Traffic Calming Toolkit

June 2022

Contents

1 Introduction 1

2 Basis for the Toolkit 2

2.1 Overview of the *Canadian Guide to Traffic Calming* 2
2.2 List of Potential Traffic Calming Measures 2

3 Toolkit of Traffic Calming Measures 4

3.1 Overview of the Toolkit 4
3.2 Indicative Costs 7
3.3 Design Guidelines 8

4 Selecting Measures 9

Appendices

Appendix A Traffic Calming Toolkit
Appendix B Traffic Calming Toolkit Decision Matrix

Tables

Table 3.1: Potential Traffic Calming Measures 5

1 Introduction

The **Town of Fort Erie Neighbourhood Traffic Calming Policy** provides a transparent, fair, and standardized process for addressing resident concerns about vehicle speeds and/or traffic volumes on neighbourhood streets. The policy guides Town staff and the Traffic Coordinating Committee (TCC) in identifying and prioritizing eligible locations for traffic calming and in applying traffic calming measures on Town streets. The aim is to improve safety for all road users and reduce aggressive driving behaviour, with the goal of improving liveability and "quality of life" in local neighbourhoods.

This **Traffic Calming Toolkit**, developed as part of the 2022 update to the policy, provides a comprehensive "toolkit" of traffic calming strategies, measures, and designs. The toolkit reflects the latest best practices in traffic calming, considering local context and available municipal resources for the Town of Fort Erie.

The remainder of the Toolkit document is organized as follows:

- **Chapter 2** summarizes the **basis for the toolkit**, providing pertinent information about the Transportation Association of Canada (TAC) *Canadian Guide to Traffic Calming*[1] (the Guide), the foundational publication that serves as the source of most guidance for this document;
- **Chapter 3** lists the **toolkit of traffic calming measures** for use in the Town of Fort Erie, with a description and photo of each treatment plus indicative costs and design guidance for implementation; and
- **Chapter 4** describes the six-step process for **selecting measures** from the toolkit.

Appendix A provides detailed information about each traffic calming treatment identified in **Chapter 3** to aid the Town in the identification and assessment of potential measures.

Appendix B contains a detailed comparison of the measures and their applicability based on cross-section (urban/rural), location (intersection/midblock), speed limit, average daily traffic volume, and roadway grade.

[1] Transportation Association of Canada. *Canadian Guide to Traffic Calming.* February 2018.

2 Basis for the Toolkit

2.1 Overview of the *Canadian Guide to Traffic Calming*

The TAC *Canadian Guide to Traffic Calming* is the preeminent source of information and guidance about traffic calming in Canada. Originally published in 1998, the Guide was updated in 2018 to incorporate the latest and best practices that evolved in the field over the 20 years since its release.

The Guide is a complete tool, providing direction on the application of traffic calming for both reactive operational retrofits and proactive approaches for new/reconstructed roadways. Most information presented in the Guide was sourced from communities in Canada and generally reflects the current state of practice in the country. Measures and designs drawn from international experience are included where needed to supplement or complete the guidance.

Much of the Guide is devoted to describing and providing information about the applicability, effectiveness, and design of potential traffic calming measures. This guidance served as the basis for the list of potential traffic calming techniques for use in the Town of Fort Erie set out below and the detailed profiles of the toolkit of measures contained in **Appendix A**. The Guide also provided information pertaining to the assessment and selection of specific traffic calming measures, including the material presented in **Appendix B**.

2.2 List of Potential Traffic Calming Measures

The Guide identifies a broad range of potential traffic calming techniques for use in Canada, organizing the measures into the following 11 general categories:

- Vertical Deflection
- Horizontal Deflection
- Roadway Narrowing
- Surface Treatments
- Pavement Markings
- Access Restrictions
- Gateways
- Enforcement
- Education
- Shared Space
- Emerging Technology

These measures can be broadly categorized into two groups, being:

- **Physical Measures**, which consist primarily of vertical and horizontal deflections in the roadway. This group also includes

treatments that narrow the roadway, alter the road surface, or restrict access. Physical measures are intended to influence motorist perceptions, thereby altering driver behaviour, and forcing motorists to travel at lower speeds and/or to select alternative routes.; and

- **Non-Physical Measures**, which include tools and strategies intended to influence or modify driver behaviour, often described as education and enforcement.

From the overall catalogue of options presented in the Guide, the Town has established a shortlist of potential traffic calming measures appropriate for the Town of Fort Erie. **Chapter 3** summarizes the "toolkit" of applicable techniques.

3 Toolkit of Traffic Calming Measures

3.1 Overview of the Toolkit

Appendix A details the “toolkit” of potential traffic calming measures for use on roads in the Town of Fort Erie. The toolkit includes a description and photo of each treatment and an overview of typical applicability, potential benefits, and other implementation considerations.

The list of applicable measures captures a range of approaches to traffic calming and reflects input received from Town stakeholders. **Table 3.1** provides a simplified, visual comparison of the different measures, highlighting their potential applicability, indicative costs, and design guidance (see **Sections 3.2 and 3.3**, respectively, for further information on these last two items).

The toolkit combines the latest and best practices in traffic calming with consideration of local context. Building on guidance contained in the Guide, the toolkit outlines a range of techniques that can be used to address different types of problems (i.e., speed, collisions, pedestrian conflicts, shortcutting traffic, etc.) in various contexts (i.e., on different road classifications, urban versus rural roadside environments, etc.). Information provided includes the pros and cons of each measure and its effectiveness based on background research.

The data contained in the toolkit assists the Town in selecting appropriate measures to address specific neighbourhood traffic concerns. This helps to avoid undesirable disbenefits of inappropriate measures for a particular application. **Chapter 4** provides further guidance on selecting specific measures for a traffic calming plan using this information.

