KINGSPORT
TENNESSEE

Neighborhood Traffic Management Plan

ADOPTED JUNE 5, 2007
REVISED AUGUST 19, 2014

MAKING KINGSPORT THE BEST PLACE TO BE

NEIGHBORHOOD TRAFFIC CALMING PLAN

CITY OF KINGSPORT TRANSPORTATION PLANNING

INTRODUCTION

Due to the growing interest in traffic calming, the City of Kingsport Transportation Planning Department has developed this guide to provide the public information on traffic calming and procedures followed by the Kingsport Transportation Planning Department. This handbook outlines the planning, installation, and maintenance processes followed by the City of Kingsport. It contains information on traffic calming issues such as funding, impacts on emergency services as well as many others.

HISTORY OF TRAFFIC CALMING

Traffic calming began in the Netherlands in the 1960's. The idea was to integrate motor traffic with pedestrian and bicycle traffic on a shared street. In the 1970's, a number of communities in the United States began applying the principles of traffic calming; these ideas have taken many years to gain popularity in America. Still today, traffic calming in America is not implemented to the extent as it is in Europe.

In America, traffic calming measures are limited for use on local streets. They can however, be used on collector streets adjacent to residential land uses and on streets throughout the downtown area. Because traffic calming measures are intended to slow traffic and reduce cut-through traffic, it is not appropriate to use these measures on arterial streets with higher speeds and traffic volumes.

OBJECTIVES OF TRAFFIC CALMING

Traffic calming measures are designed to slow traffic and to cut down "cut-through" traffic volumes on neighborhood streets. These issues can create an atmosphere where non-motorists are intimidated or endangered by motorized traffic. Along with the additional traffic generated by "cut-through" traffic, cut-through motorists often are perceived as driving faster than local motorists drive. By addressing both high speeds and volumes, traffic calming can improved both the real and perceived safety of pedestrians and bicyclists in a neighborhood, creating a more "walkable" neighborhood and improving the quality of life within the neighborhood.

The role of physical measures used in traffic calming are emphasized because they are self-policing in that they create a barrier of some type that slows the motor vehicle down even in the absence of enforcement unlike signs, weight limits and one-way streets that depend on a level of police enforcement and the willingness of motorists to comply in order to be effective.

WHEN IS TRAFFIC CALMING APPROPRIATE?

In order to determine when and where traffic calming measures are appropriate, a well defined study and approval process is necessary. Because traffic calming measures have the potential to create controversy, a three step process referred to as the "three E's" (education, enforcement, and engineering) is often recommended.

EDUCATION

An educational program seeking to remind drivers of the negative effects of speeding in neighborhoods is recommended. The use of brochures, newsletters and campaigns can spread this message that speeding puts the neighborhood children at risk. Newsletters may contain information on speeding fines, pedestrian and bicycle tips, map of school zones and information on acceptable speeds in neighborhood.

ENFORCEMENT

Enforcement involves a more intensive police presence in the neighborhoods. Unfortunately, it is not often practical to maintain a level of presence needed to permanently lower the speed, due to the greater allocation of time needed to enforce the speed limit in all neighborhoods.

ENGINEERING

Engineering includes not only traffic calming measures but also, the use of signs and pavement markings in order to obtain a desired effect.

Before installing traffic calming devices on a local or collector street, the traffic conditions on the adjacent arterial street should be investigated to determine if operational deficiencies exist and are contributing to the traffic congestion on the street in question. If deficiencies exist on the arterial, they should be addressed before any traffic calming devices are installed on the collector or local street.

WHERE ARE TRAFFIC CALMING MEASURES APPROPRIATE?

As outlined in the study and approval process in a later chapter, functional classification and adjacent land use should be the primary criteria in determining whether a traffic calming device is appropriate on a specific roadway. When conditions warrant, traffic calming devices may be appropriate on the following types of roads:

- Local residential streets
- Collector streets with predominantly residential land uses
- Arterial roads located in the downtown area with posted speeds of 30 mph or less

TRAFFIC CALMING ISSUES

A number of issues can affect a traffic calming project. These include but are not limited to, funding, impact on emergency service vehicles, landscaping, snow removal, drainage, and the American with Disabilities Act (ADA) requirements. The following will try to address some of these issues.

