Traffic Calming Guide

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2 INTRODUCTION

The City of Saskatoon is responsible for ensuring roadways serve the needs of all road users in a safe and efficient manner. Traffic calming presents an opportunity to reduce negative impacts of motor vehicles and improve safety for all road users.

The purpose of this guide is to provide an overview of what traffic calming is, when and where it can be used, and what the positive and negative impacts of applying traffic calming measures can be. It also contains a description of the different traffic calming measures available in the City, their estimated costs, information on how to request traffic calming, and the process which must be followed.

By following this process, the City shall ensure a consistent action plan is performed that results in necessary customized mitigation measures to individual neighbourhoods and appropriate evaluation is performed prior to, and following implementation of calming measures.

2.1 What is Traffic Calming?

Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for all road users including non-motorized street users. Traffic calming measures are a means to address traffic and safety issues such as speeding and shortcutting. Physical features such as speed humps, curb extensions and pinch points are often associated with traffic calming measures.

2.2 Why use Traffic Calming?

Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for all road users including non-motorized street users. Traffic calming measures are a means to address traffic and safety issues such as speeding and shortcutting. Physical features such as speed humps, curb extensions and pinch points are often associated with traffic calming measures.

2.3 Why is a Traffic Calming Policy Needed?

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;
- Minor problems may be addressed, while a major problem discovered later has no funding available for mitigation.

The City has developed a Traffic Calming Policy 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.

2.4 Resources

2.4.1 Canadian Guide to 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 the first edition (December 1998), municipalities and consultants throughout Canada and abroad have used the Guide for traffic calming guidance and application. From the foreword of the Guide, its purpose is to:

- Assist practitioners;
- Achieve an appropriate level of national standardization;
- Maximize safety; and
- Minimize liability.

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 Saskatoon 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.

3 TRAFFIC CALMING IN SASKATOON

3.1 Goals and Objectives

The overall objectives of the Traffic Calming Policy are to maintain the livability and environmental quality of our neighbourhoods while ensuring the safe, efficient and economical movement of persons and goods.

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 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 for local streets.

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

3.2 Principles

The following guiding principles form the basis for traffic calming and will be taken into consideration when investigating, selecting, and implementing appropriate measures. These principles provide overall direction and guidance in the application of traffic calming measures and applying them will maximize the effectiveness of the installed measures and help build community support by ensuring their needs are met.

1. **Identify the actual conditions**: Traffic Calming is applicable upon confirmation of identifiable neighbourhood needs: evaluation of recorded data for roadway operations (speed / volume / short-cutting) against required criteria and community support.

2. **Quantify the real problem**: Prioritization of the implementation of Traffic Calming shall be evidence based through data collection and survey results. A Priority / Severity Point System is established in this Guide.

3. **Involve the Community**: Public engagement and community support is a requirement throughout multiple stages of the process.

4. **Consider the source of the problem**: Most motorists will not shortcut through a neighbourhood unless there is a reason to, and the reason is often related to

congestion on adjacent major roads. Improvements to the major road network should be considered first, as these might prevent or reduce the need for traffic measures on the neighbourhood streets.

5. **Apply traffic calming measures on an area-wide basis**: Potential effects on adjacent streets must be considered. If local effects are not considered in advance, a traffic calming solution might simply create or exacerbate problems elsewhere in the community.

6. **Start with the least restrictive measures**: Neighbourhood traffic management measures that restrict access or egress should be carefully considered and should be accompanied by public consultation. Measures which restrict access might also divert traffic to other streets, creating or exacerbating problems elsewhere in the neighbourhood.

7. **Use self-enforcing measures**: Measures that maintain a 24-hour presence and do not require police enforcement to be effective are preferable.

8. **Accommodate and consider all users**: Mitigation measures shall avoid restricting access and ensure continued accommodation of active modes of transportation, as well as service and emergency vehicles.

9. **Consider all services**: Neighbourhood traffic management measures should not impede emergency, transit, and maintenance service access unless alternate measures are agreed upon.

10. **Monitor and follow-up:** Neighbourhoods shall be monitored for effectiveness of implemented measures (against representative “pre” and “post” data), and resident feedback incorporated to evaluate applied traffic calming actions as well as the process itself. Appropriate actions shall be taken to update and improve field operations and the guidelines.

3.3 Application

The focus of traffic calming is to address traffic and safety problems on City streets. This means, for example, speeding problems, short-cutting traffic through neighbourhood streets, and pedestrian and cyclist safety issues. Although the primary focus of traffic calming is residential streets, traffic calming can be used on almost all types of streets.

There are other uses of traffic calming measures which are not encompassed by this policy, including:

- **New developments:** Developers sometimes wish to include traffic calming devices in new developments, either as a means of preventing traffic problems from occurring in future, to mitigate known impacts of development, or as an aesthetic enhancement. Examples include traffic circles, roundabouts, curb

extensions and raised crosswalks. The use of traffic calming devices in new developments may be appropriate, provided that they would not unduly affect access for emergency vehicles, transit buses, trucks and other vehicles, and would not create safety concerns.