TABLE 3.1: POTENTIAL TRAFFIC CALMING MEASURES

Measure		Applicability			Indicative Cost[1]			Design Details[2]
		Local or Collector	Urban Arterial	Rural Arterial	Low	High	Trial	
1. Vertical Deflection								
1.1	Raised Crosswalk	●	✕	✕	$5,000	$20,000	$10,000	4.2.1
1.2	Raised Intersection	●	✕	✕	$30,000	$150,000	n/a	4.2.2
1.3	Speed Cushion	●	✕	✕	$6,000	$10,000	$8,500	4.2.3
1.4	Speed Hump	●	✕	✕	$4,000	$10,000	$6,000	4.2.4
	Speed Table	●	✕	✕	$5,000	$20,000	$10,000	
2. Horizontal Deflection								
2.1	Chicane (One-Lane, Two-Lane)[3]	●	✕	✕	$16,000	$62,500	$25,000	4.3.1
2.2	Curb Radius Reduction[4]	●	▲	✕	$60,000	$125,000	$10,000	4.3.2
2.3	Lateral Shift	●	▲	✕	$16,000	$62,500	$25,000	n/a
2.4	Speed Kidney	●	✕	✕	n/a	n/a	n/a	4.3.3
2.5	Traffic Button/	●	✕	✕	$3,000	$50,000	$10,000	4.3.4
	Traffic Circle/Mini-Roundabout	●	✕	▲	$20,000	$125,000	$15,000	
3. Roadway Narrowing								
3.1	Curb Extension	●	●	✕	$3,000	$50,000	$10,000	4.4.1
3.2	Lane Narrowing	●	▲	✕	$12,000	$20,000	n/a	OTM 11
3.3	On-Street Parking	●	▲	✕	$12,000	$20,000	n/a	4.4.2
3.4	Raised Median Island	●	▲	●	$3,000	$125,000	$8,000	4.4.3
3.5	Road Diet[6]	●	●	✕	n/a	n/a	n/a	4.4.4
3.6	Vertical Centreline Treatment	●	✕	●	$2,500 (per km)	$4,000 (per km)	n/a	OTM 6
4. Surface Treatment								
4.1	Sidewalk Extension/ Textured Crosswalk	●	▲	✕	$12,000	$30,000	n/a	4.5.1
4.2	Textured Pavement	●	✕	✕	$75 (per m^2)	$190 (per m^2)	n/a	n/a
4.3	Transverse Rumble Strips	▲	✕	●	$3,000	$4,000	n/a	n/a
5. Pavement Markings								
5.1	Converging Chevrons	●	▲	●	$10,000	$20,000	n/a	n/a
5.2	Dragon's Teeth	●	▲	●	n/a	$4,000	n/a	n/a
5.3	Full-lane Transverse Bars	●	▲	●	n/a	$4,000	n/a	n/a

TABLE 3.1: POTENTIAL TRAFFIC CALMING MEASURES

Measure		Applicability			Indicative Cost[1]			Design Details[2]
		Local or Collector	Urban Arterial	Rural Arterial	Low	High	Trial	
5.4	On-Road 'Sign' Pavement Markings	●	●	●	$150 (per symbol)	$200 (per symbol)	n/a	OTM 11
5.5	Peripheral Transverse Bars	●	▲	●	n/a	$4,000	n/a	4.6.1
6. Access Restriction								
6.1	Directional Closure	●[3]	✕	✕	$6,000	$100,000	$5,000	4.7.1
6.2	Diverter[1]	●	✕	✕	$12,000	$125,000	$5,000	4.7.2
6.3	Full Closure	●	✕	✕	$20,000	$250,000	$5,000	4.7.3
6.4	Intersection Channelization	●	▲	✕	$3,000	$50,000	$5,000	4.7.4
6.5	Raised Median Through Intersection	●	▲	✕	$3,000	$50,000	$5,000	4.7.5
6.6	Right-in/Right-out Island	●	▲	✕	$3,000	$50,000	$5,000	4.7.6
7. Gateways								
7.1	Gateways[5]	●	●	●	$10,000	$50,000	$5,000	n/a
8. Shared Space								
8.1	Shared Space[6]	●[3]	▲	✕	n/a	n/a	n/a	n/a
9. Enforcement and Education								
9.1	Speed Display Devices	●	●	●	$4,000	$7,500	n/a	n/a
9.2	Targeted Speed Enforcement	●	●	●	n/a	n/a	n/a	n/a
9.3	Targeted Education Campaign	●	●	●	n/a	n/a	n/a	n/a
9.4	Vehicle Activated Signs	●	●	●	$2,000	$12,000	n/a	n/a

Legend:

● Applicable ▲ Use with Care ✕ Not Appropriate

Notes:

1. See **Section 3.2** for explanation of indicative costs and sources.
2. See **Section 3.3** for explanation of design details and sources.
3. Measure typically not implemented on Collector roads
4. Assumes all corners of the intersection.
5. To be used in conjunction with other traffic calming measures. Typically consider for new development.
6. Measure is site-specific. Implemented as part of road reconstruction or new development.

3.2 Indicative Costs

Table 3.1 provides indicative costs, where available, for trial (temporary) and permanent installations of the traffic calming measures identified. The range of costs for permanent placement cited in Column 4 (Indicative Cost, Low) and Column 5 (Indicative Cost, High) were sourced primarily from the Institute of Transportation Engineers (ITE) *Traffic Calming Fact Sheets*[2] and adjusted to reflect Canadian dollars and inflation (from 2017 to 2021 dollars). Other municipal traffic calming guidelines[3] were also referenced in deriving the permanent indicative costs. Costs are not provided for uncommon (e.g., speed kidney), site-specific (e.g., shared space), and primarily operational (e.g., targeted speed enforcement and targeted education campaign) measures, as denoted by “n/a”.

For trial installations, the indicative costs noted in Column 6 of **Table 3.1** (Indicative Cost, Trial) were estimated based on recent quotes from vendors/manufacturers. The prices were factored up to account for installation and removal following the trial. Costs are not provided in cases where trial installations are unlikely (e.g., raised intersection, any measure primarily signing or pavement marking), as denoted by “n/a”.

The indicative costs cited in **Table 3.1** provide order of magnitude estimates for planning purposes, but should be applied with caution given the many factors affecting actual implementation costs, such as:

- Width of roadway(s);
- Corner radii;
- Existing infrastructure and utilities (e.g., catch basins, maintenance holes, utility poles, streetlights);
- Dimensions of proposed feature(s) (e.g., island size, length of extensions, width/height of raised feature);
- Quantity (e.g., number of signs, length of pavement markings, numbers of signals);
- Property acquisition (if required);
- Landscaping;

---

2 Institute of Transportation Engineers. *Traffic Calming Fact Sheets.* https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures. Accessed July 29, 2021.

3 City of Toronto. *Traffic Calming Guide for Toronto.* 2016. https://www.toronto.ca/wp-content/uploads/2017/11/97d0-2016-Traffic-Calming-Guide_March2017.pdf. Accessed July 29, 2021.

- Labour and materials;
- Design and contingency.

