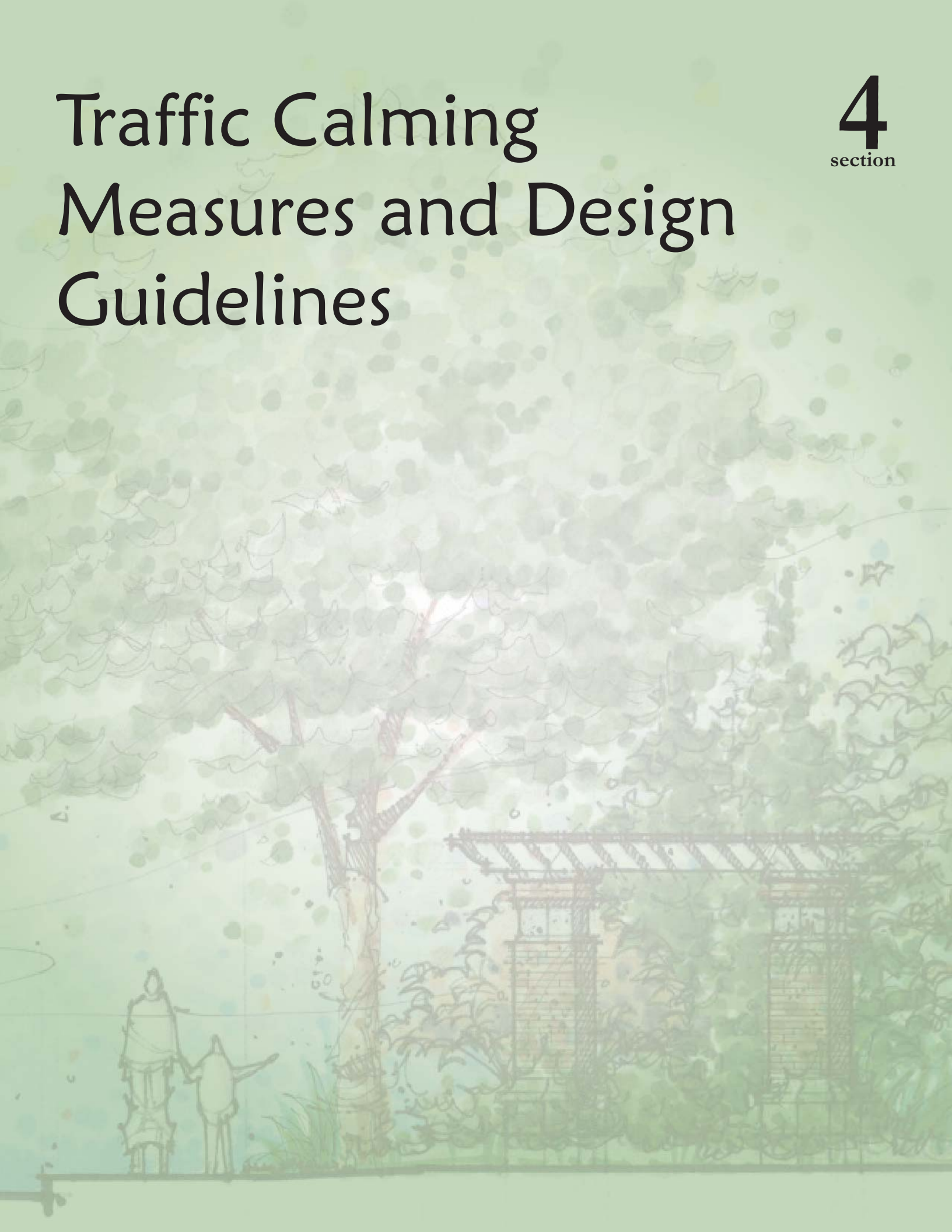


Traffic Calming Measures and Design Guidelines

4
section



4.0 TRAFFIC CALMING MEASURES AND DESIGN GUIDELINES

This section discusses how County Traffic Engineering staff will select appropriate traffic calming devices, what devices have been approved for the program as well as an overview of the each device, its uses and its advantages and disadvantages.

