

# CITY OF ORILLIA POLICY MANUAL

Part	2	Public Works	<b>2.6.1.1.</b>
Section	6	Traffic Calming	
Sub-Section	1	Manual	
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## 1 INTRODUCTION

### 1.1 Background

The Public Works Department receives numerous concerns, both real and perceived, from residents regarding high traffic volumes, short-cutting, speeding and overall neighbourhood safety. The City of Orillia does not currently have a traffic calming policy and concerns are addressed through data collection, site review, and front-line mitigating measures such as signs and line painting as well as traffic enforcement conducted by the Ontario Provincial Police, Orillia Detachment.

### 1.2 Purpose

The purpose of this policy is to provide guidelines, procedures and criteria for the initiation, investigation and implementation of traffic calming measures within residential neighbourhoods to address safety concerns related to speeding and excessive volume in a fair and efficient manner. Guidelines included in this policy will be applied to local and collector roadways within primarily residential neighbourhoods. The policy does not apply to arterial roadways.

While similar traffic related issues may exist on arterial roadways, their primary function is to move traffic efficiently. Therefore, traffic calming measure(s) that may be appropriate for use on non-arterial roadways would not be suitable for use on arterial roadways.

### 1.3 What is Traffic Calming?

Traffic calming is defined as “the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users.”<sup>1</sup> Traffic calming measures can be effective in reducing vehicle speed, excessive traffic volume and improve overall neighbourhood safety. Traffic calming measures combined with engineering, educational and enforcement tools, can significantly improve the safety of neighbourhoods.

The physical traffic calming measures referred to in the above-noted definition refer to a combination of vertical and horizontal deflections in the roadway as well as obstructions and traffic regulations. Traffic calming measures may include speed humps, raised intersections, traffic circles, curb extensions, curb radius reductions, diverters and raised median islands.

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<sup>1</sup> Canadian Guide to Neighbourhood Traffic Calming, Institute of Transportation Engineers, 1998, Page 1-1.

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The TAC/ITE Canadian Guide to Neighbourhood Traffic Calming provides a detailed list of traffic calming measures including a brief description as well as the potential benefits and disadvantages of each technique (presented in **Appendix A**).

## 1.3.1 Traffic Calming Advantages and Disadvantages

### Advantages

Traffic calming may:

- Reduce motor vehicle speeds;
- Reduce traffic volume;
- Discourage through traffic;
- May reduce collisions;
- Improve neighbourhood environment; and
- Reduce conflicts between roadway users.

### Disadvantages

Traffic calming may:

- Increase emergency vehicle response time;
- Reduce ease of access in and out of neighbourhoods;
- Result in expensive solutions (time and resources);
- Shift or divert traffic onto neighbouring roadways
- Increase maintenance time and costs (e.g. snow clearing, garbage pick-up); and
- Result in the implementation of measures some consider visually unattractive and/or cause increased noise pollution.

## 1.4 Objectives

The objective and purpose of traffic calming is to restore streets to their intended function by addressing undesirable traffic conditions such as speeding and excessive volume on local and collector roadways. The objectives of traffic calming and this policy are to:

### i. Increase the Safety of Neighbourhoods

Excessive traffic volume and speeding on residential roads is the basis for many of the concerns received from residents. Through the use of physical measures, alone or in various combinations and implemented properly, can alter driver behaviour and can improve safety on neighbourhood streets by reducing conflicts between street users. The resulting reduction in volume and speed will create a safer environment for all residents including pedestrians, cyclists, children, disabled persons and seniors.

### ii. Improve the Livability of Neighbourhoods

Traffic calming measures may restore the livability of a neighbourhood by minimizing the volume and speed of through traffic. As a result, negative impacts such as excessive noise, air pollution from vehicle emissions, volume of vehicles, and potential safety hazards are minimized. Traffic calming measures can aesthetically enhance the neighbourhood environment with design and landscaping.

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### iii. Restore Streets to their Intended Function

The purpose of traffic calming is to restore streets to their intended function. The principal function of a residential local roadway is to provide access to adjacent properties and is not intended to be through routes or move significant amounts of traffic. The principal function of a residential collector roadway is to provide access to adjacent properties and to provide connections between local roadways and other collector and arterial roadways.

### iv. Preserve Access and Minimize Impact to Emergency Services, Public Transit and Other Maintenance Services

The potential impacts to emergency services, transit and maintenance vehicles will be considered throughout the implementation of traffic calming measures. The needs of these services will be balanced against the need to slow and/or reduce traffic. In addition, this policy outlines the process through which all potentially impacted services will have the opportunity to comment on any proposed plans before implementation.

### v. Promote Public Participation and Community Support

Traffic calming measures have a direct impact on neighbourhoods and the residents living in them. For traffic calming to be successful, the neighbourhoods must be committed to and support the solution. An important part of the process includes resident communication and feedback in order for staff to understand the history of the traffic problems in the neighbourhood. Effective communication with residents provides staff with the opportunity to explain to residents the benefits of traffic calming measures while deterring them from less effective countermeasures.

## 1.5 Guidelines

The following guidelines will be taken into consideration when investigating, selecting and implementing traffic calming measures. This will ensure that the appropriate measures are considered fully, and the potential negative impacts are minimized. Following these guidelines will maximize the effectiveness of traffic calming while building community acceptance and support for the final recommendations.

Traffic calming measures will:

- Be considered only after education, enforcement and traffic engineering efforts have failed to produce the desired results.
- Be considered when there is a demonstrated safety, speed or short-cutting traffic concern and acceptable alternative measures have been exhausted.
- Be considered after focus is placed first on improvements to the arterial road network, such as adjusting signal timing.
- Include consideration as to whether an area-wide plan versus a street-specific plan is more suitable: an area wide plan should be considered if a street-specific plan would likely result in displacement of traffic onto adjacent streets.
- Be predominantly restricted to two lane roadways (one lane of through traffic in each direction) and a posted speed limit no greater than 50 km/h.
- Not impede non-motorized, alternative modes of transportation and be designed to

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- ensure pedestrian and cycling traffic is unaffected.
- Not impede emergency, transit and maintenance services access unless alternate measures are agreed upon.
- Maintain reasonable automobile access to City roadways.
- Consider parking removal on a project-by-project basis. Parking needs of residents should be balanced with the equally important functions of traffic, emergency vehicle access, transit, maintenance, bicycle, and pedestrian movement.
- Only be installed after Public Works Engineering staff has investigated existing traffic conditions and the necessary approvals have been received.
- Be monitored; follow-up studies will be completed to assess effectiveness and the results will be communicated to the community and Council.