FUNDING

Compared to other transportation expenditures for local governments, traffic calming program expenses are rarely significant. Funds for traffic calming measures can come from the capital improvements budget (general fund), State gas tax subsides, MPO – STP funds, or directly out of the general fund. Some neighborhood assessments could also be implemented, many governments nationwide require residents of the neighborhood to pay for installation and/or maintenance of traffic calming devices and landscaping, particularly if the project is low on the priority list.

EMERGENCY VEHICLES

Police Departments generally do not oppose traffic calming measures because of their potential to reduce speeds and crashes. However, fire & rescue emergency equipment may be slowed or inconvenienced from certain types of traffic calming devices and larger vehicles must slow down to negotiate certain measures. Therefore, emergency routes frequently used by emergency vehicles should be determined and mapped out so that the effect of a potential project can be determined. Circles can be installed with mountable curbs to allow emergency vehicles to drive across the traffic calming device.

LANDSCAPING

Low-maintenance landscaping should be considered to minimize the impact on the Public Works' landscaping crew and budget. When deciding what types of landscaping material to use for a particular project, one must consider along with maintenance costs, sight distance requirements and whether the landscaping will introduce a "fixed object" that will pose a potential hazard if struck by a vehicle. It is important to consider plant type, growth and location when landscaping a traffic calming device.

SNOW REMOVAL

Many of the traffic calming devices may have an effect on the removal of snow and ice. Therefore, the Public Works Department should be made aware of the location of such devices.

DRAINAGE

When installing traffic calming devices, the drainage patterns of the roadways may be changed. It is important that Public Works review the drainage characteristics of the road before such devices are installed. Otherwise, problems may be created for pedestrians such a water and ice accumulation.

ADA REQUIREMENTS

All traffic calming measures must be designed to accommodate all people in the community. To accomplish this, devices that are installed to improve pedestrian safety, or have an effect on pedestrian mobility, must be designed to meet the requirements set forth in the Americans with Disabilities Act.

TRAFFIC CALMING STUDY AND APPROVAL PROCESS

Traffic calming measures should be considered only after education and enforcement efforts do not produce the desired results. Measures should only be installed after the existing traffic conditions have been thoroughly analyzed, future traffic calming devices have been studied and the necessary approvals have been received. The following process will guide staff through this process.

This study and approval process is designed to supplement existing policies and procedures and is not intended to replace or supersede any current requirements.

Not all traffic calming projects will require an intensive study and approval process as described below, before implementation. Good engineering judgment will indicate what level of process is warranted.

PRELIMINARY TRAFFIC CALMING PROCESS

A. **Funding:** Funding should be determined and in place before staff identifies any study areas. In addition, maintenance costs should be included in funding upfront.

B. **Project Ranking System:** Sufficient funding may not be available to fund all projects and a ranking system to prioritize projects as shown below will be used. This ranking will allow staff to address the needs of the community using limited funds.

PROJECT RANKING SYSTEM

Criteria	Points	Basis for Point Assignment
Speed	0 to 30	Extent by which 85 percentile speeds exceed speed limit; 2 points assigned for every 1 mph.
Volume	0 to 25	Average daily traffic volumes (1 point assigned for every 120 vehicles)
Crashes	0 to 10	1 point for every crash reported within past 3 years.
Public Facilities	0 to 10	5 points generated for every public facility or commercial use that generates a significant number of pedestrians.
Schools	0 to 10	5 points assigned for each school crossing on the project street
Pedestrian Facility	0 to 10	5 points assigned if there is no continuous sidewalk on one side of street; 10 points if there is no sidewalk present.
Total Possible Points	**100**	

STEP 1: SUBMITTAL OF REQUEST FOR STUDY ALONG WITH SUPPORTING DATA

A. **Request for Study:** A neighborhood group formally submits a request to the Kingsport Transportation Planning office for a traffic calming study at a particular location within the municipally. A minimum of five resident's signatures needed for neighborhood request.

B. **Collect and Compile Supporting Data**: After the Kingsport Transportation Planning Office reviews the request; the Transportation Planner will gather preliminary information such as project area, street classification and land use to determine if the project warrants further study. The following is a brief description of preliminary information needed:

1) *Identification of Project Area:* The local government or neighborhood group must determine the project area or the area that will be affected by the installation of traffic calming devices. The project area will determine the neighborhood from which community approval must be sought throughout the study and approval process. The project area should include the project street, cross streets on either side of device, any street, which relies on Study Street for access and the two parallel streets.

