

# Guidelines for the design and application of neighbourhood traffic control devices



**Public Works Department**  
**Division of Roads**

October 2002

*PWD Traffic Calming Guidelines*, prepared by the PWD Division of Roads, is a summary of neighbourhood traffic control techniques recommended for reducing the negative impacts of speeding, cut-thru, and other inappropriate behaviour patterns by motorists on Cayman's residential streets.

The techniques prescribed in this document are well researched and have proven successful throughout both North America and Europe.

Calming techniques and engineering principles discussed in this document are those that PWD recommends as best for use on Cayman residential streets.

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## Abstract

The effects of motor vehicle traffic on the quality of residential environments has only recently become evident. Police and transportation officials have been under intense pressure to reduce the speed and volume of traffic on neighbourhood streets to address both real and perceived threats to safety and quality of life issues.

Increasing levels of automobile ownership, poorly designed residential street systems, and under-designed arterial roadways are some of the factors contributing to continued traffic growth and vehicular intrusion in residential areas.

While PWD is actively addressing long-term transportation needs, congestion on arterial streets is increasing and more traffic is diverting to local residential streets to bypass congestion. Whatever the reason, increased traffic volumes and speeds along local residential streets has prompted concern and protest from residents.



## **Introduction**

The Division of Roads has compiled a list of neighbourhood traffic control techniques and their effects on traffic volumes, speed and safety. These guidelines offer a variety of techniques, which creatively solve problems in partnership with the PWD, police, and local residents.

Information on these techniques was compiled from experiences in existing neighbourhoods worldwide. A wealth of literature and empirical data is available on this subject. In the Caribbean several islands have already effectively implemented traffic calming techniques with after-testing surveys that show overwhelming community acceptance.

## The Traffic Calming Process

The process of working with a community is as important as the actual plans which arise from the process. Residents who feel their concerns have not been adequately addressed may oppose plans following the procedure outlined by the *PWD Traffic Calming Policy*

PWD will address any traffic control concerns in a professional and timely manner.

The process is as follows:

1. **Define the Problem(s)** PWD engineers along with input from area residents will make a clear and definitive assessment of the traffic problem on the reported street(s). This step makes certain that all the relevant issues are addressed upfront.
2. **Document the Problem(s)** PWD will collect whatever data is necessary to document the scope of the problem; for example, how many cut through cars are there? How fast are they going? Is the problem limited to a specific area? What time of day is the problem occurring most often? Quite often there is only a perception of a problem and not an actual problem. The documentation may lead to a redefining of the problem.
3. **Define Desired Results** Given the actual performance of the roadways, the community is asked to identify what they would like the calming results to be. This can include a significant reduction in cut-thru traffic; significant speed reduction; or some other desired result.
4. **Define Constraints** Address all critical issues including; Does traffic engineering analysis support the need for traffic calming? Is funding available? Do at least 75% of affected residents approve of the device(s). Will the problem be shifted to another street? Does the recommend device pose a threat to Fire and EMS? Does the Traffic Advisory Panel (T.A.P) approve? Are there feasible alternative devices?
5. **Implementation** Install traffic calming device either on test or permanent basis depending on nature of the problem, device(s) used and on whether all previously listed constraints have been adequately addressed.

## Increased Enforcement (ref: Appendix A)

Increased enforcement involves the use of Special Constables/Police personnel or methods to encourage reduced speeds in residential areas. The enforcement procedure usually involves the use of radar to identify speeders and subsequent ticketing of speed violators.

### *Effects:*

Generally enforcement operations may result in appreciable speed reductions; Sometimes only for a short time before a return to unsatisfactory driving practices. Research shows that residents tend to support police enforcement on their streets, but often time there is backlash if the enforcement results in traffic citations to local residents.

### *Considerations:*

The Royal Cayman Islands Police (RCIP) is frequently saddled with budget and manpower constraints. Use of personnel for speed enforcement on a residential street is typically not a high priority for the Police Department. Manpower time and wages can be costly for this type of speed reductions technique.

### *Research:*

Surveys from other countries have shown that police enforcement for speed reduction is widely accepted and highly effective as long as enforcement is maintained.

Studies have generally shown that people speeding in neighbourhoods tend to be people who live in that neighbourhood or visit that neighbourhood often.



## Neighbourhood Warning Signs (ref: Appendix B)

A variety of signs may be used to try and warn of the presence of children in a residential neighbourhood. “WATCH FOR CHILDREN,” “SLOW CHILDREN,” “CHILDREN AT PLAY,” etc. These signs are not established in the Cayman Islands Road Code but their use is allowed as a cautioning device to motorists who may be unfamiliar with a residential area. The widespread misconception is that these signs provide protection for children and that they hold legal consequence and provide grounds for prosecution if not followed.

### *Effects*

- Little or no effect on traffic volume
- Little or no effect on traffic noise, or air quality
- Little or no effect on traffic safety

### *Cost*

- Minimal cost for one or two select installations.



### *Guidelines*

- PWD does not manufacture or sell neighbourhood-warning signs. Such signs may be purchased through an outside vendor or at a local hardware store.
- U.K., U.S. or other sign standards may be used on residential streets only.

### *Additional Considerations*

- There is no indication that signs of this type achieve the desired safety benefits.
- Signs of this type often lead people to think that the street is an acceptable place to play.



## Street Narrowing (ref: Appendix C)

Street narrowing involves the reduction of the typical pavement width along a roadway. The narrowing can be achieved physically by removing part of the pavement surface or psychologically by using pavement markings that indicate narrow travel lanes.

### *Effects*

- Little or no effect on traffic volume
- Minimal changes to average vehicle speed. U.S. studies show typical speed reduction of one to two mph.
- Little or no effect on traffic noise
- Minimal effect on traffic safety and overall accident experience
- Mixed community reaction. Some residents feel safer with narrower streets. Others dislike narrow streets because of loss of on-street parking and other conceivable inconveniences.

