













TRAFFIC CALMING MEASURE	EXAMPLE	DESIGN CRITERIA
<p>Speed Cushion (Innisfil Pilot Study)</p> <p>Description: Raised areas on the roadway that cause a vertical deflection for vehicles, but do not cover the whole width of the road – allows larger vehicles to straddle the cushion¹.</p>	 <p>Source: National Association of City Transportation</p>	<ul style="list-style-type: none"> • All sides of cushion must be ramped to allow for drainage • All edges of ramps should be formed and keyed into existing asphalt • One speed cushion per travel lane is typical • Optimal width of a speed cushion is 1.8 m (narrow enough to allow emergency vehicles to pass unaffected) • Space between the cushions and the curb approximately 0.6 m • Distance between cushions if only two are installed must be at least 1.5 m (prevents heavy vehicles from passing too closely to one another) • The cushion design is shown in Figure 4.5 of the TAC Traffic Calming Design Guide (for non-transit routes or for locations where transit can drive over centreline for short periods of time) • Signage: Speed Hump sign (WA-50) facing traffic and immediately adjacent to the speed cushion (may require Speed Hump warning signs if visibility is an issue), required on both sides of road for one-way streets • Recommended pavement markings are shown in Figure 4.4 and 4.5 of the TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – Medium • Reference: TAC Traffic Calming Design Guide
<p>Speed Hump/Table</p> <p>Description: Raised areas on the roadway that cause a vertical deflection for vehicles and cover the entire width of the roadway (speed tables are more elongated speed humps)¹.</p>	 <p>Source: Transportation Association of Canada</p>	<ul style="list-style-type: none"> • Use speed tables for roadways with higher design speeds • Similar configurations – speed tables have flat top section 3 m long by 80 mm high between the two halves of the local street hump • Vertical transition at end should be keyed into existing pavement • Use a series of speed humps/tables to retain slower vehicle speeds over longer distances – spacing of 80 m to 150 m is recommended to maintain an 85th percentile operating speed between 40 and 48 km/h • Install Speed Hump sign (WA-50) facing traffic and immediately adjacent to the speed hump • Configuration of design shown in Figure 4.6 and 4.7 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – Medium • Reference: TAC Traffic Calming Design Guide



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<p>Raised Crosswalk (Innisfil Pilot Study)</p> <p>Description: Marked crosswalks that are at a higher elevation than approaching roadways¹.</p>	 <p>Source: District of Squamish, BC</p>	<ul style="list-style-type: none"> • Can be implemented at an intersection or mid-block • Typically, a crosswalk is 6.5 m wide with a minimum width of 2.5 m (in accordance with MUTCD) • Ramps (sloped section of crosswalk) on either side of crosswalk are typically 2 m in width each • Design shown in Figure 4.1 and 4.2 of the TAC Traffic Calming Guide • Location of raised crosswalks relative to curbs and sidewalks should be the same as for non-raised crosswalks • Vertical transition at end of retrofit raised crosswalk to be keyed into existing pavement • Signage: Speed Hump sign (WA-50) should be installed facing traffic and immediately adjacent to raised crosswalk (on both sides of the road for one-way streets); Pedestrian Crosswalk sign (RA-4) installed on both sides of road facing traffic (not required at traffic signal or stop-sign controlled intersections) • Preliminary estimation of installation costs – Medium • Reference: TAC Traffic Calming Design Guide
<p>Raised Intersection</p> <p>Description: Intersections that are at a higher elevation than approaching roadways¹.</p>	 <p>Source: National Association of City Transportation</p>	<ul style="list-style-type: none"> • Raised the same amount as any adjacent raised sidewalk (consistent throughout street system) • 80 mm recommended 15 mm curb face retained at all crosswalk locations • Sloping surfaces connecting adjacent sidewalks have tactile finish and slope of 6% or less • Vertical transition at end should be keyed into existing pavement • Minimum pavement slope of 1% for surface drainage • Install Speed Hump sign (WA-50) facing traffic and immediately adjacent to the speed hump unless intersection is stop controlled (no signage needed) • Configuration of raised intersection design illustrated in Figure 4.3 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide


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<p>Actibump</p> <p>Description: A radar-controlled module that sinks into the roadway for vehicles with a detected speed over the posted limit.</p>	 <p>Source: Actibump</p>	<ul style="list-style-type: none"> • To be installed as per manufacturer requirements • Preliminary estimation of installation costs – High
<p>Chicane (Innisfil Pilot Study)</p> <p>Description: A series of curb extensions that alternate between sides of a roadway. Designed to narrow the roadway and require drivers to make a horizontal deflection to steer between them².</p>	 <p>Source: Traffic Calming Guide for Toronto</p>	<ul style="list-style-type: none"> • Development of effective 2-lane chicanes is restricted to wider local or collector streets • Two-lane chicanes require a pavement width of at least 12 m • One-lane chicanes require a pavement width of at least 7 m • Chicane must disrupt any single lane alignment along the street – offset between the apexes of adjacent chicane islands must be 2 m or less • Parking and stopping prohibited within the limits of the chicane • Signage: Object Markers (WA-36) typically provided at its apex (note that Delineation Markers (WA-37) or bollards with reflective striping may be an alternative to Object Markers); Yield to Oncoming Traffic sign (TC-178) required for a two-way one-lane chicane in advance of the chicane; Stopping Prohibited sign (RB-55) required • Pavement Markings: solid yellow line or raised median may be used to separate opposing traffic on two-lane chicane • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide



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<p>Lateral Shift</p> <p>Description: A change in the alignment on the roadway causing drivers to make a horizontal deflection².</p>	 <p>Source: Institute of Transportation Engineers</p>	<ul style="list-style-type: none"> • Applicable for one-lane one-way and two-lane two-way streets • Applicable for streets with or without bike lanes • Can be used on streets with bus transit routes/emergency vehicle routes (buses and emergency vehicles must be able to straddle centreline) • Opposing traffic through the lateral shift can be separated with raised median • Applicable in mid-block locations only • Should be located near streetlights if possible • Preliminary estimation of installation costs – Medium to High • Reference: Institute of Transportation Engineers (https://www.ite.org/pub/?id=2a582794%2Dfd92%2D4e12%2Defa0%2Ddc618963b268)
<p>Curb Radius Reduction</p> <p>Description: Reconstruction of the corner of an intersection that uses a smaller radius².</p>	 <p>Source: National Association of City Transportation</p>	<ul style="list-style-type: none"> • Introduce the smallest radius required to accommodate a passenger vehicle (3-5 m) and then check for larger vehicles • Evaluate risk of damage to sidewalks caused by larger vehicles as well as risk to pedestrians • In isolation do not require any additional signing or pavement markings • Relocation of existing utility poles, posts, and signing and pavement marking replacement may be required • Potential designs shown in Figure 4.9 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide

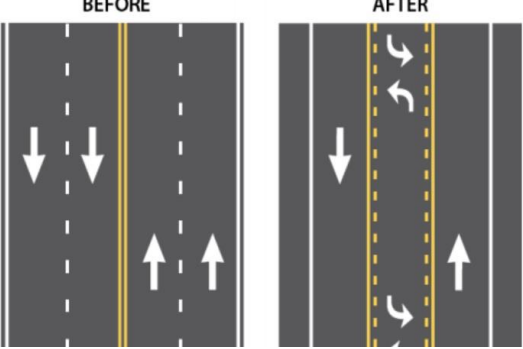

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<p>Speed Kidney</p> <p>Description: 3 Elongated speed humps arranged in a curvilinear shape positioned with the direction of traffic¹.</p>	 <p>Source: Mike on Traffic</p>	<ul style="list-style-type: none"> • Minimum lane width of 3.7 m • Sidewalk curb or edge line may require modification if street is not wide enough for a pair of speed kidneys • Radius of central curve dependent on radius of speed kidney • Speed kidney should be painted in white • Speed hump warning sign required • Can use WA-50 Speed Hump signs • Design shown in Figure 4.10 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide
<p>Traffic Circle</p> <p>Description: Raised island in the middle of an intersection that requires vehicles to drive in a circular, counterclockwise direction through the intersection² (Mini roundabout)</p>	 <p>Source: City of Vancouver, BC</p>	<ul style="list-style-type: none"> • Yield signs (RA-2) recommended on all approach streets • Chevron alignment signs (WA-9) required • Central island includes small raised/landscaped portion with mountable outer portion for larger vehicles • Inscribed circle diameter of 30 m or less • When used, splitter islands can be raised, traversable, or flush • Specific geometric requirements provided in Section 4.3.1 A. of the TAC Traffic Calming Design Guide • Guidelines for pedestrian and bicycle requirements are also available in the TAC Traffic Calming Design Guide • Design shown in Figure 4.11 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide

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<p>Roundabout</p>	 <p>Source: Canadian Institute of Transportation Engineers</p>	<ul style="list-style-type: none"> • Preliminary estimation of installation costs – High • Reference: TAC Geometric Design Guide
<p>Full Lane Transverse Bars</p> <p>Description: Series of parallel pavement markings that extend across the entire travel lane to create the illusion of increasing speed by decreasing the space between them¹.</p>	 <p>Source: Federal Highway Administration</p>	<ul style="list-style-type: none"> • Recommended spacing is the same as what is provided for Peripheral Transverse Bars in the TAC Traffic Calming Design Guide • Spacing for roadways with a posted speed of 80 km/h down to 60 km/h: 4 m spacing between bars 1 to 6, 5 m spacing between bars 7 to 12 • Spacing for roadways with a posted speed of 60 km/h down to 40 km/h: 3 m spacing between bars 1 to 7, 4 m spacing between bars 8 to 12 • Spacing for roadways with a posted speed of 50 km/h down to 30 km/h: 2 m spacing between bars 1 to 4, 3 m spacing between bars 5 to 12 • Maximum width of 0.3 m, extended across most of the travelled lane width • Preliminary estimation of installation costs – Medium • Reference: City of Kingston – TAC Traffic Calming Design Guide, Traffic Calming Guidelines (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890)



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<p>Peripheral Transverse Bars</p> <p>Description: Variation of full lane transverse bars but they are placed along the side of the travel lane.</p>	 <p>Source: Federal Highway Administration</p>	<ul style="list-style-type: none"> • Series of white transverse lines on both sides of the lane perpendicular to the centerline, edge line, or lane line • Maximum width of 0.3 m, maximum length (extended into the lane) of 0.5 m • Spacing for roadways with a posted speed of 80 km/h down to 60 km/h: 4 m spacing between bars 1 to 6, 5 m spacing between bars 7 to 12 • Spacing for roadways with a posted speed of 60 km/h down to 40 km/h: 3 m spacing between bars 1 to 7, 4 m spacing between bars 8 to 12 • Spacing for roadways with a posted speed of 50 km/h down to 30 km/h: 2 m spacing between bars 1 to 4, 3 m spacing between bars 5 to 12 • Design shown in Figure 4.20 and Tables 4.1, 4.2, and 4.3 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – Medium • Reference: TAC Traffic Calming Design Guide
<p>Converging Chevrons</p> <p>Description: Variation of full lane transverse bars but arranged in a converging chevron pattern.</p>	 <p>Source: Ruidoso Traffic Calming Design Guides</p>	<ul style="list-style-type: none"> • Size of converging chevrons varies depending on width of travel lane • Following equation can be used as a guideline for spacing: $L = v_1 * t_b + \frac{(v_1^2 - v_2^2)}{2a}$ <p style="text-align: center;">FIGURE 148. EQUATION. DECREASING VELOCITY LINEAR EQUATION</p> <p>Where:</p> <p>L = distance between successive pair of transverse bar pairs pair₁ and pair₂ (ft) v₁ = speed at pair 1 (ft/s) (speed at the first pair is the transition zone speed; speed at the last pair is the entrance posted speed limit) v₂ = speed at pair 2 t_b = perception reaction time (0.5 s) a = deceleration rate (ft/s²)</p> <ul style="list-style-type: none"> • Requires regular maintenance/reapplication • Preliminary estimation of installation costs – Medium • Reference: City of Kingston – Traffic Calming Guideline (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890); FHWA (https://www.fhwa.dot.gov/publications/research/safety/15030/009.cfm)