- **Future problems:** Traffic calming measures should generally only be used for existing traffic problems. Using traffic calming to address potential future problems should only be considered as part of an area-wide traffic calming plan as a means of avoiding problems which might be created by traffic diverted from other streets as a result of traffic calming measures implemented on those streets. In some cases, traffic calming measures which have no significant negative implications - such as curb extensions – can be used to prevent future problems.

- **Project-related works:** Traffic issues sometimes arise as a result of road construction and other transportation projects. Traffic calming measures may be used as part of these projects, during construction to mitigate impacts of detoured traffic or congestion.

Application limitations exist, as follows:

- **Grade:** Traffic calming shall not be permitted if the grade of the subject segment of roadway is equal to or greater than 5%, 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.

- **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.

- **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 collision.

- **Arterial Roads:** This traffic calming policy is targeted for Local Roads and Collectors. 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 and the understanding that restrictive measures taken on Arterials are likely to shift traffic onto lower-order roads and into neighbourhoods. If there are speeding issues that can be addressed with appropriate traffic calming measures, these will be considered outside of this process.

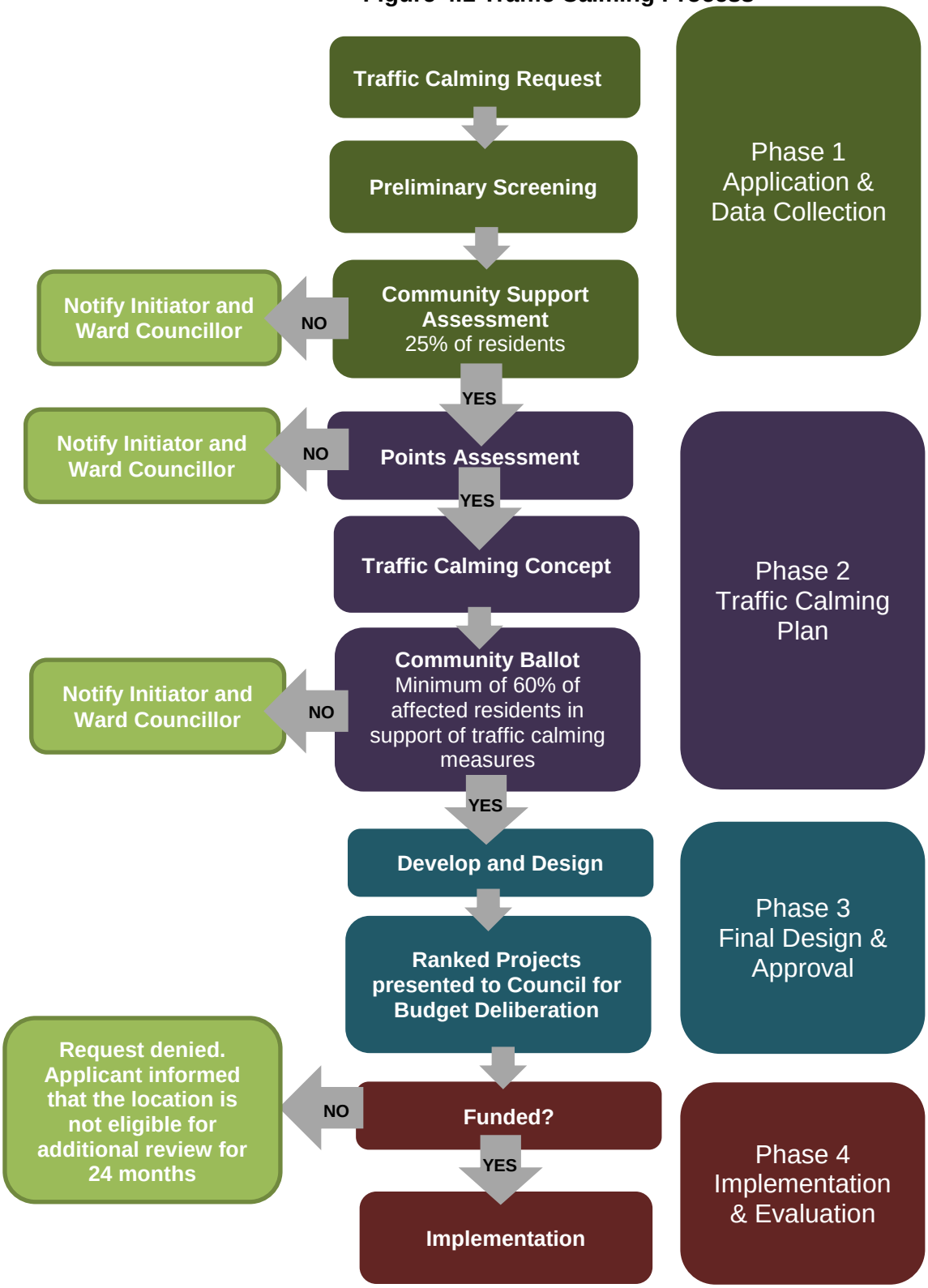
4 TRAFFIC CALMING PROCESS

The following sections describe the four-phase process for the implementation of traffic calming measures on City roads, beginning with a request for traffic calming and ending with design, approval, implementation and evaluation.

Phase 1: Application and Data Collection
Phase 2: Traffic Calming Plan
Phase 3: Final Design and Approval
Phase 4: Implementation and Evaluation

Figure 4.1 outlines an overview of the study process.

