



# Traffic Calming Policy



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### 1 Introduction

The purpose of this policy is to provide an overview of what traffic calming is, where and when it can be best implemented, and the potential impacts (positive and negative) of applying traffic calming measures. The policy includes general considerations that provide context and parameters to consider as part of any traffic calming project. It also outlines the process by which neighbourhood transportation issues, including traffic calming requests, will be reviewed and considered.

This policy is intended to be used alongside other technical and policy guidance, and should be supplemented with sound engineering judgment.

### 2 Background

In the fall of 2019, City Council adopted the Road Safety Plan (RSP) and Active Transportation Implementation Plan (ATIP), which directed staff to review the City's implementation-based transportation policies. A comprehensive review of the City's traffic calming policy was identified as a priority to determine a more effective means of addressing traffic calming requests.

As such, City Staff in conjunction with CIMA Canada Inc. developed a new Traffic Calming Policy and Guidelines that align with the City's transportation policies and Council's strategic priorities.

### 3 The Role of Traffic Calming

Speeding and other transportation issues are regularly identified throughout the City's road network, especially along the almost 600 kilometers of local roadways. Many of these issues are a direct outcome of the vehicle-centric roadway design that has been employed for many decades as these roads were constructed. Vehicle-centric design is contrary to the City's current policies, which emphasize and promote the use of active transportation and transit ahead of vehicles. These challenges are not unique to Kingston, and are reflected in most municipalities across Canada.

Traffic calming encompasses the process of encouraging driver behaviour that more closely reflects the transportation policies of the City and better meets the expectations of residents. It includes measures and street design elements aimed at improving safety for all road users, particularly for those walking and cycling, by lowering vehicular operating speeds. These tools, when implemented correctly, can address speed-related concerns at a street or block level. The objective and challenge for effective traffic calming implementation is to determine the best combination of measures that result in a net improvement (both real and perceived) in community safety at a reasonable cost. However, if the approach does not extend to the broader neighbourhood, it can shift the issue to nearby streets rather than addressing the overall speeding concern.



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Consequently, traffic calming is most effective when considered as part of a broader, integrated approach to managing transportation-related issues within neighbourhoods and may not be the most appropriate solution for all issues. Depending on the problem definition and surrounding land use, other interventions including pedestrian crossings, all-way stop control, active transportation infrastructure, or more extensive roadway reconstruction may best address the issue.

Most traffic calming measures considered within this policy and the Traffic Calming Guidelines are applicable primarily along Local roadways, which are intended to permit local traffic to access private property and convey traffic to and from the minor collector street system in residential and neighbourhood areas. Local roadways typically have an AADT (Annual Average Daily Traffic) under 1000.

Speeding concerns along Arterial and many Collector roadways are often not appropriately addressed through traffic calming measures. Rather, treatments along collector and arterial roadways are better positioned for consideration within the scope of broader transportation plans, such as the Active Transportation Master Plan and Transportation Master Plan. These projects also need to consider and/or be integrated with other road, water, and sewer renewal projects.

### 4 What is Traffic Calming?

Traffic calming involves implementing safety measures or programs to reduce speed and encourage safe driving behaviour for the comfort of all road users. A successful traffic calming approach is one that alters a street in such a way that motorists will drive slower and exercise caution, and brings the street closer to its intended use while limiting unintended operational impacts.

To successfully achieve this objective, traffic calming may consider the use of the following measures:

- Installation of special pavement markings and/or signage
- Changes to the roadways surface texture and/or colour
- Changes to the vertical and/or horizontal alignment of the roadway (may require road reconstruction)
- Changes to the travelled portion of the roadway through pavement and/or lane narrowing, such as vertical centre line treatment

Depending on the location, some traffic calming measures can be difficult to implement, or the cost of implementation (monetary and operational) may be incompatible with public expectations and the City's allocated budget. As such, the Traffic Calming Policy and Guidelines are intended to:

- Support the decision-making process from the time that a transportation-related issue is identified to implementation of the selected measure

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- Inform residents about the different elements considered as part of the traffic calming process
- Support the allocation of financial resources through an incremental implementation of required traffic calming measures

## 5 Traffic Calming Principles

The following principles are generally applied by road authorities, including several municipalities in Ontario, when selecting and implementing traffic calming measures. This ensures that appropriate traffic calming measures are selected, that they are compatible with the community's needs, and any potential negative impacts are minimized.