Closer to implementation, the Town will typically estimate permanent and trial installation costs based on more detailed design plans and current unit/benchmark prices derived from recent contracts.

3.3 Design Guidelines

The Town will generally follow the recommended design guidance provided in Chapter 4 of the Guide when implementing the traffic calming measures identified in **Table 3.1**. Column 7 (Design Details) denotes the relevant section to consult in the guidebook. The TAC *Geometric Design Guide for Canadian Roads*[4] may also be referenced in the design process.

In a few instances, the table refers to the Ontario Traffic Manual (OTM) for guidance pertaining to signing or pavement marking treatments. References are not provided for measures without available guidance (e.g., lateral shift) or for non-physical measures (e.g., targeted speed enforcement), as denoted by “n/a”.

[4] Transportation Association of Canada. *Geometric Design Guide for Canadian Roads*. June 2017.

4 Selecting Measures

Applying the toolkit consistently will assist the Town in selecting the most appropriate measures to address specific neighbourhood traffic issues and help avoid the potentially undesirable consequences of traffic calming. It is important to note that not all traffic calming measures are appropriate under all circumstances. The selection of suitable measures will depend on the exact issues being addressed and careful consideration of site-specific conditions.

The following outlines the typical decision process for selecting measures from the Traffic Calming Toolkit. As noted above, other factors can also influence the type of measures selected. See **Appendix B** for a detailed comparison of the measures and their applicability based on cross-section (urban/rural), location (intersection/midblock), speed limit, average daily traffic volume, and roadway grade.

Step 1

Determine if the subject street is a candidate for physical traffic calming measures. Per the Neighbourhood Traffic Calming Policy, locations meeting the initial screening criteria would be candidates for physical treatments. Streets not satisfying these criteria may be considered for non-physical traffic calming measures, such as education and enforcement, as a first step to address resident concerns.

Step 2

Identify the list of potentially applicable traffic calming measures based on roadway classification.

Step 3

Confirm and rank (based on severity) the primary issue(s) to be addressed through the traffic calming plan. Potential issues include:

- Speeding;
- Shortcutting traffic
- Pedestrian crossings
- Vehicle and pedestrian/cyclist conflicts;
- Heavy vehicles

Step 4

Shortlist the measures that address the issue(s) from the initial list assembled in Step 2.

Step 5

Focus on/eliminate measures that would/would not be appropriate under the following conditions:

- School Zones and Community Safety Zones
- Active transportation (cycling) routes
- Adjacent to park
- High pedestrian generators, particularly more vulnerable users
- Adjacent land uses (residential versus non-residential)
- Planned reconstruction
- Noise to surrounding neighbourhood
- Applicability for temporary installation

Step 6

Confirm measures can be used under current roadway conditions. Factors to consider include:

- Existing intersections and control
- Midblock pedestrian/cyclist crossings and control
- Cross-section width
- Need for on-street parking
- Roadway alignment (i.e., horizontal and vertical curvature)
- Grade
- Block Length
- Driveway density
- Pavement condition and materials
- Drainage
- Utilities and street furniture (e.g., benches, poles, boxes)
- Streetlighting

Appendix A

Traffic Calming Toolkit

1. VERTICAL DEFLECTION

1.1 Raised Crosswalk

Description and Purpose

A raised crosswalk is a marked pedestrian crosswalk at an intersection or midblock location constructed at a higher elevation than the adjacent roadway.

The purpose of a raised crosswalk is to reduce vehicle speeds, improve pedestrian visibility, and reduce pedestrian–vehicle conflicts.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban, sidewalk on at least one side of road
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – All volumes
- **Grade** – ≥ 1%, but ≤ 8%
- **Town** – Implement to facilitate pedestrian connections

Cost – $ to $$
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	▣
Natural Environment	▣

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	▣
Cycling Use	▣
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	▣

□/□	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

1. VERTICAL DEFLECTION
1.2 Raised Intersection

Description and Purpose

A raised intersection is an intersection, that may include crosswalks, constructed at a higher elevation than the adjacent approach roadways.

The purpose of a raised intersection is to reduce vehicle speeds, better define crosswalk areas, and reduce pedestrian–vehicle conflicts.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – All volumes
- **Grade** – ≥ 1%, but ≤ 8%
- **Town** – Site specific, considered as part of road reconstruction projects or new developments

Cost – $$ to $$$
Timeline – Permanent
Engineering Study Required – Yes

Source: www.transitutopia.blogspot.com

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	▣
Natural Environment	▣

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	▣
Cycling Use	▣
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	▣

□/□	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

1. VERTICAL DEFLECTION
1.3 Speed Cushion

Description and Purpose

A raised area on a road, like a speed hump, but does not cover the entire width of the road. The width is designed to allow a large vehicle, such as a fire truck or bus, to "straddle" the cushion, while light vehicles will have at least one side of the vehicle deflected upward.

Speed cushions are intended to produce sufficient discomfort to limit passenger vehicle travel speeds yet allow the driver to maintain vehicle control, while allowing larger vehicles to pass without difficulty.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Primarily urban
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – All volumes
- **Grade** – < 8%
- **Town** – Primary measure

Cost – $
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	▫
Conflict Reduction	■
Natural Environment	▫

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	▫
Cycling Use	▫
Traffic Enforcement	□
Vehicle Parking	▫
Street Maintenance	▫

□/□	No Benefit/Impact
▫/▫	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

1. VERTICAL DEFLECTION
1.4 Speed Hump/Table

Description and Purpose

A speed hump is a raised area of a roadway, which causes the vertical upward movement of a traversing vehicle. The purpose of a speed hump is to cause discomfort for drivers travelling at higher speeds and to reduce vehicle speeds.

A speed table is an elongated raised speed hump with a flat-topped section that is long enough to raise the entire wheelbase of a vehicle. They may be constructed with brick or other textured materials on the flat section.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – All volumes
- **Grade** – < 8%
- **Town** – Implement where a speed cushion is not effective

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	▣
Conflict Reduction	■
Natural Environment	▣

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	■
Cycling Use	▣
Traffic Enforcement	□
Vehicle Parking	▣
Street Maintenance	▣

□/□	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

2. HORIZONTAL DEFLECTION

2.1 Chicane

Description and Purpose

A chicane is a series of curb extensions on alternating sides of a roadway, which narrow the roadway and require drivers to steer from one side of the roadway to the other to travel through the chicane. Multiple series of curb extensions can be used.