This handbook does not utilize all of the traffic calming devices that are currently in use around the world. After reviewing all of the potential devices and their uses, some devices were found to be too extreme or not applicable for conditions typically found on Seminole County’s residential streets.

The traffic calming measures in this program are grouped by their primary use, i.e., speed reduction, volume reduction or both. This grouping is an important step in ensuring that the correct device, or devices be selected to address the specific traffic issue at hand. As an example, a roundabout would be a good choice in reducing accident experience at a high-conflict intersection but may not be appropriate if the primary goal is the reduction of cut-through traffic volumes.

It has been found that the most effective traffic calming applications often use two or more devices, one of which may be effective at speed reduction while the other has been shown to reduce traffic volumes. An example of this could be the combination of a center or median island that is generally effective at reducing speeds, used in conjunction with a chicane that has been shown to be effective in reducing traffic volumes.

Whatever device(s) are selected residents should remember that some of the most effective traffic calming devices can also generate significant increases in noise levels as drivers negotiate the devices.

POTENTIAL TRAFFIC CALMING DEVICE ISSUES

While the installation of traffic calming devices is often seen by residents as an immediate “fix” to a traffic problem, there are a number of non-traffic related issues that need to be considered before a traffic calming device is installed. These include the impact on emergency vehicles and services, landscaping and maintenance issues, bicycle and pedestrian considerations, impacts to property values and Americans with Disabilities (ADA) impacts. Each of these considerations are addressed below.



*Traffic circle
posted speed limit*

Potential Impacts to Emergency Vehicles and Service

Delays to emergency service vehicles is often cited as one of the most significant drawbacks to the installation of traffic calming devices. Some traffic devices can cause measurable increases in response times – especially if there are a significant number of devices along one roadway or route. The large vehicles that are used by fire departments and paramedics often have difficulty navigating traffic calming devices due to their weight, length and wheelbase. While the vertical and horizontal deflections caused by traffic calming devices only represents an inconvenience to drivers of passenger vehicles, these same deflections can cause a much greater problem for drivers of these larger vehicles.

However, since the installation of traffic calming devices has been shown to reduce accident experience and to reduce driver travel speeds, which are a major contributor in auto-pedestrian fatalities, a reasonable balance needs to be struck between two competing public welfare agendas. To that end, the County’s program will assess and consider potential impacts to emergency services providers at the same time they address resident concerns over speeding and high traffic volumes. Specifically, Seminole County Public Safety staff will be involved in the review of potential traffic calming plans that affect any designated emergency response routes.

Landscape and Maintenance Issues

As many traffic calming devices include the use of landscaping to a greater or lesser degree, there is the very real potential for increased maintenance costs. In order to minimize these costs County staff will follow standard County guidelines as it relates to landscaping and will also seek to conform to the tenets of xeriscaping. Should a community or neighborhood desire a higher level of landscaping than the County is willing to maintain, a binding agreement can be worked out whereby the community or neighborhood agrees to bear the increased costs associated with the installation and maintenance.



An example of one of the City of Orlando’s traffic circles

Bicycle/Pedestrian and ADA Issues and Considerations

Some traffic calming measures can create potential obstacles for non-motorized users including bicyclists, pedestrians and handicapped users. As an example, two of the most popular traffic calming devices, roundabouts (or traffic circles) and speed humps can cause problems for other users. Since vehicular traffic in a roundabout never actually stops, pedestrians and other users do not get the gaps that they are accustomed to in order to cross the street. This can be minimized in roundabouts with the addition of “splitter islands” which can

also act as pedestrian refuges. Speed humps can generally be traversed at reasonable speeds by bicyclists but can be problematic for bicyclists if the rider is not paying attention or is inexperienced.