While each situation is unique, the principles of traffic calming are relevant to each situation. Application of these principles will maximize effectiveness of the traffic calming plans and help build community acceptance and support of the final traffic calming plans.

### Identify the Real Problem

It is important to identify the real problem so that appropriate traffic calming measures are selected. Traffic issues or road safety issues can be emotional subjects for many people; it is important to keep the issues and problems in perspective to maximize the limited resources on proven problems and not perceived problems.

### Investigate and Detail the Problem

Observations, data collection, and review can aid in selecting and designing the most appropriate treatment, including traffic counts, speeds, collision data, and pedestrian usage, while also taking into consideration the adjacent land uses of the subject road, including the presence of schools, parks, and other pedestrian generators.

### Maintain and Minimize Impacts on Delivery of Emergency Services

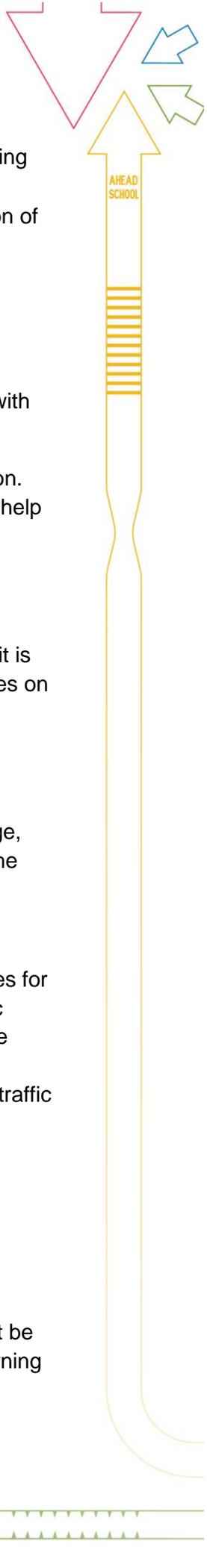
Consideration of emergency services when identifying appropriate traffic calming measures for implementation will minimize delays/impacts to these services, and build support for traffic calming in general. When selecting traffic calming measures, staff will strive to balance the needs of these services with slowing traffic on residential streets. City staff will work with emergency services to ensure that negative impacts resulting from the implementation of traffic calming measures are minimized.

### Maintain and Minimize Impacts on Delivery of Public Services

Traffic calming implementations must consider impacts on services such as transit, winter maintenance, street sweeping, waste collection, and school bus services.

### Minimize Impacts on Adjacent Residential Streets

Prior to considering traffic calming, any potential negative impact on adjacent streets must be considered. Impacts may include traffic that is diverted to another street, or changes in turning



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movements as a result of increased delays at other intersections. These effects will be considered in advance of approval so that traffic calming solutions do not create or exacerbate existing problems.

### Target Motorized Vehicles and Not Other Modes

The purpose of traffic calming is to reduce the negative effects of motor vehicles while improving conditions for other road users. Traffic calming measures should be designed to permit cyclists and pedestrians to travel unaffected, while slowing down motor vehicles.

### Monitor and Follow-up

As resources allow, comparable traffic volumes, speed, and collision data will be collected before and after implementations. This will help to assess the effectiveness of the tools in a variety of Kingston-based contexts and determine if any adjustments are needed.

## 6 Policy Direction

### 6.1 Official Plan (2019)

Section 4.6.11 of the Official Plan requires the preparation of traffic impact analysis or a transportation study as part of any development proposal. This section states the provision of traffic calming measures (if required) as part of recommended improvements necessary to accommodate the proposal.

Section 4.6.15<sup>1</sup> expands the information contained in the Official Plan regarding the use, the need and the type of traffic calming measures as follows:

- Section 4.6.15 (a) traffic calming measures will be used to increase the level of safety and convenience for all users and to improve the surrounding environment by reducing the speed of motorized traffic and reducing the volume of through traffic
- Section 4.6.15 (b) the need for traffic calming measures is determined by the City based on factors such as vehicle speeds, traffic volumes that include active transportation and vehicles, collision history and presence of school zones
- Sections 4.6.15 (c) traffic calming measures may include but are not limited to speed humps, raised crosswalks, curb extensions, speed display devices, mini-roundabouts, sidewalk connections, cycling lanes, median islands, and on-street parking

### 6.2 Active Transportation Master Plan (2018)

The City of Kingston's Active Transportation Master Plan envisions a 20% active transportation mode share by 2034 and considers the use of traffic calming measures for the provision of a safe system where pedestrians, cyclist, transit users, and motorists can equally participate.