The purpose of this measure is to discourage shortcutting or through traffic and reduce overall speeds by forcing the lateral shifting of vehicles travelling through the chicane.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – ≥ 750 vpd
- **Grade** – < 8%
- **Town** – Implement under special circumstances

Cost – $$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	■
Conflict Reduction	■
Natural Environment	▣

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	▣
Cycling Use	▣
Traffic Enforcement	□
Vehicle Parking	■
Street Maintenance	▣

□/□	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

2. HORIZONTAL DEFLECTION
2.2 Curb Radius Reduction

Description and Purpose

A curb radius reduction is the reconstruction or modification of an intersection corner with a smaller radius, usually between the 3.0 m to 5.0 m range.

The purpose is to slow down right-turning vehicles, reduce crossing distances for pedestrians, and to improve visibility of pedestrians. This measure will not be considered where there is frequent bus/truck turning.

Applicability

- **Road Class** – Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section** – Urban
- **Speed Limit** – All speed limits
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	■

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	■
Cycling Use	■
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

2. HORIZONTAL DEFLECTION

2.3 Lateral Shift

Description and Purpose

A lateral shift in a roadway occurs where an otherwise straight section is redesigned using pavement markings or curb extensions to create a curvilinear alignment (a 'jog') in the roadway like a chicane. This effect can also be achieved with the use of a central island.

A lateral shift causes drivers to have to negotiate the alignment and increases awareness aimed at reducing vehicle speeds.

Applicability

- **Road Class** – Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – All volumes
- **Grade** – < 8%
- **Town** – Primary measure

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	■
Street Maintenance	□

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

2. HORIZONTAL DEFLECTION
2.4 Speed Kidney

Description and Purpose

A speed kidney is an arrangement of three speed humps elongated with a curvilinear shape in the direction of traffic. Vehicle drivers choosing to drive in a straight path will experience discomfort as two or four wheels traverse the different parts of the speed kidney. Vehicles are required to take a curvilinear path to avoid the vertical deflection.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban
- **Location** – Midblock, Intersection
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – All volumes
- **Grade** – < 5%
- **Town –** Implement under special circumstances

Cost – $-$$
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	■

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	■
Traffic Enforcement	□
Vehicle Parking	■
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

2. HORIZONTAL DEFLECTION

2.5 Traffic Button/Traffic Circle/Mini-Roundabout

Description and Purpose

A traffic button/traffic circle/mini-roundabout is an island located at the centre of an intersection, which requires vehicles to travel in a counter-clockwise direction around the island.

Mini-roundabouts are designed in accordance with full-size roundabout design principles incorporating splitter islands and deflection of vehicles on all approaches, except that they have a smaller diameter and traversable islands. A traffic circle is typically smaller than a mini-roundabout and does not have splitter islands on the approaches. A traffic button is like a traffic circle. However, the former is typically made of coloured asphalt while the latter is landscaped.

The turning radius for left-turning trucks, buses, or emergency vehicles may require a diameter which would be larger than the intersection space available. Consequently, vehicles may turn left in front of the traffic circle or mount the centre raised island rather than travelling around the measure.

Yield traffic control is recommended.

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban and rural
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – < 1500 vpd
- **Town** – Implement to address intersection conflicts, where space permits

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	■
Natural Environment	■

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	◘
Cycling Use	◘
Traffic Enforcement	□
Vehicle Parking	◘
Street Maintenance	◘

□/□	No Benefit/Impact
◘/◘	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

3. ROADWAY NARROWING

3.1 Curb Extension

Description and Purpose

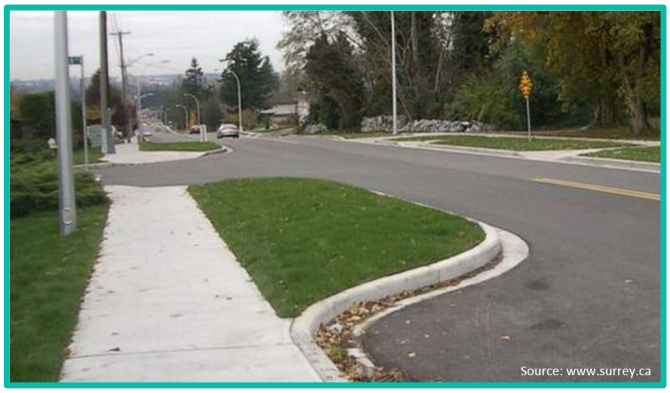
A curb extension (also known as neckdown, choker, curb bulb, or bulb-out) is a horizontal intrusion of the curb into the roadway resulting in a narrow section of roadway. The curb is extended on one or both sides of the roadway to reduce its width to as a little as 6.0 m for two-lane, two-way traffic. In urban environments, it is possible to implement curb extensions by removing existing parking spaces.

The purpose of a curb extension is to reduce vehicle speeds, reduce crossing distance for pedestrians, increase visibility of pedestrians, and prevent parking close to an intersection.

Applicability

- **Road Class** – Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 60 km/h or less
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $$-$$$
Timeline – Permanent
Engineering Study Required – Yes



Potential Traffic Calming Benefits

Speed Reduction	◻
Volume Reduction	☐
Conflict Reduction	☐
Natural Environment	■

Implementation Considerations

Local Vehicle Access	☐
Emergency Vehicle Response	☐
Cycling Use	◻
Traffic Enforcement	☐
Vehicle Parking	■
Street Maintenance	■

☐/☐	No Benefit/Impact
◻/◻	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

3. ROADWAY NARROWING
3.2 Lane Narrowing

Description and Purpose

Lane narrowing is the process of reducing lane widths using pavement markings or other features (for example, bicycle lanes, street beautification programs, pavement texture).

The intention is for drivers to perceive the roadway to be less comfortable at higher speeds due to the narrowing of the lanes and ultimately reduce operating speeds.

Applicability

- **Road Class** – Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 60 km/h or less
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	■
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	■
Cycling Use	■
Traffic Enforcement	□
Vehicle Parking	■
Street Maintenance	□

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

3. ROADWAY NARROWING
3.3 On-Street Parking

Description and Purpose

On-street parking is the reduction of the roadway width available for vehicle movement by allowing motor vehicles to park adjacent and parallel to the curb. Angled parking is not appropriate as a traffic calming measure, due to the increased potential for conflicts.

The effect of using on-street parking to narrow the effective roadway space is to reduce vehicle speeds and to reduce possible short-cutting or through traffic.