Property Value Impacts

A common concern of residents regarding the installation of traffic calming devices is whether or not they have an adverse impact on property values. A study performed by the Institute of Transportation Engineers (ITE), found that the installation of speed humps was not a predictor of property values (The Economic Impact of Speed Humps on Housing Values, January 2000). Further, in Urban Land Institute's (ULA) "Valuing The New Urbanism", it was found that consumers paid significantly more (ranging from 4% to 25%) for a home in a community designed with new urbanist principles when compared to "standard" single family housing stock in the same markets. While the installation of a few traffic calming devices does not constitute a new urbanist design scheme, it does tend to be viewed as improving the overall quality of life in residential neighborhoods which in turn generally has beneficial impacts on property values.



Parking Impacts

Many of the most common and popular traffic calming devices can require the elimination of on-street parking in the vicinity of the installation. A review of Table 4-1 shows that all of the devices approved for use in the Seminole County Program can cause the loss of on-street parking. Residents desiring the installation of traffic calming devices must be aware that such installations could cause loss of parking in their neighborhood.

SELECTION OF APPROPRIATE TRAFFIC CALMING DEVICES

When evaluating the various types of traffic calming devices that have been approved, it is important to keep in mind several, site-specific considerations including, but not limited to:

- Street type (i.e, local, collector, etc.)
- The perceived problem, i.e., traffic volume and/or speed
- Emergency services route
- Pedestrian/bicyclist safety
- Grades
- Drainage
- Bus routes
- Truck routes

All of these issues must be considered as they can have a significant impact on the selection of a traffic calming device.

Stop signs are not an appropriate traffic calming device

Stop Signs as Traffic Calming Devices

One common misnomer is the use of “stop signs” as a traffic calming device. Stop signs are not an appropriate traffic calming device for several reasons. Studies have shown that they only reduce speeds within 150-200 feet of the sign, and mid-block speeds (between stop signs) may actually *increase*. Further, increased noise and air pollution emissions occur at stop signs. Finally, overuse of stop signs will eventually lead to motorists ignoring them or rolling through them – both situations creating potentially dangerous situations. The main function of stop signs is to assign right of way and their installation is governed by the Manual of Uniform Traffic Control Devices, or MUTCD (see glossary).

Table 4-1 shows a comparison of the approved traffic calming devices and highlights the pros and cons of the device, estimated cost, impacts to emergency services, noise impacts and safety impacts as well as other important factors.

Table 4.1
Traffic Calming Device Comparison

Device	Reduces Traffic Speed?	Reduces Traffic Volume	Emergency Impacts	Noise Impacts	Safety Impacts	Loss of Parking?	Est. Cost.
Speed Trailer Display	Yes	No	None	None	Maybe	No	\$500/day
Mid-Block Choker	Yes	Some	Some	Maybe*	Maybe	Maybe	\$8,000-\$25,000
Chicane	Yes	Some	Some	Maybe*	Maybe	Yes	\$15,000-\$35,000
Traffic Circle	Yes	Maybe	Some	Maybe*	Imp. Auto Safety	Yes	\$5,000-\$20,000
Roundabout	Yes	Maybe	Some	Maybe*	Imp. Auto and Ped. Safety	Yes	\$15,000-\$100,000
Median Island	Maybe	Maybe	Some	Maybe*	Imp. Ped. Safety	Maybe	\$5,000-\$50,000
Gateway/Entry Feature	Some	Some	None	Maybe*	Maybe	Maybe	\$2,000-\$50,000

**Noise impacts depend largely on the use of stamped asphalt.*

The following pages show descriptions of each of the traffic calming devices approved for use in the Seminole County program. Copies of design standards for each device are included in Appendix C.

SPEED TRAILER/DISPLAY

Not technically a traffic calming device, speed trailers are used primarily to reduce driver speeds, usually in residential neighborhoods although they are sometimes used on collectors and even arterials. The most common variety is a trailer-based display that combines a radar gun, a static speed limit sign and a variable message board (VMS) that displays the drivers' measured speed. It is also possible to have permanent installations that are either solar-powered or have a direct electrical connection.