Figure 4.1 Traffic Calming Process



4.1 Phase 1 – Application and Data Collection

4.1.1 Traffic Calming Request

Implementation of the Neighbourhood Traffic Calming Policy and actions associated with the Process and Guidelines may be initiated by two different methods, Neighourhood-Driven or City-Driven.

Neighbourhood-Driven

A neighbourhood-driven traffic calming process is ideally suited to:

- Residential streets within existing, established neighbourhoods
- Local collector roadways within a residential neighbourhood

In neighbourhood-driven initiatives, property owners are encouraged to contact the City to initiate a review of their roadway(s) for eligibility within the City's Traffic Calming Program.

City-driven traffic

A city-driven traffic calming process is ideally suited to:

- Local / collector roadways where there may be concerns identified via traffic data analysis (such as motor vehicle collision information or annual traffic count / speed program data).
- Local / collector roadways that may be impacted by proposed new development.

In city-driven initiatives, Council or Administration may initiate a review of roadway(s) for eligibility within the City's Traffic Calming Program. All steps following the initiation phases of the program shall be followed.

4.1.2 Preliminary Screening

Investigation into received public concerns or requests shall take into account preliminary screening information, inclusive of the following criteria:

- Issues are located on a defined local or collector roadway within the City.
- Traffic patterns are stable, and are not under potential temporary impacts such as adjacent construction or special events.
- Traffic concerns are related to one or more of the following:
    - Vehicle speeds are exceeding a specified threshold above the posted speed limit;
    - Vehicles are short-cutting on residential streets in lieu of using the existing collector or arterial system, where a viable alternate route exists;

- Vehicle volumes on a residential or collector street are exceeding expected thresholds for such a roadway; and
- Pedestrian crossing visibility (for both pedestrian recognition of vehicles and driver's recognition of pedestrians).

Warrants

To comply with the Policy, the following warrants / technical criteria should be met. 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. Changes to the road design outside of the traffic calming process may also be warranted in some situations.

Table 4-1 Safety Warrant Requirements

Safety Warrant Requirements		
All of the following criteria must be met		
1.1 Grade	Traffic calming measures may be considered at or near locations where the road grade is less than 8%.	Yes/No
1.2 Sidewalks	On streets where traffic calming is proposed, there must be continuous sidewalks on at least one side of the street. **OR** On streets where there are no sidewalks, the installation of sidewalk on at least one side of the street must have first been considered.	Yes/No
	Warrant Met?	Yes/No

Table 4-2 Technical Warrant Requirements for Local Roads

Technical Warrant Requirements – Local Road		
All of the following criteria must be met		
2.1 Grade	< 8%	Yes/No
2.2 Volume	> 1,000 vehicles per day	Yes/No
2.3 Speed	≥ posted speed limit + 5 km/h	Yes/No
2.4 Non-Local Traffic	≥ 20%	
	Warrant Met?	Yes/No

Table 4-3 Technical Warrant Requirements for Collector Roads

Technical Warrant Requirements – Collector Road		
All of the following criteria must be met		
2.1 Grade	< 8%	Yes/No
2.2 Volume	> 5,000 vehicles per day	Yes/No
2.3 Speed	≥ posted speed limit + 5 km/h	Yes/No
	Warrant Met?	Yes/No

4.1.3 Community Support Assessment

It is important to determine whether there is a minimum level of support within the community for action to address the issue. This helps to avoid situations where residents might consider a solution more of a problem than the issue it was intended to address. It also helps to avoid City staff spending time and funds to respond to a reported issue that is only considered a problem by a small number of people.

At this stage in addressing reported traffic calming issues, it is not necessary to demonstrate majority support within the community for a traffic calming solution. Rather, it is only necessary to demonstrate that a sufficient number of people within the community who are affected by the reported issue and who would be affected by the solution consider that there is a need to examine the issue further. Consequently, a sufficient level of community support is required.

Residents would be responsible for documenting community support, rather than City staff. The simplest means of indicating community support is a petition which lists the addresses of all affected households, and includes space for signatures of residents. An example of such a form is included in the Appendix. Residents would then contact persons in affected households to obtain these signatures.

Affected households are typically those within the block(s) of the street(s) where problems are reported, as well as all households within one block of the block(s) where problems are reported. The Administration will guide the applicant on the affected study area for their request.

For the traffic calming process to continue, a minimum of twenty-five (25%) of property owners within the impact area must indicate their support for further study.

4.2 Phase 2 – Traffic Calming Plan

4.2.1 Points Assessment

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 7 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.