## 1.6 Community Involvement

The objective and purpose of traffic calming is to restore streets to their intended function by addressing undesirable traffic conditions such as speeding and excessive volume on residential local and collector roadways. For traffic calming to be successful, the neighbourhoods must be committed to and support the solution. The only means of gaining this commitment is to involve the residents by informing them of the study location being considered for traffic calming measures. Another important part of the process includes resident communication and feedback as to the history of the traffic problems and possible solutions. Residents are encouraged to participate in the development of a traffic calming plan suitable to the neighbourhood and the concerns identified within it. Community involvement assists in the implementation of a plan without significant opposition upon completion and also enhances the credibility of the traffic calming program.

Communication with residents is made at various stages throughout the process as the traffic calming plan is developed and implemented. Traffic calming plans should be developed with an understanding of current and historical traffic patterns within the area under investigation.

In order to obtain a working partnership with the community, meetings will be scheduled and surveys delivered to residents affected by the implementation of traffic calming measures.

## 1.7 Environmental Assessment Act, 1990

Traffic calming is exempt from the Ontario Environmental Assessment Act and is not an undertaking subject to the Municipal Engineers Association Municipal Class Environmental Assessment (October 2000, as amended in 2007). Where appropriate, public consultation elements of the Municipal Class EA for a Schedule B project have been incorporated in this policy as a best practice.

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## 1.8 Appropriate Streets for Traffic Calming

This policy defines the types of roadways that are suitable for traffic calming in the City of Orillia. Traffic calming will only be considered on residential local and collector roadways and not on arterial roadways in the City. Through application of this policy and by applying good engineering judgment, traffic calming measures, when installed, will be done so in a manner which will ensure that they provide the most effective solutions while continuing to support the intended function of the roadway. For example, to ensure that transit service remains efficient on collector routes, curb radius reduction would not be recommended at locations where transit vehicles must turn right since curb radius reductions significantly slow the turning speed of vehicles.

### Local Roadways

The primary function of local roadways is to provide access to adjacent properties. Local roadways are not intended for use as through routes or as important links to move traffic within an area's overall road network.

*Local Roadway Examples: Peter Street, Matchedash Street, Mary Street*

### Collector Roadways

Collector roadways balance access to adjacent properties with the need to collect and distribute residential traffic travelling into and out of a neighbourhood. For the purposes of this traffic calming policy, the City's collector roadways are divided into 2 categories:

- **Minor Collectors:** Carry lower traffic volume (1,000-3,000 vehicles per day) between local roads and major collector roadways and some arterial roadways. Minor collectors help circulate traffic within individual neighbourhoods. Minor collectors link smaller crescent/cul-de-sac type local roadways to the larger road network but are relatively short as compared to major collector roadways which may extend from one side of the City to the other.

*Minor Collector Roadway Examples: North Street, Bay Street, Hughes Road*

- **Major Collectors:** Carry higher traffic volume (3,000+ vehicles per day) between local roadways, other collectors and arterial roadways. Major collectors intersect with two or more arterial roadways and quite often extend from one end of the City to the other.

*Major Collector Roadway Examples: Barrie Road, Brant Street, Gill Street, Forest Avenue*

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## 2 TRAFFIC CALMING PROCESS

The following process will be used when proceeding with a request for traffic calming. An established and formal process for investigating roads provides consistency and equality in the determination of traffic calming.

### 2.1 Process Initiation

Residents with traffic related concerns are instructed to submit their written request to investigate traffic calming within their neighbourhood to the City. City staff will then conduct a brief preliminary assessment to determine if the requested roadway meets the following Initial Screening Criteria.

#### 2.1.1 Initial Screening Criteria: Determination of Eligibility

When requests are received, a review of the roadway(s) is made to determine if the following initial screening criteria are met:

- Must be a residential local or collector roadway;
- Must have a minimum 500 Annual Average Daily Traffic (AADT);
- The posted speed limit shall not be greater than 50 km/h;
- All reasonable efforts have been made to address the concerns utilizing other means including engineering, education and enforcement tools;
- Roadway must be assumed and maintained by the City of Orillia;
- Zoning should be primarily residential in nature; and
- Requested street or section of street must be a minimum of 150m in length.

Following this initial review, the City will inform residents as to whether or not their location meets the initial screening criteria. Residents with requests that meet the above-noted initial screening criteria will receive information about the traffic calming process, as well as a copy of the City's Traffic Calming Neighbourhood Petition (see Section 2.1.3). Roadways that do not meet the above-noted criteria may still be eligible for other mitigating measures and/or police enforcement initiatives, as discussed below.

#### 2.1.2 Ineligible for Traffic Calming based on Initial Screening Criteria

For locations not meeting the above-noted initial screening criteria, staff will consider front-line mitigating measures to address the neighbourhood traffic concerns. These methods could include tools such as the use of driver feedback boards, targeted police enforcement, sign installation and pavement marking modifications.

Front-line mitigating measures will often not require public involvement such as surveys and public meetings. However, they may require monitoring and evaluation to assess their effectiveness. Details regarding front-line mitigating measures are provided in **Appendix B**.

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## 2.1.3 Traffic Calming Neighbourhood Petition

After it has been determined that the requested location meets the initial screening criteria, the proponent must submit a written request, accompanied by a petition. Staff will provide a copy of the petition to the proponent. The focus of the petition will centre on whether or not there is neighbourhood support for the City to initiate an investigation into the need for traffic calming on the requested roadway.

The petition must contain an indication of support from at least 51% of the households with direct frontage or flankage onto the section of roadway that has been identified as the location for the potential implementation of traffic calming measures, as defined by Public Works Engineering Staff. Each household is represented by one signature, regardless of the number of people in the household. This step in the process is crucial in determining the level of concern from the residents. Failure to meet the 51% support level will result in termination of the investigation; meeting the required 51% support level will trigger the commencement of a traffic calming investigation.