Advantages

- Effective at reducing speeds
- Potential educational benefits
- Encourages speed compliance

Disadvantages

- Only effective when present and in use
- Should not be used in remote areas
- Some drivers may use it to “clock” high speeds



Estimated Cost

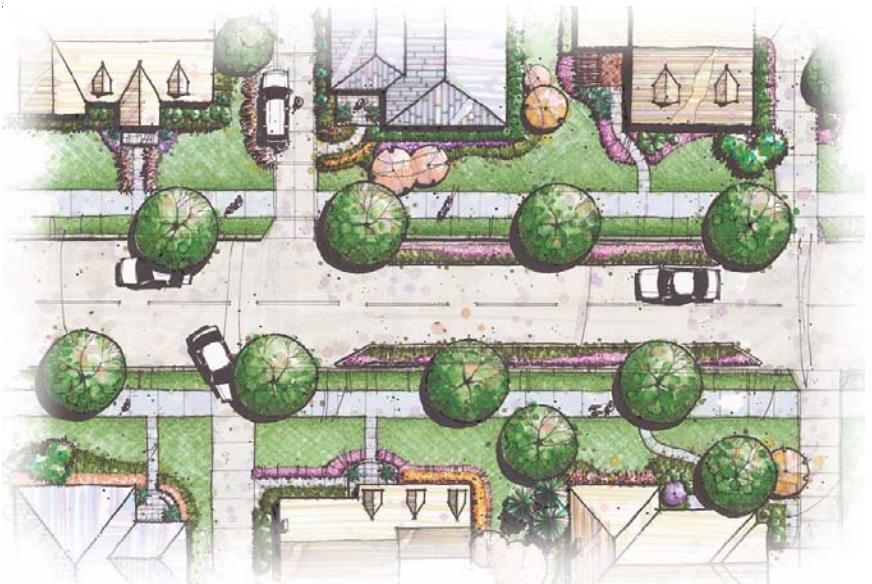
\$500 per day (estimated); or, \$8,000 - \$10,000 for a permanent solar-powered installation.

Overall Assessment

<i>Speed Impacts</i>	<i>Traffic Volume Impacts</i>	<i>Emergency Vehicle Impacts</i>	<i>Noise Impacts</i>	<i>Safety Impacts</i>
Reduces speed	No impacts	No impacts	No noise impacts	Minimal Pedestrian Improvements

MID-BLOCK CHOKER

Mid-block chokers, also known as narrowings or pinch points, constrict the roadway forcing drivers to slow down as they enter a restricted environment. This is usually accomplished through the use of new islands with landscaping or through a widening of existing sidewalks. Chokers are most effective on wide-streets that are experiencing speeding issues. Chokers can reduce the street cross-section to two narrow lanes, often less than 24 feet in width, or further reduce it to one travel lane. One-lane chokers are currently uncommon in the United States, although Portland, Oregon uses them in their traffic calming program.



Advantages

- Effective at reducing speeds and to lesser extent traffic volumes
- Provides landscaping and gateway opportunities
- Reduces pedestrian crossing width
- Does not restrict resident access
- Negotiable by large vehicles; i.e., fire trucks

Disadvantages

- Requires elimination of on-street parking
- May cause drainage problems if not properly designed; increases maintenance issues
- May require bicyclists to merge with vehicular traffic

Estimated Cost:

\$8,000 - \$25,000; varies depending on size of installation and type and amount of landscaping.

