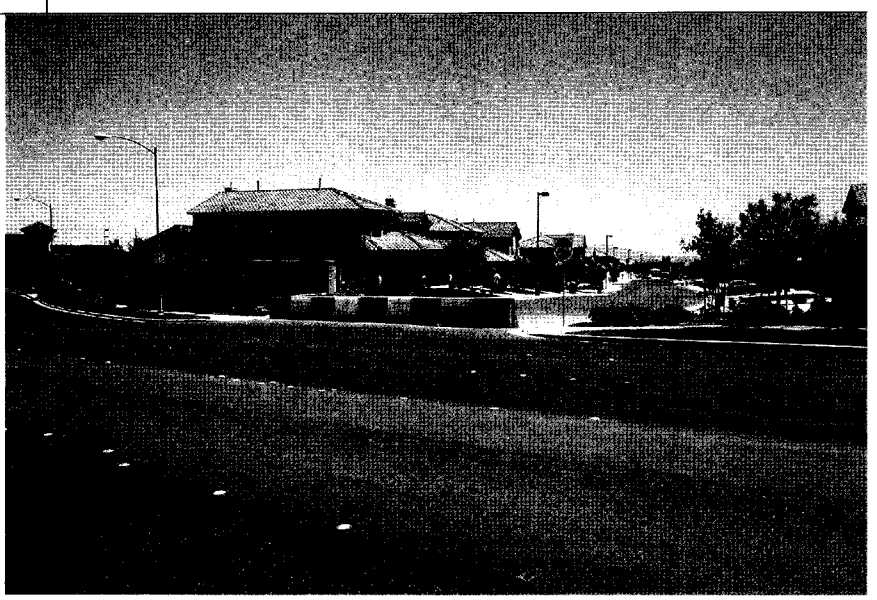
Estimated cost:

$30,000-$60,000 each, depending on the type of diverter.

FULL STREET CLOSURE

Access is temporarily closed to this Las Vegas residential street.





Definition:

A full street closure, including cul-de-sacs, has a physical barrier that blocks the street to motor vehicle traffic.

Benefits:

This device creates the ultimate limitation of motor vehicle traffic to certain streets. If used, it should be designed so that emergency vehicles can access the street by using a barrier or gate that permits large vehicles to traverse it but not automobiles. Examples are mountable curbs or an access way with a raised element in the center that a low vehicle would hit.

Consider this:

- Full street closures should be used in the rarest of circumstances and as part of an overall traffic management strategy. Neighborhoods with cul-de-sac streets require extensive out-of-the-way travel, which is both a convenience issue for local residents and typically has significant negative impacts to other streets. All traffic is forced to travel on feeder streets, which has negative consequences for the people who live on those streets and forces higher levels of controls at critical intersections.

- Analyze whether other streets would receive diverted traffic as a result of the street closure, and whether alternative streets exist for through traffic.
- Provide a turn-around area for motor vehicles including service vehicles and provide for surface drainage.
- This device will not address speeding problems.
- Full street closures may be considered for local streets but are not appropriate for collector streets.
- Does not adversely affect access by children to community areas.
- Not an appropriate measure for addressing crime or other social problems.

Share the road:

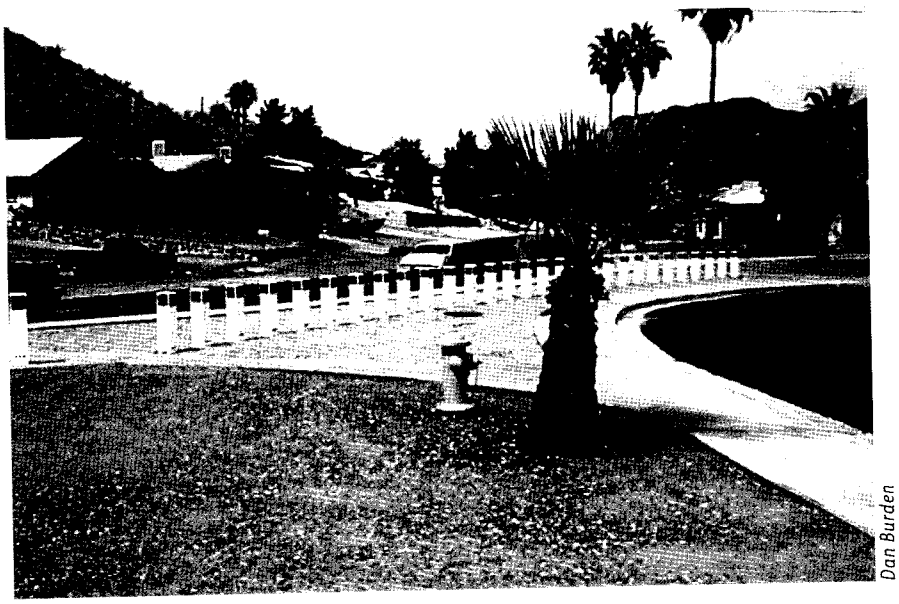
If a street closure is done, it should always allow for the free through movement of pedestrians (including wheelchair users) and bicyclists.

Estimated cost:

The cost for a full, landscaped street closure varies from approximately $30,000 to $100,000, depending on conditions.

Note: See "City of Las Vegas policy for the closure of residential streets" in the appendix to this book.

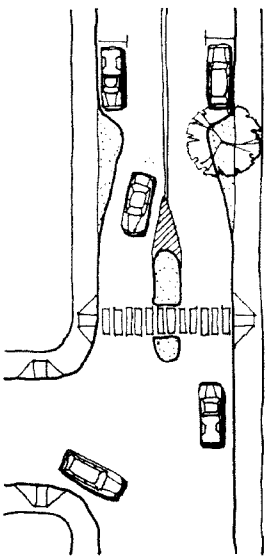
In Phoenix, this full street closure is accompanied by bollards and landscaping.

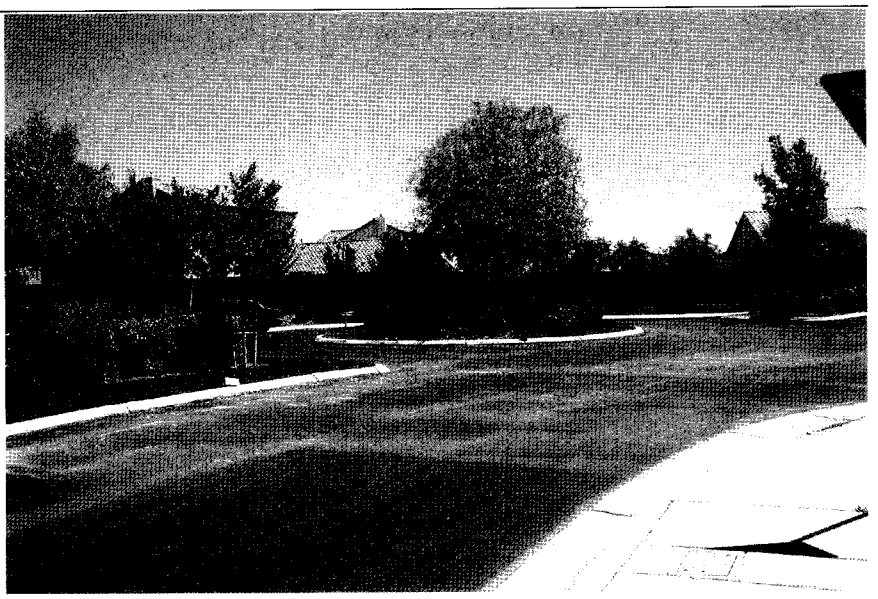


Dan Burden

GATEWAYS

Gateways, such as this landscaped median and circle, create a unique image for an area and send a clear message to motorists that they have reached a specific place and must reduce speeds.





Definition:

A gateway is a physical landmark that indicates a change in environment from a higher speed road to a lower speed residential or commercial district. Gateways may be a combination of street narrowing, medians, signing, archways, roundabouts or other identifiable features.