2) *Street Classification and Land Use:* Traffic calming measures will be considered on the following roadway types:

- ❖ Local residential streets
- ❖ Collector streets with predominantly residential land uses
- ❖ Arterial roads within the downtown district (with posted speeds of 30 mph or less)

Although traffic calming measures may be appropriate in the downtown area, the applications are typically limited to less intrusive types of traffic calming devices.

After the project area, street classification and land use have been established, the Kingsport Transportation Planning Department will decide if the project meets the necessary preliminary requirements to be considered for traffic calming measures. If it does, then the study and approval process will continue. If the project is not warranted then the neighborhood group that initiated the request will be notified why traffic calming is not appropriate at that location.

3) Document *Speeding or Cut-Through Problem and Determine Eligibility:* At the beginning of the study, the following data should be gathered and quantified by technical personnel to provide evidence that a traffic problem exists.

- ❖ *Average daily traffic (ADT) volume* - As a minimum requirement, the ADT should exceed 1,000 vehicles/day or peak hour volume should exceed 100 vehicles for the road.

Depending on the traffic problem – one of the following criteria should be considered.

- ❖ *Speeding* – The 85th percentile speed (or average speed) should exceed 10 mph over the posted speed limit

- ❖ *Cut-Through* – When cut through traffic is primary issue, the cut-through traffic on the local residential street should be 40% or more of the total one hour, single direction volume. A minimum of 100 cut-through trips in one hour, in one direction, should be set as a minimum requirement.

4) Neighborhood *Traffic Calming Survey*: Community approval is one of the most important steps in any traffic-calming program. The best way to determine community approval is through a neighborhood survey. To do this, the Kingsport Transportation Planning Department will compile a list of all parcel owners located in the project area and will conduct either a mail or door to door inquiry to document the interests in the project area. A minimum of 70% approval from the parcel owners is required for further study. These percentages will be based on the actual returned votes, and not the whole project area.

5) In the case of project failing to receive the minimum support needed and being closed out, the project street/area may be re-evaluated by staff after seven years.

C. **Project Ranking:** After the required studies have been completed, the requested project should be compared with other pending projects using the established "Project Ranking System". If funding is available, then the project can proceed to the next level, if no funding is available, the project will be put on hold until funding is available.

STEP 2: TRAFFIC CALMING PLAN DEVELOPMENT

A. **Neighborhood Committee:** This committee will help provide focus to the plan development and will provide a link between the neighborhood and City staff.

B. **Plan Development:** The Kingsport Transportation Planning Department will gather more extensive data that can be used to further define the traffic problem affecting the neighborhood if needed. Staff will analyze the data and will identify the appropriate traffic calming measure or measures for the particular situation. The following data will be analyzed for the identification of appropriate traffic calming solution:

1. **Speed** – 85th percentile or average speed (as previously discussed).
   Volume – daily and peak hour volumes on the project street and other streets within the study area.
   Adjacent arterial roads – determine if problems on area streets are related to poor traffic conditions on adjacent arterial streets.
   Crashes – crash data, by type, for the past three years.
   Parking – location, capacity and use.
   Pedestrian activity – identify vulnerable groups like children and elderly.
   Emergency routes.
   Transit routes.
   Locations of schools, parks, and other facilities.

2. *Identify Appropriate Traffic Calming Measures:* After data has been compiled and analyzed the appropriate traffic calming measures can be identified. A number of different traffic calming measures are listed in the following pages. Identifying appropriate measures includes the following:

    - ❖ Identification of which traffic calming device is designed to solve the documented problem.
    - ❖ Appropriateness of a particular traffic calming device to the location where it will be installed.

E. **Concur on Measure, Location and Design:** At this point staff will meet with the Neighborhood representatives and present the findings of the data analysis. Staff will describe which traffic calming measures are best able to address the problems identified and discuss with the representatives the opinions about traffic calming.

STEP 3: APPROVAL PROCESS

i. **Open House:** Once staff and the neighborhood representatives have reached a consensus, the Kingsport Transportation Department will hold an Open House to present and field questions from the public concerning the application of traffic calming measure. The community will be shown a single plan with options for specific locations.

ii. **Finalize Plan:** Following the public review, any necessary modifications will be made to the traffic calming plan. Additional public meetings can be held if the changes to the original plan are significant.

iii. **Local Government Approval:** After the public review, the plan will be officially adopted by the Kingsport Transportation Planning Department. At this point, funding should be identified and set aside for implementation and maintenance.