Table 4-4 Points Allocation for Assessment for Roadway Operations Factors

Roadway Operations Factors	Measure Used	Point Criteria	Maximum Points
Collision History	• Collision frequency over 3 years • Severity of collisions that occurred	• 1 point per collision occurrence resulting in property damage only • 2 points for each collision in the past three years involving vulnerable road users	10
Traffic Volumes	Average Daily Traffic (ADT)	• Local Roadways: 1 points for every 100 vehicles over 1,000 ADT • Collector Roadways: 1 point for every 200 vehicles above 5,000 ADT	25
Traffic Speeds	85th Percentile Speed	• 1 point for every km/h above posted speed. Additional 5 points if speed is > 15 km/h above the posted speed.	20
Short-Cutting Traffic	% of Total Vehicles	• 2 points for every 10% or more of short-cutting vehicles in excess of ADT	10

Table 4-5 Points Allocation for Assessment for Neighbourhood Factors

Neighbourhood Factors	Measure Used	Point Criteria	Maximum Points
Sidewalks	Presence of sidewalks	• 10 points for no sidewalks with evidence of pedestrian activity, 5 points for sidewalks on only one side	10
Pedestrian Generators	Pedestrian Generators	• 5 points for each nearby pedestrian generator such as a school, playground, community centre, libraries, retail centres, etc.	15
Cycling Concerns	Presence of All Ages and Abilities (AAA) cycling route	• 5 points if the road is an existing or planned cycle route	5

4.2.2 Traffic Calming Concept

Traffic calming plan(s) shall be created for locations moving forward within the year for the traffic calming program – the location(s) identified as ranking highest in severity and priority.

The final score awarded from the warrant evaluation will be 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.

Each Traffic Calming Plan shall:

- Use traffic calming measures identified in the Canadian Guide to Traffic Calming.
- Be aligned with a summary of received resident / stakeholder concerns and traffic data collected and identify how the proposed measure addresses noted issues.

- Be reviewed fully for all expected impacts of the Traffic Calming Plan, inclusive of traffic routing (internal to the community and surrounding network), service level impacts (Emergency Medical Services / Fire Department / Transit / Roadways & Operations), and expected travel delay to residents.
- Identify high level construction cost estimates.

An Open House consultation may be conducted during the plan development to ensure that the traffic calming measures included address the community's concerns. The need for an Open House consultation will depend on the complexity of the issues to be addressed.

4.2.3 Community Ballot

The objective of the community ballot is to determine the level of support for the traffic calming concept and to provide an opportunity for the most directly affected residents to oppose any modifications to the road. A response rate of 50% + 1 ballots must be received with a minimum 60% of all affected residents in favour of the possible traffic calming for the request to proceed.

4.3 Phase 3 – Final Design and Approval

4.3.1 Develop and Design

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. This plan shall be sent mailed to the affected residents for final comment and support.

For successful mitigation plans, City staff, or consultant representation, will prepare cost estimates and detailed construction drawings, and follow other City policies regarding construction activities.

4.3.2 Project Ranking

Projects will be ranked according to the points assessment (as outlined above).

4.4 Phase 4 – Implementation and Evaluation

4.4.1 Funding

The complete list of ranked projects will be sent to Council for budget deliberation. Funding of a traffic calming plan will be considered as final Council approval and standard City processes for tendering and construction shall commence, followed by evaluation and monitoring of the plan.

4.4.2 Implementation

Prior to full and permanent construction, temporary measures may be deployed within the neighbourhood for a minimum period of 1 year (maximum period of 2 years) to assess the effectiveness of the proposed traffic calming plan and to allow residents an opportunity to adjust to the new roadway conditions. Not all calming measures are applicable to being implemented as temporary traffic calming measures.

For successful mitigation plans, detailed cost estimates and construction drawings will be prepared, and construction activities will proceed following City policies.

If the traffic calming 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
- Lack of Council support for funding.

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 development near the requested location.

4.4.3 Evaluation

In accordance with traffic calming communication strategy, once constructed, a minimum period of 6 months should transpire before a study is conducted within the neighbourhood to quantitatively measure vehicle speeds, volumes and cut-through vehicles and qualitatively solicit feedback from property owners on the effectiveness of the traffic calming plan, any observed changes, etc.

The City shall monitor the impacts of the implementation of the traffic calming measures for a minimum of 2 years (following the program data collection created for the specific neighbourhood).

Quantitative data shall be collected in a manner consistent with the base conditions collected, including locations for data collection. Additional data may be collected at specific measures to quantify the effectiveness of the specific device. The data collected will be compared to the data from prior to project initialization to evaluate the effectiveness of the overall traffic calming plan. The results will be compared to established metrics to determine if the plan achieved the intended vehicle speed and/or volume goals and objectives. If the plan does not operate as expected, modifications may be applied. If the proposed modifications are deemed significant, the City may host another workshop with stakeholders for further discussion.

4.4.4 Traffic Calming Removal

An adjustment period is necessary for drivers to adapt to the changes along the community roadways following the implementation of a Traffic Calming Plan.

Following evaluation (minimum 6 months lapse prior to the implementation of a Traffic Calming Plan), the City may identify issues or safety concerns from the implementation of traffic calming measures, or a negative impact that was created that cannot be corrected.

- Safety issues shall take priority and will be addressed appropriately, inclusive of potential removal or adjustment of the mitigation measure.
- Non-safety issues may be left and monitored for a further time period (minimum period of 1 year) to further evaluate potential traffic changes or driver behaviour changes.

In some instances, property owners may wish to remove the traffic calming measures from their community due to a variety of concerns. If a safety concern should occur, the City will evaluate the condition and modify / remove the traffic calming strategy as necessary.

For non-safety related traffic calming removal requests, a minimum installation period of 1 year will be required before the plan will be reviewed for removal. To initiate the review of traffic calming measures for removal the resident / stakeholder must submit an Application for Existing Traffic Calming Device Review / Removal Form. Following the receipt of the application, Administration shall contact the applicant and discuss concerns or issues to ensure full details are obtained to begin further field review.