Benefits:

Gateways create an expectation for motorists to drive more slowly and watch for pedestrians where traffic enters a commercial business or residential district from a higher speed roadway. Gateways are only an introduction and slower speeds are not likely to be maintained unless the entire area has been redesigned or other traffic calming features are used.

Consider this:

- Traffic slowing effects will depend upon the device chosen and the overall traffic calming plan for the area.

Share the road:

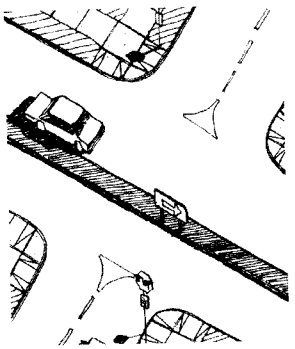
Design gateway features to ensure bicycle safety and access.

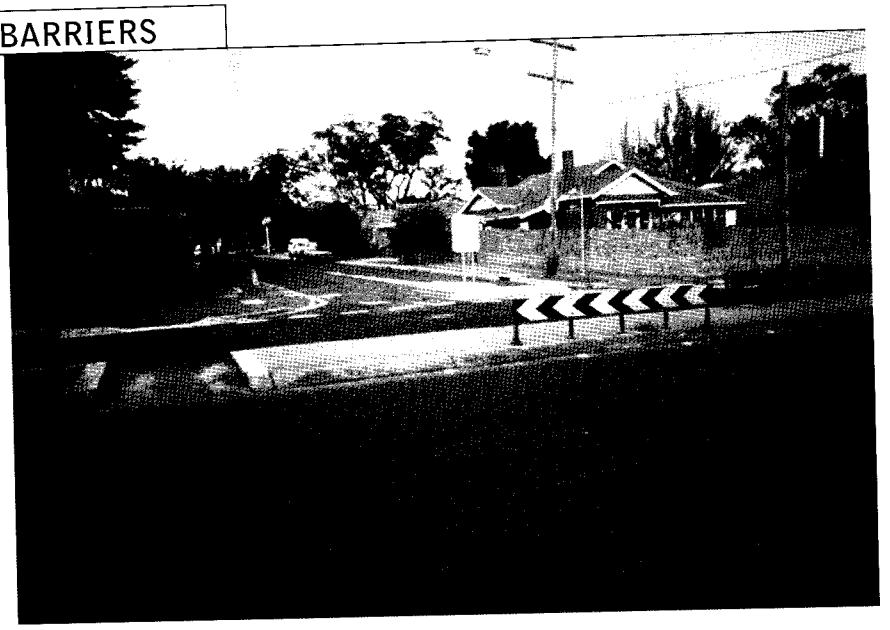
Estimated cost:

Varies widely depending on measures chosen.

INTERSECTION MEDIAN BARRIERS

Intersection median barriers reduce cut-through traffic and restrict vehicle movement onto neighborhood streets.





Definition:

A shorter version of a raised curb median placed in the center of the roadway across the intersection, an intersection median barrier prevents traffic from traveling through the intersection or making left turns onto the main street.

Benefits:

By restricting through and turning movements, this device reduces the number of conflict points for a pedestrian at the intersection. It also reduces cut-through traffic by restricting vehicles from entering neighborhood streets.

Consider this:

- The barriers that keep cut-through traffic out of your neighborhood will also restrict your access. Consider local access needs to make sure that any diversion is acceptable to the community.
- An analysis of traffic patterns should be done to ensure that cut-through traffic would not be diverted to a nearby street.
- Ensure that emergency access is not negatively impacted. Some designs (e.g. high mountable curbs) may allow fire truck access while inhibiting cars.

Estimated cost

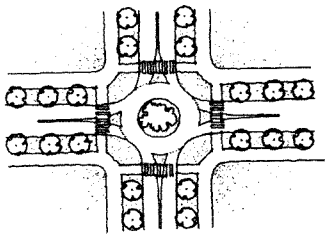
$20,000 - $40,000

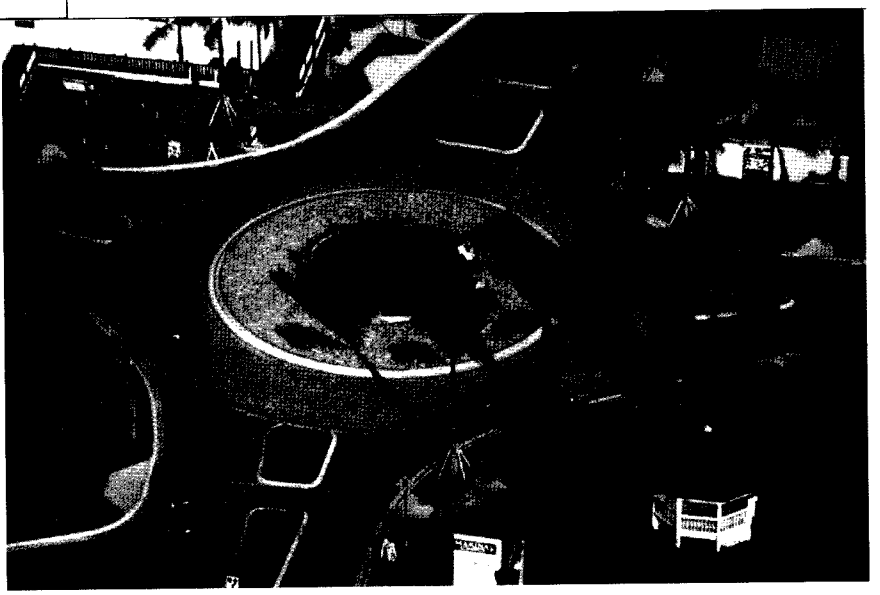
Share the road:

Create a barrier free cut-through for cyclists and pedestrians to ensure safe, convenient bicycle and pedestrian access.

MODERN ROUNDABOUTS

Modern roundabouts create gateways into a neighborhood while slowing speeds at large, complicated intersections. They can replace signalized intersections at locations with heavy traffic backup and congestion.





Definition:

A modern roundabout is a large, circular, raised island located at the intersection of an arterial street with one or more crossing roadways. Splitter islands at the approaches slow vehicles and allow pedestrians to cross one lane at a time. Roundabouts may take the place of a traffic signal. Traffic maneuvers around the circle in a counter-clockwise direction, and then turns right onto the desired street. All traffic yields to motorists in the circle and left-turning movements are eliminated.

Benefits:

Unlike a signalized intersection, vehicles generally flow and merge through the roundabout from each approaching street, traveling at slower speeds, and yielding to traffic already in the circle. Vehicles are not required to stop and wait for a signal where long traffic queues can form and create congestion, including blocking access to side streets. A roundabout needs to accommodate pedestrians and bicyclists. Pedestrians may need to travel out of their way to cross the intersection, but generally have a shorter wait than with a signal and have only one direction of approaching traffic to watch for. The large circular island at the center of a roundabout provides space for entry markers, gateway features and landscaping.

Consider this:

- Street width or right-of-way must be sufficient to accommodate a properly designed roundabout.
- Roundabouts have a mixed record regarding bicyclist safety—low design speed required.
- Roundabouts are generally not appropriate if traffic volumes are extremely high.
- Roundabouts often work best where there is a high percentage of left-turning traffic.
- Deflection on each leg of the intersection must be set to control speeds to 15-18 mph.
- Visually impaired people have difficulty crossing at roundabouts. This issue needs to be adequately addressed in the design of roundabouts.