STEP 4: INSTALLATION AND EVALUATION

After the traffic calming plan is approved, the traffic calming device can be installed either on a temporary or permanent basis.

A. **Temporary Measure:** Temporary measures should be considered if traffic flow is severely affected by the installation of traffic calming device. After installation, traffic patterns and community approval may not be as expected. Temporary measures provide an opportunity to review the design in the field without major removal expense if the device does not satisfy the original goal.

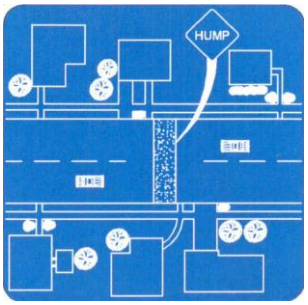
Test Period: When temporary measures are installed, a three to twelve month test period should be considered. After the appropriate time, the Kingsport Transportation Planning Department will gather the data concerning speed, volume and other data to ensure that the device has had the desired effect and their impact on emergency service vehicles.

B. **Install or Modify Measure:** Following the temporary installation period, the Kingsport Transportation Planning department will decide whether to install the measure permanently.

C. **Conduct Follow-up Studies:** Whether the device is installed permanently at the onset or after a temporary installation, follow-up traffic studies will be conducted. Traffic data such as crashes, speeds, traffic flow will be monitored and compared to a before analysis.

D. Modify Design or Remove Device if needed: A traffic-calming device will be removed after it has been in place for no less than 6 months based on speed or if a safety problem arises. A neighborhood petition with five signatures is required to begin study for removal. If findings show a reduction in 85% speed less than 5 mph or sufficient crash data then staff will bring forward for neighborhood vote.

Speed Humps



a.k.a. road humps, undulations

Speed humps are rounded raised areas placed across the roadway. They are generally 10 to 14 feet long (in the direction of travel), making them distinct from the shorter "speed *bumps*" found in many parking lots, and are 3 to 4 inches high. The profile of a speed hump can be circular, parabolic, or sinusoidal. They are often tapered as they reach the curb on each end to allow unimpeded drainage.

Good for:

- Locations where very low speeds are desired and reasonable, and noise and fumes are not a major concern.

Advantages:

- Speed Humps are relatively inexpensive;
- They are relatively easy for bicycles to cross if designed appropriately; and
- They are very effective in slowing travel speeds.

Disadvantages:

- They cause a "rough ride" for all drivers, and can cause severe pain for people with certain skeletal disabilities;
- They force large vehicles, such as emergency vehicles and those with rigid suspensions, to travel at slower speeds;
- They may increase noise and air pollution; and
- They have questionable aesthetics.

Cost Estimates: $2,000-2,500 (Portland, OR)
$2,000 (Sarasota, FL)
$2,000 (Seattle, WA)

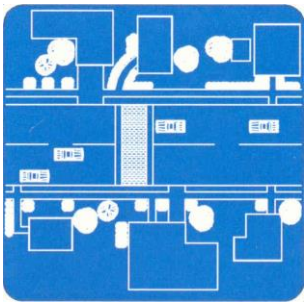
Effectiveness:

- For a 12-foot hump:
  - Average of 22% decrease in the 85th percentile travel speeds, or from an average of 35.0 to 27.4 miles per hour; (from a sample of 179 sites).
- For a 14-foot hump:
  - Average of 23% decrease in the 85th percentile travel speeds, or from an average of 33.3 to 25.6 miles per hour (from a sample of 15 sites).

Similar Measures:

- By lengthening the hump with a flat section in the middle, you have a Speed Table.
- By turning an entire crosswalk into a speed hump, you have a Raised Crosswalk; and
- By raising the level of an entire intersection, you

Speed Tables



a.k.a. trapezoidal humps, speed platforms

Speed tables are flat-topped speed humps often constructed with brick or other textured materials on the flat section. Speed tables are typically long enough for the entire wheelbase of a passenger car to rest on the flat section. Their long flat fields, plus ramps that are sometimes more gently sloped than Speed Humps, give speed tables higher design speeds than Speed Humps. The brick or other textured materials improve the appearance of speed tables, draw attention to them, and may enhance safety and speed-reduction.

Good for:

- Locations where low speeds are desired but a somewhat smooth ride is needed for larger vehicles.