<sup>1</sup> Amended by Law Number 2017-57 OPA Number 50

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### 6.3 Road Safety Plan

The Vision Zero Road Safety Plan identifies several countermeasures which are intended to collectively reduce the incidence or severity of motor vehicle collisions. These initiatives provide a framework to coordinate available resources and plan, prioritize, and implement road safety projects. Part of the recommendations included a review of the City's existing traffic calming policy to determine a more appropriate or expedited means of addressing traffic calming requests.

## 7 Roadway Classifications

The City's Official Plan (OP) identifies the City's current road network classifications. The OP references the classification of roadways and includes the following definitions:

### Arterial Roads

- serve relatively high volumes of intra-urban traffic at medium to moderately high speeds
- link freeways to collector roads
- have limited access from abutting properties
- may have restrictions on stopping, parking and loading during peak hours

### Collector Roads

- serve medium volumes of intra-urban traffic at low to medium speeds
- link freeways and arterial roads to the local road system
- permit full access to abutting properties
- have few parking restrictions during peak hours

### Local Roads

- serve low volumes of traffic at low speeds
- provide access to collector road system from properties
- permit full access to abutting properties, subject to driveway regulations
- have few parking restrictions during peak hours

The traffic calming measures considered within the proposed policy and guidelines are primarily applicable along Local roads.

Given the role and function of Arterial and Collector roads, speed management along these roads typically requires a different, more comprehensive approach than on Local roads. Arterial roads are designed and built for higher volumes of vehicles, which often also lends itself to higher travel speeds. Managing speed along Arterial roadways in particular requires consistent enforcement and is typically best addressed through longer-term capital planning and policies, such as through the City's Active Transportation Master Plan.

While select tools included in the Traffic Calming Guidelines may be considered as part of broader capital work along Arterial and Collector roads, the Traffic Calming Policy, including the

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District-selected street process, will not apply to these types of roads, except in rural hamlets on a case-by-case basis.

## 8 Neighbourhood Transportation Issue Review Process

The City regularly receives requests and inquiries from residents regarding speeding and other transportation issues throughout the City's neighbourhoods. Each time a neighbourhood transportation issue is received, a general review process is undertaken.

Traffic calming is most effective when considered as part of a broader, integrated approach to managing transportation-related issues within neighbourhoods and may not be the most appropriate solution for all issues. Depending on the problem definition, other interventions including pedestrian crossings, all-way stop control, active transportation infrastructure, or more extensive roadway reconstruction may best address the issue.

The following section outlines the process by which neighbourhood transportation issues will be reviewed, and depending on the problem definition of the issue at hand, how traffic calming measures may be considered as part of this process.

### 8.1 Context Review

When a neighbourhood transportation issue is raised, the City reviews the existing context, which may include a review of available traffic data, road classifications, solutions previously implemented, existing applicable policy, and planned capital work.

### 8.2 Primary Problem Definition

Based on the context review, the neighbourhood transportation issue may be categorized into broad primary problem definitions, including pedestrian connection concerns, vehicular speeding concerns, or traffic volume concerns. The scope of the process and associated tools considered within this policy and the guidelines is specific to issues that are primarily defined as vehicular speeding and volume-related concerns on local roadways.

### 8.3 Determining Potential Next Steps

Based on the problem definition and nature of the request, the issue is documented and may be monitored or scheduled for further assessment. In determining any potential next steps, the following process streams are considered:

#### District-selected Street

City Councillors can select one local street in their district for a traffic calming implementation each year. These implementations will involve the use of Type I (minor-adjustment) traffic calming measures that aim to slow vehicles down and improve safety and can be installed more quickly and are more easily modified than other traffic calming measures. To be eligible for this process, the selected street must be classified as a Local road, except for rural hamlets, which may be considered on a case-by-case basis.

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To facilitate this process, City staff will share information with Councillors regarding neighbourhood transportation concerns raised by residents received by the City, including a list of streets where traffic calming has been requested. Staff will work with Councillors to help determine a suitable location for the intervention in their district and will identify an appropriate Type I implementation plan for the selected street.

### Neighbourhood-level Programs

Neighbourhood-level programs and reviews may identify the need for traffic calming interventions. Opportunities to link traffic calming measures would typically be identified as part of a broader plan or program that seeks to address transportation issues or behaviours within a designated area.