Share the road:

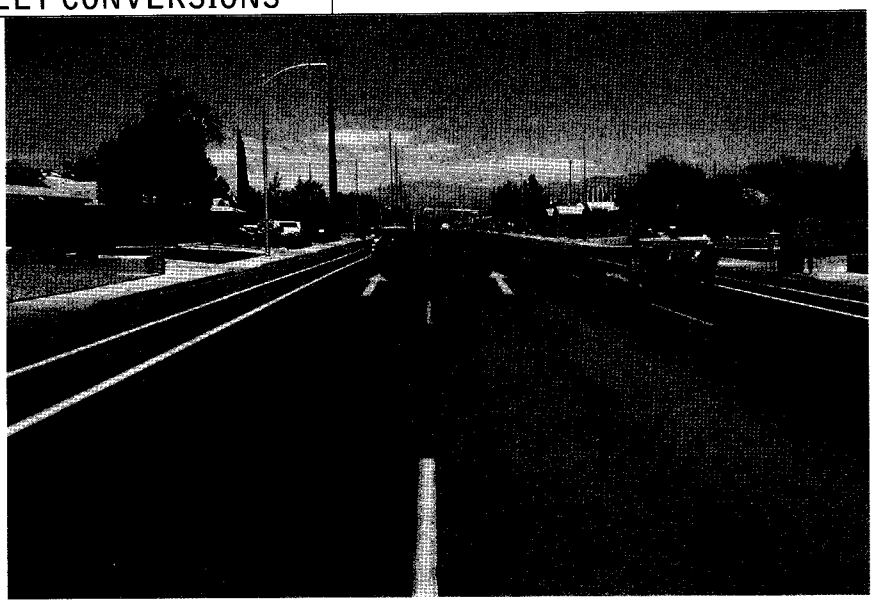
Bicyclists usually have a difficult time with roundabouts. Unless the road is very narrow (one lane in each direction), speeds very slow, and traffic very light, bicyclists may not be able to share the road comfortably. In larger roundabouts, an off-road bicycle path should be created to direct cyclists to follow the pedestrian route; while this is usually inconvenient and takes longer, it is generally safer.

Estimated cost:

The cost for a landscaped roundabout varies widely and can range from $100,000 – $250,000.

In Las Vegas, several roundabouts have been constructed in the Summerlin area.

ONE-WAY/TWO-WAY STREET CONVERSIONS



This one-way street also includes a parking lane and a bike lane.

Definition:

Converting the flow of traffic on a street from two-way to one-way to manage traffic patterns and reduce conflicts, or from one-way to two-way to reduce speeds.

Benefits:

A one-way to two-way conversion will generally reduce speeds. One-way streets can simplify crossings for pedestrians, who must look for traffic in only one direction. While studies have shown that conversion of two-way streets to one-way generally reduces pedestrian crashes, one-way streets tend to have higher speeds, which creates new problems. If a street is converted to one-way, it should be evaluated to see if additional changes should be made, especially if the street or lanes are overly wide. Also, traffic circulation in the broader area must be carefully considered before conversion to one-way streets. As a system, one-way streets can increase travel distances of motorists and create some confusion, especially for non-local residents. One-way streets operate best in pairs, separated by one block to no more than one-quarter mile. Conversions can go the other way as well: some places are returning one-way streets back to two-way to allow better local access and to slow traffic. Two-way streets tend to be slower due to traffic 'friction,' especially on residential streets without a marked centerline.

Consider this:

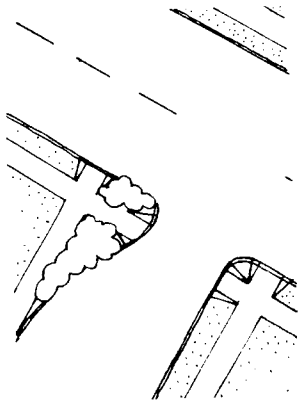
- Consider impacts on other streets.
- Be careful not to create speeding problems where a two–way street is changed to a one–way street. Redesign or traffic calming measures may be required to address this.

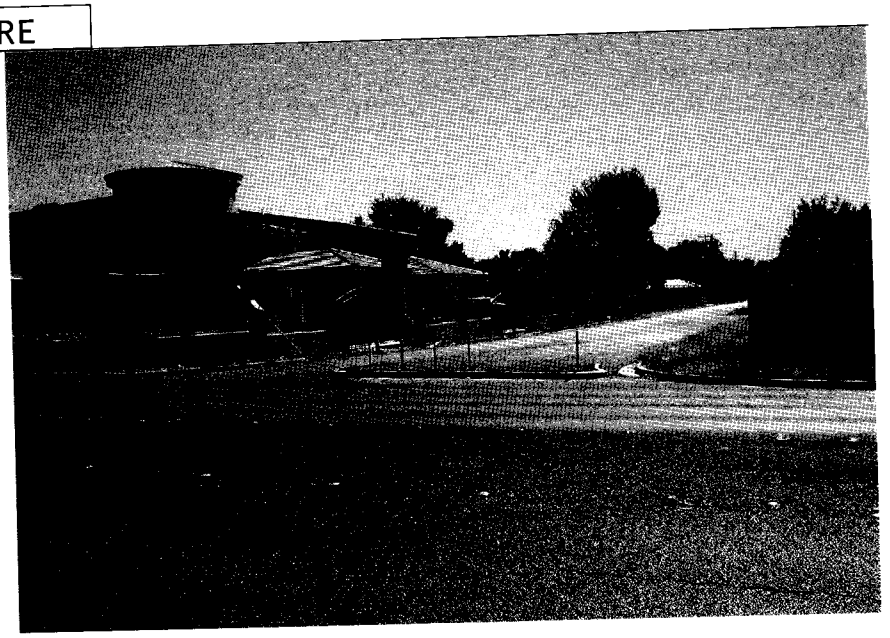
Estimated cost:

$20,000–$200,000 depending on length of treatment and if the conversion requires modification to signals.

PARTIAL STREET CLOSURE

This partial street closure in Las Vegas allows vehicles to exit from the neighborhood street but not to enter.





Definition:

A partial street closure involves physically closing or blocking one direction of vehicle travel into or out of an intersection. It could also involve blocking one direction of a two-way street.

Share the road:

The design of this measure should allow for easy access by bicyclists and pedestrians.

Benefits:

Partial closures prevent turns from an arterial street onto a residential street. They also reduce the use of the street as a cut-through route and restrict access to a street without creating one-way streets. A partial closure provides better emergency access than a full closure. Since this design allows motorists to easily violate the prohibitions, police enforcement may be required.

Consider this:

- Analyze whether less restrictive measures would work.
- Analyze whether other local streets will be adversely affected and/or access into or out of the neighborhood would not be adequate.
- This device will create out-of-the-way travel for residents and put additional traffic on other streets.
- Do not use if the street is an emergency or school bus route.
- Will not solve speeding issues; speeds may increase on the new one-way street.

Estimated cost:

A well-designed, landscaped partial street closure at an intersection typically costs approximately $30,000-$50,000.

RAISED MEDIANS

This landscaped median in the Scotch Eighties neighborhood of Las Vegas narrows the street to one lane in each direction.

Definition:

Medians are raised barriers in the center portion of the street or roadway. Raised medians manage motor vehicle traffic and provide comfortable left-hand turning pockets with fewer or narrower lanes. They are most useful on high volume, high speed roads.

Benefits:

Raised medians provide a refuge for pedestrians crossing the street and create space for street trees and other landscaping which can help reduce speeds by changing the character of a street. They also have benefits for motorist safety when they replace center turn lanes. Desired turning movements need to be carefully provided, so that motorists are not forced to travel on inappropriate routes such as residential streets, or an unsafe U-turn condition is not created. In some environments, medians can be constructed in sections creating an intermittent rather than continuous median. Another good alternative device for two, three or four lane roads is the crossing island, which provides the crossing refuge for pedestrians, and in some designs, aids in decreasing vehicle speeds (see p. 29).

Share the road:

Ensure that there is enough room for wider sidewalks, bike lanes, and planting strips before proceeding with construction.

Consider this:

- In some cases, raised medians can increase traffic speeds by decreasing the perceived friction through separating traffic flow directions.
- Medians may take up space that can be better used for wider sidewalks, bicycle lanes, landscaping buffer strips, or on-street parking.
- Consider crossing islands if cost is an issue or space is limited.
- Landscaping in medians should not obstruct the visibility between pedestrians and approaching motorists.
- Midblock crossings must be fully wheelchair accessible.

Estimated cost:

The cost for adding a raised median is approximately $20,000-$40,000 per 100 feet, depending on the design, site conditions, and whether the median can be added as part of a utility improvement or other street construction project.