Advantages:

- They are smoother on large vehicles (such as fire trucks) than Speed Humps; and
- They are effective in reducing speeds, though not to the extent of Speed Humps.

Disadvantages:

- They have questionable aesthetics, if no textured materials are used;
- Textured materials, if used, can be expensive; and
- They may increase noise and air pollution.

Cost Estimates: $2,000-2,500 (Portland, OR)
$2,000 (Sarasota, FL)
$2,000 (Seattle, WA)

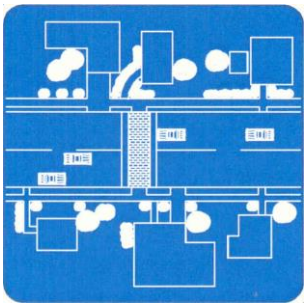
Effectiveness:

- For a 22-foot speed table:
  - Average of 18% decrease in the 85th percentile travel speeds, or from an average of 36.7 to 30.1 miles per hour; (from a sample of 58 sites).
  - Average of 45% decrease in accidents, or from an average of 6.7 to 3.7 accidents per year (from a sample of 8 sites).

Similar Measures:

- By removing the flat section in the middle, you have a Speed Hump.
- By placing a crosswalk on the flat section, you have a Raised Crosswalk; and
- By raising the level of an entire intersection, you have a Raised Intersection.

Raised Crosswalks



a.k.a. raised crossings, sidewalk extensions

Raised crosswalks are Speed Tables outfitted with crosswalk markings and signage to channelize pedestrian crossings, providing pedestrians with a level street crossing. In addition, by raising the level of the crossing, pedestrians are more visible to approaching motorists.

Good for:

- Locations where pedestrian crossings occur at haphazard locations and vehicle speeds are excessive.

Advantages:

- Raised Crosswalks improve safety for both pedestrians and vehicles;
- If designed well, they can have positive aesthetic value; and
- They are effective in reducing speeds, though not to the extent of Speed Humps.

Disadvantages:

- Textured materials, if used, can be expensive;
- Their impacts on drainage needs to be considered; and
- They may increase noise and air pollution.

Cost Estimate: $4,000

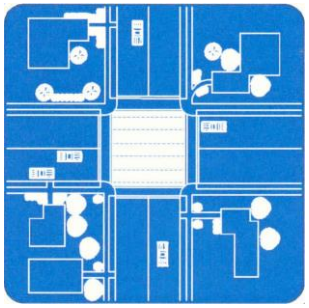
Effectiveness:

- For a 22-foot Speed Table (the most similar device for which data is available):
  - Average of 18% decrease in the 85th percentile travel speeds, or from an average of 36.7 to 30.1 miles per hour; (from a sample of 58 sites).
  - Average of 45% decrease in accidents, or from an average of 6.7 to 3.7 accidents per year (from a sample of 8 sites).

Similar Measures:

- By removing the crosswalk markings and signage, you have a Speed Table; and
- By removing the crosswalk and the flat section in the middle, you have a Speed Hump.
- By raising the level of an entire intersection, you have a Raised Intersection.

Raised Intersections



a.k.a. raised junctions, intersection humps, plateaus

Raised intersections are flat raised areas covering an entire intersection, with ramps on all approaches and often with brick or other textured materials on the flat section. They usually raise to the level of the sidewalk, or slightly below to provide a "lip" that is detectable by the visually impaired. By modifying the level of the intersection, the crosswalks are more readily perceived by motorists to be "pedestrian territory".

Good for:

- Intersections with substantial pedestrian activity; and
- Areas where other traffic calming measures would be unacceptable because they take away scarce parking spaces.

Advantages:

- Raised Intersections improve safety for both pedestrians and vehicles;
- If designed well, they can have positive aesthetic value; and
- They can calm two streets at once.

Disadvantages:

- They tend to be expensive, varying by materials used;
- Their impact to drainage needs to be considered; and
- They are less effective in reducing speeds than Speed Humps, Speed Tables, or Raised Crosswalks.

Cost Estimate: $12,500 (Sarasota, FL)

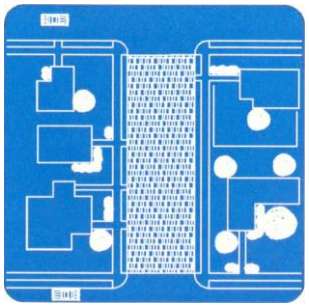
Effectiveness:

- Average of 1% decrease in the 85th percentile travel speeds, or from an average of 34.6 to 34.3 miles per hour; (from a sample of 3 sites).