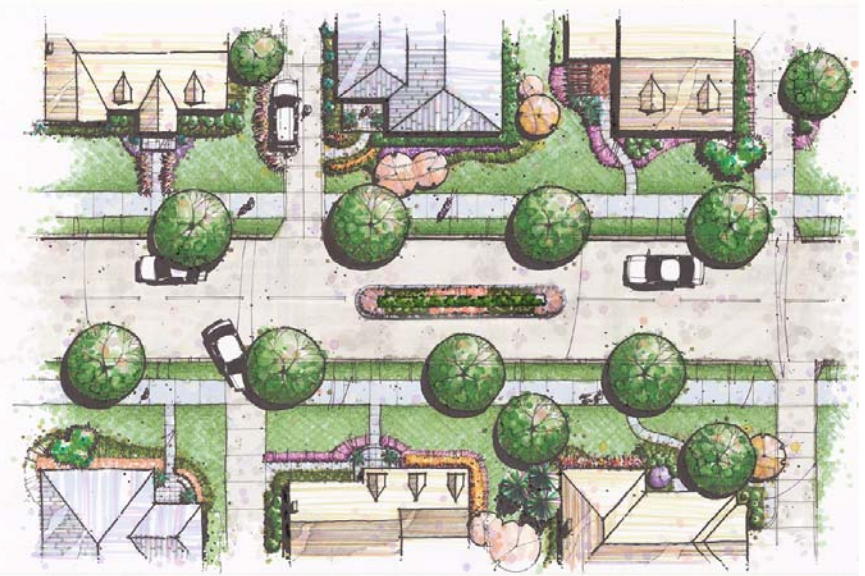


Overall Assessment

<i>Speed Impacts</i>	<i>Traffic Volume Impacts</i>	<i>Emergency Vehicle Impacts</i>	<i>Noise Impacts</i>	<i>Safety Impacts</i>
Reduces speed	Minor reductions	Minor impacts	Maybe, depending on pavement treatment	Improves pedestrian safety

CENTER-ISLAND

Center islands are raised islands constructed along the centerline of the street so as to force drivers to deflect their travel path to the outside to accommodate the island. They function by narrowing the travel lanes and are also known as median islands. Center islands generally operate more effectively if they are not too long, at which point they can actually increase speeds. Sometimes known as “gateway islands”, these devices create significant opportunities for landscaping. If the island is constructed in conjunction with a cross-walk, they can act as a pedestrian refuge.



Advantages

- May reduce traffic volumes
- Provides landscaping and gateway opportunities
- Can improve pedestrian crossing safety
- Can be aesthetically pleasing

Disadvantages

- May require elimination of on-street parking
- May interrupt driveway access
- Limited speed reduction potential

Estimated Cost:

\$5,000 - \$40,000; varies depending on size of installation and type and amount of landscape.



City of Orlando Center Island

Overall Assessment

<i>Speed Impacts</i>	<i>Traffic Volume Impacts</i>	<i>Emergency Vehicle Impacts</i>	<i>Noise Impacts</i>	<i>Safety Impacts</i>
May reduce speeds	Reduces traffic volumes	Some impacts	Maybe, depending on pavement treatment	Improves pedestrian safety

TRAFFIC CIRCLE

Traffic circles are generally raised islands that require drivers to make a horizontal deviation in their direction of travel, thereby forcing drivers to slow down as they maneuver around the circle.

Similar to roundabouts, traffic circles also require traffic to circulate in a counterclockwise motion. Yield signs are usually placed on all approaches to control traffic flows. They function by assigning rights-of-way among competing movements such as a through movement vs. a turning movement. They are generally used on local streets and collectors. They are not recommended for arterials.



Advantages

- Effective at reducing speeds
- Does not restrict resident access
- Provides significant landscaping and gateway opportunities
- Generally low impact on emergency vehicles with the provision of a truck apron or other accommodating design
- Can calm two streets at once

Disadvantages

- Can be somewhat costly
- May restrict left-turns by large vehicles
- May effect pedestrian and bicycle movements
- Maintenance of landscaping may be an issue

Estimated Cost:

\$5,000 - \$20,000; varies largely depending on size of installation and type and amount of landscape and hardscape.