ROAD SIGNS

This sign instructs drivers to share the road with bicycles, and reminds them that others use the road also.

Definition:

Signs provide regulations or information to road users as to what to expect and how to behave.

Benefits:

Signs can provide important information that can improve road safety. By letting people know what to expect, there is a greater chance that they will react and behave appropriately. For example, giving motorists advanced warnings of upcoming pedestrian crossings or that they are entering a traffic-calmed area will enable them to modify their speeds. Regulatory signs, such as 'Stop,' 'Yield' or turn restrictions require certain driver actions and can be enforced. Warning signs can provide helpful information, especially to motorists and pedestrians unfamiliar with an area. Some examples of signs that affect pedestrians include pedestrian warning signs, motorist warning signs, 'No Turn on Red' signs, and guide signs. Advance pedestrian warning signs should be used where pedestrian crossings may not be anticipated by motorists, especially if there are many motorists who are unfamiliar with the area. A new fluorescent yellow-green color is now approved for use on non-motorized warning signs. This bright color attracts the attention of drivers because it is unique. In some cases, signs may be used to prohibit pedestrian crossings at an undesirable location and re-route them to a safer crossing location, or warn pedestrians of unexpected driver maneuvers.

Consider this:

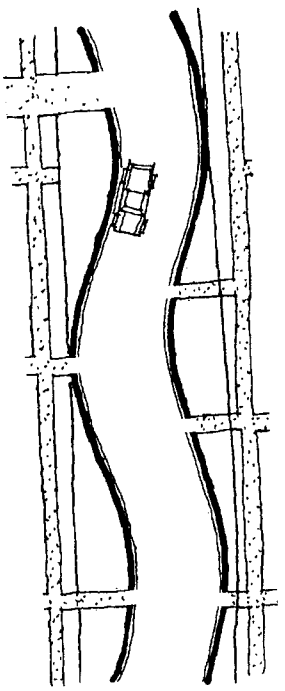
- Overuse of signs breeds noncompliance and disrespect. Too many signs can lead to visual clutter with the result that a driver is not likely to read or pay attention to any of the signs.
- Traffic signs must be in compliance with the Manual on Uniform Traffic Control Devices.
- All signs should be periodically checked to make sure they are in good condition, free from graffiti and continue to serve a purpose.

Estimated cost:

$100-$200 per sign.

SERPENTINE STREET

A winding street, landscaping and colored pavement are the visual cues that slow drivers down in this illustration.



Definition:

A serpentine street refers to the use of a winding street pattern. Driveways create a link to the street for residents.

Benefits:

The winding street allows for two-way through movements while forcing vehicles to slow.

The serpentine pattern provides areas which can be landscaped to create visual interest and slight visual obstructions, forcing vehicles to slow.

Purpose:

- Sends a visual cue about the function of a street.

Considerations:

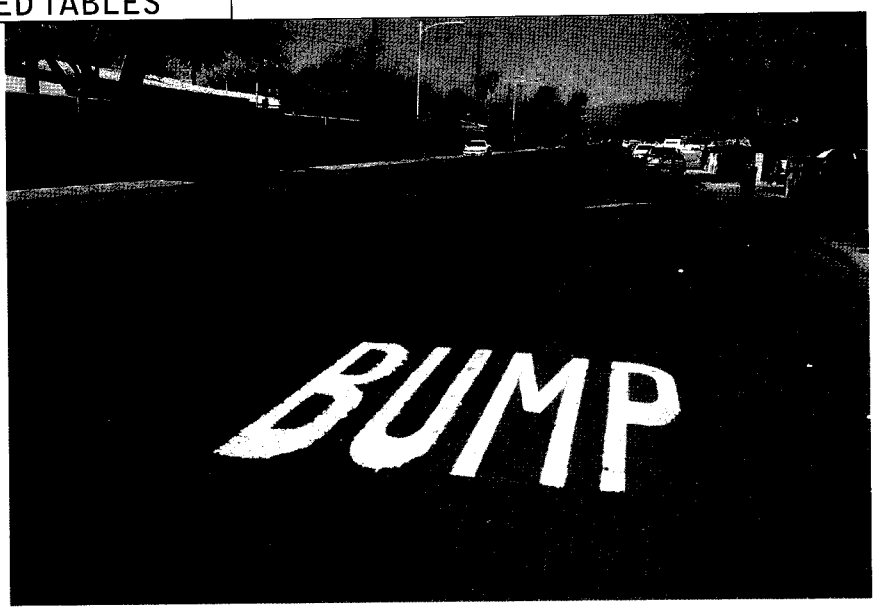
- This type of design can be more expensive than other traffic calming options and needs to be coordinated with driveway access.
- Ideal to build when a street is being reconstructed for major utility or other purposes, or when slow streets are being designed as part of the construction of a new neighborhood.
- Don't use if lower-cost traffic calming strategies would be more effective.

Estimated Cost:

$90,000 and higher.

SPEED HUMPS AND SPEED TABLES

Speed humps are frequently used on residential streets to reduce speeds. However, they can create unwanted noise if they are too severe, or cause motorists to slow down more than is necessary.



Definition:

Speed humps are a paved, raised device usually constructed out of asphalt. They are approximately 3-4 inches high at their center, and extend the full width of the street. Speed humps should not be confused with a speed bump that is often found in mall and casino parking lots. Speed humps are longer (12-22 feet) are designed to slow traffic, and do not require vehicles to stop in order to travel over them. A speed table is a very long and broad speed hump that can accommodate a pedestrian crossing in the flat portion of the speed table. Speed tables can be used in combination with curb extensions where parking exists.

Benefits:

Speed humps and speed tables reduce vehicle speeds. Raised measures tend to have the most predictable speed reduction impacts. They also enhance the pedestrian environment and pedestrian crossings.

Consider this:

- Do not use if sight distance is limited and/or if the street is on a steep grade.
- If the street is a bus route or primary emergency route, design must be coordinated with operators. Usually some devices are acceptable if used prudently—one device may be appropriate if used in a location in most need of slowing traffic to improve pedestrian conditions.
- The aesthetics of speed humps and speed tables can be improved through the use of color and special paving treatments.
- Noise may increase particularly if trucks use the route regularly.
- May create drainage problems on some streets.

Share the road:

Make sure to design speed humps and tables to accommodate bicyclists.

Estimated cost:

The cost for each speed hump is approximately $4,000. Speed tables are $8,000–$15,000, depending on drainage conditions and materials used.

Note: See "City of Las Vegas policy for the use of speed humps on residential streets," in the appendix to this book.

SPEED MONITORING TRAILER

Speed monitoring trailers let motorists know the speed limit, and the speed they are traveling.

Definition:

Speed monitoring trailers—signboards on trailers that display the speed of passing vehicles—are used by police departments as educational tools that can enhance enforcement efforts directed at speed compliance.

Benefits:

Enhanced enforcement efforts through public education and awareness. Speed radar trailers are best used in residential areas and may be used in conjunction with Neighborhood Speed Watch or other neighborhood safety education programs. They can help raise residents' awareness of how they themselves, not just 'outsiders,' are often those speeding. Speed trailers are not substitutes for permanent actions to address neighborhood speeding issues, such as traffic calming treatments. Speed trailers can be used at several locations and should have occasional police monitoring and enforcement to maintain driver respect.

Consider this:

- Occasional enforcement is needed to supplement the speed trailers.
- Speed trailers are not a substitute for engineering measures.

Estimated cost:

$10,000 plus the costs to move the trailer to different locations.

Note this

A successful neighborhood traffic management program is composed of three basic objectives—education, enforcement, and engineering. Speed trailers are an enforcement tool.

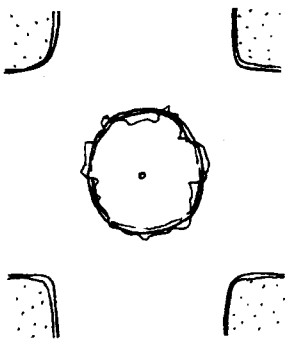
Education – Guided by Public Works staff, you and your neighbors will receive the information and tools necessary to make informed decisions regarding traffic concerns in your area.