## 2.2 Data Collection and Analysis

If the requested location meets the initial screening criteria and petition results indicate that there is at least 51% support, data collection and analysis will commence. The collection of traffic data, as deemed necessary by Public Works Engineering Staff, will serve to provide a better understanding of the current traffic conditions and to prioritize locations for the investigation of traffic calming.

### 2.2.1 Data Collection

Staff will conduct the necessary traffic studies to quantify and qualify the traffic concerns within a neighbourhood. The data collected will pertain to vehicle volume, vehicle speed (85<sup>th</sup> percentile), collisions, pedestrian activity, origin/destination study if request relates to short-cutting traffic, and historical site-specific information. Standard traffic engineering data collection methods will be used for the collection of data.

Once collected and summarized, the data will be utilized in the point assessment system to determine a total point value (See Section 2.2.2.). This assessment will be used to determine the need for traffic calming and assist in setting priority for locations of consideration.

If the implementation of traffic calming could result in undesirable traffic displacement onto parallel roadways, 'before' traffic volume data will be collected as deemed necessary by Public Works Engineering staff. This data will then be utilized to determine if corrective action is required on parallel streets after comparing the 'before' and 'after' traffic volume.

### 2.2.2 Point Assessment System

The point assessment system is a screening process focused on the various attributes of a roadway in order to quantify its potential need for traffic calming. By means of

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assigning weighted points based on the severity of certain road attributes (e.g. 85<sup>th</sup> percentile speed), this process will bring to the forefront roadways requiring consideration while quantifying the current conditions. A point assessment system is provided in **(Appendix C)**.

The point assessment system will also be used to prioritize locations for consideration. Those locations with an extremely high point assessment will be given priority based on the quantitative nature of the point assessment system. Depending on funding availability, locations will be selected based on the point system with those locations with the highest points constructed first. If funding does not permit all locations to be constructed in one year, roadways will be carried forward to the next year when they will then be re-prioritized to include any new locations.

The minimum number of points required to proceed with the investigation of traffic calming measures differs based on the classification of roadway. In keeping with the objective of restoring roadways to their intended function, local and collector roadways are designed and expected to convey varying levels of traffic volume. This, in turn, has a bearing on the minimum point value required to proceed, as traffic volume is a major consideration.

Based on this, the following are minimum point values for each road type:

- **Local roadway** → **minimum 35 points**
- **Collector roadway** → **minimum 52 points**

Should a location fail to meet these requirements, residents will be notified in writing and the investigation for traffic calming measures will discontinue. Locations failing to meet the requirements for the implementation of traffic calming measures are not eligible for re-evaluation for a period of three years following notification. However, staff will continue to address the concerns of the residents by means of the *front-line mitigating measures* (refer to **Appendix B**).

## 2.3 Traffic Calming Design Considerations

The data collected combined with site visits, historical information, future maintenance and construction plans, as well as resident feedback will be taken into consideration to determine potential traffic calming measures.

Appropriate traffic calming measures will be determined based on the list of traffic calming measures outlined in Section 3 of this policy. The traffic calming design could include one or more different types of traffic calming techniques. The proposed traffic calming measures will be in accordance with the design guidelines outlined in the Canadian Guide to Neighbourhood Traffic Calming and the engineering judgement and experience of staff.



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The preferred design will first be presented to emergency, transit and maintenance services. It will then be presented at a public meeting. After any required modifications to the preferred design as a result of this input, a traffic calming survey will be delivered to affected residents.

## 2.4 Comments from Emergency/Transit/Maintenance Services

Staff will provide the preferred design to the relevant review agencies (e.g. emergency and transit services). Comments from the potentially affected services will be solicited and feedback with respect to possible impacts will be encouraged. As required, City staff will work with agencies to modify the design, as necessary. While it is preferable to modify the traffic calming design, if modifications are not able to remedy agency concerns, the traffic calming process will be discontinued for the roadway under consideration and residents will be notified.

## 2.5 Define Survey Canvas Area

Using summarized comments from the submitted petition and preliminary information about the roadway and surrounding area, staff will define the survey canvas area. As part of this process, surrounding roads may be identified as part of the investigation. As a minimum, households with direct frontage onto the roadway to be investigated will be surveyed, in addition to each property whose side yard abuts the subject roadway section. Households that do not directly front the subject roadway, but who have no other option but to use the section of roadway where traffic calming is being proposed (e.g. in the case of a cul-de-sac), will not receive the survey; however a public meeting notice will be delivered to their homes.

## 2.6 Public Input Notice

Notification will be published in the local newspaper and on the City's website. The purpose of this notice will be to provide notification to the public regarding the meeting date, time and location. It will also present an opportunity to solicit comments on the alternative traffic calming measures.

## 2.7 Public Meeting

Staff will host a public information meeting to present the purpose, objectives and implementation process of traffic calming in general. Staff will then present and explain the rationale behind the specific preferred traffic calming design. The public meeting will provide residents with an opportunity to become involved in the process, learn more about the proposed traffic calming treatment(s) and to provide their feedback.

## 2.8 Community Support Survey

Based on input received from emergency, transit and maintenance services as well as from the public at the public meeting, the preferred design will be modified. The objective of the community support survey is to determine the level of support for the traffic calming design and to provide an opportunity for the most directly affected

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residents to oppose any modifications to the road. It is also intended to measure the support of the preferred design proposed to the residents.

## 2.8.1 Survey Scope

Surveys will be delivered by mail and at a minimum, will contain:

- A brief description of traffic calming, including its advantages and disadvantages;
- The results of the traffic studies undertaken by staff;
- A survey question asking if residents are in favour, opposed or neutral to the implementation of traffic calming measures in the identified location(s);
- The preferred traffic calming design;
- A request for comments and feedback; and
- An indication that this is the final opportunity to modify and improve the preferred design to address any outstanding concerns and to incorporate resident input.

## 2.8.2 Measuring Community Support

In order for the process to continue, a minimum of **25%** of total surveys delivered must be returned to the City. Of this **25%**, **60%** acceptance for the implementation of traffic calming is required<sup>3</sup>. This reinforces that community support is vital for the ultimate success of traffic calming.

**For example**, if **100** surveys are delivered, a minimum of **25** surveys is required to be returned. Of those **25** surveys, **15** must indicate acceptance for the implementation of traffic calming measures.