### *Costs*

Costs can vary considerably. Physically narrowing a street may be very expensive (\$60.00 per lin ft) if concrete curbing and landscaping is involved. Narrowing the street by use of pavement markings is relatively inexpensive. (paint + man-hour costs).

### *Additional Considerations*

Typically, physical narrowing of the street should be accompanied by street beautification programs, which provide landscaping, wider sidewalks, bike lanes, or other amenities along the street. These amenities are generally perceived as having a positive effect on the neighbourhood.

The minimum road corridor width in Grand Cayman is thirty (30) ft. The street narrowing or skinny street concept refers to a reduction in the travel lane width to allow for additional shoulder, landscaping, bike lanes etc.

## Turn Restriction Signs (ref: Appendix D)

Turn restrictions are a passive control technique involving the use of regulatory signing which prohibits certain traffic movements generally where an arterial and local street meet. Turn restrictions can be used in neighbourhoods where “cut through” traffic is a problem. Turn prohibitions involve the use of standard “No right Turn” or “No left turn” sign with or without time limitations. They are most effective when used during rush hours only if that is the time when “cut through” traffic occurs, thereby reducing neighbourhood inconvenience. They should be used at the periphery of neighbourhoods rather than within them.

Violations are likely wherever a turn prohibition sign is installed and no reasonable alternative exists in the drivers eyes. Without regular police enforcement frequent flaunting of the regulations occurs and these signs become ineffective.

### *Effects*

- Very effective in reducing traffic volumes turning onto local residential streets. (if regularly enforced)
- Reduced volumes tend to lead to reduced speeds on residential streets, particularly during rush hour periods.
- Noise on residential streets is generally improved with impacts transferred to other streets.
- Safety is improved on residential streets.
- Community reaction is generally positive. Most turn restrictions are in fact installed out of community concern over “cut through” traffic.

### *Costs*

Minimal – Costs of sign plus labour to erect (< \$50 per sign)

### *Additional Considerations*

Wherever arterial street constraints are the cause of cut through traffic, turn restriction signs should be the first option considered, as it is an effective yet relatively low-cost solution.



## Street Closure (ref: appendix E)

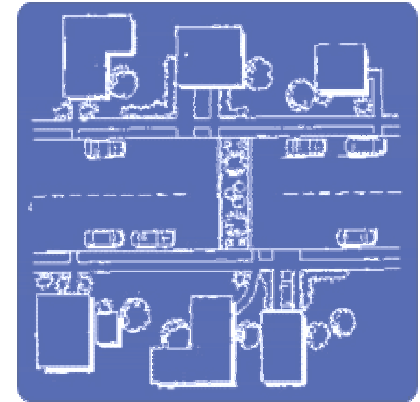
A street closure for the purpose of residential neighbourhood traffic control is defined as closing a street either at one end or the other, or at a mid block location. The purpose is primarily to eliminate unwanted through traffic. Street closing has high political implications therefore PWD would never close a street without the approval of the Commissioner of Police, Traffic Advisory Panel (TAP) and other relevant agencies.

### *Effects*

- The impact on traffic volume is drastic, reducing traffic volume to that which is generated by the land use on the abutting properties.
- Speed reduction is drastic, reducing speed to that normally associated with short dead-end residential streets.
- There is a substantial increase in traffic safety. The neighbourhood abutting the closed street has less traffic and the traffic that remains is all-local, usually well known amongst themselves. There is also safety improvement to the main street. Traffic entering or exiting the main street is eliminated at the closed street and relocated at adjacent intersection with better traffic control.

### *Additional Considerations*

The reduced access to the closed street should be reviewed prior to the actual closing, especially for emergency services such as police, fire and ambulance



## Small Roundabouts & Calming Circles (ref: appendix F)

A mini roundabout is a raised geometric control island (circular in nature), in the centre of an intersection of local streets. A typical calming circle would be about 16 ft in diameter. Traffic travelling through the intersection must avoid the island. This affects the path and speed of the traffic. Calming circles may be used with or without stop sign control of the intersection. Frequently the island is landscaped with low growing shrubs and a tree.

### *Effects*

- The impact on traffic volume is minimal
- Speeds near the intersection are reduced so that vehicles can avoid the centre circle. Speeds in the middle of the block tend to increase as drivers tend to try and make up for lost time.
- There is a noted increase in the noise level as vehicles accelerate and decelerate near the roundabout.
- Depending on accident patterns, a positive change in accidents could occur. Roundabouts are proven to reduce accidents as they demand more drive alertness and employ a simpler yield on entry principle than conventional intersections
- Community reaction may be mixed. Some drivers see a roundabout as an unnecessary driver obstruction and a potential hazard.

### *Costs*

The typical cost of a mini roundabout with curbing and landscaping can be anywhere from \$5,000 to \$10,000.

### *Additional Considerations*

Neighbourhood roundabouts are fairly small and cramped. Confusion over the correct way to make a right turn usually occurs. Emergency vehicles and larger vehicles especially are compromised. In that regard, the Police and highway authority may allow right turns to occur around the circle or in advance of the circle.

## Median Barriers (ref: appendix G)

The use of median barriers for neighbourhood traffic control is a physical means for preventing left turning traffic on a major street from accessing a local street and through traffic from continuing on that local street. In using this technique as with other traffic diversion techniques, the impact of the diverted traffic should be assessed. Alternate routes for the diverted traffic should be analysed with regard to traffic carrying capacity and desirability.

### *Effects*

- The degree to which traffic volumes will be reduced on the minor street will vary dependent upon the proportion of traffic that is prohibited by the median barrier. If right turns onto and off the local street are a significant part of the traffic volume, there will be a significant volume reduction.
- When through traffic is reduced or eliminated, there will more than likely be an accompanying reduction in vehicle speeds.
- Reduced traffic volumes on the street closed to through traffic volume will result in reduced noise.
- It is anticipated that a reduction in traffic volumes created by the median barrier will also bring with it a reduction in accidents. There is also an added benefit to pedestrians that results by providing a safety island to help in crossing the major street.
- The reaction from people on the affected residential street is generally positive, since they are typically the ones generating the complaints leading to the controls.