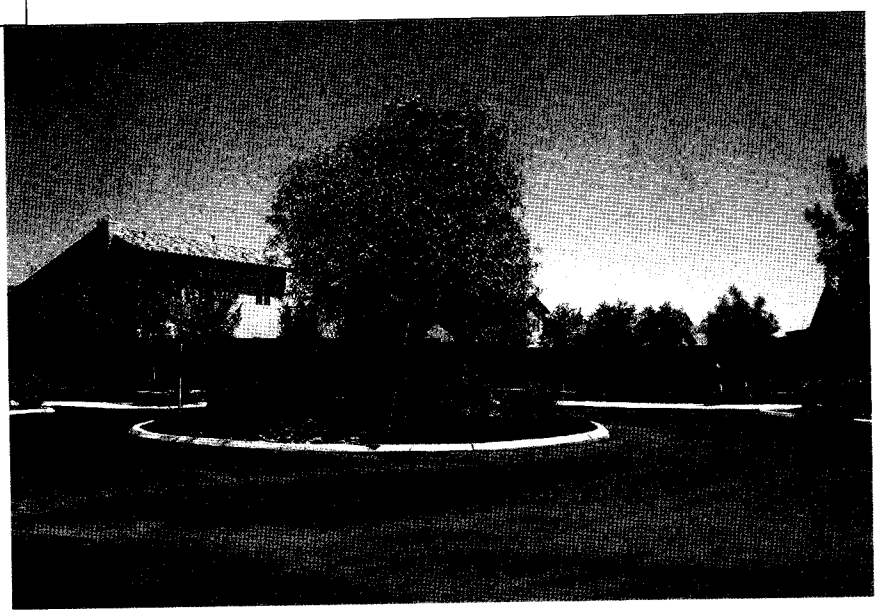
Enforcement – Community-identified strategies can be supported by targeted police and parking enforcement.

Engineering – Through this partnership, traffic calming strategies will be implemented based on engineering principles and community input.

TRAFFIC MINI-CIRCLES

A traffic mini-circle helps reduce vehicle speeds, but still allows cars, buses and other large vehicles to pass through the intersection with little difficulty.





Definition:

Mini-circles are raised circular islands in the center of residential street intersections.

Benefits:

Mini-circles manage traffic at intersections where volumes do not warrant a signal. In Seattle, they have been found to reduce motor vehicle crashes at the intersections of residential streets by an average of 90 percent. They can reduce vehicle speeds at the intersection when used on a series of intersections along a local street as part of a neighborhood traffic improvement program. They are commonly enhanced with landscaping or special paving treatments.

Consider this:

- Signs may be installed within the circle to direct motorists to proceed around the right side of the circle before passing through or making a left turn.
- Traffic circles with splitter islands make crossing easier for pedestrians (especially for persons with disabilities) and control vehicle movements entering the intersection, but require more space.
- Larger vehicles that need access to streets (e.g. school buses and fire engines) may need to make left hand turns in front of the circle. They can also be accommodated by creating a mountable curb in the outer portion of the circle.
- Use yield, not stop controls.

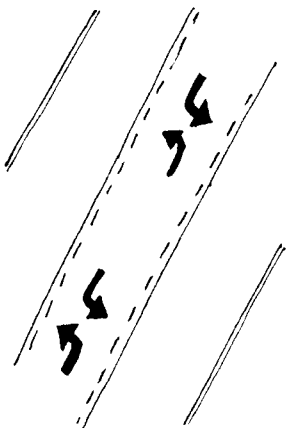
Estimated cost:

The cost is approximately $20,000–$40,000 for a traffic mini-circle on an asphalt street and about $30,000–$60,000 for a mini-circle on a concrete street.

Share the road:

Mini-circles must be properly designed to benefit pedestrians and cyclists. Right-turning vehicles are not controlled at an intersection with a mini-circle, potentially putting pedestrians and cyclists at risk. Do not make generous allowances for motor vehicles by increasing the turning radii — this compromises pedestrian and cyclist safety.

TWO-WAY TURN LANES



Definition:

Two-way left turn lanes are marked in the center of the street. Usually, a two-way left-turn lane can be accommodated by reducing the number of through lanes or by eliminating parking.

Benefits:

Left turn lanes move turning vehicles out of the traffic flow. Two-way left turn lanes can help decrease accidents, slow traffic, create smoother traffic flow, and provide crossings for pedestrians. Two-way left turn lanes can be used in conjunction with bicycle lanes to make the roadway appear narrower.

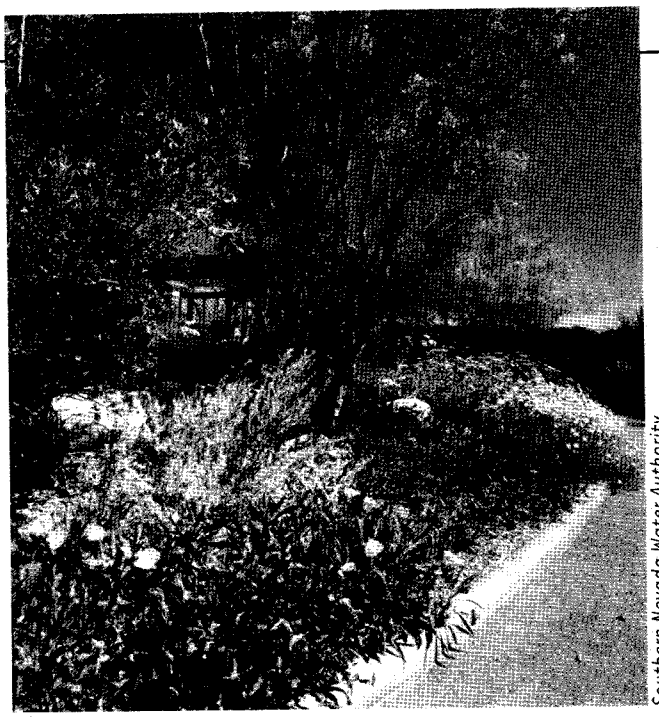
Consider this:

- A two-way left turn lane may be marked as an interim solution in locations where a future median may be constructed.
- A two-way left turn lane can be successful in an area experiencing collisions involving left-turning traffic, or on streets with many intersecting driveways and cross streets.
- Do not use if the street is not wide enough to accommodate a two-way left turn lane, or if the project conflicts with a need for on-street parking.
- Some studies have shown that two-way left turn lanes do not reduce speeding.

Estimated cost:

The estimated cost for a left turn lane is $1,000 per block.

Landscaping and Xeriscaping



Southern Nevada Water Authority

In a recent community vision survey of Las Vegas residents, the image of a well-landscaped residential streetscape emerged as the epitome of a walkable neighborhood. The careful use of landscaping along a street can provide separation between motorists and pedestrians, reduce the effective width of the roadway (which in return can reduce vehicle speeds) and provide a more pleasant street environment for all. In the preceding discussion of traffic management devices, specific mention was given to the integration of landscaping into these devices.

However, our dry desert climate demands careful consideration of any type of planting program. *Xeriscaping* is the name of the program the Southern Nevada Water Authority (SNWA) has developed to promote water-efficient landscaping. A neighborhood xeriscape (pronounced *zeer–ih–scape*) program can include plantings from the SNWA's list of over 250 native and desert-tolerant plants, and should follow recommended guidelines for watering and/or irrigation. Some xeriscape programs may also be eligible for water credits.

Neighbors should be prepared to maintain their street-planting program. A good maintenance program consists of:

- Fertilizing, pruning and winterizing
- Removal of tree stakes when appropriate
- Aerating and fertilizing turf
- Pest and disease control
- Watering or irrigation.