City of Orlando Traffic Circle

Overall Assessment

<i>Speed Impacts</i>	<i>Traffic Volume Impacts</i>	<i>Emergency Vehicle Impacts</i>	<i>Noise Impacts</i>	<i>Safety Impacts</i>
Effectively reduces speed	Potential reductions	Potential impacts	Maybe, depending of pavement treatment	Possible improvements

ROUNDBABOUT

Roundabouts are a European import that requires traffic to circulate in a counterclockwise motion, generally around a raised center island. Roundabouts act as another type of traffic control similar to a stop sign or a traffic signal. They function by assigning rights-of-way among competing movements such as a through movement vs. a turning movement. They are generally used on collectors and sometimes on minor arterials. They are not recommended for major arterials. Roundabouts are a larger version of neighborhood traffic circles and usually have raised “splitter” islands to direct traffic into the roundabout. Generally, drivers already inside the roundabout have the right-of-way over drivers entering the roundabout from an approach street, requiring these drivers to yield the right-of-way. The provision of a truck apron, usually from bricks or other coarse materials, allows for large vehicles to traverse a roundabout while at the same time restricting passenger vehicles.



Advantages

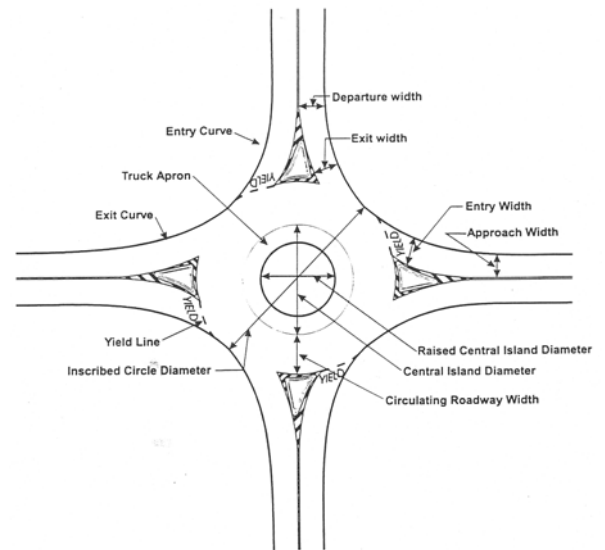
- Effective at reducing speeds
- Less expensive to operate than signals
- Provides significant landscaping and gateway opportunities
- Generally low impact on emergency vehicles with the provision of a truck apron
- Can be installed in place of a traffic signal or 4-way stop sign.

Disadvantages

- Can be very costly
- May require right-of-way
- May restrict left-turns by large vehicles
- May effect pedestrian and bicycle movements
- Potential maintenance issues

Estimated Cost:

\$15,000 - \$100,000; varies largely depending on size of installation and type and amount of landscape and hardscape.



Typical roundabout design features

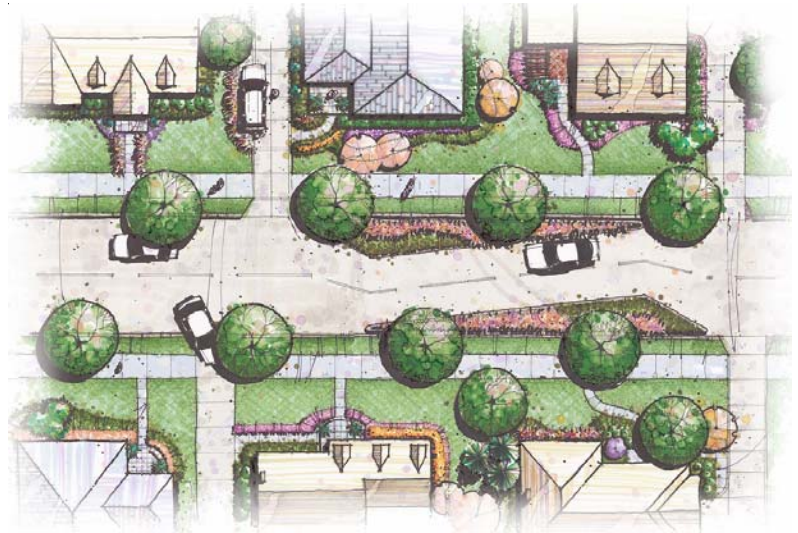
Overall Assessment

<i>Speed Impacts</i>	<i>Traffic Volume Impacts</i>	<i>Emergency Vehicle Impacts</i>	<i>Noise Impacts</i>	<i>Safety Impacts</i>
Effectively reduces speed	Potential reductions	Some impacts	Maybe, depending on pavement treatment	Substantial improvements

CHICANE

A chicane is a curvilinear, S-shaped street configuration or alignment that forces drivers to perform additional maneuvering and shortens visual sight lines.