Similar Measures:

- By raising only a single crosswalk, you have a Raised Crosswalk.
- By raising only a short section to a flat level (without a crosswalk), you have a Speed Table; and
- By raising an even shorter section and constructing it without a flat top, you have a Speed Hump.

Textured Pavements



a.k.a. cobblestone, brick pavement, stamped pavement

Textured and colored pavement includes the use of stamped pavement or alternate paving materials to create an uneven surface for vehicles to traverse. They me be used to emphasize either an entire intersection or a pedestrian crossing, and are sometimes used along entire street blocks.

Good for:

- A "Main Street" area where there is substantial pedestrian activity and noise is not a major concern.

Advantages:

- Textured Pavements can reduce vehicle speeds over an extended length;
- If designed well, they can have positive aesthetic value; and
- Placed at an intersection, they can calm two streets at once.

Disadvantages:

- They are generally expensive, varying by materials used; and
- If used on a crosswalk, they can make crossings more difficult for wheelchair users and the visually impaired.

Cost Estimate: varies by materials used and the amount of area covered

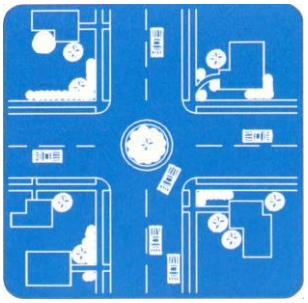
Effectiveness:

- No data has been compiled on the effects of textured pavements.

Similar Measures:

- Textured pavements are often combined with Speed Tables, Raised Crosswalk, and Raised Intersections.
- Textured pavements are occasionally combined with Speed Humps.

Traffic Circles



a.k.a. rotaries, intersection islands

Traffic circles are raised islands, placed in intersections, around which traffic circulates.

Good for:

- Calming intersections, especially within neighborhoods, where large vehicle traffic is not a major concern but speeds, volumes, and safety are problems.

Advantages:

- Traffic Circles are very effective in moderating speeds and improving safety;
- If designed well, they can have positive aesthetic value; and
- Placed at an intersection, they can calm two streets at once.

Disadvantages:

- They are difficult for large vehicles (such as fire trucks) to circumnavigate;
- They must be designed so that the circulating lane does not encroach on the crosswalks;
- They may require the elimination of some on-street parking; and
- Landscaping must be maintained, either by the residents or by the municipality.

Cost Estimate: varies by materials used and the amount of area covered

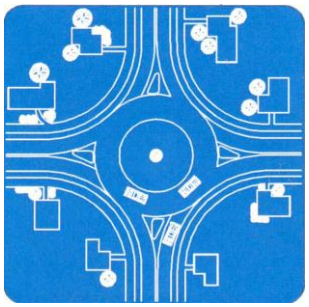
Effectiveness:

- Average of 11% decrease in the 85th percentile travel speeds, or from an average of 34.1 to 30.2 miles per hour (from a sample of 45 sites).
- Including a large sample from Seattle, an average of 73% decrease in accidents, or from an average of 2.2 to 0.6 accidents per year (from a sample of 130 sites).
- Excluding the large sample from Seattle, an average of 29% decrease in accidents, or from an average of 5.9 to 4.2 accidents per year (from a sample of 17 sites).

Similar Measures:

- By placing a raised island in a midblock location, you have a Center Island Narrowing.
- By enlarging the intersection and the center island, inserting splitter islands at each approach, setting back the crosswalks away from the circulating lane, and implementing yield control at all approaches, you have a Roundabout.

Roundabouts



a.k.a. rotaries

Roundabouts require traffic to circulate counterclockwise around a center island. Unlike Traffic Circles, roundabouts are used on higher volume streets to allocate right-of-way between competing movements.

Good for:

- Locations with a history of accidents;
- Intersections where queues need to be minimized;
- Intersections with irregular approach geometry;
- Providing inexpensive-to-operate traffic control as an alternative to a traffic signal;
- Handling a high proportion of U-turns; and
- Locations with abundant right-of-way.

Advantages:

- Roundabouts can moderate traffic speeds on an arterial;
- They are generally aesthetically pleasing if well landscaped;
- They enhanced safety compared to traffic signals;
- They can minimize queuing at the approaches to the intersection; and
- They are less expensive to operate than traffic signals.