If this support rate is not met, the process will cease and a notification of failure to meet the community support levels will be sent to the residents on the mailing list.

## 2.9 Finalize Preferred Traffic Calming Plan

Using technical data, community feedback, and in keeping with the goals, objectives and principles set out in this policy, staff will finalize the preferred traffic calming design to be put forward as the recommended preferred traffic calming plan. In finalizing the preferred traffic calming plan, general consideration will be given to the various aspects of road design such as utility placement, landscaping, sign requirement and drainage.

## 2.10 Detailed Traffic Calming Design

With a recommended preferred traffic calming plan in hand, detailed engineering drawings are required. These drawings will provide a high level of detail taking into consideration but not limited to the following:

- Surface drainage
- Utility locations or relocations

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- Sub base requirements (i.e. granular type and thickness)
- Surface type (asphalt, concrete, decorative concrete)
- Roadway grade
- Sightlines and sight distances
- Adherence to Guide to Neighbourhood Traffic Calming, Transportation Association of Canada Geometric Design Guide and Town design standards
- Requirements for warning signs and pavement markings
- Driveway and intersection locations
- Cost considerations

At this point, the feasibility of the preferred traffic calming measures will be evaluated in detail. If, during the detailed design stage, limitations are identified which challenge the feasibility of the plan, alternatives will need to be considered. This may include alterations or a re-development of the preferred plan. If significant or major changes to the plan are required due to design constraints, agencies and residents on the mailing list will be consulted and notified of any changes. If staff believe that the required modifications to create the detailed design result in a significantly different final design from that which was presented to residents as part of the survey, staff may recommend another survey and/or public meeting.

## 2.11 Recommend Final Plan to Budget Committee

If the traffic calming design is such that budget monies will have to be allocated to implement then a traffic calming project budget request recommending the implementation of the recommended preferred traffic calming measures will be submitted to Budget Committee for consideration and approval.

## 2.12 Resident Notification

Staff will deliver notices to residents to inform them that traffic calming has been either approved or not approved by City Council on the subject roadway. The notice will be sent to the same mailing list used to deliver the traffic calming survey and any other persons having requested notification throughout the process. If the traffic calming plan is approved, the notice will include information about the traffic calming review process for the subject roadway and will include the following details:

- Copy of Preferred Traffic Calming Plan clearing showing locations of treatments;
- Information about where residents may review the detailed design drawings; and
- Implementation timeframe

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## 2.13 Implementation of Traffic Calming Measures

Upon approval of Council, resident notification, and sufficient funding, traffic calming measures will be implemented. Residents will be notified of implementation timelines through the contact mailing list. Where feasible, staff may decide it is beneficial to phase in the traffic calming plan through the use of temporary or removable traffic calming measures such as pavement markings or barrels. This will allow time to examine the impact of the measures and their effectiveness before committing funding to permanent treatments.

## 2.14 Evaluation and Monitoring

Public Works Engineering staff will monitor the roadway to determine the effectiveness of the utilized measures and their impact on the surrounding road network. This information will be used in recommending similar measures in the future. In addition to conducting before and after speed studies, 4-6 months after implementation, the City will conduct studies to assess if the traffic calming plan has resulted in significant amounts of traffic diverting to adjacent, parallel streets. These after studies will be compared with the City's 'before' studies to determine the change in traffic volume. While every attempt will be made to avoid transference of traffic onto other streets, if it is found that traffic has increased by greater than 15% (with a minimum of 150 vehicles), on a parallel street due to traffic calming implementation, the City will explore corrective action opportunities to remedy the situation and/or reduce the impact.

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<sup>3</sup> Canadian Guide to Neighbourhood Traffic Calming (1998) recommends minimum of 50-70% support from respondents, Page 2-6.

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## 2.15 Removal of Traffic Calming Measures

Traffic calming devices may be removed, at the request of residents provided that at least the same level of support exists to remove as was measured for installation (25% returned surveys, with 60% of respondents agreeing to the removal). The survey will be delivered to the same residents as was initially done to gauge support for traffic calming. Traffic calming measures must be installed for at least 2 years before starting the process to remove them. If traffic calming devices are removed, the subject street must wait at least three years before requesting a new traffic calming plan; at this point the approval process will start over.

If a request to remove a single traffic calming device, within an overall traffic calming plan, is received, all traffic calming devices will be considered for removal. Depending on circumstances, it could be possible to remove a single device constructed as part of an overall plan, however, in most cases all devices work together to be effective and to ensure that traffic is not diverted where it should not be. The City reserves the right to remove traffic calming measures if it determines that they are ineffective or unsafe, or if they have created a negative impact that cannot be corrected. The City will mail out a notification and advertise on its website and in local newspapers informing of its decision to remove traffic calming measures.

## 3 TRAFFIC CALMING MEASURES

This section of the policy provides a brief description of each traffic calming technique that is appropriate for use within the City of Orillia.

### 3.1 Measures Considered for Use in Orillia

The Canadian Guide to Neighbourhood Traffic Calming identifies traffic calming techniques that are commonly used in Canada. However, the Guide notes that not all measures that have been used for traffic calming purposes are appropriate as traffic

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calming measures. Some measures, such as signing (stop signs and maximum speed signs) and rumble strips/textured pavement, for example, should not be used for traffic calming purposes. Although effective for other purposes, these measures have proven to be less effective for traffic calming and are therefore not recommended for use as traffic calming techniques in Orillia. The Canadian Guide to Neighbourhood Traffic Calming Table 3.1 lists traffic calming measures most commonly used in Canada (also included in **Appendix A**).

This section of the policy identifies the traffic calming measures (identified in **Table 1**) that are appropriate for the City of Orillia. Some traffic calming measures may be considered for both local and collector roadways, whereas others should be used only on one type of roadway.

Other factors affecting the applicability of traffic calming measures in Orillia include access for emergency vehicles, transit service, and ongoing maintenance of roadways. Measures that are not suitable for primary emergency response and transit routes are identified in the table.