### *Cost*

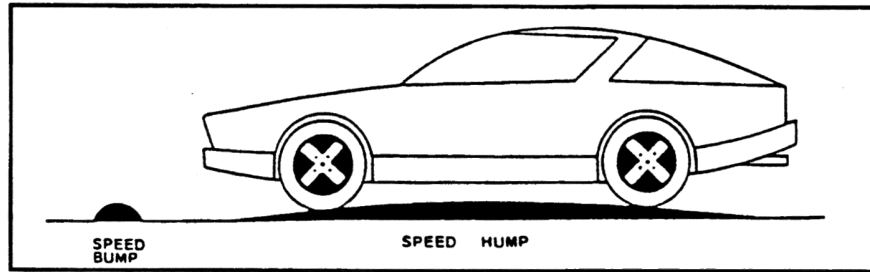
Costs for the construction of a median barrier will vary dependent on the need to widen the roadway on which the median barrier is installed.

## Speed Humps/Bumps (ref: appendix H)

Speed humps and bumps are design features, which rise above the roadway surface and extend across the roadway perpendicular to the traffic flow. Speed bumps are typically 3-6 inches high and 1 to 3 ft long (shorter than the wheel base of the automobile). They are typically used in low speed parking lots and private streets. Speed humps, on the other hand, are 3 to 4 inches high and 12 ft long (longer than the wheel base of an automobile).

### *Effects*

- Speed bumps and humps will often reduce traffic volumes on the streets where they are installed. The degree of traffic reduction is dependent upon the number and spacing of the bumps/humps, the amount of cut-thru traffic, and the availability of alternate routes. Speed humps/bumps can be quite effective in deterring trucks and larger vehicles from using a street.
- Speed bumps are effective in slowing vehicles travelling at typical residential speeds to approximately 5 mph when crossing the bump. Speed humps generally slow vehicles travelling at typical residential speeds to approximately 15 mph.
- Speed bumps/humps should only be installed on streets where the prevailing speed limit is 25 mph or less.
- Traffic noise is sometimes a problem because of the inherent braking and accelerating between bumps. Sanitation vehicles for example typically draw a lot of noise complaints because of the screeching and jarring noises they make as they traverse a street littered with speed humps.
- On the whole community reaction to speed bumps/humps is positive. In general speed bumps/humps are installed at the request of the public.



### *Legality*

A speed bump is not a traffic control device. It is rather a design feature of the roadway. The Highway Authority accepts it only if it meets the guidelines and policy procedures set forth by the PWD. If the device is considered to cause a major grievance to motorists then it may be removed.

### *Costs*

The cost of constructing a speed hump is in the range of \$1200 to \$2,000 per hump. That includes accompanying pavement markings and signs.

Speed bumps cost between \$300-\$500 if manufactured of Hot mixed asphalt. Pre-fabricated rubber speed humps are available at local retail stores for approximately \$300.

The impact on maintenance activities such as grass cutting and street sweeping is minimal. However humps will need to be replaced in instances where a roadway is to be resurfaced or where it is found to impact drainage flow patterns.

### *Additional Considerations*

Speed humps and bumps are by far the most popular form of traffic calming and their success is well documented worldwide.

## Chicanes & Lateral Shifts (ref: appendix I)

A chicane is a series of narrowings or curb extensions that alternate from one side of the street to the other forming S-shaped curves also called serpentine, twists, staggers or curvilinear streets.

A lateral shift is similar to a chicane and includes a series of bends and turns in the roadway intended to slow speeds on a roadway.

The installation of chicanes and or lateral shifts can occur in two ways;

1. Reconstruct the street with a curved centerline alignment and a uniform roadway width.
2. Introduce chokers or other types of barriers on alternate sides of the street to create a serpentine travel effect.

### *Effects*

- Little or no effect if the same number of travel lanes are retained for both the before and after situation.
- Little or no effect for curved alignment, uniform width construction.
- Minimal noise impacts
- Mixed results in terms of traffic safety. Some studies indicate accident reduction even though motorists are generally concerned that curvilinear streets are more hazardous because they limit driver sight distances.
- Community reaction is generally mixed.

### *Costs*

Costs are generally high. Street reconstruction is expensive. Chicanes are best used in the initial design stages of a subdivision rather than a countermeasure.



## Other Devices

Other traffic calming devices such as full or partial diverters, chokers, short-block intersections, 4- way stops, etc may be allowed after careful engineering study by the PWD.

The proposed traffic calming device will be given consideration based on its capability to:

- Reduce traffic volumes
- Reduce vehicle travel speeds
- Installation costs/maintenance costs
- Traffic safety
- Noise impacts
- Community acceptance

## Subdivision 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 neighbourhood.

The principle intent is to produce a roadway network within which traffic is dispersed and slowed naturally without the need for physical traffic calming measures such as humps, chokers, etc.

PWD shall adopt the following principles for all new subdivision plans under review in order to eliminate the negative impact potential of speeding and cut-thru traffic:

- Four way intersections should be avoided. Local residential streets should not intersect in such a way as to result in a four way intersection; except where at least two legs of the intersection are a short loop or cul-de-sac street with little potential for heavy cross-intersection traffic. Where four-way intersections are unavoidable a roundabout should be installed.
- As a rule of thumb subdivision roads should have a centerline radius of no less than 100 ft and no more than 200ft. Curves of a radius of less than 100ft will not be safe at a driving speed of 20 mph. On the other hand curves with a radius of more than 200ft will generate traffic speeds in excess of 25 mph.
- Curvilinear roadway construction is encouraged for roadway lengths exceeding 600 ft. Chicanes (serpentines) and lateral shifts in subdivision roads are highly recommended.
- Roundabouts, short-block intersections are encouraged on long straight-a-ways in order to deter speeding and cut-through traffic.