Disadvantages:

- They may be difficult for large vehicles (such as fire trucks) to circumnavigate;
- They must be designed so that the circulating lane does not encroach on the crosswalks;
- They may require the elimination of some on-street parking; and
- Landscaping must be maintained, either by the residents or by the municipality.

Cost Estimate: varies by dimensions of the roundabout.

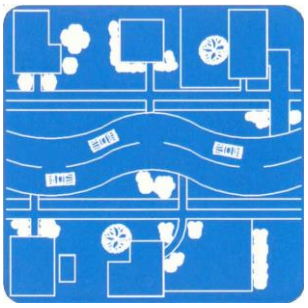
Effectiveness:

- Average 29% reduction in accidents, with a reduction from 9.3 to 5.9 accidents per year (from a sample of 11 sites; source: *Roundabouts: An Informational Guide*).

Similar Measures:

- By constructing a small island in a neighborhood intersection and leaving the existing curbs, you have a Traffic Circle.

Chicanes



a.k.a. deviations, serpentines, reversing curves, twists

Chicanes are curb extensions that alternate from one side of the street to the other, forming S-shaped curves. Chicanes can also be created by alternating on street parking, either diagonal or parallel, between one side of the street and the other. Each parking bay can be created either by restriping the roadway or by installing raised, landscaping islands at the ends of each parking bay.

Good for:

- Locations where speeds are a problem but noise associated with Speed Humps and related measures would be unacceptable.

Advantages:

- Chicanes discourage high speeds by forcing horizontal deflection; and
- They are easily negotiable by large vehicles (such as fire trucks) except under heavy traffic conditions.

Disadvantages:

- They must be designed carefully to discourage drivers from deviating out of the appropriate lane;
- Curb realignment and landscaping can be costly, especially if there are drainage issues; and
- They may require the elimination of some on-street parking.

Cost Estimates: $14,000 (Sarasota, FL)

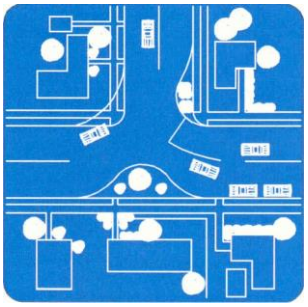
Effectiveness:

- No data has been compiled on the effects of chicanes.

Similar Measures:

- By placing the edge islands opposite each other (without staggering them), you have a Choker.

Realigned Intersections



a.k.a. modified intersections

Realigned intersections are changes in alignment that convert T-intersections with straight approaches into curving streets that meet at right angles. A former "straight-through" movement along the top of the T becomes a turning movement. While not commonly used, they are one of the few traffic calming measures for T-intersections, because the straight top of the T makes deflection difficult to achieve, as needed for Traffic Circles.

Good for:

- T-intersections.

Advantages:

- Realigned Intersections can be effective reducing speeds and improving safety at a T-intersection that is commonly ignored by motorists.

Disadvantages:

- The curb realignment can be costly; and
- They may require some additional right-of-way to cut the corner.

Cost Estimates: varies by curve radii and size of right-of-way acquisition, if required.

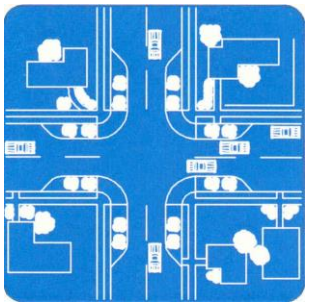
Effectiveness:

- No data has been compiled on the effects of realigned intersections.

Similar Measures:

- A T-intersection can also be calmed using a Traffic Circle, but special provisions are needed to ensure that there is horizontal deflection along the top of the T. Either:
  - The curb along the top of the T must be widened to accommodate the circulating lane; or
  - An approach deflection island must be constructed for vehicles approaching along the top of the T;
- If vertical measures are acceptable, then a T-intersection can be calmed using a Raised Intersection.

Neckdowns



a.k.a. nubs, bulbouts, knuckles, intersection narrowings, corner bulges, safe crosses

Neckdowns are curb extensions at intersections that reduce the roadway width from curb to curb. They "pedestrianize" intersections by shortening crossing distances for pedestrians and drawing attention to pedestrians via raised peninsulas. They also tighten the curb radii at the corners, reducing the speeds of turning vehicles.