One of these programs is the City's Safe Routes to School program, which is designed to make it easier and safer for students to get to and from school using active modes of transportation. The program involves a multi-disciplinary approach, which often includes consideration for traffic calming measures. Traffic volume or speeding-related issues that fall within the scope of neighbourhood areas that are being actively considered as part of the Safe Routes to School program will be captured for review as part of this implementation.

### Community-based Initiatives

Community-based initiatives involve the use of tools and programming that are intended to provide stakeholders and residents with an opportunity to participate in improving road safety on local roads within their neighbourhood. Community-based initiatives are intended to be facilitated or made available to interested residents and community groups.

### Transportation Implementations and Capital Planning

Transportation issues received and reviewed by the City may be considered as part of longer-term neighbourhood and capital project planning. Typically, the scope of capital implementations would consider the use of Type II (engineered-based) measures, which are more permanent in nature and require significantly more resources, costs and involve more extensive timelines to plan, design, and construct. The City may also consider the use Type I (minor-adjustment) measures to address safety issues as they arise on local roadways through the ongoing review of neighbourhood transportation concerns. In some cases, Type I measures provide an opportunity to test concepts that can inform the design of Type II measures as part of future capital work.

## 8.4 Community Involvement

Residents living adjacent to where traffic calming is planned will receive information (including detailed plans) about the measures in advance of implementations and will have an opportunity to provide feedback or ask questions about the proposed plans. This communication may also be expanded to include the broader neighbourhood depending on the scale of change that is being proposed. Longer-term transportation plans that include traffic calming components may include public consultation conducted as part of those broader projects.

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### 8.5 Implementation and Monitoring

The City will aim to collect traffic volumes, speed, and collision data before and after implementations as resources allow.

## 9 Types of Traffic Calming Measures

The traffic calming measures considered as part of this policy are based on current best practices and applicable standards including the Transportation Association of Canada (TAC) Canadian Guide to Traffic Calming Second Edition and customized for Kingston's needs.

To align with the neighbourhood transportation issue review process outlined in the subsequent section, the traffic calming measures considered in this policy have been grouped into three categories based on their intended usage:

- **Type I (Minor-adjustment) measures:** Type I measures are tools that can be more quickly and easily installed. While often temporary or seasonal in nature, these tools are an important step in reducing vehicular speeds and increasing safety for all road users. Examples may include vertical centreline treatments, on-road pavement messaging, or speed display devices.
- **Type II (Engineered-based) measures:** Type II measures are physical changes that are more permanent in nature and typically involve more resources and longer timelines to plan, design and construct. Examples include horizontal changes to the curb or road to narrow or shift a vehicle's path or slow vehicles around a corner, or vertical deflections that are designed to reduce the speed of a motorist as they drive over them.
- **Community-based initiatives:** Community-based initiatives involve tools and programs that residents could implement with support from the City. Examples may include lawn signs, a pace car program, or a 'local-traffic only' initiative.

Each measure within these broader groups is outlined in detail in the Traffic Calming Guidelines.

## 10 General Considerations

### 10.1 Accessibility

Selection, design, and implementation of traffic calming measures needs to ensure accessibility. For example, visually impaired pedestrians may have challenges navigating a curb extension if the measure does not include the appropriate elements (e.g. tactile surface and ramps). The development and implementation of traffic calming measures should be consistent with The Accessibility for Ontarians with Disabilities Act (AODA) and industry practices for accessibility and universal design.

The following highlights important considerations for some items related to accessibility that may arise as part of traffic calming projects:

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- **Tactile Walking Surface Indicators** – The use and placement of tactile walking surface indicators must be carefully considered when developing a traffic calming plan. For example, measures that adjust curb placement, affect traffic signal operations, adjust cycling or pedestrian crossing locations, and affect bus stops must be context sensitive and comply with AODA standards.
- **Existing Street Design** – Traffic calming measures should consider consistency with existing street design as it relates to the intended function from an accessibility perspective.
- **Accessible Vehicle Roadside Loading / Unloading** – Traffic calming measures should consider existing operations for curbside loading/unloading with regards to accessible vehicles (i.e. buses, taxis, and vans).
- **Colour Contrasting** – Colour contrasting may be used to emphasize the presence of any hazards and the travel path for all road users (particularly those with visual impairment). Colour contrasting is recommended to consider a standardized approach throughout the City where it is implemented.

### 10.2 Walking and Cycling

Traffic calming designs should consider the needs of and impact on active transportation in balance with overall project objectives. For example, Type II (engineered-based) measures such as speed humps or curb extensions can improve conditions for cyclists by calming vehicular traffic. However, they may also negatively impact cyclists by forcing them into and out of vehicle travel paths.