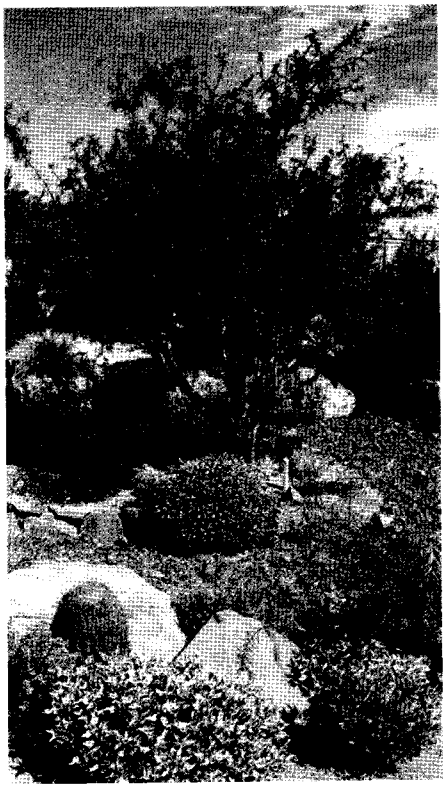
See the plant list on the following page, contact the Southern Nevada Water Authority, or visit the Desert Demonstration Gardens for more information on xeriscaping.

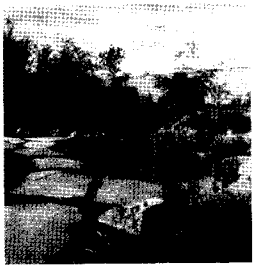
Southern Nevada Water Authority
Conservation Helpline
(702) 258-SAVE (7283)
www.snwa.com

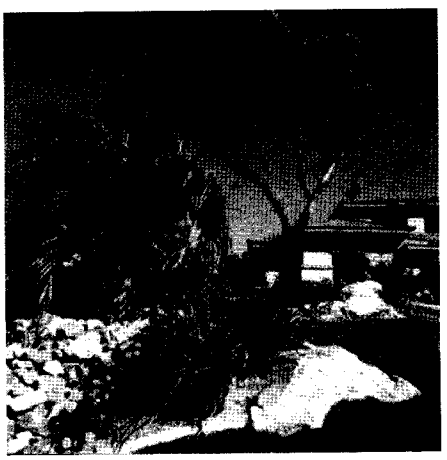
The Southern Nevada Water Authority is committed to managing Southern Nevada's water resources and to developing solutions that will ensure adequate future water supplies for the region.

Desert Demonstration Gardens
3701 West Alta Drive
(702) 258-3205

The Desert Demonstration Gardens are eleven theme gardens featuring plants suited to Southern Nevada's climate. Free workshops, tours and classes covering a wide range of landscape and irrigation issues are offered.







all—Southern Nevada Water Authority

A Desert Plant Sampler

These are some of the more than 250 colorful plants that neighbors can use to help create an attractive and inviting desert landscape.

Name	**Type**
Aloe vera	accent
Banana yucca	accent
Joshua tree	accent
Ocotillo	accent
Soaptree yucca	accent
Mojave prickly pear	cactus
Blue fescue	groundcover
Ground morning glory	groundcover
Bear grass	shrub
Bearded iris	shrub/flower
Creosote	shrub
California poppy	shrub/flower
Coarse verbena	shrub
Chapparal sage	shrub
Dwarf bottlebrush	shrub
Mormon tea	shrub
Colorado mesquite	tree
Blue palo verde	tree
Fig tree	tree
Fremont cottonwood	tree
Heritage live oak	tree
Olive tree	tree
Pomegranate	tree
Cape honeysuckle	vine
Virginia creeper	vine

WHAT IS TRAFFIC MANAGEMENT? WHY HAVE A NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN?

Traffic management is a process for identifying and addressing problems related to speeding, excess traffic volume, and safety on streets. The practice of using roadway geometry to improve safety has come to be known as traffic calming. Speed bumps, curb bulbs, and other combinations of geometry, landscape, and street furniture can be effective in lowering drivers' speed on local streets.

Traffic management and traffic calming: what's the difference?

Although they are sometimes lumped together, traffic management and traffic calming are different tools and address different problems. Traffic management includes the use of traditional traffic control devices to manage volumes and routes of traffic. Traffic calming deals with what happens to traffic once it is on a street. For example, limiting access to a street (e.g., diverting traffic from entering a street on one end) may reduce the amount of traffic on that street, but will do nothing to affect the speed of the traffic that travels on that street or others. Traffic management and traffic calming are often complementary, and a plan to retrofit an area often includes a variety of tools.

Communities should think about the broader context of traffic. If there is too much traffic on any one street, it may be that there is too much traffic everywhere. A more significant plan to reduce overall traffic volumes would be appropriate: encouraging and providing for alternate modes of travel, implementing transportation demand management, enhancing transit systems, and improving land use planning. Comprehensive traffic reduction or mitigation strategies are important but beyond the scope of this guide. Resources that provide guidance on these issues are included in the reference section.

Livable Las Vegas

Most neighborhood groups undertake a traffic management program because they are seeking a more livable community. A livable community is one that is safe, secure, and attractive, where it is easy to travel by bicycle, car, transit, or on foot. In a livable community, there are many opportunities to interact with other people because the streets are pleasant places to walk and socialize.

Traffic calming addresses the following measures of livability:

- **Access and mobility**: Safer streets balance mobility and access for all users, particularly for those who travel by non-motorized means, like pedestrians and bicyclists. This is especially important for children, the disabled, and the elderly.
- **Quality of life**: Traffic calming improves 'livability' by reducing the number of automobile trips taken, thereby decreasing levels of pollution and traffic-related noise. Traffic calming devices can provide additional space within the street right-of-way for landscaping, street furniture and outdoor eating areas, and transit shelters. These amenities create pleasing

streets that attract pedestrians, encourage people to walk more frequently for short trips, and increase the likelihood of interactions among neighbors.

- **Safety**: Traffic travels slowly on traffic-calmed streets, resulting in fewer and less severe accidents. The number of fatalities due to motor vehicle crashes is also reduced on streets with slower-moving traffic. In fact, streets where traffic management or traffic calming is at work are proven to be safer than other streets in a variety of ways, as shown below.

STREET DESIGN AND SAFETY

Setbacks, street walls, and speeds

When buildings are set back far from the street edge, the roadway appears to be very wide. This often results in excessive vehicle speeds. Buildings that are adjacent to the sidewalk create a 'street wall' that frames the street and narrows the driver's field of vision. Taller buildings placed close together create a solid street wall and give the street a sense of enclosure. Pedestrians tend to feel more comfortable walking on streets with a sense of enclosure. How wide are your neighborhood streets? Is there sense of enclosure?

This pharmacy in Las Vegas is set back far from the street, in a parking lot.

This grocery store in San Diego is next to the sidewalk, creating a street wall and contributing to a pedestrian–friendly environment.

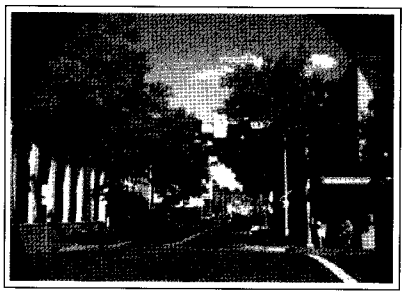
both—Tom Phillips, townmeetingdirect.com

A recent community vision survey for Las Vegas showed that the most popular images were those showing tree-lined streets in residential areas, and commercial buildings close to the street in business districts (as shown in the photograph above at right). Both trees and buildings contribute to the sense of enclosure.

Drivers will drive faster on wider, straighter streets than on those that are perceived to be narrower. In a recent study in the city of Longmont, Colorado, the most significant relationships to injury accidents were found to be street width and street curvature. The analysis illustrates that as street width increases, accidents per mile per year increase exponentially.

(Peter Swift and Associates, Longmont, CO, 1998. From their website: http://members.aol.com/Phswi/Swift-street.html).

Safety and driver behavior



Field of vision at 15 mph...

...at 25 mph...

...at 30 mph.

Maintaining slower speeds allows drivers to be more aware of their surroundings. The series of pictures above shows how a driver's field of vision is reduced as he or she increases the speed of the vehicle being driven. The setting for these pictures is a busy street in a commercial district. Shops and residential buildings line both sides of the street. At 15 miles per hour (mph), the driver can see that he or she must share the road with pedestrians and bicyclists. At 25 mph, the driver's field of vision is greatly reduced, and at 30 mph all the driver sees clearly is the roadway in the distance.

