

City of St. John's

**DEVELOPMENT OF TRAFFIC CALMING POLICY & WARRANT
TASK 4 DELIVERABLE: TRAFFIC CALMING POLICY**

FINAL REPORT

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City of St. John's
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1. INTRODUCTION

City of St. John's staff receive numerous requests each year for traffic calming features such as speed humps, curb extensions and raised intersections. The city currently has no process for responding to such requests. The City of St. John's retained IBI Group to develop a traffic calming policy, including a warrant and prioritization process, which will aid City staff in the evaluation of these requests and the application of traffic calming devices.

1.1 What is Traffic Calming?

Traffic calming is the use of mainly physical traffic management techniques to reduce the impacts of traffic on neighbourhood communities and other public facilities such as parks, school areas, and community centres. Traffic calming has been used in North America to:

- Improve neighbourhood liveability;
- Increase road user safety; and
- Promote urban redevelopment.

Various industry groups, agencies and municipalities may define traffic calming in slightly different ways, but almost all definitions have common themes of reducing vehicle speeds, improving road user safety and improving neighbourhood quality of life.

1.2 Why is Traffic Calming Important?

Urban sprawl and automobile dependency have resulted in significant traffic growth throughout North America. These trends in automobile travel may place considerable strain on the roadway network's ability to safely accommodate all users within the public right-of-way. In many cases, a lack of arterial road capacity will cause motorists to choose Collector and residential roadways to bypass a congested turning movement, intersection or corridor.

Such inappropriate use of neighbourhood streets may have the following negative effects:

- Arterial road congestion may cause motorists to look for parallel or alternative routes to reach their destinations. These parallel/alternative roads then begin to take on greater traffic volumes and function in ways that were not intended at the time of planning. For example a local residential or Collector roadway becomes a mid-block arterial bypass;
- Motorists operate vehicles at speeds which are not appropriate for the residential roadway and/or the roadside environment;
- The safety of all road users is decreased due to volume, speed and other compliance issues; and/or
- Resources are called upon to provide frequent enforcement of numerous problem areas.

In general, the above impacts typically occur in older established neighbourhoods next to busy traffic areas. However, traffic issues may also occur in newer subdivisions depending on the road network and adjacent activities.

One response to these problems is the self-enforcing option of traffic calming devices.

1.3 Why is a Traffic Calming Policy Necessary?

When traffic calming measures are applied without a governing policy, new problems may be created just as old problems are solved. Examples of these potential problems include:

- Traffic may divert into a different neighbourhood;
- Improperly designed measures may need to be removed shortly after installation; or
- Minor problems may be addressed, while a major problem discovered later has no funding available for mitigation.

In light of the above, the City of St. John's traffic calming policy is intended to:

- Provide a standardized process to address concerns regarding speeding and safety concerns;
- Provide this process in a manner that is fair, reasonable, consistent and cost-effective;
- Provide a proactive tool to address concerns before they become complaints;
- Reduce staff workload and duplication of effort when responding to requests;
- Encourage public involvement in the traffic calming activities; and
- Avoid the above mistakes and inconsistencies.

1.4 Resources

1.4.1 CANADIAN GUIDE TO NEIGHBOURHOOD TRAFFIC CALMING

The *Canadian Guide to Neighbourhood Traffic Calming* is a document developed jointly by the Transportation Association of Canada and the Institute of Transportation Engineers. Since its December 1998 publication, municipalities and consultants throughout Canada and abroad have used the Guide for traffic calming guidance and application. From the foreword of the Guide, its intent is to:

- "Develop a document to assist practitioners;
- Achieve and appropriate level of national standardization;
- Minimize liability; and
- Maximize safety."

To that end, the Guide provides a detailed introduction to traffic calming, discusses community involvement, the applicability and effectiveness of traffic calming, and offers technical guidelines.

Many municipalities have adapted its guidelines to suit their own traffic calming needs and goals. The City of St. John's shall adopt the traffic calming guidelines contained within the Guide, except where it differs from this document and in specific, case-by-case installations where local conditions dictate.

1.4.2 U.S. TRAFFIC CALMING MANUAL

In 2009, APA Planners Press and the American Society of Civil Engineers published the *U.S. Traffic Calming Manual*. The manual, which evolved from a Delaware Department of Transportation design manual, provides engineers and planners with guidance for selecting the right traffic calming measures, design and installation. It also discusses the establishment of traffic calming programs, and how to ensure that the program is standardized, yet still flexible when required.

2. TRAFFIC CALMING IN ST. JOHN'S

2.1 Goals and Objectives

The two primary goals of St. John's traffic calming policy are to improve safety and liveability within the city. When properly designed and implemented, traffic calming measures have the ability to improve safety for all road users, particularly vulnerable users such as pedestrians and cyclists. Safety improvements are directly related to reducing vehicle speeds and mitigating the impacts of driver behaviour on traffic calmed roadways, while liveability may be improved by reducing the negative effects of traffic, such as noise, exhaust emissions and congestion. Many traffic calming features also have a secondary benefit of improving the streetscape through plantings and decorative pavement treatments.

The objective of the policy is to restore traffic calmed roads to their intended functionality and restore motorist behaviour to acceptable and appropriate levels of compliance within the system. Specific objectives for local streets and Collectors include:

- Slower vehicular speeds;
- Fewer, less severe collisions;
- Increased safety for all road users, particularly pedestrians and cyclists;
- Reduced reliance on police enforcement;
- Enhanced roadway environment and streetscape;
- Improved access to all modes of transportation; and
- Reduced 'cut-through' or non-local traffic.

Collectively, these factors determine how 'liveable' a street or community is.

2.2 Principles

This traffic calming policy has been developed to ensure that common principles are applied in a consistent manner for all requests. These principles strive to be consistent with North American jurisdictions that have been at the forefront of traffic calming implementation. Consistent application of this traffic calming policy and the following principles will ensure that St. John's does not repeat

the often costly and disruptive mistakes that other jurisdictions have made in the past. These principles are also intended to foster community support to ensure that traffic calming plans meet the needs of those who made the initial request, as well as those of the affected local community.