Applicability

- **Road Class** – Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – All volumes
- **Town** – Implement in accordance with Town By-laws

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	■

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	■
Cycling Use	■
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

3. ROADWAY NARROWING
3.4 Raised Median Island

Description and Purpose

A raised median island is an elevated median constructed on the centerline of a two-way roadway to reduce the overall width of the adjacent travel lanes.

The purpose of a raised median island is to reduce vehicle speeds and to reduce pedestrian–vehicle conflicts.

Applicability

- **Road Class** – Local Streets, Collector Roads, Urban and Rural Arterials
- **Roadway Cross-Section** – Urban and rural, two-lane
- **Speed Limit** – 60 km/h or less
- **Average Daily Traffic** – All volumes
- **Town** – Implement where width permits and/or road reconstruction projects

Cost – $$-$$$
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	■
Natural Environment	□

Implementation Considerations

Local Vehicle Access	■
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	■
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

3. ROADWAY NARROWING
3.5 Road Diet

Description and Purpose

A road diet is a reconfiguration of a roadway where the number of travelled lanes and/or effective width of the road is reduced to allocate the reclaimed space for other uses, such as widen sidewalks, turning lanes, bus lanes, pedestrian refuge islands, bike lanes, parking, etc.

Typically, a Road Diet involves converting an existing four-lane, undivided roadway segment to a three-lane segment consisting of two through lanes, a centre two-way left-turn lane, and two bicycle lanes. However, other conversions are possible, such as 4-lane to 5-lane, 2-lane to 3-lane, 3-lane to 3-lane, and 5-lane to 3-lane.

Applicability

- **Road Class** – Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 60 km/h or less
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $ - $$
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	■
Natural Environment	■

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	◘
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	□

□/□	No Benefit/Impact
◘/◘	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

3. ROADWAY NARROWING
3.6 Vertical Centreline Treatment

Description and Purpose

The use of vertical treatments such as flexible post-mounted delineators or raised pavement markers to create a centre median. This could be used to give drivers a perception of lane narrowing and create a sense of constriction.

Flexible post-mounted delineators are similar in appearance to bollards. They are commonly used in work zones, high-occupancy vehicle (HOV) lanes, and on-ramp exits to direct vehicles or prevent certain movements.

Applicability

- **Road Class** – Local Streets, Collector Roads, Rural Arterials
- **Roadway Cross-Section** – Urban and rural, two-lane
- **Speed Limit** – 80 km/h or less
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

4. SURFACE TREATMENT

4.1 Sidewalk Extension/ Textured Crosswalk

Description and Purpose

A sidewalk extension is a sidewalk continued across a local street intersection at the level of the roadway. Textured/patterned elements that contrast the roadway can be incorporated into the sidewalk extension.

The purpose of a sidewalk extension is to visually enhance a pedestrian crossing location so drivers become more aware of its presence. It is not intended to indicate whether drivers or pedestrians are required to yield (traffic must comply with local or provincial regulations governing the type of pedestrian crossing system being enhanced by the sidewalk extension / textured crosswalk).

With a sidewalk extension/textured crosswalk the continuation of the surface and enhanced visual/tactile identification of the crosswalk area emphasizes pedestrian priority.

Applicability

- **Road Class –** Local Streets, Collector Roads, Urban Arterials
- **Roadway Cross-Section –** Urban, sidewalks on both sides
- **Speed Limit –** 50 km/h or less
- **Average Daily Traffic –** All volumes
- **Town –** Implement to facilitate pedestrian crossings, streetscape projects

Cost – $-$$
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	◻
Volume Reduction	☐
Conflict Reduction	◻
Natural Environment	◻

Implementation Considerations

Local Vehicle Access	☐
Emergency Vehicle Response	☐
Cycling Use	◻
Traffic Enforcement	☐
Vehicle Parking	☐
Street Maintenance	■

☐/☐	No Benefit/Impact
◻/◻	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

4. SURFACE TREATMENT
4.2 Textured Pavement

Description and Purpose

Textured pavement is roadway pavement that incorporates a textured and/or patterned surface which contrasts other adjacent roadways in the surrounding area. The difference in texture alerts drivers of the potential need to reduce speed.

Applicability

- **Road Class –** Local Streets and Collector Roads
- **Roadway Cross-Section –** Urban
- **Speed Limit –** 50 km/h or less
- **Average Daily Traffic –** All volumes
- **Town –** Streetscape projects

Cost – $-$$
Timeline – Permanent
Engineering Study Required – No

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	■

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	■
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

4. SURFACE TREATMENT
4.3 Transverse Rumble Strips

Description and Purpose

Transverse rumble strips are raised buttons, bars or grooves closely spaced at regular intervals on the roadway that create both noise and vibration in a moving vehicle.

The purpose of a rumble strip is to alert motorists to a traffic control device which is associated with unusual or changing conditions ahead. Rumble strips are sometimes incorrectly used in a standalone mode as a speed control device.

With rumble strips, motorists are alerted by minor vertical deflection of vehicle wheels and audible warning created as vehicles wheels pass over.

Applicability

- **Road Class –** Local Streets, Collector Roads, Rural Arterials
- **Roadway Cross-Section –** Urban and rural (usually one lane per direction)
- **Speed Limit –** All speed limits
- **Average Daily Traffic –** All volumes
- **Town –** Primary measure

Cost – $
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	■
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

5. PAVEMENT MARKINGS

5.1 Converging Chevrons

Description and Purpose

Converging chevrons are pavement markings painted in the shape of a forward facing V pointing in the roadway travel direction. They can be spaced close together or painted thinner to create the illusion that a vehicle's speed is increasing. This is done to alert the driver of the need to reduce speed.

Applicability

- **Road Class** – Local Streets, Collector Roads, Urban and Rural Arterials
- **Roadway Cross-Section** – Urban and rural
- **Speed Limit** – All speed limits
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	▣

□/□	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

5. PAVEMENT MARKINGS

5.2 Dragon's Teeth

Description and Purpose

Dragon's teeth are a series of triangular pavement markings along the edge of the travelled lanes. They may be painted with increasing size to give the impression of roadway narrowing. They provide a visual change of the roadway and alert drivers that they are entering a rural community.