- No subdivision should be designed with a local street exceeding 600-900 ft in length. Where unavoidable a local street may extend to 1/4/ mile provided the street is of curvilinear design and or includes roundabouts, neckdowns, or lateral shifts to discourage speeding.
- Promote subdivision street interconnectivity. Interconnected streets in and between subdivisions give pedestrians many alternative walking paths and helps shorten walking distances. More importantly when streets are interconnected in this way, motorists have many different routes to follow. Traffic gets dispersed throughout the subdivision and reduces the volume of cars using any particular street in the network.
- Implement forced-turn channelization (channeled islands) where necessary. Where a subdivision access road intersects a major arterial road it is often necessary to apply this very effective access management tool. A channeled island may be used to force vehicles to make left-turn only movements. At minor entrance/exitways to subdivisions channeled islands allow for unsignalized intersection control, reduced accidents caused by right turn conflicts and prevents through traffic from executing specific movements at an intersection.

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# INCREASED ENFORCEMENT

## Appendix A

- **Crossing Guards for Schools**
- **Increased Police Presence in Neighbourhoods**
- **Neighbourhood Speed Watch Programs**
- **Portable Speed Display or Speed Radar Warning Signs**

Programs of this nature are not highly developed in Grand Cayman as with other countries. There is, for example, no official crossing guard training program, however some local schools have been using hired personnel to assist with traffic control and pedestrian safety during school start and finish times. Police presence is also evident at some district primary schools during morning peak hours.

Neighbourhood patrols by police is hampered primarily by budget and manpower constraints. Neighbourhood speed watch programs do have potential. It basically relies on neighbourhood participation to create awareness and offer help with catching and prosecuting offenders. A personal letter may be sent to local residents by police asking for their cooperation. Signs may be erected declaring a neighbourhood as a speed watch zone. Volunteer residents may also be given radar units to record speeds of repeat traffic offenders on a subdivision street. Plate numbers are reported to the police and a warning letter sent to the offender.

Radar warning and speed watch signs can be effective in alerting or reminding a motorist to the fact that he/she is in a residential area. The problem is that it is usually residents that live in the area and know where and when radar watches are prevalent, that commit speeding offences.



POLICE  
RADAR



# NEIGHBOURHOOD WARNING SIGNS

- **School Zone Ahead**
- **Slow Children**

A variety of signs or even banners may be used to try and warn of the presence of children in a residential neighbourhood. In Grand Cayman only the School Zone ahead sign is a legal driver-warning sign. It's purpose is to warn the driver that he/she is approaching an area where there are school children, and therefore to drive with caution.

In a residential subdivision there is no restriction to using signs such as “Slow Children” or “Caution Children”. Some neighbourhoods may even opt for attention grabbing banners that may prove to be more effective at reminding motorists to be cautious of their speed in that area.



School Zone



Children warning signs not enforceable but considered an effective warning and driver awareness tool especially if used with an eye-catching fluorescent colour background.



Neighbourhood banners

# STREET NARROWING

**Chokers:** (aka pinch points, neck downs, bulb outs, knuckles)

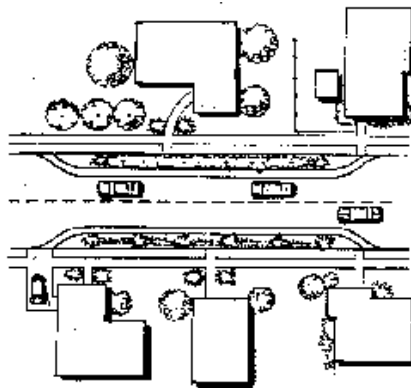
Curb extensions at mid-block or intersection corners that narrow the street by extending the sidewalk or widening the planting strip. Chokers can leave the road cross section with two lanes or with a single lane.

**Design Issues:** Some applications use an island which allows drainage and cyclists to continue between the choker and the original curb line. Chokers are typically designed to narrow the road to 20ft for two way traffic.

## Other narrowing methods

Rather than physical countermeasures such as chokers some transportation experts favor what is termed the ‘skinny street’ concept. This can be implemented from the design stages or after-the-fact with a complete street reconstruction. Some U.S. counties have gone as small as an 9 ft width for one-way traffic and 18 ft for two-way traffic and added in a greater landscape element. The perception of street narrowing may be achieved using pavement markings that indicate narrower lanes with remaining roadway space striped as a bike lane and/or on-street parking.

**PWD’s definition of street narrowing does not include a reduction of the minimum thirty (30) ft corridor width for residential streets. All subdivision roads shall have a minimum corridor width of 30 ft. Street narrowing or ‘skinny street’ refers to the reduction of the travel lane width and not the corridor width.**

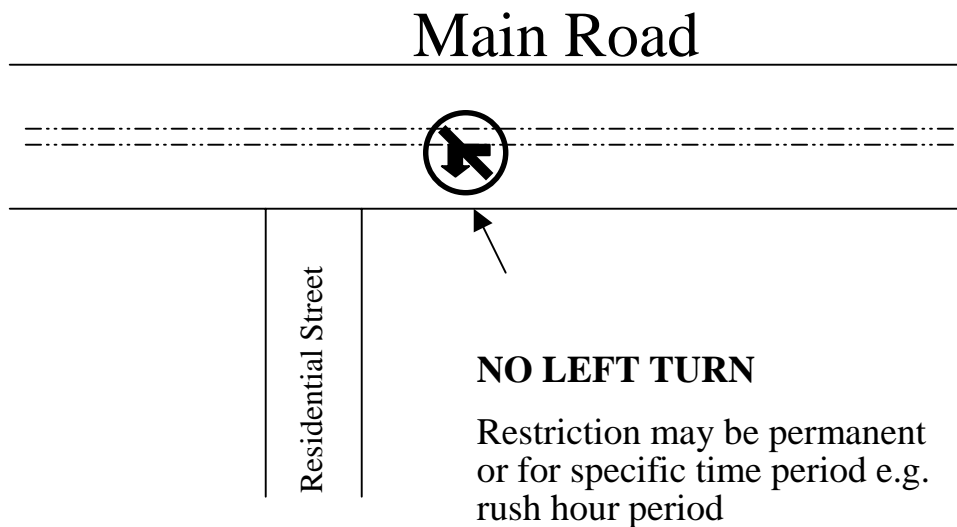


# TURN RESTRICTION

## Appendix D

Turning to: LEFT or RIGHT (indicated by arrow on sign) is prohibited. Sign may or may not include a time limitation.