If the resident / stakeholder wishes to pursue removal, a community ballot will be circulated to determine the level of support for the removal of the traffic calming measures. A response rate of 50% + 1 ballots must be received with a minimum 60% of all affected residents in favour of the removal of the traffic calming measure.

Upon removal, no new traffic calming requests from the community for those roadways will be processed for a minimum of 2 years unless a safety concern is identified by the City.

4.5 Community Input

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.

5 COMMUNITY BASED INITIATIVES

This section is intended to address numerous initiatives which individuals and community groups can undertake as a means of addressing traffic issues. The intent of these initiatives is to help communities help themselves. Together with any action undertaken by the City, these initiatives result in a balanced response to local traffic issues.

- **Community Newsletters**: Community Associations can publish information on traffic concerns in their newsletters to encourage more appropriate driving behavior among motorists or notify a neighbourhood of planned projects that will affect local traffic patterns (construction or permanent installations).

- **Community Events**: Public meetings and community open houses involving residents and stakeholders can be an effective means of identifying traffic issues and options available to deal with problems. These discussions can also bring awareness and education to help improve driver behavior. This will assist in the traffic study process.

- **Alternative Modes of Transportation:** A wide range of initiatives can be used to reduce vehicle trips and the amount of traffic on neighbourhood streets. Some examples include:
    - Car Pooling
    - Working from at home
    - Flex time – staggering work hours to avoid peak hour traffic volumes
    - Public Transit
    - Cycling
    - Walking

5.1 Community Speed Display Board Program

The purpose of this program is to allow communities to purchase their own speed display board. The following criteria will be followed:

- Community Associations will need to submit an initial application to the City of Saskatoon to purchase the speed display board.
- The City of Saskatoon will arrange to acquire the speed display board.
- Community Association will submit written confirmation of location to install speed display board.
- The City of Saskatoon will arrange for installation.
- The speed display board is to be installed for one-year at one location.
- The community can submit another written confirmation to the city to have the speed display board relocated to another position the following year.

The following process and required timeline is outlined in Table 5-1.

Table 5-1 Speed Board Display Process

Process	Time line	Year
Initial application (one-time application)	January - December	1
Purchase of speed display board	January-March	2
Confirmation of location	January-March	2
Installation of speed display board	April-May	2
The speed display board will be located in one location for one year	May-May	2-3
Written confirmation of another location	May-May	2-3

The cycle after year 1 will continue until the community decides they no longer want to continue with the program.

Table 5-2 outlines the guidelines and reasons for these guidelines for the purpose of using speed display boards.

Table 5-2 Speed Display Boards Guidelines

Guidelines	Reasons for Guideline
The community will only be allowed to purchase one speed display board.	Doesn't conflict with recommendations for permanent speed display boards from the neighbourhood review plans.
The speed display board can only be installed at one location per year.	This reduces staff resources required to relocate signs throughout the season. .
The speed display board cannot be used as enforcement purposes.	The police are the only group who can enforce speeding.
The speed display boards are to be used only within the neighbourhood on local and collector streets.	To educate the drivers within the neighborhood.

The speed display boards can be used in school zone for education purposes only.	The police are the only group who can enforce speeding.
The speed display boards shall not conflict with any SGI or police education enforcement programs.	These programs will take priority over the community speed display program
The speed boards should be installed in locations with clear site visibility to the board. No vegetation should be blocking the view of the board.	Speed display boards are solar powered will not be effective if they do not have sufficient sunlight. Drivers need clear site visibility to see the board.

6 TRAFFIC CALMING MEASURES

This section describes the tools that will be used by the City of Saskatoon as potential traffic calming solutions within the neighbourhood. Not all tools used will be applicable to each traffic concern.

Table 6-1 Traffic Calming Measures Toolkit

	Effectiveness			Road Classification			
Measures	Speed Reduction	Volume Reduction	Safety	Local	Collector	Cost per Measure	Section
Education							
Speed Display Board	●	○	○	✓	✓	Low – Medium	
Horizontal Deflection							
Curb Extension	◐	○	○	✓	✓	Medium – High	
Median Island	◐	○	◐	✓	✓	Medium – High	
Traffic Circle	●	◐	●	✓	✓	Low – Medium	
Chokers (Pinch Points)	◐	○	○	✓	✓	Medium – High	
Curb Radius Reduction	◐	○	○	✓	✗	Low – Medium	
Chicane	●	●	●	✓	✗	Medium	
Lateral Shift	○	○	○	✓	✓	Low – Medium	
Speed Kidney	◐	○	○	✓	✗	Low – Medium	

	Effectiveness			Road Classification			
Measures	Speed Reduction	Volume Reduction	Safety	Local	Collector	Cost per Measure	Section
Vertical Deflection							
Raised Crosswalk	●	○	◐	✓	✓	Low – Medium	
Raised Intersection	●	○	◐	✓	✓	Medium – High	
Speed Cushion	●	◐	●	✓	✓	Low	
Speed Hump	●	◐	●	✓	✓	Low – Medium	
Access Restriction							
Diverter	○	●	◐	✓	✓	Low - Medium	
Right-in / Right-out	○	●	◐	✓	✓	Low - Medium	
Directional Closure	●	●	◐	✓	✓	Low – High	
Full Closure	○	●	●	✓	✓	Medium – High	
Intersection Channelization	○	◐	◐	✓	✓	Low - Medium	
Raised Median through Intersection	○	●	◐	✓	✓	Low - Medium	
Legend	● Substantial Benefits ◐ Minor Benefits ○ No Benefits or Limited Data Available						

6.1 Education

6.1.1 Speed Display Boards

Speed Display 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 these signs are combined with a regulatory speed limit sign, a clear message is sent to the driver displaying their speed.