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<p>Dragon Teeth Pavement Markings</p> <p>Description: Variation of full lane transverse bars but use a series of triangular markings on the edge of the travel lane.</p>	 <p>Source: City of Ottawa</p>	<ul style="list-style-type: none"> • Size and Spacing: Each triangular pavement marking is typically 2 ft wide, 2 ft tall, and spaced 5 ft apart from adjacent pair of teeth • No specific constraint to number of teeth (typically 9-17 pairs of teeth are used) • Requires regular maintenance/application • Preliminary estimation of installation costs – Medium • Reference: City of Kingston – Traffic Calming Guideline (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890)
<p>On Road Sign (Innisfil Pilot Study)</p> <p>Description: Pavement markings that provide information to drivers.</p>	 <p>Source: Queen Street at Glenfern</p>	<ul style="list-style-type: none"> • Examples of messaging: set speed limit, “SLOW”, school crossing/school ahead • Requires regular maintenance/reapplication • Preliminary estimation of installation costs – Medium • Reference: City of Ottawa Traffic Calming Design Guidelines (https://documents.ottawa.ca/sites/documents/files/traffic_calm_design_guide_en.pdf); City of Kingston – Traffic Calming Guidelines (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890)



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<p>Lane Narrowing (Innisfil Pilot Study)</p> <p>Description: Reducing lane widths using pavement markings or features so that drivers perceive the roadway as less comfortable and reduce their speeds.</p>	 <p>Source: King Township Traffic Calming</p>	<ul style="list-style-type: none"> • Lane widths can be reduced to a minimum width of 3.0 m • Use on roads with a grade of 8% or less • Preliminary estimation of installation costs – High • Reference: Geometric Design Guide for Canadian Roads: Chapter 6 – Pedestrian Integrated Design; City of Kingston – Traffic Calming Guidelines (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890)
<p>Curb Extension</p> <p>Description: An extension of the curb to narrow the roadway.</p>	 <p>Source: National Association of City Transportation</p>	<ul style="list-style-type: none"> • Lane width approaching intersection reduced to 3 m for maximum effectiveness (minimum of 2.5 m where permitted) • Departure lane width remain at 3 m for a minimum total width of 5.5 m • Minimum clear offset of 5 m required when used on diagonally opposite corners of intersection • Curb extension at intersection 5 to 7 m in length (or long enough to accommodate longest bus when used at bus stops) • At mid-block – 3 m lane widths (minimum of 2.75 m where permitted) for a total street width of 5.5 m • At mid-block – 7 m length minimum • Object Markers (WA-36) optional • Delineation Markers (WA-37) may be acceptable alternative to Object Markers • Design shown in Figure 4.13 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide



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<p>Road Diet Change</p> <p>Description: Reconfiguration of roadway that reduces the number of lanes and allocates the reclaimed space for other uses.</p>	 <p>Source: The Kinder Institute for Urban Research</p>	<ul style="list-style-type: none"> • Applicable for existing roadways with 4 or more lanes • Geometric and Operation Design available from the FHWA Road Diet Information Guide – Section 4 • Preliminary estimation of installation costs – High • Reference: FHWA Road Diet Informational Guide Road Diet Informational Guide - Safety Federal Highway Administration (dot.gov)
<p>Raised Median Island</p> <p>Description: Elevated median constructed along the centerline of a two-way road that reduces the lane widths.</p>	 <p>Source: Federal Highway Association</p>	<ul style="list-style-type: none"> • Minimum width of 3.5 m for single lane adjacent to median island • Length of median section at intersection or mid-block crossing is 5 to 7 m • Minimum width of median is 1.5 m • Keep Right sign (RB-25) required at each end of median section • Object Marker (WB-36L) is optional • Stopping Prohibited signs (RB-55) required in the area of the median island • Crosswalk signs (RA-4) required for mid-block crosswalk applications • Geometric requirements available in Section 4.4.3 A. of TAC Traffic Calming Design Guide • Design shown in Figure 4.15 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide



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<p>Vertical Centerline Treatment (Innisfil Pilot Study)</p> <p>Description: Use of vertical treatments on the centerline to create a center median (flexible post-mounted delineators or raised pavement markers).</p>	 <p>Source: Iowa State University Institute for Transportation Research</p>	<ul style="list-style-type: none"> • Used on roads with a grade of 8% or less • Vertical treatments can be flexible post-mounted delineators or raised pavement markers • Installed on a temporary/seasonal basis • Preliminary estimation of installation costs – Medium • Reference: Ottawa Traffic Calming Design Guidelines (https://documents.ottawa.ca/sites/documents/files/traffic_calm_design_guide_en.pdf); City of Kingston – Traffic Calming Guidelines (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890)
<p>On-Street Parking</p> <p>Description: Variation of lane narrowing using on-street parking.</p>	 <p>Source: City of Toronto</p>	<ul style="list-style-type: none"> • Should only be used where cyclist volumes are low, and cyclists can use vehicular travel lanes • Site constraints include driveway locations, fire hydrant locations, etc. • Should not be used as form of curb extension at or near intersections • Parking Prohibited signs (RB-51) used in areas of minimum pavements width and adjacent to intersections • Minimum geometric requirements shown in Figure 4.14 of the TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – Low • Reference: TAC Traffic Calming Design Guide