When developing a traffic calming plan, it is important to consider the context and intended function of the implementation for those travelling using active modes. For illustration purposes, the following highlights examples of active transportation considerations as they relate to traffic calming measures:

- The use of treatments such as curb extensions and pinned curbs reduces crossing distance for pedestrians, improving mutual visibility between motorists and pedestrians as an added benefit
- Vertical deflections are not conducive to bicycle travel in general and should be used carefully, especially for heavy travelled bicycle routes – speed humps, for example, can be cut back at the sides to allow bicycles to pass and facilitate drainage rather than extend to the full width of the road
  - Speed kidneys, in particular, should only be considered at locations where a buffered bicycle lane exists (or will exist) to allow cyclists to proceed unimpeded and to reduce the likelihood of motorists shifting into the buffered bicycle lane to avoid the vertical deflection
- Horizontal deflections should be clearly marked to enable cyclists to identify and anticipate them, and merge as necessary. They can also be used in conjunction with other speed control devices such as speed tables at the narrowing, which allows slower moving motorists to allow cyclists through before trying to pass

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- Medians and refuge islands can be valuable along major corridors that present safety issues for cyclists and pedestrians wishing to cross.

### 10.3 Kingston Transit

Due to their dimensions, consideration needs to be given to transit vehicles in navigating vertical and horizontal deflections. Horizontal deflection measures are typically preferred over vertical deflections when considering the comfort and convenience of transit passengers. However, it should be noted that horizontal measures alone may not always be sufficient to reduce speeds to desired levels. For example, if a curb extension or choker is designed to provide adequate space for an articulated bus, its effect on reducing the speed of other type of vehicles will be minimal. Alternatively, speed cushions are a measure that can accommodate buses along transit routes because they are designed to slow passenger vehicles while allowing vehicles with larger wheelbases (i.e. buses) to pass unimpeded.

The location of traffic calming measures relative to transit stops also needs to be considered to ensure that they do not impede pedestrians, and remain easily accessible.

To maximize the benefits of a traffic calming plan and minimize the effects on transit services, the following items should be considered:

- The proposed traffic calming plan should avoid a substantial increase in travel times along transit routes
- A recommended operational speed of 25 kilometres per hour or less should be targeted when travelling over traffic calming measures (such as speed tables and raised crosswalks)

The dimensions of transit vehicles and the comfort of transit passengers both need to be considered as part of traffic calming designs in balance with overall project objectives. The following is to be considered in planning traffic calming measures (particularly Type II measures) as it relates to Kingston Transit routes:

#### Transit Routes Considerations

- All traffic calming measures need to consider turning requirements for buses when designed for implementation along transit routes
- Horizontal deflections (including intersection treatments):
  - Consider opportunities for dual purpose horizontal traffic calming measures, such as bulb-outs providing bus stop treatments at bus stops
  - Consider traffic calming designs to support unimpeded bus operations 36m in advance (upstream) of the bus stop and 18m beyond (downstream)
- Vertical deflections and intersection treatments involving vertical deflections:
  - Vertical deflections will not be considered along Express Transit routes
  - Along local Transit routes, evaluate other types of traffic calming measures prior to considering vertical deflection and/or intersection treatments that include vertical deflections

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- If other traffic calming measures are insufficient or not feasible, in consultation with Kingston Transit, consider speed tables, speed cushions, raised intersections, and raised crossings
  - Consider placement of these elements relative to bus stops (target minimum 20m upstream or downstream of bus stops if the stops are not co-located with intersections); this may be dependent upon the movement of bus stops along the route (e.g. stop controls).
  - The flat surface of speed tables and raised crosswalks should be a minimum of 6 metres long
- If vertical deflections are being considered along local transit routes (in accordance with the considerations above), traffic calming plans should not include more than five (5) vertical deflection measures per transit route
- Specialized implementations:
  - Specialized implementations may be considered as part of broader projects and will include consultation with Transit to consider impacts to Local and Express routes. Some measures may include opportunities for Transit priority (e.g. lane reductions), however others such as mini-roundabouts would need to consider turning movements for Transit buses and proximity of transit stops.

### 10.4 Emergency Services

Although there are safety benefits of traffic calming and speed reduction techniques in reducing the frequency and severity of collisions, especially involving pedestrians and cyclists, there can be impacts to emergency response times with the application of particular traffic calming measures. The challenge is to balance these two considerations. Generally, a single traffic calming installation along an emergency route would not significantly delay a responding emergency vehicle. However, multiple traffic calming measures along a route could cumulatively cause significant delays and can have negative consequences in the emergency outcome.