Applicability

- **Road Class** – Local Streets, Collector Roads, Urban and Rural Arterials
- **Roadway Cross-Section** – Urban and rural
- **Speed Limit** – All speed limits
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

- Speed Reduction ☐
- Volume Reduction ☐
- Conflict Reduction ☐
- Natural Environment ☐

Implementation Considerations

- Local Vehicle Access ☐
- Emergency Vehicle Response ☐
- Cycling Use ☐
- Traffic Enforcement ☐
- Vehicle Parking ☐
- Street Maintenance ☐

☐/☐ No Benefit/Impact
☐/☐ Minor Benefit/Impact
■/■ Substantial Benefit/Impact

5. PAVEMENT MARKINGS
5.3 Full-lane Transverse Bars

Description and Purpose

Full-lane transverse bars are a series of parallel pavement markings which extend across the majority of the travelled lane width. The series of markings may be placed closer together with distance to create the illusion that a vehicle's speed is increasing to alert the driver of the need to reduce speed.

Applicability

- **Road Class** – Local Streets, Collector Roads, Urban and Rural Arterials
- **Roadway Cross-Section** – Urban and rural
- **Speed Limit** – All speed limits
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	◘

□/□	No Benefit/Impact
◘/◘	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

5. PAVEMENT MARKINGS

5.4 On-Road Sign Pavement Markings

Description and Purpose

On-road 'sign' pavement markings provide information that would typically be shown to drivers through signage but are painted on the roadway to provide a larger image, and one that is directly in the driver's line of sight. Some examples could be speed limit, 'SLOW', 'Stop ahead, etc.

Applicability

- **Road Class** – Local Streets, Collector Roads, Urban and Rural Arterials
- **Roadway Cross-Section** – Urban and rural
- **Speed Limit** – All speed limits
- **Average Daily Traffic** – All volumes
- **Town** – Compliments other measures

Cost – $
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

5. PAVEMENT MARKINGS

5.5 Peripheral Transverse Bars

Description and Purpose

Peripheral transverse bars are a series of parallel pavement markings along the edge of the travelled lane widths. The series of markings may be placed closer together with distance to create the illusion that a vehicle's speed is increasing. This is done to alert the driver's awareness of the need to reduce speed. Peripheral transverse bars are similar to full-lane transverse bars but require less maintenance of pavement markings.

Applicability

- **Road Class** – Local Streets, Collector Roads, Urban and Rural Arterials
- **Roadway Cross-Section** – Urban and rural
- **Speed Limit** – All speed limits
- **Average Daily Traffic** – All volumes
- **Town** – Primary measure

Cost – $
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	▣

□/□	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

6. ACCESS RESTRICTIONS

6.1 Directional Closure

Description and Purpose

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.

When combined with other measures elsewhere in a neighborhood, directional closures obstruct short-cutting or through traffic routes.

Bicycles are typically permitted to travel through a directional closure in both directions, including the direction in which motor vehicle traffic is obstructed. In some cases, gaps or a contra-flow bicycle lane are used to provide bicycle access.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban
- **Location** – Midblock, Intersection
- **Speed Limit** – All speed limits
- **Average Daily Traffic** – <1500 vpd Local, 1500 to 5000 vpd Collector Road
- **Town –** Consider for volume reduction in the context of the network design

Cost – $-$$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	■
Conflict Reduction	▫
Natural Environment	▫

Implementation Considerations

Local Vehicle Access	■
Emergency Vehicle Response	▫
Cycling Use	▫
Traffic Enforcement	▫
Vehicle Parking	□
Street Maintenance	▫

□/□	No Benefit/Impact
▫/▫	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

6. ACCESS RESTRICTIONS
6.2 Diverter

Description and Purpose

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 can be mountable by emergency vehicles.

The purpose of a diverter is to obstruct and redirect short-cutting or through traffic.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban and rural
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – < 1500 vpd, use with caution for volumes up to 5000 vpd
- **Town –** Consider for volume reduction in the context of the network design

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	☐
Volume Reduction	■
Conflict Reduction	◘
Natural Environment	◘

Implementation Considerations

Local Vehicle Access	■
Emergency Vehicle Response	◘
Cycling Use	◘
Traffic Enforcement	☐
Vehicle Parking	☐
Street Maintenance	◘

☐/☐	No Benefit/Impact
◘/◘	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

6. ACCESS RESTRICTIONS
6.3 Full Closure

Description and Purpose

A full closure is a barrier extending the entire width of a roadway, which obstructs all motor vehicle traffic movements from continuing along the roadway. A closure can change a four-way intersection to a three-way intersection, or a three-way intersection to a non-intersection. Gaps can be provided for cyclists or to allow for emergency vehicles.

The purpose of a full closure is to eliminate short-cutting or through traffic.

Applicability

- **Road Class** – Local Streets and Collector Roads
- **Roadway Cross-Section** – Urban
- **Speed Limit** – 50 km/h or less
- **Average Daily Traffic** – All volumes
- **Town –** Consider for volume reduction in the context of the network design

Cost – $$-$$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	☐
Volume Reduction	■
Conflict Reduction	■
Natural Environment	▣

Implementation Considerations

Local Vehicle Access	■
Emergency Vehicle Response	■
Cycling Use	▣
Traffic Enforcement	☐
Vehicle Parking	☐
Street Maintenance	▣

☐/☐	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

6. ACCESS RESTRICTIONS
6.4 Intersection Channelization

Description and Purpose

Intersection channelization is the use of raised islands or bollards located in an intersection to obstruct 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.

Bicycles are typically permitted to make all movements, including those which motor vehicles are prevented from making. Gaps in channelization islands may be used to accommodate bicycles.

Applicability

- **Road Class –** Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section –** Urban
- **Speed Limit –** All speed limits
- **Average Daily Traffic –** All volumes
- **Town –** Consider for volume reduction in the context of the network design

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	☐
Volume Reduction	◘
Conflict Reduction	◘
Natural Environment	◘

Implementation Considerations

Local Vehicle Access	■
Emergency Vehicle Response	◘
Cycling Use	☐
Traffic Enforcement	☐
Vehicle Parking	☐
Street Maintenance	◘

☐/☐	No Benefit/Impact
◘/◘	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

6. ACCESS RESTRICTIONS

6.5 Raised Median Through Intersection

Description and Purpose

A raised median through an intersection is a concrete or asphalt island located on the centerline of a two-way roadway through an intersection, which prevents left turns and through movements to and from the intersecting roadways. It can create a refuge for pedestrians and cyclists, enabling them to cross one direction of travel at a time, thereby reducing waiting time for gaps when crossing the roadway.

The purpose of a raised median through an intersection is to obstruct short-cutting or through traffic and reduce crossing distance for pedestrians.