Streets and life safety

Another area of concern often expressed by those dealing with the subject of traffic management and traffic calming is maneuverability and response time for emergency vehicles, typically fire trucks. A recent report shows that many kinds of traffic calming devices and strategies can work effectively and still permit unimpeded access for these vehicles. (Emergency Response, Traffic Calming and Traditional Neighborhood Streets. Local Government Commission, Sacramento, California, 2000.)

Related to this theme, communities must also decide their safety priorities when designing their streets and undertaking traffic management and traffic calming programs. While fire rescue is of primary importance, so is the prevention of injury and death on neighborhood streets. Fire safety is but one part of the larger picture of life safety. And in residential neighborhoods, the biggest threat to life safety, by a very large margin, is car accidents. Indeed, if wider streets with wider turning radii are actually contributing factors to increases in accidents and injuries, as current research indicates, perhaps it is time to reconsider priorities for public safety when designing streets and traffic management programs.

APPENDIX

LAS VEGAS NEIGHBORHOOD TRAFFIC MANAGEMENT PROGRAM: ADOPTED POLICIES

The following policies are established as part of the Neighborhood Traffic Management Program (NTMP) for local residential streets:

a. Through traffic should be routed to arterial streets, as designated in the Master Plan of Streets and Highways. Arterial streets are those of sufficient width to be marked for four or more travel lanes.

b. Traffic may be rerouted from one local residential street to another as a result of an NTMP project. The amount of rerouted traffic that is acceptable should be defined on a project-by-project basis.

c. Adequate emergency vehicle access must be preserved.

d. Reasonable automobile access should be maintained. NTMP projects should encourage and enhance pedestrian, bicycle, and transit access to neighborhood destinations.

e. Application of NTMP shall be limited to local, public residential streets, herein defined as streets with 60 feet or less of right-of-way, except as arterial treatments contribute to improvement of conditions on local residential streets.

f. The City shall typically employ traffic management devices to achieve the NTMP's objectives. Traffic management devices are roadway features and shall be planned and designed in keeping with sound engineering and planning practices. The City Traffic Engineer shall direct the installation of traffic control devices (signs, signals, and markings) as needed to accomplish the project, in compliance with the municipal code and pertinent state and federal regulations.

g. To implement the NTMP, certain procedures shall be followed by the Department of Public works in processing traffic management requests according to applicable codes and related policies and within the limits of available resources. At a minimum, the procedures shall provide for submittal of project proposals, evaluation of proposals by city staff, citizen participation in plan development and evaluation, and communication of any test results and specific findings to area residents and affected neighborhood organizations before installation of permanent traffic management devices.

CITY OF LAS VEGAS POLICY FOR THE USE OF SPEED HUMPS ON RESIDENTIAL STREETS

The City of Las Vegas is committed to preserving neighborhood integrity. One of the issues in the maintenance of livable communities is traffic and the need to minimize non-essential vehicular traffic on residential streets and the need to ensure that those vehicles using those streets do so at an appropriate rate of speed. A technique that has been used successfully to manage this situation is the installation of speed humps.

Administrative procedures

1. A Neighborhood Traffic Management Program (NTMP) project includes issues of excessive speeds, and the traffic engineer finds that a speed hump installation may be appropriate.
2. Staff evaluates the site based on minimum criteria. Evaluation would include recommended locations on both the requested street and adjacent streets where installation may be required to mitigate impact of installation.
3. Following the procedures contained in the NTMP, public comment and approval are received.
4. Action by City Council to approve installation.

Minimum criteria

To effectively use speed humps for neighborhood traffic control, specific minimum criteria must be met before the installation. They are:

1. Street speed limit must be 25 m.p.h.
2. 85th percentile speeds must be greater than 35 m.p.h.
3. Average daily volumes must be between 800 and 3,000.
4. Street is not classified higher than neighborhood collector, with no more than one lane in each direction.
5. Installation location must be visible from 200 feet.
6. Street grades cannot be higher than 8%.
7. Street cannot be a major emergency response route.

8. Hump installation should not cause diversion of traffic to other residential streets.
9. Street cannot be a Citizens Area Transit (CAT) route.

Placement of speed humps

The following guidelines should be used to determine the number and placement of speed humps for various street lengths:

1. Single short blocks (less than 400 feet) with speed control problems are unusual. Where such blocks must be treated, a single hump positioned near mid-block would likely provide satisfactory speed control over the entire block.
2. Where control is required on single block segments of moderate length, a two-hump configuration should be satisfactory.
3. On very long blocks, three or more humps may be necessary.
4. On lengthy continuous segments or on control segments composed of a number of blocks, it appears desirable to space interior humps 400 to 600 feet apart, although spacings up to 750 feet apart may be satisfactory. At least one hump should be placed in each block of a control segment.
5. The first hump that is approached in a system should be located within 100 feet of the street entry.

Signs and markings

It is essential to warn roadway users of a speed hump's presence and guide their subsequent action.

Signs: The most common warning sign will be the MUCTD W8-1 "BUMP" warning sign. The sign should be located based on MUCTD Table II-1, "A Guide for Advance Warning Sign Placement Distance." Advisory speed plates should be added indicating the recommended crossing speed and to educate unfamiliar roadway users of the recommended crossing speed when the humps are initially installed.

Markings: The speed humps will be marked with distinctive painted markings, so as to be visible to the approaching traffic.

Implementation

Installation angle: Speed humps should be installed exactly at a right angle to the vehicular travel path.

Drainage and utilities: Speed humps should be installed with appropriate provisions made for roadway drainage and utility access. Humps should generally not be located over or contain maintenance access holes, or be located next to fire hydrants.

Ideally, a hump should be installed at a location immediately on the downside of an existing drain inlet. If this is not feasible, the construction of a bypass drain or other treatment to route water around the hump should be considered.

Roadway edge treatments: On roadways with 'L' curbs, humps should ideally extend fully across the road from curb to curb. If tapering is necessary for drainage or other reasons, the edge taper should be accomplished at an angle that will not affect the downstroke of bicycle pedals or subject vehicles to undercarriage damage.

A phenomenon known as 'gutter running' may be encouraged with the tapered hump edges since drivers can drive with one wheel in the gutter, thereby reducing the hump's ability to slow vehicles. If humps are installed with tapers, or used on non-curbed roadways (not recommended), raised pavement markings, delineator posts, or other treatments should be considered to eliminate or reduce the possibility of vehicles attempting to partially or totally avoid the hump. It should be recognized, however, that these devices may have an impact on maintenance. If installed on roadways with paved shoulders, the hump should ideally extend across the shoulder to discourage vehicles from attempting to avoid the hump.

Coordination with traffic operations: Speed humps should not be installed within an intersection or driveway or within 250 feet of a traffic signal. This suggestion is not intended to apply to the use of a raised intersection as a valid traffic management technique.

On-street parking: Care should be taken to ensure that the vehicles parked on streets do not diminish the effectiveness of the signing and marking for speed humps. Should parking be removed adjacent to or before the hump, the ability of vehicles to avoid tapered humps by 'gutter running' will be enhanced. Each hump installation should be evaluated independently for site-specific parking consideration.

Street lighting: to improve nighttime visibility, especially where sight distance is less than desirable, coordination of hump locations with existing or planned street lighting should be considered.

Construction materials: The construction of the hump can be pre-cast concrete sections, concrete cast in place, asphalt or brick/concrete pavers. Experience has shown that the use of soft material will result in deformations as the top of the hump is pushed in the direction of the traffic stream.

Construction procedures: It is recommended that a template be constructed to verify the accuracy of the hump profile and to ensure that the desired dimensions are attained within the reasonable tolerances (normally one-half inch or less). If the profile is incorrect, hump characteristics will be changed, which may result in vehicle damage or ineffective speed control.

If the hump is constructed in place, it is recommended that the road surface be excavated at the tapering edges to prevent spalling.