- **Find out what the community thinks:** Community support may be the single most important principle when considering traffic calming. A citywide traffic calming policy is appropriate for general selection and implementation criteria and requirements, but every neighbourhood has its own unique identity. Given that each community is different, there is a chance that city staff and/or outside consultants will not recognize special attributes or problems that are specific to a particular request, unless the input of all affected parties is requested. Subsequent sections of this document will discuss the public support components and requirements of the policy.
- **Identify the real problem:** It is critical to listen to and consider every issue raised by the community, but care must be taken to separate real problems from those that are perceived. Incorrect assessment may lead to worse problems than before or possibly to the introduction of new problems.
- **Quantify the problem:** How fast is “speeding”? How much traffic is “too much”? Residents are more likely to understand and accept a decision when a fair, equitable and defensible process can be demonstrated. This policy describes a two-step warrant process for quantifying the conditions surrounding traffic calming requests. The process uses traffic volumes, speed and collision data and other neighbourhood characteristics to score and rank a location against other requests throughout the city. This process is designed to ensure that locations with the most severe problems score the highest and receive priority.
- **Consider improvements to the major road network first:** Whenever possible, if a traffic problem at a particular location can be traced with some degree of certainty to a shortcoming of the arterial road network, every effort should be made to address the problem at the source. In some cases, the fix may be as simple as changing the signal timing at an arterial intersection. If it becomes clear that a simple arterial fix is not possible, then it is appropriate to consider what can be done on the lower-order roads.
- **Use self-enforcing measures:** Sufficient police presence does not exist to enforce every speed limit or stop sign throughout the city, particularly during peak traffic periods. Traffic calming measures are designed to be self-enforcing. Vehicles must slow down over speed humps, and more restrictive measures like diverters or partial closures prevent unwanted movements more effectively than turn restriction signs.
- **Start with the least restrictive measures:** The residents of a street or community must live with the implemented traffic calming solution. Restrictive devices such as full or partial closures should only be implemented with strong levels of community support, and only when it can be proven that other measures are unlikely to achieve desired results.
- **Do not impact cyclists or pedestrians:** Traffic calming should improve safety for all road users, but its application should not negatively impact pedestrians and cyclists. Some traffic calming measures may in fact make it more difficult for pedestrians and cyclists to navigate a neighbourhood, and such impacts should be considered equally as important as those to cars and trucks.
- **Temporary Measures:** In some cases it may not be clear exactly what needs to be done to address a particular request. For example, it might not have been clear until

after implementation that a traffic problem would shift to an adjacent street. Many traffic calming measures can be installed on a temporary basis and monitored for performance. It is less expensive to remove a temporary device than a permanent device if it becomes necessary, and it demonstrates a willingness of the City to follow through with its commitment to address a problem to completion.

- **Implementation does not mean completion:** Conditions must be monitored to determine if the traffic calming devices fully addressed the problem. Post-implementation data collection is equally important as pre-implementation.

2.3 Application

This traffic calming policy is designed for application to Local Roads and Collectors only. The logic behind the decision to limit the application of the traffic calming policy is based on the function of higher order Arterials to move large volumes of people and goods throughout St. John's and beyond, and the understanding that restrictive measures taken on Arterials are likely to shift traffic onto lower-order roads and into neighbourhoods.

Application limitations exist within the accepted classifications, as follows:

- **Posted Speed Limit:** traffic calming shall only be applied to roads with posted speeds of 50 km/h or below. Roads posted at 60 km/h or greater may be candidates for greater police enforcement or changes to design in order to reduce speeding or collisions;
- **Grade:** Traffic calming shall not be permitted if the grade of the subject segment of roadway is equal to or greater than 8%, due to the fact that traffic calming devices implemented on steep grades may cause safety concerns, particularly during winter;
- **Transit and Emergency Routes:** Traffic calming devices shall be permitted on Local Roads or Collectors that serve as transit routes or emergency routes. However, since vertical traffic calming measures such as speed humps and raised crosswalks increase emergency vehicle response times, create uncomfortable rides for transit passengers and potentially increase the maintenance required to keep these vehicles operational, such devices shall be limited to horizontal measures and signing only;
- **Urbanized vs. Rural Areas:** traffic calming is typically applied only to roads in urban areas, and not in rural or agricultural areas. Speed reduction on rural roads presents specific challenges that may be better served through increased enforcement or possibly changes to the road's design;
- **Cross Section:** Roads with rural cross-sections within urbanized areas should be given the same traffic calming consideration as those with urban cross-sections; however, the available options are limited due to the absence of a curb and gutter system. Horizontal deflection treatments such as median islands, traffic circles and lane narrowing shall be considered appropriate for all rural cross-sections, while vertical traffic calming measures may be appropriate on a case-by-case basis and in accordance with the remainder of the traffic policy; and
- **New Developments:** while this policy is designed for existing roads, new developments should be required to follow its principles so that proactive measures can be applied before traffic problems manifest themselves.

3. TRAFFIC CALMING PLANNING PROCESS

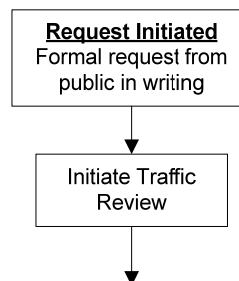
The following sections describe a six-step process for the implementation of traffic calming measures on City roads, beginning with a request for traffic calming and ending with design, approval and implementation. **Appendix A** contains a flowchart of the entire framework, and the relevant sections of the flowchart are included within each step.

3.1 Step 1: Request for Traffic Calming

Requests for traffic calming may come from City residents, business owners, or schools and shall be submitted in writing or be approved for screening by the Police and Traffic Committee. Identification of potential locations may also come from on-going staff reviews. Traffic Division staff shall be responsible for the review of all requests.

Exhibit 3-1 describes the request process. In the case of a request from the public, a formal request in writing is required. City staff shall then respond in writing to inform the applicant that a Traffic Review will be initiated, described in **Sections 3.2** and **3.3**.

Exhibit 3-1: Step 1: Request for Traffic Calming



Some jurisdictions incorporate a public support requirement at this stage. At this point, the City would circulate a petition to affected residents. The petition would require a specific response rate from affected residents, with a specific percentage of support.

Through experience with other jurisdictions, it was determined that it is generally not desirable to conduct a resident poll prior to the detailed review of data. It is possible that residents would sign an initial petition, which would only serve to raise expectations of traffic calming. Alternatively, residents may not respond if they are not familiar with the purpose or origin of the request. As such, this approach was removed from consideration, and the simplified initiation process shown in **Exhibit 3-1** was carried forward for the policy.

3.2 Step 2: Traffic Calming Screening Process

Step 2 in the process is an initial screening undertaken by City staff. Different screening criteria are established for Local Roads and Collectors, and a combination of these requirements must be satisfied for a site to be eligible for traffic calming. **Exhibit 3-2** defines the screening criteria and associated thresholds.