The objective of the speed display board is to improve road safety by making drivers aware of their speed, evoking voluntary speed compliance.

Speed display boards are used as traffic calming devices in addition to or instead of physical devices such speed humps, speed cushions, or speed tables.

Speed Display Board Usages

- Used on collector roads where there are no trees or other vegetation that will restrict the operations of the speed display board.
- Used in conjunction with physical traffic calming devices.
- Typically installed where there is already an enforcement speed sign. E.g. entrance to neighbourhoods.

Advantages

- Provides awareness to driver.
- Encourages speed compliance
- Portable mounting method allows for exposure at numerous locations citywide.

Disadvantages

- Not an enforcement tool.
- Less effective on multi-lane, high volume roadways.

6.2 Horizontal Deflections

Horizontal deflection measures are those which require a motorist to steer around them. Examples include curb extensions and raised median islands.

Horizontal Deflections have the following benefits:

- Discourage short-cutting traffic or through traffic to a varying extent.

- May reduce vehicle speeds and reduce conflicts.
- Enhance pedestrian crossings and all-way stop sign placement.
- Relatively inexpensive.

6.2.1 Curb Extension (Bulb-out or bulbing)

A curb extension is a horizontal intrusion of the curb into the roadway resulting in a narrower section of roadway. The curb is extended on one or both sides of the roadway to reduce the width to as little as 6 m for two-way traffic.

Curb extensions are used to reduce vehicle speeds, reduce crossing distance for pedestrians, increase visibility of pedestrians and prevent parking close to an intersection.

Curb extensions can be used on all roadways which have on-street parking. They are often used at midblock crossing locations, in front of schools and at major crosswalk locations.

7th Avenue and Princess Street
(City Park Neighbourhood)

Saskatchewan Crescent
(Nutana Neighbourhood)

Figure 6.1 Curb extensions

6.2.2 Raised Median Island

A raised median island is a small-elevated median constructed on the centerline of the street, placed directly behind the crosswalk area. For example, in a marked crosswalk, it will be placed behind the standard painted markings. The purpose of the raised median island is to offer a place of refuge for pedestrians crossing the street. It increases pedestrian visibility and may help to reduce speeds. Raised median islands are also placed to improve the visibility of four-way stop signs as well as pedestrian crosswalk signs.

Typically, raised median islands are designed using concrete and often have a mountable median tip. They often are 1.5 m in width.

Figure 6.2 Avenue P and 21st Street (Pleasant Hill Neighbourhood)

6.2.3 Traffic Circles

A traffic circle is 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. It is similar to large roundabout except it does not require pedestrian islands.

A traffic circle eliminates speeding and the potential for the route to become a thoroughfare for motorists.

A traffic circle would be recommended for local streets only.

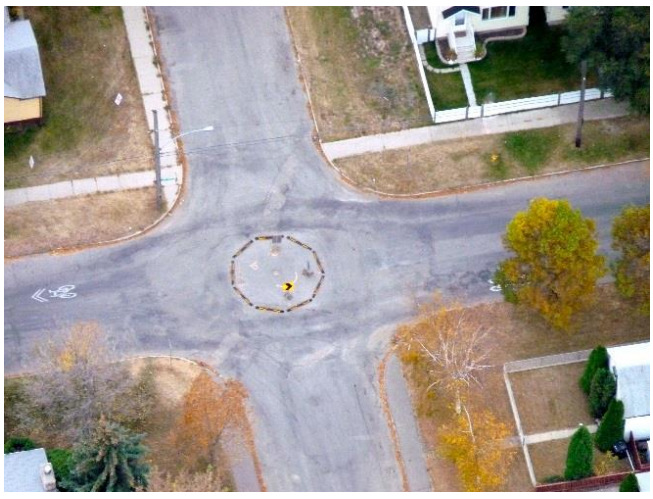


Figure 6.3 Temporary traffic circle on 23rd Street (part of the Bike Boulevard)

6.2.4 Chokers (Pinch points)

A choker is a curb extension at midblock or intersection corners that narrow a street by extending the sidewalk or widening the planting strip. It can leave the cross section with two narrow lanes or a single lane. Chokers are often referred to as parallel chokers, angled chokers, twisted chokers, angle points, pinch points, or midblock narrowing. When at intersections, they are often referred to as neckdowns, bulbouts, knuckles, or corner bulges. If marked as a crosswalk, they are also called safe crossings.

Figure 6.4 Saskatchewan Crescent (Nutuana Neighbourhood)Pinch Point on Saskatchewan Crescent indicating that traffic must yield to oncoming traffic.