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**Table 1- Applicability of Traffic Calming Measures in City of Orillia**

Traffic Calming Technique	Measure Applicable On:				
	Road Classification			Other Considerations	
	Local Roadway	Minor Collector Roadway	Major Collector Roadway	Emergency Response Route	Transit Route
Vertical Deflection					
Speed Cushion	YES	YES	YES	YES	YES
Horizontal Deflection					
Curb Extension	YES	YES	YES	YES	YES
One-Lane Chicane	YES	NO	NO	NO	NO
Curb Radius Reduction	YES	YES	YES	YES <sup>4</sup>	YES <sup>5</sup>
On-Street Parking <sup>6</sup>	YES	YES	YES	YES	YES
Raised Median Island	YES	YES	YES	YES	YES
Traffic Circle	YES	YES	NO	NO	NO
Road Diet	YES	YES	YES	YES	YES

<sup>4</sup> No curb radius reduction if emergency vehicles typically turn right at a particular corner being considered

<sup>5</sup> No curb radius reduction if transit vehicles typically turn right at a particular corner being considered

<sup>6</sup> No on-street parking on side of street if already banned on that side of street due to roadway width.

Narrower design standard does not allow room for parking on both sides.

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**Table 1- Applicability of Traffic Calming Measures in City of Orillia - continued**

Traffic Calming Technique	Measure Applicable On:				
	Road Classification			Other Considerations	
	Local Roadway	Minor Collector Roadway	Major Collector Roadway	Emergency Response Route	Transit Route
<b>Obstruction<sup>7</sup></b>					
Directional Closure	YES	YES	NO	NO	NO
Raised Median Through Intersection	YES	YES	YES	YES	YES
Right-In / Right-Out Island	YES	YES	NO	NO	NO
Intersection Channelization	YES	YES	YES	YES	YES
Diverter	YES	YES	NO	NO	NO
Full Closure	YES	YES	NO	NO	NO
<b>Signage</b>					
Traffic Calmed Neighbourhood Sign	YES	YES	YES	YES	YES
<b>Other</b>					
Textured Crosswalk	YES	YES	YES	YES	YES

<sup>7</sup> Obstructions are more extreme measures and should only be considered after other vertical and horizontal traffic calming measures have been tried. Traffic Diverters and closures should be a very last resort due to their restrictive nature.



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## 3.2 Vertical Deflection

Traffic calming measures utilizing vertical deflection can be problematic for emergency and transit vehicles since most (e.g. speed humps and raised intersections/crosswalks) requires significant speed reduction to navigate the treatment and should be used as a last resort. Therefore the only vertical deflection technique approved for usage in the City of Orillia is speed cushions.

**Speed Cushions** are small speed humps designed to slow passenger vehicles but are typically designed so that the wheel base of emergency vehicles straddle the speed cushion. The wider wheelbase on emergency vehicles allows them to pass over the speed cushion without slowing down. Speed cushions can be sized and designed in sets of 2-3 cushions (one in the middle and one on each side). Another technique is to use a mountable centre island design with a 'knock-down' post in the middle (shown in picture below). The separation between speed cushions is designed with enough space for emergency vehicles to avoid touching the speed cushions and thus not having to slow down. Speed cushions may be used on local and collector roadways with design modifications tailored to suit individual roadway dimensions to ensure smooth passage for emergency and transit vehicles. Speed cushions are not used during winter months.



Figure 1 – Speed cushion with Mountable Centre Median, Oakville, ON<sup>8</sup>

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<sup>8</sup> The centre, mountable median with speed cushions on either side as shown in image is a design developed by staff at the Town of Oakville using temporary rubber speed cushions developed by TrafficLogix. Photo courtesy of the Town of Oakville.

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Figure 2 – Speed Cushions, Calgary, AB<sup>9</sup>



Figure 3 – Speed Cushions for Emergency Vehicles<sup>10</sup>

<sup>9</sup>Image from City of Calgary website: <http://www.calgary.ca>

<sup>10</sup> Image from website: <http://streetswiki.wikispaces.com/Speed+Bumps,+Humps,+and+Cushions>.

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### 3.3 Horizontal Deflection

This section describes traffic calming measures that cause a horizontal deflection of vehicles. These types of measures discourage short-cutting or through traffic to varying degrees and may also reduce vehicle speeds, reduce conflicts and enhance the neighbourhood environment.

**Curb extensions (intersection and/or mid-block)** improve pedestrian safety by reducing the distance that pedestrians must travel to cross a roadway, by improving the visibility of pedestrians for approaching motorists, and the visibility of approaching vehicles for pedestrians.

Curb extensions are sometimes referred to as bulb-outs or neck-downs. They can be used at intersections and at midblock locations, and can be used alone or in combination with a textured crosswalk and/or a median island. In addition to their pedestrian safety benefits, curb extensions on one or both sides of the roadway also help to reduce vehicle speeds. Curb extensions may be considered for use on both local and collector roadways, including transit and emergency response routes.



Figure 4 – Curb Extension

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**One-Lane Chicane** has a set of two or more alternating curb extensions that narrow a two-lane road to a one-lane road for a short distance. Chicanes require drivers to slow down to drive around them. The effect is to create a serpentine or snake-like driving pattern. Depending on the width of a roadway, chicanes can also be achieved by alternating on-street parking. The Canadian Guide to neighbourhood Traffic Calming does not recommend using a one-lane chicane on transit or emergency routes.



Figure 5 – One-lane chicane<sup>12</sup>

The Institute of Transportation Engineers and the U.S. Federal Highway Administration specify the following applications for chicanes:<sup>11</sup>

- Appropriate for midblock locations only
- Most effective with equivalent volumes on both approaches
- Typically, includes a series of at least three curb extensions.

A one-lane chicane is most applicable to the City of Orillia's application on local roadways that are not designated transit routes.

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<sup>11</sup> Hayes, Jolene M., Managing Traffic in Residential Neighborhoods: A New Challenge in Modeling Transportation in Urbanized Regions, Page 8.

<sup>12</sup> Image of one-lane chicane from: <http://www.talkingtraffic.org/index.php/2008/02/05/episode-11-traffic-calming/>: Photo credits go to Richard Drdul. This photo is licensed as a Creative Commons 2.0 Attribution, Share-alike, per the original photographer.