Exhibit 3-2: Step 2: Screening Criteria and Thresholds

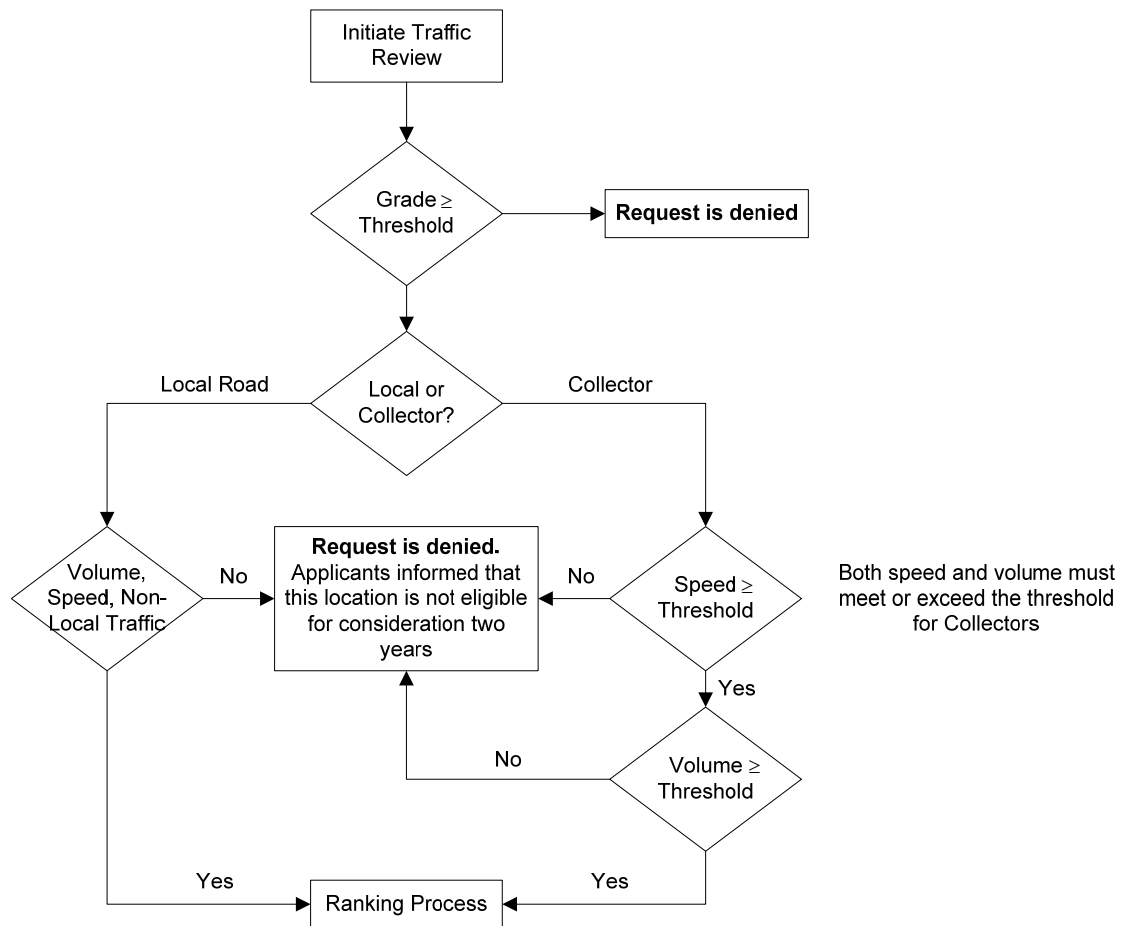
Criteria	Threshold		Notes
	Local Road	Collector	
Grade	< 8%		If the grade is equal to or greater than 8%, traffic calming is not permitted
Volume	≥ 900 vpd	≥ 3,000 vpd	Two-way ADT volume
Speed	≥ posted speed limit	≥ posted speed limit + 5 km/h	85 th percentile speed
Non-Local Traffic	≥ 30%	N/A	'Cut-through traffic.' This component only applies to Local Roads, although Collectors will receive points for non-local traffic in the scoring and ranking step

The screening can be summarized as follows:

- **Grade:** if the grade of the roadway is equal to or greater than the maximum threshold of 8%, then traffic calming is not permitted on the roadway at all. This is consistent with other jurisdictions and is due to the fact that traffic calming devices implemented on steep grades could cause safety concerns, especially in poor weather.
- **Speed, Volume and Non-Local Traffic:**
 - On **Local Roads**, at least two of these must meet the minimum threshold for further traffic calming consideration. City of St. John's staff have given direction that if volumes are low enough, a higher percentage of non-local traffic should be accepted. However, once speeds reach a certain threshold, traffic calming should be at least considered regardless of volume. Similar rationale applies to the conditions of speed + volume and volume + non-local traffic; and
 - On **Collectors**, only the combination of speed + volume will cause a candidate site to pass the initial screening. Given the geography and existing roadway network of St. John's, city staff are less concerned with non-local traffic on Collectors.

It is recognized that there may be roads that only meet one of the criteria for speed, volume and non-local traffic, and therefore do not qualify for traffic calming under the formal warrant process. For these roads, it may be appropriate to implement other solutions, such as changes to signing or additional speed enforcement. Rural roads often fall into this category, and changes to the road design outside of the traffic calming process may also be warranted in some situations.

Exhibit 3-3 graphically represents the screening process, while **Exhibit 3-4** and **Exhibit 3-5** show the possible scenarios that can arise from application of this screening process for Local Roads and Collectors, respectively.

Exhibit 3-3: Step 2: Screening Process**Exhibit 3-4: Possible Screening Scenarios – Local Roads**

Scenario	Grade	Speed	Non-Local	Volume	Result
1	≥ Max	Any	Any	Any	Not eligible for traffic calming
2	< Max	≥ Min	≥ Min	≥ Min	Eligible; continue evaluation
3	< Max	≥ Min	< Min	≥ Min	Eligible; continue evaluation
4	< Max	< Min	≥ Min	≥ Min	Eligible; continue evaluation
5	< Max	≥ Min	≥ Min	< Min	Eligible; continue evaluation
6	< Max	≥ Min	< Min	< Min	Not eligible for traffic calming
7	< Max	< Min	≥ Min	< Min	Not eligible for traffic calming
8	< Max	< Min	< Min	≥ Min	Not eligible for traffic calming
9	< Max	< Min	< Min	< Min	Not eligible for traffic calming

Exhibit 3-5: Possible Screening Scenarios – Collectors

Scenario	Grade	Speed	Volume	Result
1	≥ Max	Any	Any	Not eligible for traffic calming
2	< Max	≥ Min	≥ Min	Eligible; continue evaluation
3	< Max	≥ Min	< Min	Not eligible for traffic calming
4	< Max	< Min	≥ Min	Not eligible for traffic calming
5	< Max	< Min	< Min	Not eligible for traffic calming

3.3 Step 3: Scoring and Ranking

Sites that pass the initial screening are then ranked against each other in the next step of the process. The evaluation, scoring and ranking process incorporates 11 criteria with appropriate weighting applied to each. Each eligible traffic calming request is awarded points based on its score for each factor, with a maximum score of 100 points.