Applicability

- **Road Class –** Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section –** Urban
- **Speed Limit –** All speed limits
- **Average Daily Traffic –** All volumes
- **Town –** Consider for volume reduction in the context of the network design

Cost – $-$$
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	☐
Volume Reduction	■
Conflict Reduction	▣
Natural Environment	▣

Implementation Considerations

Local Vehicle Access	■
Emergency Vehicle Response	▣
Cycling Use	▣
Traffic Enforcement	☐
Vehicle Parking	▣
Street Maintenance	▣

☐/☐	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

6. ACCESS RESTRICTIONS
6.6 Right-In/Right-Out Island

Description and Purpose

A right-in / right-out island is a raised triangular island at an intersection approach which obstructs left turns and through movements to and from the intersecting street or driveway.

Bicycles are typically permitted to make left turns and through movements from the side street, either through gaps or depressions in the island, or by travelling around the island.

The purpose of a right-in / right-out island is to obstruct short-cutting or through traffic.

Applicability

- **Road Class –** Local Streets, Collector Roads and Urban Arterials
- **Roadway Cross-Section –** Urban
- **Speed Limit –** All speed limits
- **Average Daily Traffic –** All volumes
- **Town –** Consider for volume reduction in the context of the network design

Cost – $-$$
Timeline – Temporary or Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	☐
Volume Reduction	■
Conflict Reduction	▣
Natural Environment	▣

Implementation Considerations

Local Access	▣
Emergency Vehicle Response	▣
Cycling Use	▣
Traffic Enforcement	▣
Vehicle Parking	☐
Street Maintenance	▣

☐/☐	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

7. GATEWAYS

Description and Purpose

Gateways are the combination of traffic calming devices, that help to provide an entry or "gateway" which identifies transitional zones such as between commercial/rural areas and urban/rural residential zones, villages, or hamlets.

Applicability

- **Road Class –** Local Streets, Collector Roads, Urban and Rural Arterials
- **Roadway Cross-Section –** Urban and rural
- **Speed Limit –** All speed limits
- **Average Daily Traffic –** All volumes
- **Town** – Site specific, compliments other measures

Cost – $-$$
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	◻
Volume Reduction	☐
Conflict Reduction	☐
Natural Environment	■

Implementation Considerations

Local Vehicle Access	☐
Emergency Vehicle Response	☐
Cycling Use	☐
Traffic Enforcement	☐
Vehicle Parking	☐
Street Maintenance	■

☐/☐	No Benefit/Impact
◻/◻	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

8. SHARED SPACE

Description and Purpose

Shared space is a design concept commonly used in Europe where the priority for users is shifted from vehicles towards cyclists and pedestrians as they are free to cross anywhere. Often, there are no pavement markings, traffic signals, signs or barriers which requires drivers to be more attentive. There may also be trees or street furniture in the roadway to act as deflections. This shared use reduces vehicles speeds and encourages better public spaces for the community.

Applicability

- **Road Class –** Local Streets, Collector Roads, and Urban Arterials
- **Roadway Cross-Section –** Urban
- **Speed Limit –** 50 km/h or less, lower to 20-30 km/h
- **Average Daily Traffic –** <15,000 vpd
- **Town** – Site specific, implemented as part of road reconstruction or new development

Cost – $-$$
Timeline – Permanent
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	■

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	▣
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

9. ENFORCEMENT AND EDUCATION

9.1 Speed Display Devices

Description and Purpose

A speed display device is an interactive sign that displays vehicle speeds as oncoming motorists approach. Vehicle speed is captured using radar and can trigger the display board to show when vehicles approach at predetermined undesirable speeds. Can be used upstream of targeted speed enforcement.

Applicability

- **Road Class –** Local Streets, Collector Roads, Urban and Rural Arterial Roads
- **Town** – Prior to implementing physical traffic calming and/or compliments other measures

Cost – $
Timeline – Temporary or Permanent
Engineering Study Required – No

Potential Traffic Calming Benefits

Speed Reduction	◘
Volume Reduction	☐
Conflict Reduction	☐
Natural Environment	☐

Implementation Considerations

Local Vehicle Access	☐
Emergency Vehicle Response	☐
Cycling Use	☐
Traffic Enforcement	◘
Vehicle Parking	☐
Street Maintenance	■

☐/☐	No Benefit/Impact
◘/◘	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

9. ENFORCEMENT AND EDUCATION
9.2 Targeted Speed Enforcement

Description and Purpose

Targeted speed enforcement involves employing additional police enforcement in locations when speed, collision, citation, resident comments, or other sources of information suggest that the site is unusually hazardous due to illegal driving practices.

Applicability

- **Road Class –** Local Streets, Collector Roads, Urban and Rural Arterial Roads
- **Town** – Prior to implementing physical traffic calming and/or compliments other measures

Cost – $$$
Timeline – Temporary
Engineering Study Required – No

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	□
Natural Environment	□

Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	■
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
■/■	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

9. ENFORCEMENT AND EDUCATION

9.3 Targeted Education Campaign

Description and Purpose

Targeted education campaigns are initiatives to raise awareness of road safety issues. Education campaigns can address multiple types of driver awareness. In some cases, these will be an integral component of an overall strategic road safety program.

Applicability

- **Road Class –** Local Streets, Collector Roads, Urban and Rural Arterial Roads
- **Town** – Prior to implementing physical traffic calming and/or compliments other measures

Cost – $-$$$
Timeline – n/a
Engineering Study Required – No

Potential Traffic Calming Benefits

- Speed Reduction ☐
- Volume Reduction ☐
- Conflict Reduction ☐
- Natural Environment ☐

Other Implementation Considerations

- Local Vehicle Access ☐
- Emergency Vehicle Response ☐
- Cycling Use ☐
- Traffic Enforcement ☐
- Vehicle Parking ☐
- Street Maintenance ☐

☐/☐ No Benefit/Impact
◻/◻ Minor Benefit/Impact
■/■ Substantial Benefit/Impact

9. ENFORCEMENT AND EDUCATION
9.4 Vehicle Actuated Signs (VAS)

Description and Purpose

Vehicle actuated signs are electronic roadside warning signs equipped with radar speed detectors and illuminated display.

Vehicle activated signs are like speed feedback signs but instead of showing the speed of the vehicle, the speed is used to activate a symbol displaying the actual hazard ahead when a predetermined speed threshold is exceeded. Otherwise, the sign shows no message.

The purpose is to alert drivers with the aim that they reduce their travel speed as they approach specific conditions or hazards ahead.