Monitoring and evaluation

The type, number, and extent of studies performed to determine the effectiveness and impacts of speed humps will vary based upon the particular circumstances of each installation. However,

some review should be performed after installation to ascertain whether the humps have achieved the desired results without creating unexpected problems.

On-site observations: Immediately after the speed humps' installation and at selected times thereafter, observations will be made to determine motorists' behavior patterns and any unusual operating conditions (such as gutter running.) The observations should be scheduled during both day and night conditions.

Speed studies: Speed studies should be performed before hump installation. After installation, speed studies should normally be performed before, at, and beyond each speed hump to determine its impact on vehicle operating speeds.

Volume studies: Traffic volume counts should be made on the subject street and on those streets where traffic diversion may be expected. These counts should be made before installation and after traffic patterns have stabilized to determine the magnitude and specific location of this diversion. Both turning movements and 24–hour volume counts may be needed to quantify these impacts.

Stop sign obedience: Studies may be desirable before and after hump installation to determine if the speed humps have impacted the compliance rate of affected stop sign locations. Increased violation rates should be considered in speed hump evaluations, and selective enforcement may be necessary to address the problem.

Travel time studies: Based on the particular requirements of the installation, it may be desirable to perform detailed travel time studies before and after hump installation to determine the effect on overall travel time along the subject street or through the area.

Accident analysis: A thorough before and after accident analysis should be performed to determine if accident trends have been noticeably impacted by the speed hump installation. It may be necessary to establish ongoing analysis at some locations to gauge the longer-term trends of accident rates.

Resident and driver surveys: within 30 to 60 days after installation (or at the end of the established trial period), it may be desirable to survey adjacent residents and other affected residential areas to assess their concerns and perception of the speed humps' performance. Motorists continuing to travel the street may also be selectively surveyed to assess their opinion of the speed humps' installation. Emergency and service agencies should also be offered the opportunity to comment on the installation.

Liability concerns

Speed humps and other pavement undulations are not traffic control devices as defined by the Manual on Uniform Traffic Control Devices. They are, however, geometric design features of the roadway and should be designed, installed, operated, and maintained using accepted engineering principles and prudent engineering judgment.

If speed humps are not installed in a proper manner and with due care, and vehicle damage or personal injury occurs, it is possible that the installing agency could be found to be maintaining a public nuisance, i. e., a known defect in the street system which may result in increased liability exposure. Therefore, complete and proper documents should be retained to justify the decisions made. Local and state laws should also be reviewed to identify any regulations pertaining to roadway design, roadway maintenance, traffic control, or other elements that may be related to the use of speed humps or other geometric design features.

Vehicle and cargo damage: Where streets with speed humps are expected to carry substantial numbers of long wheel-base vehicles or other special vehicle types such as motorcycles and bicycles, a special attempt should be made to warn and notify drivers of these vehicles that speed humps exist and how they should be driven to minimize problems. It may also be desirable to modify the standard hump design to further minimize impacts to these users.

Other considerations

Coordination with pedestrian crossings: If mid-block pedestrian crossings exist or are planned, it may be desirable to coordinate them with the speed humps, since vehicular speeds will generally be lowest at speed hump crossings. In fact, it may be desirable to install a hump directly adjacent to or on the pedestrian crossing. Pedestrian access can be encouraged by paving any grassed area connecting the hump to nearby sidewalks. In addition to standard signing, pedestrian crossing signs should be installed for any established crossing.

Aesthetic considerations: it is possible that speed humps can be constructed of special materials such as brick pavers or specially treated concrete to enhance their appearance. However, consideration should be given to street maintenance requirements in the area and whether special materials can be properly maintained by the responsible agency.

Incorporation in new street design: It is desirable in the planning of new residential subdivisions to configure and design local streets to minimize excessive speed, excessive volumes, and cut-through traffic from outside the immediate neighborhood. However, where adequate subdivision planning and street design have not or cannot be achieved, and one of the aforementioned problems is considered likely, it may be appropriate to include speed humps as a part of new street construction only after consideration of less restrictive design or traffic control techniques. Adequate signs, markings, and other devices should also be provided to support their installation.

Enforcement needs: During the initial stages of speed hump experience, it will be generally be desirable to employ special police assignment to enforce traffic violations occurring at or near speed humps and along routes experiencing diversion.

Maintenance issues: Care should be taken in the initial installation and monitoring of speed humps to ensure that edge raveling and profile deformation do not exceed established tolerances. Regularly scheduled inspections and maintenance should be performed to maintain the appropri-

ate design relationship between the hump and the street, so the hump continues to perform its intended purpose within allowable tolerances. If pavement maintenance activities result in speed hump markings being reduced or eliminated, they should be promptly replaced or supplemented with temporary signs providing the same warning to motorists.

CITY OF LAS VEGAS POLICY FOR THE CLOSURE OF RESIDENTIAL STREETS

The City of Las Vegas is committed to preserving neighborhood integrity. One of the issues in the maintenance of livable communities is traffic and the need to minimize non-essential vehicular traffic on residential streets and the need to ensure that those vehicles using those streets are not using them to bypass arterial streets. A technique that has been used successfully is the closure of the street to normal traffic.

The purpose of this policy shall be to set forth the process and criteria by which modification of traffic flow or closure of public streets may be considered by the City's staff and elected officials and to identify the condition under which closures or modifications may be enacted. This policy should only apply to the closure or modification of traffic flow on public streets initiated by citizens. This policy should not apply when initiated by a local agency to address specific traffic safety issues or to comply with state and federal standards and warrants. The policy also does not apply to temporary changes in traffic that are needed to stage construction/maintenance activities or special events.

Administrative Procedures

5. Neighborhood Traffic Management Program (NTMP) project includes issues of excessive volumes of traffic and the project engineer finds that a street closure may be appropriate.
6. Staff evaluates site based on minimum criteria. Evaluation would include recommending a location on both the requested street and adjacent streets where a closure or other mitigating measures may be required to mitigate impact of the closure.
7. Following the procedures contained in the NTMP, public comment and approval are received.
8. Action by City Council to approve installation.

Minimum criteria

To effectively use street closures for neighborhood traffic control, specific minimum criteria must be met before the installation. They are:

1. Street speed limit must be 25 m.p.h.
2. The street should be primarily residential in nature.
3. Average daily volumes should be more than 2,000 vehicles per day for complete closures or 1,000 vehicles per day for partial closure.

4. Street should not be classified higher than neighborhood collector, with no more than one lane in each direction.
5. Street cannot be a major emergency response route.
6. Closure should not cause diversion of traffic to other residential streets.
7. Street cannot be classified a Citizens Area Transit (CAT) bus route.

PLACEMENT OF STREET CLOSURE

The following guidelines should be used to determine the placement of the street closure:

1. The street closure should be made on the perimeter of the neighborhood.
2. Street closures should not be made in such a way as to interrupt internal neighborhood travel patterns. For example, the closure should not separate elementary school students from their school.
3. The closure of a street by a neighborhood association or other group of individuals will require the vacation of the street right-of-way. The application for the vacation of the street is submitted to the Planning Commission through the community Planning and Development Department. Once vacated, the land will revert to the adjacent property owners. The City may retain easements for utilities, drainage, or emergency access through the vacated right-of-way. The neighborhood association will be responsible maintenance of the vacated street.
4. Unless otherwise approved by the fire chief, all closures will have to be constructed with an emergency access per Fire Services Department standards.
5. The street closure will require the construction of a cul-de-sac to terminate the street sections. A mid-block closure would require that both stub streets be terminated with cul-de-sacs. The radius of the cul-de-sac will be dependent on parking restrictions. If parking is prohibited, a smaller radius will be allowed. If the resultant stub street contains frontage for four or fewer homes, the traffic engineer, with the concurrence of the city engineer and the fire chief, may waive the cul-de-sac requirement.

Signs and markings

It is essential to warn roadway users of the street closure and guide their subsequent action. All signs and markings shall be in conformance with the Manual of Uniform Traffic Control Devices (MUCTD).