*The turn restriction sign is an official traffic control device and recognized as a mandatory traffic sign (signs that must be obeyed) in the Cayman Islands Road Code.*



Colours: white background, signal red border and diagonal stripe, with black symbol



# STREET CLOSURES

## FULL CLOSURES (cul-de-sacs, dead ends)

Full street closures are barriers placed across a street to completely close the street to through-traffic, usually leaving a sidewalk, foot or bike-path open for non-vehicular traffic.



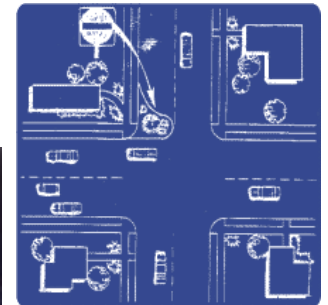
Full Road Closure – Crewe Road & Crewe Road Bypass. No access to or from higher order arterial.

## PARTIAL CLOSURES

Half Closures that block travel in one direction for a short distance on otherwise two-way streets. These can be a most effective means of controlling unwanted turns onto a neighbourhood street; Essentially used as a permanent turn restriction.



Permanent turn restriction onto local street. Vehicles may exit but not enter from this end of the street.

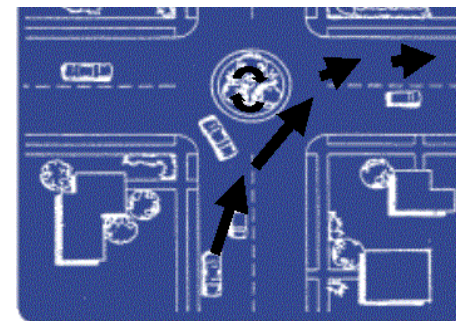


## SMALL ROUNDABOUTS & CALMING CIRCLES

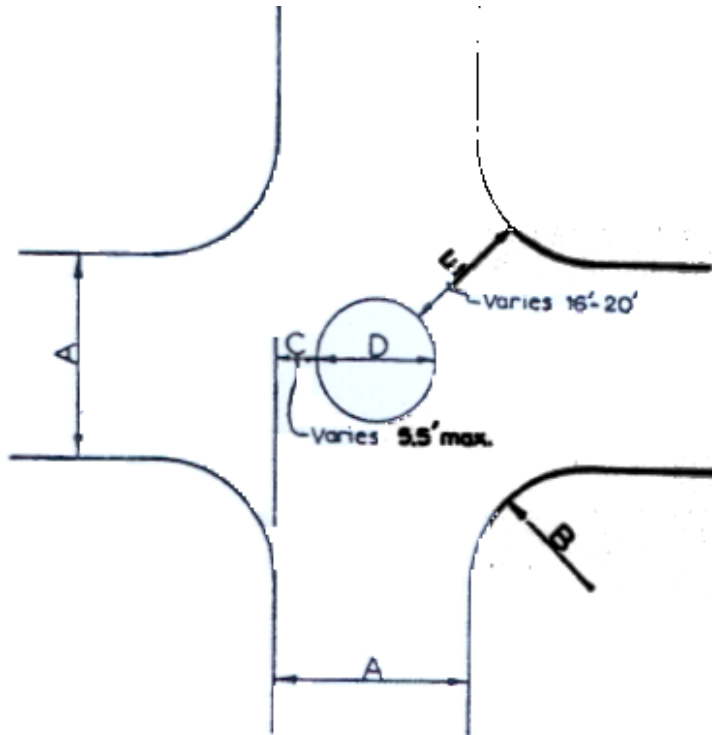
**Description:** Raised islands placed in intersections, around which traffic circulates; motorists give way to motorists already in the circle (intersection). A roundabout is a most effective traffic calming tool as it requires drivers to slow to a speed that allows them to comfortably maneuver around them. Calming circles (aka traffic circles) when used in a neighbourhood setting may be give-way or stop controlled. For the most part they will consist of a small circular curbing placed in the center of an intersection for the sole purpose of discouraging speeding through the intersection.

**Applications:** Intersections of local or collector streets. Not practical for intersections with higher volume of large turning trucks. **Calming circles are prescribed no place other than residential subdivisions, and where there is little or no truck traffic.**

**Special Exceptions:** In many cases where calming circles are used they are outside the minimum design standards used for roundabouts. Larger vehicles (fire, garbage disposal) cannot negotiate right turns at an intersection. A special exception is made for such vehicles allowing them to pass on the right hand side of a traffic circle to complete a right hand turn.



Right turn exceptions for large vehicle



**Calming Circle Intersection Diagram**

**Legend**

- A** Street Width
- B** Curb Return Radius
- C** Off-set Distance
- D** Circle Diameter
- E** Opening Width

**Optimum Criteria**

Off-Set Distance	Opening Width
5.5 ft max	16 ft min
5.0 ft	17 ft
4.5 ft	18 ft
4.0 ft	19 ft
3.5 ft or less	20 ft

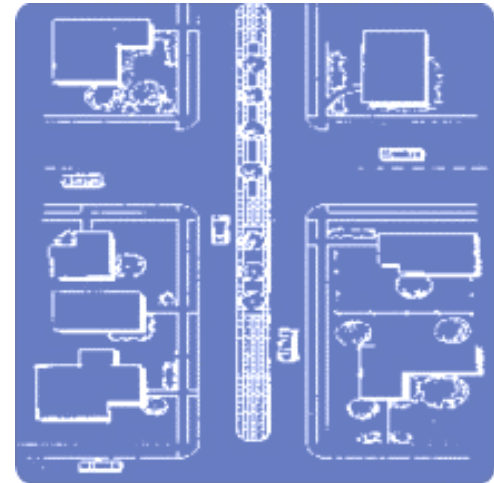


PWD crewmen construct small roundabout on higher arterial street.