Based on an objective analysis of the evaluation scoring, a score of 30 points has been established as a minimum threshold to qualify for traffic calming consideration.

3.3.1 SCORING

A separate evaluation of Local Roads and Collectors is recommended due to the intended function of each road classification, including transit service and emergency services needs. **Exhibit 3-6** and **Exhibit 3-7** show the scoring for Local Roads and Collectors, respectively.

Exhibit 3-6: Step 3: Recommended Scoring: Local Roads

Factor	Point Criteria	Maximum Points
Collision History	2 points for each collision in the past three years involving vulnerable road users, to max of 20	10
Traffic Volumes	1 point for every 50 vehicles above 900, max 25	25
Traffic Speeds	1 point for each km/h above posted speed, max 20	20
Non-Local Traffic	3 points for each 10% of non-local above 30%, to a maximum of 15 (reached at 70% non-local traffic)	15
Pedestrian Generators	5 points for each high school, park, community centre or senior facility within study area, to max of 10	10
Pedestrian Facilities	5 points if no sidewalk	5
Schools and Safe Routes to School	5 points if there is an elementary school or Safe Route to School within the study area	5
Bicycle Concerns	5 points if the road is an existing or planned cycle route	5
Transit Services and Routes	-2 points if existing or planned transit route	0
Block Length	1 point for each 50m increment if greater than 100m, to max of 10	5
		100

Exhibit 3-7: Step 3: Recommended Scoring: Collectors

Factor	Point Criteria	Maximum Points
Collision History	1 points for each collision in the past three years involving vulnerable road users, to max of 5	5
Traffic Volumes	1 point for every 100 vehicles above 3,000, max 25	25
Traffic Speeds	1 point for each km/h above threshold (posted speed + 5 km/h), max 25	25
Non-Local Traffic	2 points for each 10% of non-local traffic above 30%, to a maximum of 10 (reached at 70% non-local traffic)	10
Pedestrian Generators	5 points for each high school, park, community centre or senior facility within study area, to max of 10	10
Pedestrian Facilities	10 if no sidewalks, 5 if only on one side	10
Schools and Safe Routes to School	5 points if there is an elementary school or Safe Route to School within the study area	5
Bicycle Concerns	5 points if the road is an existing or planned cycle route	5
Transit Services and Routes	-4 points if existing or planned transit route	0
Block Length	1 point for each 50m increment if greater than 100m, to max of 10	5
		100

3.3.2 EMERGENCY AND TRANSIT ROUTES

Traffic calming devices are often considered to be a hindrance for emergency vehicles and buses. The scoring system developed for St. John's recognizes this concern and scores potential sites accordingly. Under this scoring system, if a particular road is not an emergency or transit route, it receives zero points in each category, i.e. the maximum. The presence of one or more of these routes would therefore subtract points from the overall score. The scoring also reflects that these routes are more likely to be present on Collectors than on Local Roads, and subtracts more points for Collectors. Further considerations of the impacts of traffic calming devices on emergency and transit vehicles are addressed in the policy document, in a step of the framework guiding the selection of measures.

3.3.3 NON-LOCAL TRAFFIC

It is also understood that determining the percentage of non-local traffic within a study area may be a costly and time-consuming process. The City may not have the resources to conduct a full survey and may be required to estimate the percentage of cut-through traffic. As a result, the scoring for non-local traffic falls into 'bins' of 10 percent each. The following list contains four recommendations of how non-local traffic may be recorded or estimated, beginning with the method requiring least effort. Each alternative requires that the City determine an appropriate 'local' area prior to estimation.

1. Apply the following formula:

$$\text{Local Road Non- Local Traffic Percentage} = 1 - \left(\frac{900}{ADT} \right)$$

$$\text{Collector Non- Local Traffic Percentage} = 1 - \left(\frac{3,000}{ADT} \right)$$

This formula implies that a Local Road with an ADT less than 900 vehicles has a low potential for cut-through traffic, as does a Collector with an ADT of less than 3,000 vehicles;

2. Apply the following formula:

$$\text{Non-Local Traffic Percentage} = \frac{\text{ADT} - (10 \times [\text{number of homes on the block}])}{\text{ADT}}$$

This formula implies that each home generates ten daily trips per day, which is roughly consistent with ITE trip generation estimates. For a neighbourhood study (as opposed to a single street), this method can be used to estimate cut-through traffic on representative blocks of the affected streets;

3. Determine the daily or peak hour trip generation potential of the local area based on its land uses and compare it to recorded ADT or peak hour traffic counts. This approach is similar to #2, but can be used in areas that include schools and parks, for example;
4. Conduct a full origin-destination study at all entry and exit points of the local area. Match the license plates of entering and exiting vehicles to determine the percentage of vehicles that pass through the entire local area compared to those that begin or end their trips within. This approach is the most accurate of the four approaches but is only recommended if staff/budget resources are available.

3.3.4 DETERMINING THE 'LOCAL AREA'

For a Local Road, the local area should be comprised of the Local Road, at a minimum; while for a Collector, the local area may be defined as the section of the roadway that connects the nearest higher-order roads, as well as the other intersecting roadways.

3.4 Step 4: Traffic Calming Toolbox

Some jurisdictions throughout North America use an approach where the final score awarded from the warrant evaluation is applied to a 'toolbox' of traffic calming measures. Higher-ranking requests may be flagged for physical traffic calming measures, while lower-ranking requests would be restricted to less intrusive forms such as signing. This method is advantageous in that it does not dismiss the lower ranking request that may be accommodated through low cost and low maintenance traffic calming features.

Given that each road and surrounding neighbourhood is unique and presents individual characteristics, the toolbox approach of identifying traffic calming measures can be used as a guideline for the various types of traffic calming measures that may be applied to a particular case. An initial staff review of all outstanding requests is recommended at this point, before a public support component is implemented for selected projects. (Data collection for subsequent requests should be carried out on a semi-annual basis with the screening and evaluation process carried out at least once per year.)

Exhibit 3-8: Step 4: Available Traffic Calming Measures

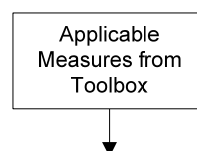


Exhibit 3-9 shows the recommended toolbox for the City of St. John's. This toolbox identifies a variety of traffic calming devices, as well as signage often used for traffic calming purposes. Care should be taken in the application of any measures marked with **◆**, particularly in the case of designated emergency or transit routes. As well, vertical deflection measures are not permitted for application on existing or planned transit routes, or designated emergency routes. **Appendix B** provides information on the applicability and implications of each measure.