Depending on the type of traffic calming measure being considered, traffic calming plans should consider consultation with emergency services, and consider the movement of “design vehicles” through the area. These types of considerations are outlined in the Traffic Calming Guidelines for each specific measure.

The following highlights a few design considerations regarding emergency service access when developing traffic calming plans:

#### Vertical Deflection Measures

- Consider avoiding and/or consult on the placement of speed humps and speed tables on roadways that are classified as designated emergency access routes (i.e. hospital and fire access routes) and any feeder roads located by hospitals.



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accommodation of a 1.5 m wide sidewalk plow with additional 0.15 m side clearances on both sides).

- Where feasible, a 2.0 m or greater clearance width is preferable, particularly on main streets and high-activity streets where active transportation levels are expected to be high.
- Traffic calming designs should also provide a suitable clearance width for roadways that can accommodate the typical width of a snow plow plus 0.25 m buffers on both sides (e.g. a 3.75 m wide snow plow width requires  $3.75\text{ m} + 2(0.25\text{ m}) = 4.25\text{ m}$  clearance width, as illustrated in Figure 1).
- In situations where a suitable clearance width cannot be provided, specialized maintenance equipment may be required.

## Surface materials

- Monolithic surfaces (e.g. asphalt and concrete) are preferred over other surfaces (e.g. cobblestone and interlocking) from a maintenance standpoint because they have lower potential to be damaged from freeze/thaw cycles relative to non-monolithic surfaces.
- Non-monolithic surfaces are more difficult to maintain in winter conditions due to irregular surface edges that could be damaged and potentially cause damage to maintenance equipment.

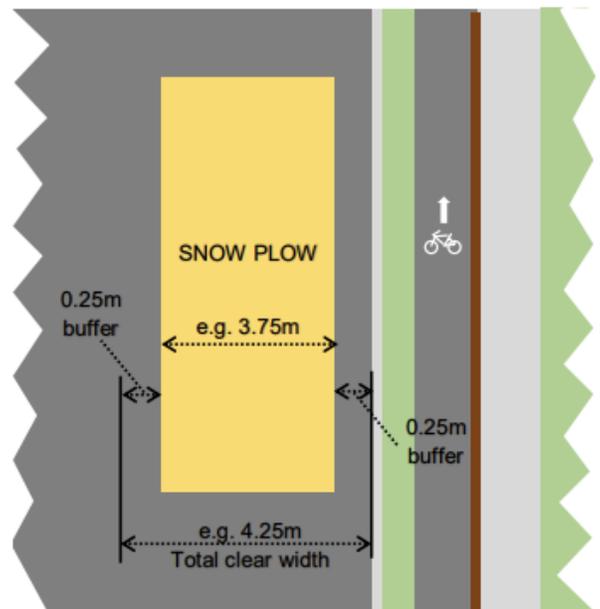


Figure 1: Roadway Clearance Width Requirements for 3.75 m Snowplow

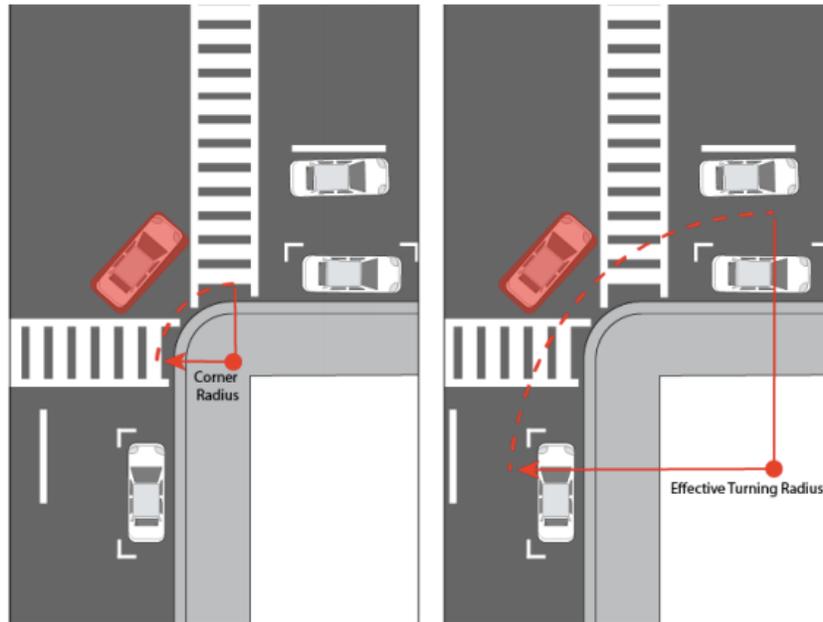
## 10.6 Turning / Corner Radii

The design of intersections and accesses should target a design that allows service vehicles to comfortably complete required turns and not mount the curb in most, if not all, circumstances.