# MEDIAN BARRIERS

Concrete medians are typically raised islands in the centre of a street and continuing through an intersection to block right turn movement from all intersection approaches.

A median barrier will typically only be applied after other measures have failed or been determined inappropriate. They can prove controversial when used in certain commercial environments, or to divide neighbourhoods by income or race.



# SPEED BUMPS/HUMPS

The typical acceptable width of a speed hump is 12 to 14 ft. Some roads agencies have experimented with 22' and 30 ft wide humps or tables. Humps are often placed 200 to 600 ft apart.

### Design Issues:

- Hump shapes are generally either parabolic or flat-topped.
- Acceptable humps heights are between 3 inches and 4 inches.
- Difficult to construct precisely.
- Often have signage (advanced warning signs).
- Typically include pavement markings (zig-zag, sharks tooth, chevron, zebra).
- Tapered edge near curb to allow unrestricted stormwater runoff.
- Can be hazardous to cyclist and motorcycles (especially if not clearly visible).

### Potential Impacts:

- Speeds determined by hump spacings and height
- Possible increase in traffic noise caused from braking/acceleration of vehicles (particularly large vehicles).



14ft hump w/chevron markings



12 ft hump w/ sharks tooth markings



12 ft hump w/ reflective yellow striping

# SPEED HUMPS

## Road Markings



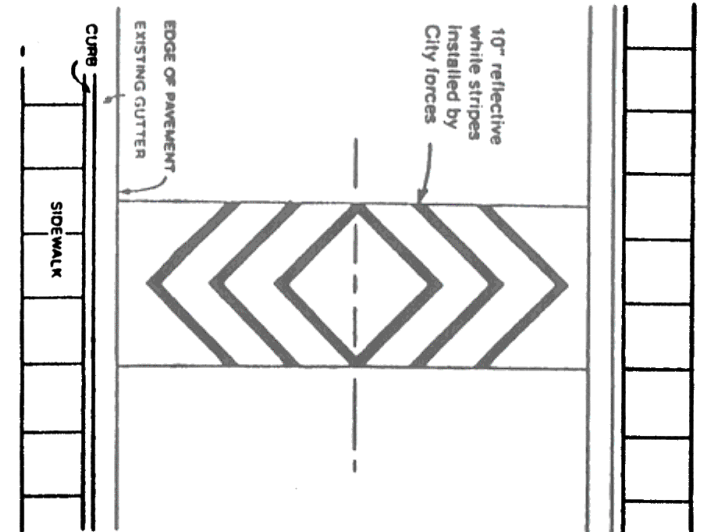
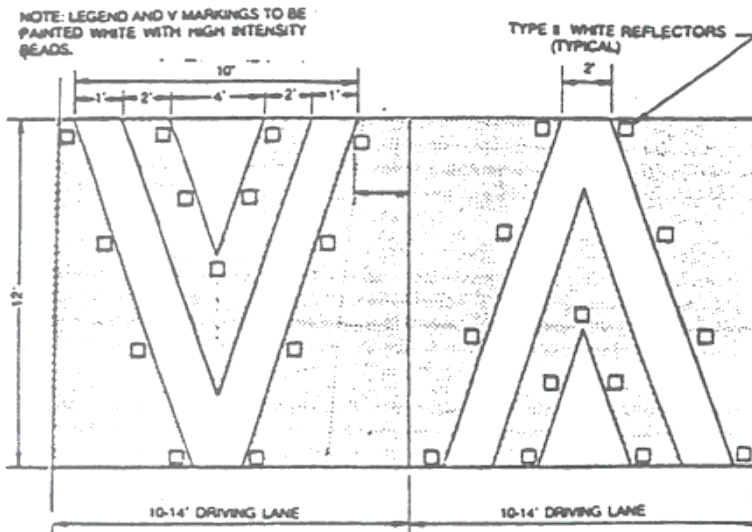
V-Markings Style Hump