6.2.5 Curb Radius Reduction

A curb radius reduction is the reconstruction of an intersection corner with a smaller radius—usually in the 3.0 m to 5.0 m range.

The purpose of a reduced curb radius is to:

- Slow right-turning vehicles;
- Reduce crossing distance for pedestrians; and
- Improve pedestrian visibility.

6.2.6 Chicane

A chicane consists of multiple curb extensions on alternate sides of a roadway. The chicane requires the driver to steer from one side of the roadway to the other and also narrows the road. The purpose of the chicane is to reduce overall speeds by forcing the lateral shift of vehicles as they pass through the device, and also discourages shortcutting traffic.

A one-lane chicane will discourage through traffic further, as it narrows a two-way road to less than a two vehicle width. When vehicles traveling in the opposite direction meet at a chicane, one must yield to the other.

6.2.7 Lateral Shift

A lateral shift involves the redesign of a straight section of road with pavement markings or curb extensions to create a curve in the road, similar to a chicane, which the driver must navigate around. A central island can also be used for a similar effect. The purpose of the lateral shift is to increase driver's awareness as they negotiate it. It can also be effective in reducing speeds.

6.2.8 Lane Narrowing

Lane narrowing is reducing lane widths with the addition of pavement markings, or other features such as bicycle lanes, street beautification programs, pavement texture, etc. The purpose is for the narrow road to reduce vehicle speeds by making drivers feel less comfortable driving at higher speeds.

Lane narrowing pavement markings have a low cost but tend to have minimal effect as physical measures tend to provide better results.

6.2.9 Vertical Centreline Treatment

Vertical centreline treatment involves the use of flexible post-mounted delineators or raised pavement markers to create a centre median. Flexible post-mounted delineators are similar to bollards in appearance. The purpose of vertical centreline treatments is to reduce speeds by giving drivers a sense of lane narrowing. The separation of traffic also has the potential to reduce collisions.

6.3 Vertical Deflections

Vertical deflections measures are those which create vertical motion in a motor vehicle when it is driven over the device. Vertical deflections are not recommended on a street where there is a transit route or emergency access.

Vertical deflections have the following benefits:

- Reduce vehicle speeds which can reduce traffic volumes.
- Relatively inexpensive.

Vertical deflections devices used by the City of Saskatoon include:

- Raised crosswalk
- Textured Crosswalk

- Raised Intersection
- Speed Hump
- Speed Table
- Speed Kidney
- Speed Cushion

6.3.1 Raised Crosswalks

A raised crosswalk is a marked pedestrian crosswalk at an intersection or mid-block location constructed at a higher elevation than the adjacent roadway. Raised crosswalks may help reduce vehicle speeds and improve pedestrian visibility, thereby reducing pedestrian-vehicle conflicts.

Figure 6.5 Meilicke Road between David Knight Crescent and Stechishin Crescent (Silverwood Heights Neighbourhood)

6.3.2 Raised Intersection

A raised intersection is an intersection including crosswalks which are constructed at a higher elevation than the adjacent roadways. It consists of a flat raised area covering the entire intersection, with ramps on all approaches and often brick or other textured materials on the flat section.

A raised intersection is not readily noticeable to motorists and other roadway users.

The effect of a raised intersection on vehicle speed and volume is minor.

The purpose of a raised intersection is to better define crosswalk areas; and the potential for a reduction in pedestrian-vehicle conflicts.

6.3.3 Speed Hump

A speed hump is a raised area of roadway that deflects both the wheels and frame of a traversing vehicle. Speed humps should only be considered if other traffic calming measures are not applicable or if there is excessive speed on a street.

Figure 6.6 Speed Hump on Hughes Avenue (Dundonald Neighbourhood)

Speed humps are designed in series and may reduce the volume of traffic on a street by diverting traffic to other streets.

Speed humps can increase safety - slower drivers and less traffic can reduce collision rates.

Speed humps should be avoided on roadways that are considered an emergency route or transit route.

Speed humps will only be considered if the speeds are 30% higher than the posted speed limit (e.g. on a roadway with a posted speed limit of 50km/h the 85th percentile speed must be 66.5km/h or higher) and supported by community, City Council, Transit, emergency services (Fire, Police, and Ambulance) and Public Works.

Speed humps are different than a speed bump. Speed humps are less aggressive than speed bumps at low speeds and are used on actual streets, as opposed to speed bumps which are primarily placed in parking lots.

While speed bumps generally slow cars to 15 km/h, speed humps slow cars to 15– 30 km/h. The narrow nature of speed bumps often allows vehicles to pass over them at high speed while only perturbing the wheels and suspension, hardly affecting the vehicle cab and its occupants. The relatively long slopes of speed humps gradually

accelerate the entire vehicle in vertical direction, causing the perturbation of the cab to become progressively more severe at higher speeds.

6.3.4 Speed Cushion

Speed cushions are traffic calming devices designed as several small speed humps installed across the width of the road with spaces between them. They are generally installed in a series across a roadway resembling a split speed hump.

The design of a speed cushion forces cars to slow down as they ride with one or both wheels on the humps. However, the wider axle of emergency vehicles such as fire trucks and ambulances allows them to straddle the cushions without slowing down or increasing response times.