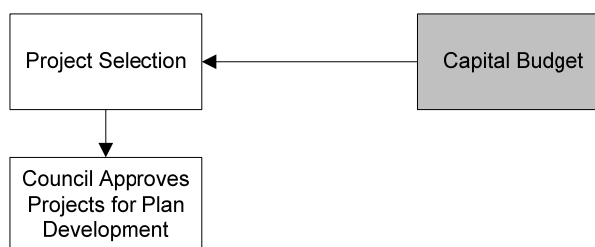
Exhibit 3-9: Step 4: Traffic Calming Toolbox

Measures		Local Road	Low-Volume Collector	Other Collector
Horizontal Deflection	Curb Extension	✓	✓	✓
	Traffic Circle / Mini Roundabout	✓	✓	◆
	Raised Median Island	✓	✓	✓
	Corner Radius Reduction	✓	✓	✓
	Chicane, 1-Lane	✓	✗	✗
	On-Street Parking	✓	✓	✓
Vertical Deflection	Speed Hump / Table	✓	◆	◆
	Speed Cushion	✗	◆	◆
	Raised Crosswalk	✓	◆	✗
	Raised Intersection	◆	✗	✗
Obstruction / Closure	Directional Closure	✓	◆	✗
	Right-In/Right-Out Island	✓	◆	✗
	Raised Median	✓	✓	✗
	Intersection Channelization	✓	✓	◆
	Full Closure	◆	✗	✗
Signage (when primarily application is traffic calming)	Traffic-Calmed Neighbourhood	✓	✓	◆
	Turn Prohibited	◆	◆	◆
	Through Traffic Prohibited	◆	◆	◆
	One Way	◆	◆	✗
	Warning signs (playground, school, etc)	◆	◆	◆
	Maximum Speed (only when used in conjunction with physical measures)	◆	◆	◆
	Yield	✗	✗	✗
	Stop	✗	✗	✗
✓ = Appropriate Measures ◆ = Use with Caution ✗ = Not Recommended				

3.5 Step 5: Project Selection and Study Approval

In this step, staff prepare preliminary estimate ranges for the higher-ranking projects and for any projects that may be served through advisory, warning, or traffic control signage features. A project shall receive priority if it can be tied into a capital project already planned for the current or following year. Staff shall then forward a list of the recommended project(s) to Council for approval, in full awareness of the allotted Traffic Calming budget.

Exhibit 3-10: Step 5: Project Selection and Council Approval



3.6 Step 6: Design, Public Support, Final Council Approval, Implementation

Exhibit 3-11 shows the final step of design, approval and implementation. Once Council approves a project or series of projects in principle and the funding envelope is established (Step 5), a public support component is to be initialized to determine residential support for the implementation of traffic calming measures:

The resident who submitted the original request shall circulate a petition to residents of the affected street. A minimum 60% of all affected residents on the street must be in favour of possible traffic calming for the request to proceed. The same requirement shall apply to public approval of a recommended plan.

If the initial public support requirement is satisfied, City staff or a consultant shall then prepare a preliminary design receiving input from City departments, including emergency, fire and transit, as well as the affected residents. This plan shall be sent back to the public for final comment and support.

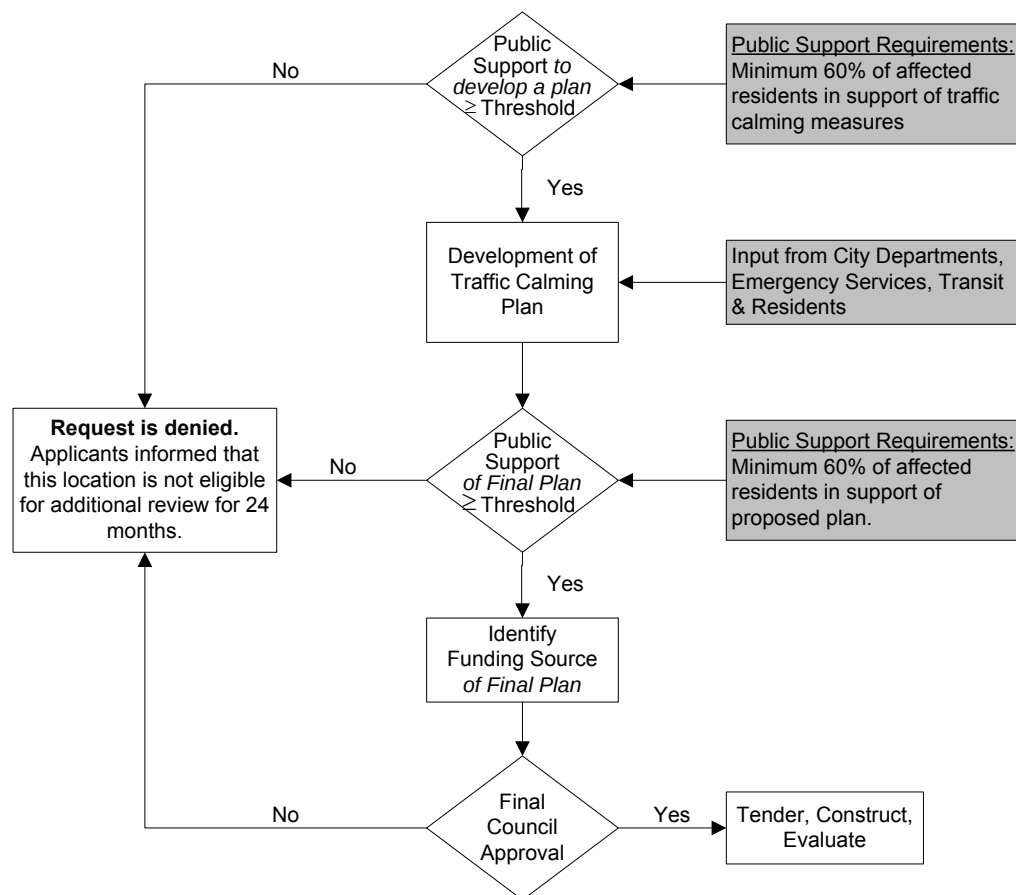
After the final plan is developed by the City or its consultant and is endorsed by the public in accordance with public support requirement, City staff shall identify its funding source. The plan shall then be sent to Council for final approval. Upon final Council approval, standard City processes for tendering and construction shall commence, followed by evaluation and monitoring of the plan.