Sharks-tooth Style Hump



Chevron Style Hump





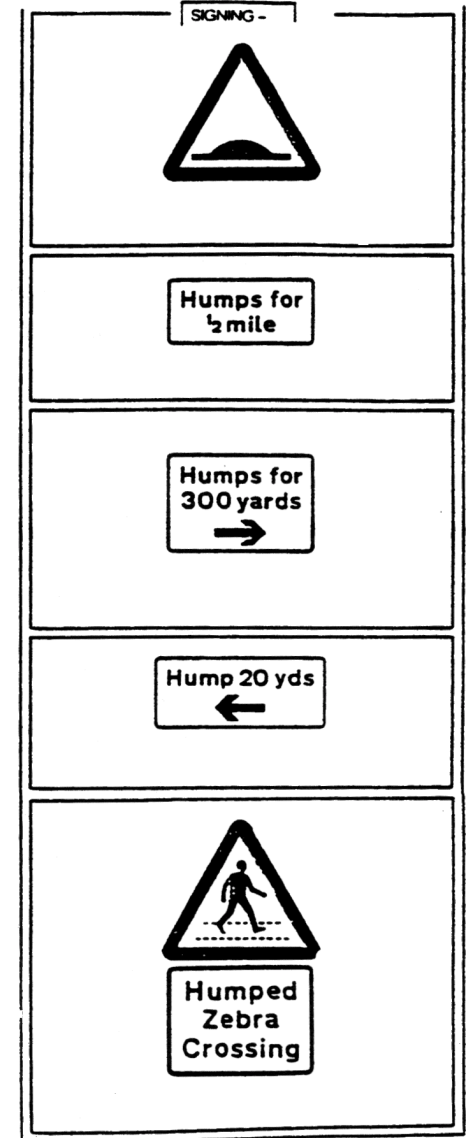
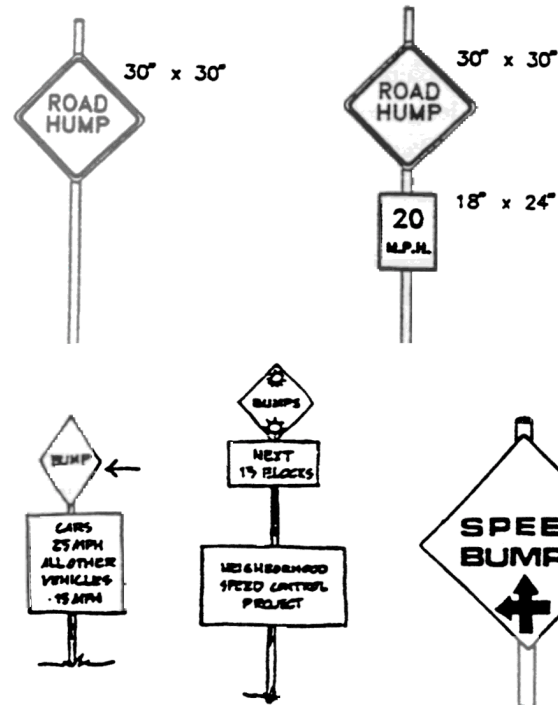
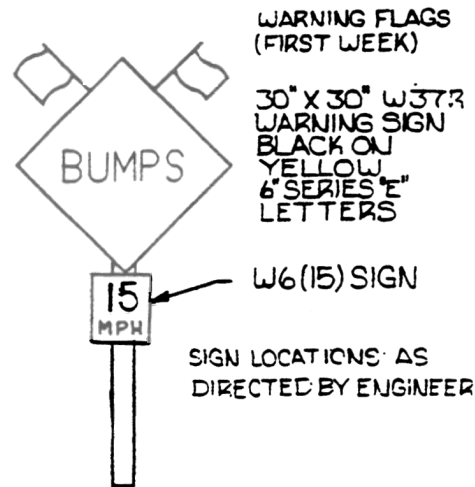
# SPEED HUMPS

## Advanced Warning Signs



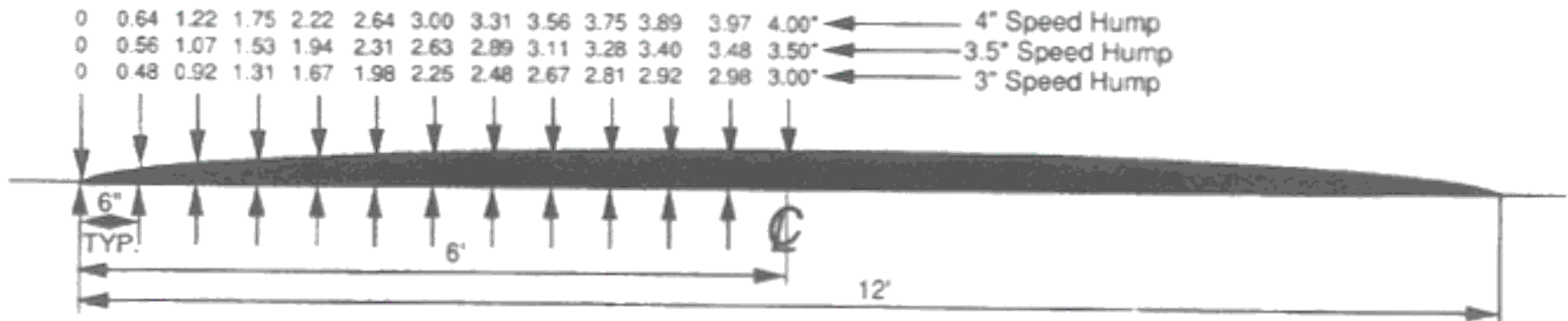
PWD – preferred signing

The preferred warning sign for speed humps in Grand Cayman is shown in the above photo. This is the European and Australian standard warning triangle with a hump profile drawn in between. Various other speed hump warning signs are found throughout U.S.. Typically U.S. signs will have the W8 diamond shape with a bright yellow reflective background. The words “bump”, “road hump” or some variation thereof shall be present on the sign.

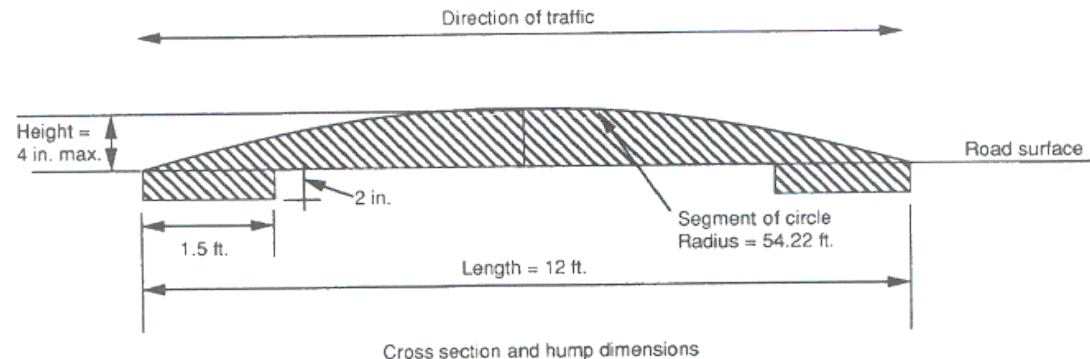


# SPEED HUMPS

## 12ft-Hump Cross Section



The twelve (12) ft wide hump is the most widely used hump on residential streets. Three (3) inches is the typical height; A 3" hump can be expected to cause speeds of 20 to 25 mph at the hump; a 4" hump creates crossing speeds of 15 to 20 mph. Humps should not exceed four (4) inches in height, and wherever a high percentage of trucks, buses or other long wheel-base vehicles are expected, a 3" hump is considered more acceptable.