Applicability

- **Road Class –** Local Streets, Collector Roads, Urban and Rural Arterial Roads
- **Town** – Prior to implementing physical traffic calming and/or compliments other measures

Cost – $
Timeline – Temporary or Required
Engineering Study Required – Yes

Potential Traffic Calming Benefits

Speed Reduction	■
Volume Reduction	□
Conflict Reduction	▣
Natural Environment	□

Other Implementation Considerations

Local Vehicle Access	□
Emergency Vehicle Response	□
Cycling Use	□
Traffic Enforcement	□
Vehicle Parking	□
Street Maintenance	■

□/□	No Benefit/Impact
▣/▣	Minor Benefit/Impact
■/■	Substantial Benefit/Impact

Appendix B

Traffic Calming Toolkit Decision Matrix

Measure		Road Class			Cross-Section	Location	Speed Limit	Average Daily Traffic	Grade	Notes
		Local or Collector	Urban Arterial	Rural Arterial						
1. Vertical Deflection										
1.1	Raised Crosswalk	●	×	×	Urban[1]	n/a	≤ 50 km/h		≥ 1%, but ≤ 8%	Implement to facilitate pedestrian connections
1.2	Raised Intersection	●	×	×	Urban	n/a	≤ 50 km/h		≥ 1%, but ≤ 8%	Site specific, considered as part of road reconstruction projects or new development
1.3	Speed Cushion	●	×	×	Primarily Urban	n/a	≤ 50 km/h		< 8%	Primary measure
1.4	Speed Hump	●	×	×	Urban	n/a	≤ 50 km/h		< 8%	Implement where a speed cushion is not effective
	Speed Table	●	×	×						
2. Horizontal Deflection										
2.1	Chicane (One-Lane, Two-Lane)[2]	●	×	×	Urban	n/a	≤ 50 km/h	≥ 750 vpd	< 8%	Implement under special circumstances
2.2	Curb Radius Reduction	●	▲	×	Urban	n/a	n/a			Primary measure
2.3	Lateral Shift	●	▲	×	Urban	n/a	≤ 50 km/h		< 8%	Primary measure
2.4	Speed Kidney	●	×	×	Urban	Midblock or Intersection	≤ 50 km/h		< 5%	Implement under special circumstances
2.5	Traffic Button/	●	×	×	Urban and Rural	n/a	≤ 50 km/h	< 1,500 vpd	n/a	Implement to address intersection conflicts (where space permits)
	Traffic Circle/Mini-Roundabout	●	×	▲						
3. Roadway Narrowing										
3.1	Curb Extension	●	●	×	Urban	n/a	≤ 60 km/h		n/a	Primary measure
3.2	Lane Narrowing	●	▲	×	Urban	n/a	≤ 60 km/h		n/a	Primary measure
3.3	On-Street Parking	●	▲	×	Urban	n/a	≤ 50 km/h		n/a	Implement in accordance with Town by-laws
3.4	Raised Median Island	●	▲	●	Urban and Rural[2]	Two-lane roads	≤ 60 km/h		n/a	Implement where width permits and/or alongside reconstruction projects
3.5.	Road Diet[6]	●	●	×	Urban	n/a	≤ 60 km/h		n/a	Primary measure
3.6	Vertical Centreline Treatment	●	×	●	Urban and Rural	Two-lane roads	≤ 80 km/h		n/a	Primary measure
4. Surface Treatment										
4.1	Sidewalk Extension/Textured Crosswalk	●	▲	×	Urban[1]	n/a	≤ 50 km/h		n/a	Implement to facilitate pedestrian crossings, streetscape projects
4.2	Textured Pavement	●	×	×	Urban	n/a	≤ 50 km/h		n/a	Consider in streetscape projects
4.3	Transverse Rumble Strips	▲	×	●	Urban and Rural	n/a	n/a		n/a	Primary measure
5. Pavement Markings										
5.1	Converging Chevrons	●	▲	●	Urban and Rural	n/a	n/a		n/a	Primary measure
5.2	Dragon's Teeth	●	▲	●	Urban and Rural	n/a	n/a		n/a	Primary measure
5.3	Full-lane Transverse Bars	●	▲	●	Urban and Rural	n/a	n/a		n/a	Primary measure
5.4	On-Road 'Sign' Pavement Markings	●	●	●	Urban and Rural	n/a	n/a		n/a	Compliments other measures
5.5	Peripheral Transverse Bars	●	▲	●	Urban and Rural	n/a	n/a		n/a	Primary measure

Measure		Road Class			Cross-Section	Location	Speed Limit	Average Daily Traffic	Grade	Notes
		Local or Collector	Urban Arterial	Rural Arterial						
6. Access Restriction										
6.1	Directional Closure	●	✕	✕	Urban	Midblock or Intersection	n/a	Local: < 1,500 vpd Collector: 1,500 – 5,000 vpd	n/a	Consider for volume reduction within the context of the network design
6.2	Diverter	●	✕	✕	Urban and Rural	n/a	≤ 50 km/h	< 1,500 vpd	n/a	
6.3	Full Closure	●	✕	✕	Urban	n/a	≤ 50 km/h		n/a	
6.4	Intersection Channelization	●	▲	✕	Urban	n/a	n/a		n/a	
6.5	Raised Median Through Intersection	●	▲	✕	Urban	n/a	n/a		n/a	
6.6	Right-in/Right-out Island	●	▲	✕	Urban	n/a	n/a		n/a	
7. Gateways										
7.1	Gateways	●	●	●	Urban and Rural	n/a	n/a		n/a	Site specific, compliments other measures
8. Shared Space										
8.1	Shared Space	●	▲	✕	Urban	n/a	≤ 50 km/h	< 15,000 vpd	n/a	Site specific, implemented as part of road reconstruction or new development
9. Enforcement and Education										
9.1	Speed Display Devices	●	●	●	n/a	n/a	n/a		n/a	Use prior to implementing physical traffic calming and/or compliments other measures
9.2	Targeted Speed Enforcement	●	●	●	n/a	n/a	n/a		n/a	
9.3	Targeted Education Campaign	●	●	●	n/a	n/a	n/a		n/a	
9.4	Vehicle Activated Signs	●	●	●	n/a	n/a	n/a		n/a	

Legend:

● Applicable ▲ Use with Care ✕ Not Appropriate

Notes:

1. Consider only if sidewalk is on at least one side of road
2. Consider on two-lane roads