If the request is rejected at any point in the process, the applicants and affected residents shall be notified in writing, and traffic calming shall be excluded from additional review for 24 months. Requests may be rejected on the basis of:

- Failure to meet the minimum screening criteria;
- Lack of public support; or
- Council rejection.

In the event that a request fails to meet the minimum screening criteria, it shall be eligible for further consideration within 24 months only if external conditions are such that traffic operations change significantly for the requested location. This would most likely occur due to subdivision construction near the requested location.

Exhibit 3-11: Step 6: Design, Approval, Implementation



4. CONSIDERATIONS

4.1 Public Awareness and Involvement

The City of St. John's traffic calming policy shall continue to support and encourage public requests for traffic calming, as residents often have the greatest knowledge and understanding of traffic conditions in their neighbourhoods.

City staff shall initiate a public involvement process once a requested site has been established as a candidate for implementation in Step 5 of the process. At a minimum, two public meetings will be held with affected residents, as follows:

1. Project initiation meeting:
 - Describe the purpose, objectives, process and timelines of the study;
 - Describe the study approach and methodology;

- Review initial preliminary findings based on a review of background information;
 - Provide examples of typical solutions to traffic issues;
 - Receive community input on current traffic and safety problems in the neighbourhood; and
 - Initiate survey process for plan development.
2. If the public support level satisfies minimum criteria, a meeting shall be held after the draft traffic calming plan is developed:
- Review the draft traffic calming plan and receive public input; and
 - Initiate survey process for final plan approval.

If input and comments received at meeting #2 suggest that the final plan will differ significantly from the draft plan, the plan approval petition process should be deferred and a third meeting should be held to review the revised plan.

All meetings are to be advertised in accordance with other City of St. John's public information sessions.

Neighbourhood and resident responsibilities include:

- Identify traffic related issues in the neighbourhood;
- Respond to all surveys;
- Attend public meetings for traffic calming studies;
- Approve or reject the development of a traffic calming plan;
- Select from the options presented by staff, traffic calming concepts which address the identified issues; and
- Approve or reject the implementation of the preferred traffic calming plan.

4.2 Community Initiatives

A number of community initiatives should be considered prior to the decision to implement traffic calming, or in conjunction with it. Often, these will incur little to no cost to the City using existing resources, frameworks and materials. Some possible initiatives that may address driver behaviour and traffic concerns include:

- **Community-Based Publications and Events:** Neighbourhoods and Business Improvement Areas often publish their own newsletters and bulletins, or maintain their own websites. These resources should be used for spreading the word of traffic concerns within an area, especially to neighbourhood residents who may themselves be a component of the traffic problem. City staff could be invited to submit articles, advice or recommendations for the newsletters and websites, or to attend community meetings and events to listen to residents' concerns.

- **Neighbourhood Speed Watch Program:** Residents can participate in the City's Neighbourhood Speed Watch Program, an initiative to reduce speeding on area roads through public awareness. A portable radar unit is available for temporary installation, alerting passing motorists to their speed in comparison with the posted limit;
- **City of St. John's Publications:** the City provides a variety of information on its website related to traffic and transportation. This information may also be available at City Hall or at other locations. Residents should be aware of the availability of this material, inasmuch as some of it may begin to address concerns without the need to initiate a request for traffic calming;
- **Trip Reduction Initiatives:** Business community initiatives including flex-time schedules and work from home arrangements, as well as City programs designed to reduce the reliance on single-occupant vehicle travel can have a major impact on the number of trips on St. John's streets, and may reduce or eliminate the need for many traffic calming requests.

5. TRAFFIC CALMING MEASURES

This section discusses traffic calming measures that have been identified as appropriate for the City of St. John's. The section aggregates each type of measure into one of four categories and describes the associated advantages and disadvantages.

5.1 Horizontal Deflection

Horizontal deflection measures are those devices which require a motorist to steer around them, altering the vehicle's path within the roadway cross section. Most horizontal deflection devices are appropriate for all roadways, although care needs to be taken when installing higher-deflection devices such as chicanes and traffic circles on higher volume roads.

Advantages

- Effective in reducing average and/or higher operating speeds;
- Devices such as curb extensions reduce road user conflict potential; and
- Devices typically do not impact emergency vehicle response times on lower order roads.

Disadvantages

- Maintenance activities such as street cleaning and snow removal may be complicated in the vicinity of the device;
- A number of the devices may impact transit and cyclist operations due to constrained travel portions of the roadway; and
- Typically do not impact through traffic volumes.

5.1.1 CURB EXTENSION

Curb extensions (also known as bump-outs) reduce the width of the roadway by extending the boulevard and/or sidewalk into what is currently either a travel lane or a parking lane. They are

appropriate for all roadways. For maximum effectiveness, the approach lane width is typically reduced to 3.0 metres on Local Roads. For designated cycling routes, the lane width should be 4.3 metres to provide additional room for cyclists. On-street parking will typically be lost opposite a curb extension. Curb extensions are often used at intersections to reduce crossing width, or they can be used in conjunction with median islands or traffic circles.



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5.1.2 TRAFFIC CIRCLE / MINI ROUNDABOUT

Traffic circles and mini roundabouts are not to be confused with modern roundabouts. Modern roundabouts are traffic control devices designed to replace or be used instead of traffic signals. Traffic circles consist of a raised island constructed in the centre of an intersection. The island is often landscaped. Depending on the location, stop signs at intersections retrofitted with traffic circles may be replaced with yield signs. Traffic circles are typically constructed with mountable curbs, to allow for larger vehicles such as buses to pass over them if necessary. While traffic circles are appropriate for Local Roads and most Collectors, care should be taken to ensure the traffic circle design will accommodate the turning path of all vehicles that are expected to use a designated roadway.



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5.1.3 MEDIAN ISLAND

Median islands are constructed with either mountable or barrier curb and are appropriate for all roadways that have the width to support a minimum-1.5 metre island while still maintaining proper travel lane widths. They are often used in conjunction with curb extensions to create a chicane effect. Median islands can be constructed at any length; often driveway spacing is the limiting

factor. Median islands can be landscaped and should be signed at either end to alert motorists. Consideration should be given to on-street parking that is lost with the construction of a median island.

5.1.4 CORNER RADIUS REDUCTION

Corner radii should be designed as small as possible, only large enough to accommodate the largest design vehicle expected to use a particular road. Small-radius corners reduce crossing distance for pedestrians and force motorists to slow when turning.

5.1.5 CHICANES

A chicane can be used to reduce the width of a section of road to one lane, thereby forcing one direction of traffic to stop and allow the other to pass. One-lane chicanes shall only be used on Local Roads, and should only be used on those experiencing high volumes and with approximately equal directional splits, or the associated reduction in traffic volumes will be minor.