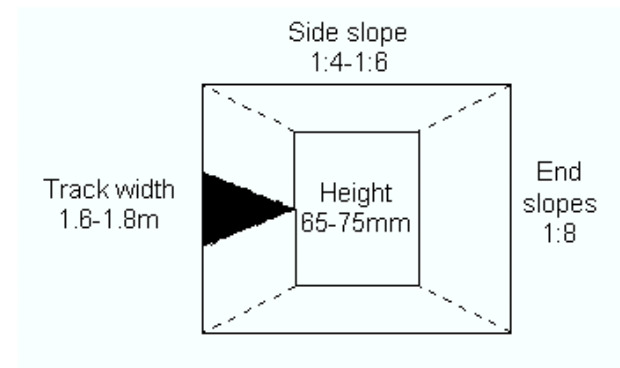


# SPEED CUSHIONS

Very popular in Europe, speed cushions are an alternative to speed humps because they do not affect hard sprung vehicles as much. A speed cushion is essentially a hump with sections cut out to match the axle width of a larger vehicle. This means that cars and light vans having smaller axle widths cannot avoid the humps but larger vehicles such as a fire trucks can pass thru the device avoiding the humped sections. The caveat to using speed cushions is that they should not be used where there is the likelihood of on-street parking as a parked vehicle will alter the alignment which a bus or fire truck has to make in order to match its wheels to the openings.



**Pre-engineered Rubber Cushions**



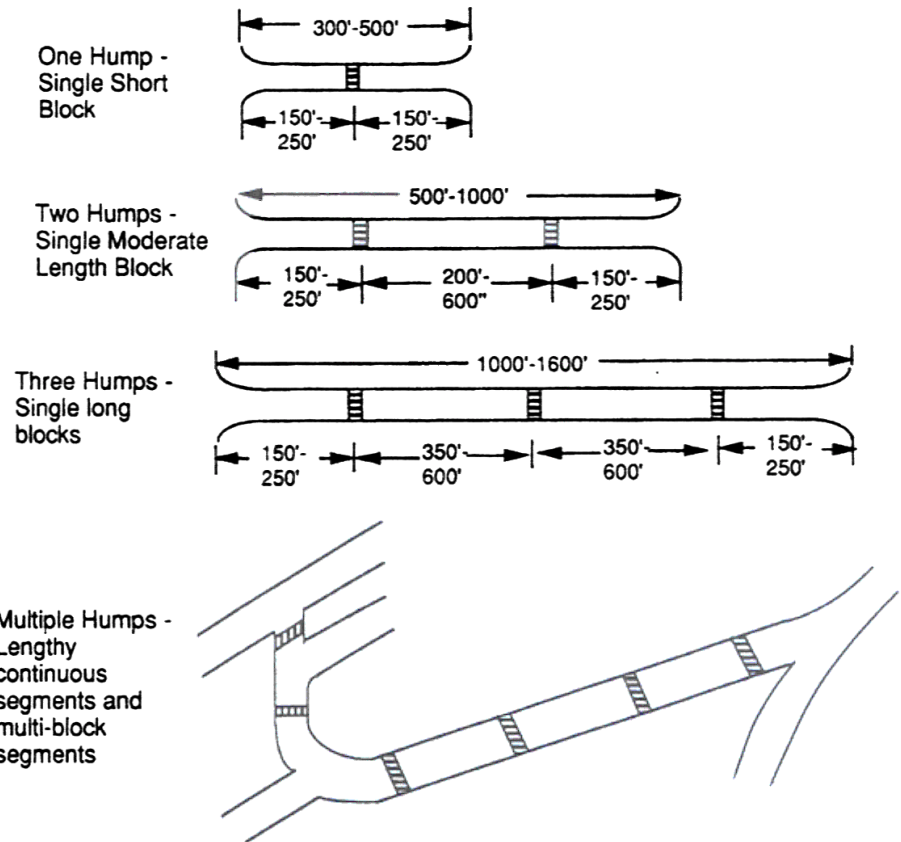
**Plan detail of HMA or concrete cushion**

# SPEED HUMPS

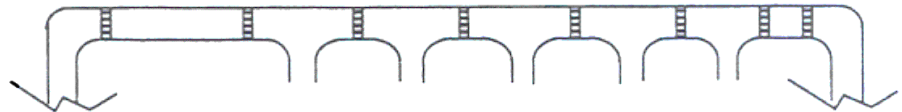
## Spacings

The current practice is to place speed humps from 200 ft to 750 ft apart. On a 25 mph street experience has shown that humps should be placed at approximately 250 ft intervals.

The accompanying diagram is a guideline for determining the number of humps and placement of the humps for various street segment lengths.



At least one hump per block. Follow spacing concepts above within each component block. Maximum and minimum separation and "first hump" criteria may be relaxed somewhat to conform to particular site conditions.

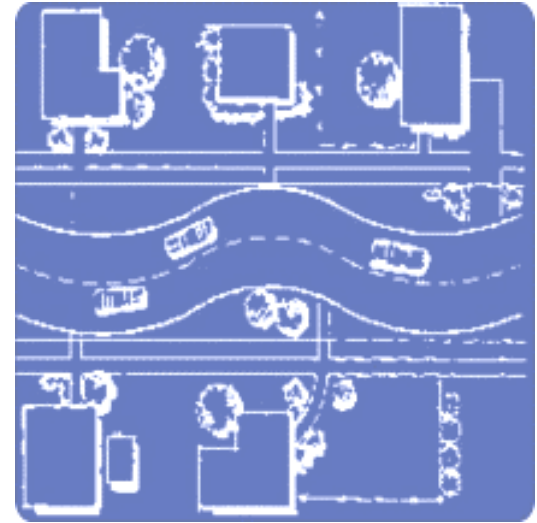


# CHICANES & LATERAL SHIFTS

Chicanes are a series of street narrowings forming S-shaped curves.

They are appropriate for midblock locations only and prove most effective when there is equivalent volumes on both approaches of the roadway.

Unless well-designed, chicanes may still permit speeding by drivers cutting straight paths across the center line. European manuals recommend shifts in alignment of at least one lane width, and deflection angles of at least 45 degrees.



End