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This will require appropriate corner radii at intersections and accesses by considering the effective turning radius of service vehicles.

The corner radius is the radius of a curve along a roadway's edge with a full barrier curb, specifically at locations where vehicles need to make turns. The effective turning radius is the radius of the inside curve of turning vehicles, and is governed by all of the physical elements that create a barrier at the roadway's edge that physically limit a vehicle from encroaching beyond the edge of the road. The difference between corner radius and effective turning radius is illustrated in the following figure:



**Figure 2: Corner Radius vs. Effective Turning Radius (Source TAC Geometric Design Guide for Canadian Roads)**

In a traffic calming context, reducing the effective turning radius typically encourages vehicles to lower turning speeds but may create operational challenges for larger vehicles. The dimensions and operational characteristics of transit vehicles, maintenance equipment, emergency vehicles, school busses, and waste collection vehicles should be considered.

The minimum effective turning radius to be selected when developing designs for traffic calming plans is dependent on the surrounding land use (e.g. residential, commercial, industrial) and road designation (e.g. local, collector, arterial).

The following sections highlight a few design considerations for three types of physical street contexts (i.e. all locations, “unconstrained context”, and “constrained context”) that should be considered after a minimum effective turning radius is selected. Unconstrained contexts include streets with relatively wide City right-of-ways, a high level of general visibility, limited levels of street-side activity, and/or high operating speeds. Constrained context includes streets with

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constrained City right-of-ways, low to moderate levels of general visibility, and/or low to moderate distances between intersections. Depending on the street context, a different target effective turning radius may need to be determined to accommodate various vehicle operations. At any intersection corner where the subject turning radius exceeds the minimum effective turning radius, physical corner radius reductions are typically considered.

The following outlines design considerations for turning radii along different street contexts:

### All Locations

- Ensure that the design vehicle can make permitted turns:
  - Into large private accesses and onto intersecting streets as necessary using the roadway area intended for vehicular operation
  - Without encroaching onto street-side facilities such as sidewalks, multi-use pathways, transit stop waiting areas, separated cycling facilities, streetscaping, and street furniture

### Unconstrained Context

- Aim to reduce the potential for excessive vehicular speed differentials between through and turning traffic (e.g. consider implementing traffic calming measures to reduce operating speeds on the primary street well in advance of the subject turn where the minimum effective turning radius is applied)

### Constrained Context

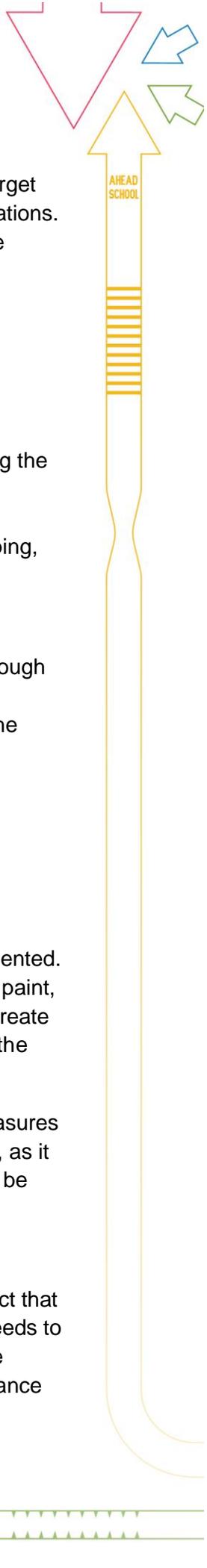
- Consider balancing the objectives of service vehicle operation and traffic calming objectives where they may compete

At locations where physical corner radius reductions are not feasible, visual corner radius reductions that psychologically induce drivers to slow down before turning may be implemented. Examples of visual corner radius reduction measures include mountable curbs or aprons, paint, textured pavement, and/or flexible stake bollards. These measures have the potential to create a traffic calming effect for smaller vehicles, while still allowing larger vehicles to complete the turning maneuver without difficulty.