Two-lane chicanes offer little in the way of volume or speed reduction and should not be used as traffic calming measures. They often have the unintended consequence of allowing drivers to straddle the centre line, as one might do on a winding road, potentially increasing crash potential. A more suitable two-lane chicane effect can be accomplished through curb extensions and centre medians.

5.1.6 ON-STREET PARKING

On-street parking is an inexpensive and practical traffic calming measure. It reduces the width of the road and causes motorists to reduce their speeds. It should be considered wherever possible, prior to, and in conjunction with, the implementation of physical traffic calming devices.

5.2 Vertical Deflection

Vertical deflection devices change the motorist's path in the vertical plane. As such, they are primarily intended for use on local streets and low volume Collector roads. Vertical deflection devices are not permitted for use on transit routes or designated emergency routes.

Advantages:

- Effective in reducing operating speeds
- Do not impact local access

Disadvantages:

- Devices have the potential to impact emergency vehicle response times, as they are required to slow down for the devices to ensure they do not injure patients/passengers or damage their vehicles
- Devices may increase maintenance requirements
- Typically do not impact through traffic volumes significantly

5.2.1 SPEED HUMPS AND TABLES

Speed humps are appropriate for all local streets and low-volume Collector roadways that do not serve as transit or emergency response routes. Speed tables, which have a longer profile, may be considered with caution on higher-volume Collectors. Speed tables should not be used on roads posted at 30 km/h, because vehicles will not have to slow down to pass over them.

5.2.2 SPEED CUSHIONS

Speed cushions are similar to speed humps or tables, except that they have channels cut into them, approximately the width of a large vehicle, to allow such vehicles to pass over them without slowing down considerably. Some jurisdictions allow speed cushions to be used on transit or emergency routes. In St. John's, since no vertical deflection of any sort is to be used on transit or emergency routes, speed cushions should only be used, and with caution, on roads where truck traffic is permitted yet traffic calming is still warranted. The cushions will allow truck traffic to pass through relatively unencumbered.



San Francisco Municipal Transportation Authority

5.2.3 RAISED CROSSWALKS

Raised crosswalks, often constructed with decorative, textured pavement, serve three purposes: they highlight the functional area of an intersection and reduce vehicle speeds and depending on surface treatment, they may improve the streetscape. Raised crosswalks shall be installed consistent with the city's crosswalk policy, and only on Local Roads and low-volume Collectors that do not serve as transit or emergency routes.



Richard Drdul (flickr.com/drdul)

5.2.4 RAISED INTERSECTIONS

Raised intersections are costly to retrofit and minimally reduce vehicle speeds and volumes. Therefore, they are not recommended for use on existing City streets, although the city may allow them at the intersection of two Local Roads in new developments.

5.2.5 OTHER DEVICES

Rumble strips should not be used as traffic calming measures. Rumble strips are designed to alert motorists to changes in roadway conditions by creating both noise and vibration in the vehicle. They are used as traffic calming devices in some communities, but their associated noise makes them largely unacceptable for this purpose. They should only be used as warning devices when conditions dictate.

Textured crosswalks should not be used alone as a traffic calming measure, but should be considered in conjunction with traffic calming implementations. These crosswalks, often constructed with interlocking pavers, can serve to highlight the functional area of an intersection and improve the streetscape. However, they do nothing to reduce vehicle speeds or volumes, and are often both expensive to maintain and limiting to some mobility-challenged pedestrians. Consideration should be given to other methods of creating textured pavement, such as stamped asphalt and concrete, whenever including textured crosswalks as part of a larger traffic calming plan.



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5.3 Obstruction/Closure

Included in this category are partial and full roadway closures, intersection diverters, raised medians and right-in-right-out channelized islands. The main purpose of these devices is to reduce infiltrating traffic on neighbourhood streets.

Advantages:

- Reduces road user conflicts and volumes
- Requires little or no enforcement

Disadvantages:

- Penalizes local traffic access
- Reduces access to transit, emergency services, delivery service, etc.
- Complicates road maintenance efforts in the vicinity of devices
- Potential to divert both local and through traffic to parallel or alternative routes

5.3.1 DIRECTIONAL CLOSURES / RIGHT-IN, RIGHT-OUT ISLANDS

Compliance with these devices relies on the presence of other motorists to deter would-be violators from circumventing the device. As such, they should only be used at the intersection of Local Roads with lower-volume Collector roads. They should also only be used when local traffic has another alternative to access the higher-order road in the direction prevented by the closure.

5.3.2 RAISED MEDIAN

These raised medians should not be confused with the raised medians discussed above in the horizontal deflection section. These raised medians effectively serve the same purpose as right-in, right-out islands, and should only be used to prevent left turns to and from local streets and low-volume Collector roads. As with directional closures, this type of raised median should only be used when local traffic has another alternative to access the higher-order road in the direction prohibited by the closure.

5.3.3 CHANNELIZATION

Intersection channelization may be used on all roadways.

5.3.4 FULL CLOSURE

Full closure should only be considered for Local Roads and only as a last resort, as it has severe implications on local residents. If considered, care must be taken to ensure that the local traffic affected by the closure does not create unanticipated problems on adjacent local streets.

5.4 Signage

These devices are sometimes used as traffic calming devices and include both regulatory and warning signs, including stop and yield controls, maximum speed, turn prohibitions, 'traffic calmed neighbourhood' signs.

Advantages:

- Has the potential to reduce vehicle speeds and volumes
- Reduces road user conflicts
- Relatively inexpensive

Disadvantages:

- Frequent enforcement is required to be effective
- "Traffic calmed neighbourhood" and "No through traffic" signs are not regulatory signs that can be enforced
- May reduce local access in the case of one-way streets and turn restrictions.

5.4.1 STOP, YIELD AND OTHER REGULATORY SIGNS

Regulatory signs, with the exception of speed limit signs, are not to be used as traffic calming devices within St. John's. Unwarranted all-way stop signs are not a valid method of calming traffic and should not be installed for that purpose. When intended as traffic calming, maximum speed signs are only to be used in conjunction with other physical devices.

5.4.2 TRAFFIC CALMED NEIGHBOURHOOD SIGNS

These signs should be considered as part of all traffic calming implementations.



Richard Drdul (flickr.com/drdul)

5.4.3 WARNING SIGNS

Warning signs shall be considered where appropriate as part of larger traffic calming plans. The *Canadian Guide to Neighbourhood Traffic Calming* offers guidance as to which signs are suggested/required for various installations.