Good for:

- Intersections with substantial pedestrian activity; and
- Areas where vertical traffic calming measures would be unacceptable because of noise considerations.

Advantages:

- Neckdowns improves pedestrian circulation and space;
- Through and left-turn movements are easily negotiable by large vehicles
- They create protected on-street parking bays; and
- They reduce speeds, especially for right-turning vehicles.

Disadvantages:

- Effectiveness is limited by the absence of vertical or horizontal deflection;
- They may slow right-turning emergency vehicles;
- They may require the elimination of some on-street parking near the intersection; and
- They may require bicyclists to briefly merge with vehicular traffic.

Cost Estimate: $40,000 - 80,000 for four corners.

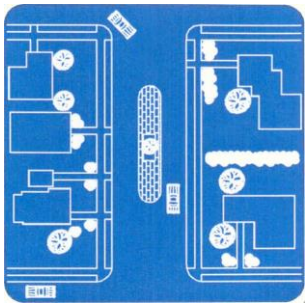
Effectiveness:

- Average of 4% decrease in the 85th percentile travel speeds, or from an average of 34.9 to 32.3 miles per hour (combined average for various narrowing measures, taken from a sample of 7 sites).

Similar Measures:

- If a roadway is narrowed at a midblock location, you have a Choker;
- Can be easily combined with a Raised Intersection.

Center Island Narrowings



a.k.a. midbock medians, median slow points, median chokers

A center island narrowing is a raised island located along the centerline of a street that narrows the travel lanes at that location. Center island narrowings are often landscaped to provide a visual amenity. Placed at the entrance to a neighborhood, and often combined with textured pavement, they are often called "gateway islands." Fitted with a gap to allow pedestrians to walks through at a crosswalk, they are often called "pedestrian refuges."

Good for:

- Entrances to residential areas;
- Wide streets where pedestrians need to cross.

Advantages:

- Center Island Narrowings increase pedestrian safety;
- If designed well, they can have positive aesthetic value; and
- They reduce traffic volumes.

Disadvantages:

- Their speed-reduction effect is somewhat limited by the absence of any vertical or horizontal deflection; and
- They may require elimination of some on-street parking.

Cost Estimate: $8,000 - 15,000 (Portland, OR).
$5,000 (Sarasota, FL)

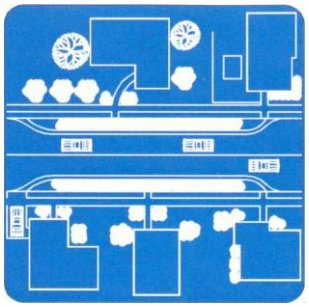
Effectiveness:

- Average of 4% decrease in the 85th percentile travel speeds, or from an average of 34.9 to 32.3 miles per hour (combined average for various narrowing measures, taken from a sample of 7 sites).

Similar Measures:

- If a roadway is narrowed out from the curbs at an intersection, you have a Neckdown;
- If a roadway is narrowed outward from the sidewalk or planting strip, rather than from the centerline, you have a Center Island Narrowing.

Chokers



a.k.a. pinch points, midblock narrowings, midblock yield points, constrictions

Chokers are curb extensions at midblock locations that narrow a street by widening the sidewalk or planting strip. If marked as crosswalks, they are also known as safe crosses. Two-lane chokers leave the street cross section with two lanes that are narrower than the normal cross section. One-lane chokers narrow the width to allow travel in only one direction at a time, operating similarly to one-lane bridges.

Good for:

- Areas with substantial speed problems and no on-street parking shortage.

Advantages:

- Chokers are easily negotiable by large vehicles (such as fire trucks);
- If designed well, they can have positive aesthetic value; and
- They reduce both speeds and volumes.

Disadvantages:

- Their effect on vehicle speeds is limited by the absence of any vertical or horizontal deflection;
- They may require bicyclists to briefly merge with vehicular traffic; and
- They may require the elimination of some on-street parking.

Cost Estimate: $7,000 - 10,000 (Portland, OR).

Effectiveness:

- Average of 4% decrease in the 85th percentile travel speeds, or from an average of 34.9 to 32.3 miles per hour (combined average for various narrowing measures, taken from a sample of 7 sites).

Similar Measures:

- If a roadway is narrowed at an intersection, you have a Neckdown;
- If a roadway is narrowed from the centerline, rather than from the curbs (i.e. using a raised island), you have a Center Island Narrowing.