It is important to clearly indicate to pedestrians and cyclists that the area where these measures are implemented is not intended as a waiting area or a space to reduce crossing distance, as it may create conflicts with large turning vehicles. Crosswalks at the subject location should be extended towards the barrier curb line.

## 10.7 Streetscaping

Streetscaping elements present on both sides of the roadway can create a narrowing effect that may induce drivers to reduce their speed, however, introducing new streetscaping also needs to be strongly considered from an operational perspective, as it introduces a new asset to be regularly maintained. When considering new streetscaping implementations, low maintenance



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options should be reviewed first. This is especially important in areas where grass is being considered without existing grass-cutting routes near by. Small green spaces can be difficult to get to, difficult to maintain and may expose workers to traffic hazards. Low maintenance options like mulch or permeable materials should be considered wherever possible. Caution also needs to be exercised if these elements are installed inside the vehicular right-of-way.

Some traffic calming designs introduce opportunities for streetscaping (i.e. more curbed areas, street beautification) as well as improved stormwater management (i.e. LID improvements). However, the construction of traffic calming measures themselves may also be detrimental to some existing landscaping (i.e. trees when built within or in close vicinity to the root zones).

### 10.8 Enforcement

At locations where traffic calming measures are implemented but have not been sufficient in changing driver behaviour, police enforcement may be an option. However, it is important to note that enforcement resources are typically quite constrained. The implementation of self-enforcing measures should be considered (where appropriate), including physical changes to roadway characteristics such as speed humps that strongly encourage vehicles to slow down when traversing them, or diverters and directional closures that physically prevent unwanted movements.

### 10.9 Treatment Selection

Permanent traffic calming solutions may be costly and difficult to maintain once they are implemented. Therefore, it may be beneficial to first explore measures that could result in the desired outcome without requiring permanent, physical changes to the roadway environment. Measures such as removable rubber products (e.g. curbing, speed cushions, humps, tables), flexible bollards, pavement markings, and speed display devices can be implemented or modified relatively easily compared to permanent measures. For example, pinned curbs or flexible bollards could be used to pilot or test changes, or could be used as part of annual programs. If these measures were found to be ineffective or did not provide the desired outcome, alternative approaches or adjustments to the design of permanent changes could be considered.

Some considerations regarding the use of these measures include:

- Ongoing operational and maintenance-related costs and/or resource requirements
- Seasonal installation and removal requirements
- Potential to have similar or higher overall costs than permanent measures
- Level of effectiveness may potentially be lower than permanent measures
- The aesthetic value can be relatively low
- If measures are anchored into existing roadway surfaces, accelerated degradation of the road surface may occur

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The selection of appropriate treatment for a roadway is primarily dependent on the City's goals for a specific instance along with any constraints such as cost, scope, general considerations and measure-specific considerations (detailed in the Traffic Calming Guidelines).

Additionally, the traffic calming treatment selection process should also consider:

- Effectiveness in addressing the problem or opportunity
- Effects on users of the corridor (pedestrians, cyclists, transit, etc.)
- Effects on traffic volumes and transportation system efficiency and intersection operations
- Design vehicle considerations (for each particular case, the City should identify the appropriate design vehicle to be considered/designed for)
- Constructability and durability
- Applicability (e.g. is it seasonal or all year round), and maintenance requirements/implications
- Lifecycle costs
- Streetscaping and other considerations

### 10.10 Traffic Control Measures Not Intended for Traffic Calming Purposes

Some traffic control measures should not be used for the sole purpose of traffic calming. This includes the following:

#### Stop Signs

Stop signs are intended for intersection control and are generally installed in locations where they meet established warrants (i.e. where specific minimum conditions are met). Historically, when placed in locations where warrants have not been met, they generally have received lower compliance levels than in locations where warrants were met. Placing stop signs in locations where warrants have not been met can contribute to eroding the effectiveness of the subject stop sign, and also more broadly may contribute to lower compliance levels at other stop-controlled locations.

#### Speed Limit Signage in Isolation

Lowering speed limits on City streets without consideration of the physical configuration of the road typically has minimal impact on driver behaviour. Implementing a speed limit that does not consider roadway design or its function may also result in enforcement challenges and increases in traffic hazards. In such cases where a posted speed limit is below operating speeds, most motorists will continue to drive at speeds they feel are reasonable and prudent unless continual police enforcement is present. The visual and physical cues that a driver uses to determine the appropriate travel speed should be consistent with the posted speed limit.