This type of device can either be constructed during the initial construction of the roadway, or as a retrofit installation within existing right-of-way, generally in an island configuration. This type of device is primarily used for speed control or reduction. Chicanes are also sometimes referred to as serpentes, deviations or as a reversed curve.



Advantages

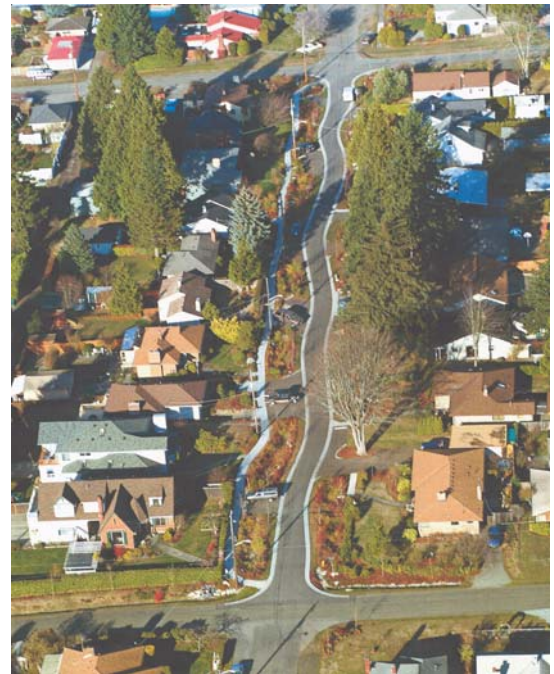
- Effective at reducing speeds
- Does not restrict resident access
- Provides landscaping opportunities
- Generally low impact on emergency vehicles

Disadvantages

- Must be carefully designed to be effective
- Can be costly
- Potential loss of parking
- May require right-of-way
- Potential drainage concerns

Estimated Cost

\$15,000 - \$35,000; varies largely depending on size of installation and type and amount of landscaping.



Overall Traffic Assessment

<i>Speed Impacts</i>	<i>Traffic Volume Impacts</i>	<i>Emergency Vehicle Impacts</i>	<i>Noise Impacts</i>	<i>Safety Impacts</i>
Effectively reduces speed	Potential reductions	Low impacts	No expected noise impacts	Possible improvements

GATEWAY/ENTRY FEATURE

A gateway or entry feature generally consists of some combination of landscaping and architectural features such as columns, fences or statuary. They are primarily used to signify to drivers that they are entering a special area, usually a residential neighborhood. From a traffic calming perspective they are most effective when vertical elements such as trees or columns are combined with horizontal measures such as bulbouts or corner extensions.



Advantages

- Promotes neighborhood identity
- Can discourage cut-through traffic
- Provides landscaping opportunities/aesthetically pleasing

Disadvantages

- Minimal reductions in speed and volumes
- Can be costly
- Maintenance and irrigation requirements
- Potential drainage concerns

Estimated Cost:

\$2,000 - \$50,000; varies largely depending on size of installation, whether architectural features are included and type and amount of landscaping .



City of Winter Park Golf Course gateway

Overall Traffic Assessment

<i>Speed Impacts</i>	<i>Traffic Volume Impacts</i>	<i>Emergency Vehicle Impacts</i>	<i>Noise Impacts</i>	<i>Safety Impacts</i>
Minimal reductions	Minimal reductions	Low impacts	No expected noise impacts	Possible improvements