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**Curb radius reduction** is the reconstruction of an intersection corner to a smaller radius. This measure effectively slows down right-turning vehicle speeds by making the corner 'tighter' with a smaller radius. A corner radius reduction may also improve pedestrian safety to a certain degree by shortening the crossing distance. This type of measure is acceptable on local and collector roadways, but its use is often limited to specific situations where the existing intersection geometry would allow the reconstruction. In addition, curb radius reductions should not be used on transit routes requiring a right turn.



Figure 6 – Curb Radius Reduction

**On-street parking** is a practical way of decreasing the effective road width by allowing vehicles to park adjacent and parallel to the road edge. This type of measure is applicable on most local and collector roadways. The primary benefit of allowing on-street parking as a traffic calming measure is the reduction in vehicle speeds due to the narrowed travel space. In newer City subdivisions some roadways have a narrower design to accommodate parking on only one side (parking banned on opposite side). In this situation, changing the parking configuration to permit parking on both sides is not recommended.



Figure 7 – On-street Parking on Both Sides, James St., Milton, ON

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**Raised median islands** are installed in the centre of a roadway to reduce the overall width of the travelled lanes. They help slow traffic without affecting the capacity of the road. Raised median islands can be combined with curb extensions and/or textured crosswalks to further improve pedestrian safety. This measure may be considered on both local and collector roadways.



**Figure 8 – Raised Median (with Textured Crosswalk)<sup>13</sup>**

**Traffic circles** are a raised island located in the centre of an intersection designed to reduce vehicle speeds and reduce vehicle-vehicle conflicts. Intersection should have balanced traffic volumes. Traffic circles should not be used on major collector or arterial roadways, even where these roads intersect local residential streets. Experience in other communities has shown that, where traffic circles are located on more major roads that carry significantly higher traffic volume, traffic entering the traffic circle from the major road often fails to yield to traffic that has already entered from the local street, creating a safety concern. Traffic circles should not be confused with the modern roundabout which is typically larger with raised median islands at all approaches and it may serve two or more entry lanes of traffic.



**Figure 9 – Traffic Circle, Ancaster, ON**

<sup>13</sup> Image from pps.org (Project for Public Spaces)

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**Road diets** are a new technique used to better define road space for various users and to encourage motorists to slow down. In many cases, wide local and collector streets do not have pavement markings (other than a centre line in the case of collectors) to clearly indicate where motorists should drive. Road diets involve the addition of pavement markings to define driving space, parking space, and, in some cases, bicycle facilities. More clear definition of driving space can induce drivers to reduce their speed. Road diets can be applied to local and collector roadways.



Figure 10 - Road Diet, Mississauga, ON

## 3.4 Obstruction

This section describes those traffic calming measures that obstruct specific vehicle movements with the intention of deterring or preventing short-cutting traffic from making certain traffic movements. It is important to note that they are intended to deter motor vehicle traffic only and not to obstruct bicycle or pedestrian traffic. These types of measures are typically implemented at intersections, but may also be applied at some mid-block locations. Obstructions range from those that have a relatively minor impact on vehicular access to those that severely restrict access such as a road closure. Although these types of measures are effective at discouraging short-cutting and through traffic to varying extents, they are only recommended for use when horizontal or vertical deflection measures would not be effective or appropriate. The following obstruction traffic calming techniques are appropriate for use in the City of Orillia.

**Directional closures** are created using a curb extension or other barrier that extends into the roadway, approximately as far as the centerline. This device obstructs one side of the roadway and effectively prohibits vehicles travelling in that direction from entering. Directional closures are especially useful for controlling non-compliance of one-way road sections and are compatible with other modes such as bicycles. At all directional closures, bicycles are permitted to travel in both directions through the unobstructed side of the road; however, some directional closures have a pathway built through the device specifically for bicycles. Since their purpose is to prevent short-cutting traffic, directional closures are applicable for use on local streets and minor collectors, at their intersection with collectors and arterials.

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Figure 10 – Road Diet, Mississauga, ON

**Raised median through intersection.** These devices may be used on the centerlines of local and collector roadways to prevent left-turn and through movements to and from intersecting streets. This type of device is especially effective at preventing short-cutting and through traffic while providing some secondary pedestrian safety benefits.



Figure 12 – Raised Median through Intersection, Kitchener, ON

**Right-in/right-out islands** are raised triangular islands located on an intersection approach to limit the side street to right turn in and out movements. Similar to a raised median through an intersection, this device is used primarily to restrict movements to and from an intersection roadway. Right-in/right-out islands may be considered only for use in locations where local residential streets intersect another roadway of any class.



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**Figure 13 – Intersection Channelization and Right-in/Right-out Island, Kitchener, ON**

**Intersection channelization** is used to delineate specific movements at or through an intersection. They typically restrict access to and from cross-streets and therefore impact access to neighbourhoods for residents and emergency vehicles. They may be used on both local and collector roadways. The following techniques could be used where significant short-cutting problems exist and should only be considered in extreme circumstances, as they severely restrict access for residents. The following two techniques should not be used on transit or emergency routes:

1. **Diverter**<sup>14</sup> are raised, physical barriers placed diagonally across an intersection that prevent motorists from travelling straight through an intersection (they are forced to turn).
2. **Full closures** are typically only considered as a last resort, as they completely restrict access for residents and others travelling to and from locations within a neighbourhood. They also restrict emergency and transit access. Less restrictive measures should be considered first, as in most cases these can achieve the same results, without the severe impacts associated with a full closure.



**Figure 14 – Diverter**

<sup>14</sup> Photo by Richard Drdul. This photo is licensed as a Creative Commons Attribution-Share Alike 2.0 Generic Licence.

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### 3.5 Signage

Signage prohibiting turns and through movements should only be used as an alternative in situations where appropriate traffic calming measures cannot be used. The use of signage without accompanying physical traffic calming devices should be avoided where possible, as this can create an enforcement problem and, as a result, can be costly in terms of police resources. There is, however, one type of signage that can be used to complement the physical devices installed through a traffic calming plan.

**“Traffic-Calmed Neighbourhood” signage** is used to notify motorists and other road users that they are about to enter a neighbourhood that has been ‘calmed’ by the installation of various traffic calming measures. Although this signage alone does not have any significant impact on driver behaviour, it aims to make the motorist aware of the conditions they are about to enter and could potentially act as a ‘deterrent’ for motorists looking for a short-cut.