Richard Drdul (flickr.com/drdu1)



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5.4.4 TURN RESTRICTIONS

Turn restrictions may be considered as traffic calming, but two important points highlight the caution that must be exercised:

- They are not self-policing devices, and when used on low-volume roads, do not by themselves deter motorists from making the prohibited movement; and
- While it is possible under the Highway Traffic Act to enforce turn restrictions at particular times of the day, it is not possible to enforce a "local traffic excepted" plate on a turn restriction sign. If a turning movement is prohibited for some traffic, it must be prohibited for all traffic.

6. PLANNING, ENGINEERING AND CONSTRUCTION COSTS

Most traffic engineering plans can be developed in-house, using existing City, Provincial and TAC guidelines, as well as best practices research from other jurisdictions. For particularly large or complex plans, or when staff resources are short, the services of a consultant may be considered, keeping in mind that consultant costs may range into the tens of thousands of dollars.

Typical recent construction costs are shown in **Exhibit 6-1**. Factors such as land acquisition, utilities, drainage and grading should be expected to influence construction costs.

Exhibit 6-1: Typical Traffic Calming Construction Costs

Measures		Unit Cost
Horizontal Deflection	Curb Extension	\$3,000-\$10,000 per side
	Traffic Circle / Mini Roundabout	\$5,000 - \$20,000
	Raised Median Island	\$5,000-\$15,000
	Corner Radius Reduction	\$3,000 and up, depending on radius
	Chicane, 1-Lane	\$10,000 - \$30,000 per series
	On-Street Parking	Minor
Vertical Deflection	Speed Hump	\$2,000-\$5,000 (depending on width of roadway)
	Speed Table	\$5,000-\$20,000 (depending on width of roadway and material)
	Speed Cushion	\$2,000-\$5,000 (depending on width of roadway)

Measures		Unit Cost
	Raised Crosswalk	\$5,000-\$20,000 (depending on width of roadway and material)
	Raised Intersection	\$20,000 - \$75,000
Obstruction / Closure	Directional Closure	\$5,000 - \$25,000
	Right-In/Right-Out Island	\$5,000 - \$10,000
	Raised Median Through Intersection	\$10,000 - \$30,000
	Intersection Channelization	\$3,000 and up, depending on length
	Full Closure	\$10,000 - \$30,000
Signage	Traffic-Calmed Neighbourhood, Warning Signs, etc	\$200

7. ANTICIPATED STAFF LEVEL OF EFFORT AND TIMELINES

The warrant component of the traffic calming process has been specifically designed to require a similar level of effort to a traffic signal warrant. That is, once all of the required input data has been collected, running the warrant spreadsheet should only be a matter of minutes. Much of the required input data is information that is expected to be readily available, e.g.:

- Presence or absence of transit or emergency routes;
- Block length between controlled intersections;
- Land use data;
- Pedestrian facilities and pedestrian generators; and
- Collision data.

In many cases, the city will have volume and speed data already on hand for the location. For those locations where this data is not available, it will need to be collected prior to warrant analysis. As discussed above, the most resource-intensive component of the data collection will be the determination of non-local traffic. This report provides guidance on four different methods of estimating non-local traffic percentages.

Additional staff effort will be required once a site is selected for further study. Project initiation, additional data collection, the public consultation process and plan development may take several months. Approval, tender, implementation and evaluation times would generally be consistent with similar-scale capital works projects.

8. GLOSSARY

- **85th Percentile Speed** – The speed separating the fastest 15% of vehicles from the slowest 85%;
- **ADT** – Average daily traffic, recorded over a 24-hour period;
- **Cut Through Traffic** – Traffic determined to neither begin nor end a trip within a defined study area. Typically synonymous with “non-local traffic”;

- **EMS** – Emergency medical services;
- **Local Road, Collector, Arterial**– Three of the roadway classifications used by the City of St. John's, in increasing order of volume and importance within the overall roadway network;
- **Pedestrian Facilities** – Sidewalks;
- **Pedestrian Generators** – Parks, community centers, high schools and senior facilities; and
- **VPD** – Vehicles per day.

APPENDIX A

RECOMMENDED TRAFFIC CALMING FRAMEWORK

APPENDIX B

APPLICABILITY AND IMPLICATIONS OF RECOMMENDED TRAFFIC CALMING MEASURES

Potential Benefits of Recommended Traffic Calming Measures

Measures		Speed Reduction	Volume Reduction	Conflict Reduction	Environment
Horizontal Deflection	Curb Extension	●	○	○	●
	Traffic Circle / Mini Roundabout	●	●	●	●
	Raised Median Island	●	○	●	○
	Corner Radius Reduction	●	○	○	●
	Chicane, 1-Lane	●	●	●	●
	On-Street Parking	●	○	○	●
Vertical Deflection	Speed Hump / Table	●	●	●	●
	Speed Cushion	●	●	●	●
	Raised Crosswalk	●	○	●	●
	Raised Intersection	●	○	●	●
Obstruction / Closure	Directional Closure	○	●	●	●
	Right-In/Right-Out Island	○	●	●	●
	Raised Median	○	●	●	●
	Intersection Channelization	○	●	●	●
	Full Closure	○	●	●	●
Signage (when primarily application is traffic calming)	Traffic-Calmed Neighbourhood	●	○	○	○
	Turn Prohibited	○	●	●	●
	Through Traffic Prohibited	○	●	●	●
	One Way	○	●	●	●
	Warning signs (playground, school, etc)	●	○	●	○
	Maximum Speed	●	○	○	○
	Yield	○	○	●	○
	Stop	○	●	●	○
● = Substantial Benefits ● = Minor Benefits ○ = No Benefit					

Potential Disbenefits of Recommended Traffic Calming Measures

Measures		Local Access	Emergency Response	Other Travel Modes	Enforcement	Maintenance
Horizontal Deflection	Curb Extension					
	Traffic Circle / Mini Roundabout					
	Raised Median Island					
	Corner Radius Reduction					
	Chicane, 1-Lane					
	On-Street Parking					
Vertical Deflection	Speed Hump / Table					
	Speed Cushion					
	Raised Crosswalk					
	Raised Intersection					
Obstruction / Closure	Directional Closure					
	Right-In/Right-Out Island					
	Raised Median					
	Intersection Channelization					
	Full Closure					
Signage (when primarily application is traffic calming)	Traffic-Calmed Neighbourhood					
	Turn Prohibited					
	Through Traffic Prohibited					
	One Way					
	Warning signs (playground, school, etc)					
	Maximum Speed					
	Yield					
	Stop					
= Substantial Disbenefits = Minor Disbenefits = No Disbenefits						

Source: *Canadian Guide to Neighbourhood Traffic Calming* (Transportation Association of Canada, Institute of Transportation Engineers, December 1998)