Speed cushions will only be considered if the speeds are 30% higher than the posted speed limit and supported by community, City Council, Transit, emergency services (Fire, Police, and Ambulance) and Public Works.

6.4 Access Restrictions

Access restrictions physically restrict certain vehicle movements and should only be used on local streets and on low-volume collectors where there is not a likelihood that traffic would be diverted to nearby local streets.

Access restrictions are typically deployed at intersections, but may also be applied in mid-block positions. The nature and number of movements obstructed, as well as the presence of other traffic calming measures in the neighbourhood, combine to discourage shortcutting and through traffic to varying extents.

Access restrictions should be avoided and should only be used where horizontal or vertical deflection measures will not adequately address a traffic problem.

Access restriction devices used by the City of Saskatoon include:

- Diverter
- Right in/Right out
- Directional Closure or Full Closure
- Intersection Channelization
- Raised Median Through Intersection

6.4.1 Diverter

A diverter is a raised barrier placed diagonally across an intersection that forces traffic to turn and prevents traffic from proceeding straight through the intersection.

Diverters can incorporate gaps for pedestrians, wheelchairs and bicycles and may allow passage of emergency vehicles in some cases.

The purpose of a diverter is to obstruct shortcutting or through traffic.

Figure 6.7 Avenue C and 38th Street – Temporary Device (Mayfair Neighbourhood)

6.4.2 Right in/Right out

A right-in/right-out island is a raised triangular island at an intersection approach.

A right in/right-out island restricts left turns, and through movements to and from the intersecting street or driveway.

The purpose of right-in-right-out island is to restrict shortcutting or through traffic.

Figure 6.8 51st Street and Miller Avenue (Hudson Bay Industrial Neighbourhood)

6.4.3 Directional Closure

A directional closure is a curb extension or vertical barrier extending to approximately the centerline of a roadway, effectively obstructing (prohibiting) one direction of traffic.

The purpose of a directional closure is to restrict shortcutting or through traffic.

6.4.4 Full Closure

Full closure is a barrier extending across the entire widths of a roadway that restricts all motor vehicle traffic movement from continuing along the roadway.

The purpose of a full closure is to eliminate shortcutting or through traffic. It can be designed to allow pedestrian and cyclist access.

Figure 6.9 Coppermine Crescent and Churchill Drive (River Heights Neighbourhood)

6.4.5 Intersection Channelization

Intersection channelization is the use of raised islands or bollards to specific traffic movements and physically direct traffic through an intersection. Intersection channelization can improve pedestrian crossing safety by reducing crossing distances and providing refuge areas.

The purpose of intersection channelization is to reduce conflict points, including vehicle-pedestrian conflicts and reduced crossing distance.

6.4.6 Raised Median through Intersection

A raised median through an intersection is an island that eliminates left turns to and from a local street and obstructs straight through movements.

The median must extend a sufficient distance beyond the intersection to discourage drivers from attempting to get around it and continuing through the intersection.

A raised median through an intersection should be sufficiently wide to offer a pedestrian refuge area. The sidewalk crossing should include a depressed section in the median. This depressed section should be narrow enough to discourage general usage but not preclude emergency access. Separate openings may also be required for cyclists.

This measure should not be used across primary emergency access routes.

6.5 Other Issues

Traffic calming measures will be implemented on local and collector streets only. There may be a desire to implement traffic calming measures in other areas. This section describes other approaches to implementing traffic calming measures in the City.

Lanes – It is the standard policy of the Transportation Division that traffic calming measures are not appropriate in lanes. Lanes are meant for backyard access for the residents living in that area or for garbage pickup and access to utilities. Lanes should not be used as a short-cut. If short-cutting is deemed an issue in lanes, other measures will be considered.

Major Roads (arterials and expressways) - A different approach should be used in implementing speed reduction measures on major roads. It is recommended major roads receive a corridor study which would consider other transportation options such as changes to traffic signals and roadway lanes, improved pedestrian facilities and crossing, space for bicycles and parking, and streetscape enhancement.

Road Construction Projects - Where traffic is diverted or delayed as a result of a construction project on a major road, there is the potential for traffic to divert to adjacent neighbourhood streets. As part of construction plans, temporary traffic calming measures may be identified on adjacent local/collector roads (as needed) to mitigate any effects of diverted traffic. The intent would be to remove the temporary measures when the road construction project is completed.

Special Events - As with road construction projects, delays and diversions to traffic as a result of special events can divert traffic to nearby neighbourhood streets and create traffic concerns on these streets. Transportation plans for special events should include temporary traffic calming measures on adjacent local/collector roads as needed to mitigate any effects of the diverted traffic. Where possible, preparation of a temporary traffic calming plan should be required as part of the planning process for a special event. In all cases, the costs of temporary traffic calming measures associated with a special event should be paid entirely by the organization hosting the event.

New Development - Traffic calming measures are now often incorporated in the design of new residential neighborhoods and are included in the initial construction. Any devices should conform to the design standards as identified in section 6.

7 RESIDENT RESOURCES

If you are interested in submitting a traffic calming request, example materials are provided in Attachment A.

Please contact the Transportation Division for additional information:
Customer Service: 306-975-2454
transportation@saskatoon.ca

Sample Letter
Sample Petition
Sample Removal Request