Figure 15 – Traffic Calming Sign, Mississauga, ON



Figure 16 – Textured Crosswalk, Portland, OR

### 3.6 Other

Textured Crosswalks incorporate a texture or patterned surface which contrasts with the adjacent roadway. It helps to better delineate the crossing locations and helps reduce pedestrian-vehicular conflicts. This treatment may be used on both local and collector roadways. Textured crosswalks can be combined with curb extensions and/or raised median islands to further improve pedestrian safety. They are only to be used at formal pedestrian crossing locations with painted crosswalk pavement markings such as those found at signalized or stop controlled intersections.

(R. 2013-390 13.12.16)  
 (R. 2014-42 14.03.17)  
 (R. 2014-231 14.12.15)

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**Appendix A**

**TAC/ITE Canadian Guide to Neighbourhood Traffic Calming Reference Tables**

**Appendix B**

**Front-Line Mitigating Measures**

**Appendix C**

**Traffic Calming Point Assessment System**

**Neighbourhood Survey**

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## Appendix A

### TAC/ITE Canadian Guide to Neighbourhood Traffic Calming Reference Tables



CANADIAN GUIDE TO NEIGHBOURHOOD TRAFFIC CALMING

TABLE 3.1: TRAFFIC CALMING MEASURES		
Measure	Description	Page
Chicane	A series of curb extensions on alternating sides of a roadway, which narrow the roadway and require drivers to steer from one side of the roadway to the other to travel through the chicane. Typically, a series of at least three curb extensions is used.	3-17
Curb Extension	A horizontal intrusion of the curb into the roadway resulting in a narrower section of roadway.	3-19
Curb Radius Reduction	The reconstruction of an intersection corner using a smaller radius, usually in the 3.0 m to 5.0 m range.	3-21
Directional Closure	A curb extension or vertical barrier extending to approximately the centerline of a roadway, effectively obstructing (prohibiting) one direction of traffic.	3-29
Diverter	A raised barrier placed diagonally across an intersection, that forces traffic to turn and prevents traffic from proceeding straight through the intersection.	3-30
Full Closure	A barrier extending across the entire width of a roadway, which obstructs all motor vehicle traffic movements from continuing along the roadway.	3-32
Intersection Channelization	Raised islands located in an intersection, used to obstruct specific traffic movements and physically direct traffic through an intersection.	3-33
On-Street Parking	The reduction of the roadway width available for vehicle movement by allowing motor vehicles to park adjacent and parallel to the curb.	3-22
Raised Crosswalk	A marked pedestrian crosswalk at an intersection or mid-block location constructed at a higher elevation than the adjacent roadway.	3-5
Raised Intersection	An intersection — including crosswalks — constructed at a higher elevation than the adjacent roadway.	3-8
Raised Median Island	An elevated median constructed on the centreline of a two-way roadway to reduce the overall width of the adjacent travel lanes.	3-24
Raised Median Through Intersection	An elevated median located on the centreline of a two-way roadway through an intersection, which prevents left turns and through movements to and from the intersecting roadway.	3-35
Right-in/Right-out Island	A raised triangular island at an intersection approach which obstructs left turns and through movements to and from the intersection street or driveway.	3-36
Rumble Strip	Raised buttons, bars or grooves closely spaced at regular intervals on the roadway that create both noise and vibration in a moving vehicle.	3-9
Sidewalk Extension	A sidewalk is continued across a local street intersection. For a "raised" sidewalk extension, it is continued at its original elevation, with the local roadway raised to the level of the sidewalk at the intersection. For an "unraised" sidewalk extension, the sidewalk is lowered to the level of the roadway.	3-10
Speed Hump	A raised area of a roadway, which deflects both the wheels and frame of a traversing vehicle.	3-12
Textured Crosswalk	A crosswalk incorporating a textured and/or patterned surface which contrasts with the adjacent roadway.	3-15
Traffic Circle	A raised island located in the centre of an intersection, which requires vehicles to travel through the intersection in a counter-clockwise direction around the island.	3-25

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CANADIAN GUIDE TO NEIGHBOURHOOD TRAFFIC CALMING



TABLE 3.2: APPLICABILITY OF TRAFFIC CALMING MEASURES						
Measure	POTENTIAL BENEFITS				Page	
	Speed Reduction	Volume Reduction	Conflict Reduction	Environment		
Vertical Deflection	Raised crosswalk	●	○	●	●	3-5
	Raised intersection	●	○	●	●	3-8
	Rumble strip	○	○	○	○	3-9
	Sidewalk extension	●	○	●	○	3-10
	Speed hump	●	●	●	●	3-12
	Textured crosswalk	○	○	●	●	3-15
Horizontal Deflection	Chicane — one-lane	●	●	●	●	3-17
	Chicane — two-lane	●	○	●	●	3-17
	Curb extension	●	○	○	●	3-19
	Curb radius reduction	●	○	○	●	3-21
	On-street parking	●	○	○	●	3-22
	Raised median island	●	○	●	○	3-24
	Traffic circle	●	●	●	●	3-25
Obstruction	Directional closure	○	●	●	●	3-29
	Diverter	○	●	●	●	3-30
	Full closure	○	●	●	●	3-32
	Intersection channelization	○	●	●	●	3-33
	Raised median through intersection	○	●	●	●	3-35
	Right-in/right-out island	○	●	●	●	3-36
Signing*	Maximum Speed	●	○	○	○	3-39
	Right (Left) Turn Prohibited	○	●	●	●	3-40
	One-Way	○	●	●	●	3-40
	Stop	○	●	●	○	3-41
	Through Traffic Prohibited	○	●	●	●	3-43
	Traffic-Calmed Neighbourhood	○	○	○	●	3-44
	Yield	○	○	●	○	3-44

● = Substantial benefits      ● = Minor benefits      ○ = No benefit

\* The primary purpose of signing is to regulate traffic movements, not to calm traffic.

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TABLE 3.3. IMPLICATIONS OF TRAFFIC CALMING MEASURES							
MEASURE	POTENTIAL DISBENEFITS						Emplace- ment Cost
	Local Access	Emergency Response	Other Travel Modes	Enforce- ment	Mainte- nance		
Vertical Deflection	Raised crosswalk	○	◐	◐	○	◐	\$ to \$\$
	Raised intersection	○	◐	◐	○	◐	\$\$\$
	Rumble strip	○	○	◐	○	◐	\$ to \$\$
	Sidewalk extension	○	○	○	○	◐	\$\$
	Speed hump	○	◐	◐	○	◐	\$ to \$\$
	Textured crosswalk	○	○	◐	○	◐	\$ to \$\$
Horizontal Deflection	Chicane — one-lane	○	◐	◐	○	◐	\$\$ to \$\$\$
	Chicane — two-lane	○	○	○	○	◐	\$\$
	Curb extension	○	○	◐	○	◐	\$ to \$\$
	Curb radius reduction	○	○	○	○	◐	\$ to \$\$
	On-street parking	○	◐	◐	○	◐	\$ to \$\$
	Raised median island	◐	○	○	○	◐	\$ to \$\$
	Traffic circle	○	◐	◐	○	◐	\$\$ to \$\$\$
Obstruction	Directional closure	◐	○	◐	◐	◐	\$\$
	Diverter	◐	◐	◐	○	◐	\$\$ to \$\$\$
	Full closure	◐	◐	◐	○	◐	\$\$ to \$\$\$
	Intersection channelization	◐	◐	○	○	◐	\$\$ to \$\$\$
	Raised median through intersection	◐	◐	◐	○	◐	\$ to \$\$
	Right-in/Right-out Island	◐	◐	◐	◐	◐	\$\$
Signing	Maximum Speed	○	○	○	◐	○	\$
	Right (Left) Turn Prohibited	◐	○	○	◐	○	\$
	One-Way	◐	◐	◐	○	○	\$
	Stop	○	◐	○	◐	○	\$
	Through Traffic Prohibited	◐	○	○	◐	○	\$
	Traffic-Calmed Neighbourhood	○	○	○	○	○	\$
	Yield	○	○	○	○	○	\$

◐ = Substantial disbenefits     ◐ = Moderate disbenefits     ○ = No disbenefits  
⌘ = Low cost     ⌘ = Moderate cost     ⌘ = High cost

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## Appendix B Front-Line Mitigating Measures

**Driver Feedback Boards** are pole-mounted devices equipped with radar speed detectors and an LED display. The boards are capable of detecting the speed of an approaching vehicle and displaying it back to the driver. When combined with a regulatory speed limit sign, a clear message is sent to the driver displaying their vehicle speed. The objective of the program is to improve road safety by making drivers aware of their speed, evoking voluntary speed compliance.



Figure 17 - Whaley Way, Milton, ON

**Community Entrance Signs “Drive Slowly... Think of Us”** sign is purely informational and as such, is intended to serve as a reminder to motorists that they are entering a residential area where the residents are concerned about the safety and integrity of their neighbourhood.

As the over use of any traffic control device or sign can have a negative effect on motorist activities, the Engineering Services Department limits the placement of community entrance signs using the following principles/guidelines:

Limits its installation to entrances to residential neighbourhoods off collector and arterial roadways where the neighbourhood experiences a degree of non-residential through traffic.

The sign is meant to serve as a reminder for motorists to “turn off” the highway driving mode and to be aware that they are entering a residential area where reduced speeds are required to negotiate vehicles entering and exiting driveways as well as the potential for children to be playing adjacent to the roadway.



Figure 18 - Scott Blvd., Milton, ON

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## Police Enforcement.

The Ontario Provincial Police Service deploys officers to perform selective/directive enforcement on roadways within the City of Orillia.

The intended benefit of selective/directive police enforcement is to make drivers aware of local speed limits and to reduce vehicle speeds.

### Advantages:

- Visible enforcement is very effective
- Driver awareness increased
- Will reduce speeds temporarily while police present

### Disadvantages:

- Temporary measure
- Requires long-term use to be effective
- Fines lower than enforcement cost
- Disrupts traffic on high volume streets
- Time and resource constraints

### Special Considerations:

- Police enforcement is continually in effect throughout the City
- Usually conducted on streets with documented speeding problems
- Typically only effective while officer is actually monitoring speeds
- Helpful in school zones
- Short-term benefits (benefits not sustainable) without regular enforcement






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## Appendix C Traffic Calming Point Assessment System

 <b>City of Orillia</b> <b>Public Works Engineering Department</b>				
<b>TRAFFIC CALMING POINT ASSESSMENT</b>				
Location:		Date Compiled:		
Roadway Type:	<input type="checkbox"/> Local	<input type="checkbox"/> Collector		
<b>3.6.1.1 Traffic Data</b>				
	<u>Feature</u>	<u>Range</u>	<u>Criteria</u>	<u>Total</u>
1.	Speed	0 to 35	1 point for every 1 km/h over the 85 <sup>th</sup> percentile speed, where the 85 <sup>th</sup> percentile exceeds the posted speed limit.	
2.	Volume	0 to 20	Local Roadways: 1 point for every 200 ADT Collector Roadways: 1 point for every 300 ADT	
3.	Traffic Generators	0 or 15	5 points for each nearby* traffic generator such as a school, community centre, retail centres, etc. (*Nearby = must have direct connection to subject roadway)	
4.	Collisions	0 to 10	1 points for every 3 collisions/year over a 3 year period	
<b>3.6.1.2 Road Characteristics</b>				
	<u>Feature</u>	<u>Range</u>	<u>Criteria</u>	<u>Total</u>
5.	Sidewalks	0 or 5	5 points for no sidewalks with evidence of pedestrian activity	
6.	Pedestrian Generators	0 to 15	5 points for each nearby* pedestrian generator such as a school, playground, community centre, libraries, retail centres, school bus routes etc. (*Nearby = must have direct connection to subject roadway, does not include residential dwellings, and is not already considered a "traffic generator" above.)	
<b>3.6.1.3 Total *</b>				
Does the location meet the minimum requirements?				
• Local roadway = minimum 35 points				
• Collector roadway = minimum 52 points				
				<input type="checkbox"/> YES <input type="checkbox"/> NO

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City of Orillia Public Works Engineering Department

## Neighbourhood Petition

**Date:** \_\_\_\_\_

**Roadway Name:** \_\_\_\_\_

**Traffic Concern on Roadway:** \_\_\_\_\_

\_\_\_\_\_

Name/Signature of Resident	Address of Resident