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<p>Speed Display Devices</p> <p>Description: Interactive signs that display the speed of an oncoming vehicle by using radar speed detectors.</p>	 <p>Source: University of New Brunswick</p>	<ul style="list-style-type: none"> • Post or trailer mounted • Use as a stand-alone system or part of a broader traffic calming strategy • Should not be used where other devices and roadway environments are already making intensive demands on driver attention (i.e., close to traffic control devices, pedestrian crossings, etc.) • Most beneficial over limited distances • TAC Application Guidelines for Speed Display Devices has guidelines for specific applications – school zones • TAC Application Guidelines for Speed Display Devices – Section 6 contains Design of Display guidelines, Section 7 contains Installation information • Active display text must be a minimum of 200 mm high and clearly visible from entire approach lane from a distance of 45 m to 200 m • For urban or residential areas: ideally placed between 300 mm to 2 m from curb lane • For rural areas: ideally placed 2 to 4 m from edge of outer travel lane • Preliminary estimation of installation costs – Low to Medium • Reference: TAC Application Guidelines for Speed Display Devices; City of Kingston – Traffic Calming Guidelines (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890)
<p>Vehicle Activated Signs</p> <p>Description: Interactive signs that alert drivers of a hazard ahead when their speed is detected to be above a threshold.</p>	 <p>Source: Trafficlogix</p>	<ul style="list-style-type: none"> • Post or trailer mounted • Use as a stand-alone system or part of a broader traffic calming strategy • Should not be used where other devices and roadway environments are already making intensive demands on driver attention (i.e., close to traffic control devices, pedestrian crossings, etc.) • Most beneficial over limited distances • TAC Application Guidelines for Speed Display Devices has guidelines for specific applications – school zones, narrow lanes and bridges, highway community entry, neighbourhood traffic calming, curves, work zones • TAC Application Guidelines for Speed Display Devices – Section 6 contains Design of Display guidelines, Section 7 contains Installation information • Active display text must be a minimum of 200 mm high and clearly visible from entire approach lane from a distance of 45 m to 200 m • For urban or residential areas: ideally placed between 300 mm to 2 m from curb lane • For rural areas: ideally placed 2 to 4 m from edge of outer travel lane • Preliminary estimation of installation costs – Low • Reference: TAC Application Guidelines for Speed Display Devices; City of Kingston – Traffic Calming Guidelines

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		https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890
<p>Fixed Speed Enforcement</p> <p>Description: Permanent cameras that photograph vehicles travelling at unsafe/high speeds without requiring a law enforcement officer present.</p>	 <p>Source: Trafficlogix</p>	<ul style="list-style-type: none"> • To be installed as per manufacturer requirements • Preliminary estimation of installation costs – High
<p>Aircraft/Drone Radar Enforcement</p> <p>Description: Aircrafts or drones that monitor the speeds of vehicles on highways/freeways using transverse pavement markings.</p>	 <p>Source: NNTC Innovative Technology Company</p>	<ul style="list-style-type: none"> • To be installed as per manufacturer requirements • Preliminary estimation of installation costs – Medium



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<p>Mobile Speed Enforcement</p> <p>Description: Radar photography units mounted in mobile vehicles or trailers that are used in areas that require speed enforcement.</p>	 <p>Source: Trafficlogix</p>	<ul style="list-style-type: none"> • To be installed as per manufacturer requirements • Preliminary estimation of installation costs – Medium
<p>Speed Watch Programs</p> <p>Description: Volunteers/residents help monitor traffic and record license plates of vehicles that are speeding. Letters may be sent to vehicle owners alerting them of their excessive speeding.</p>	 <p>Source: SRTS Guide – Safe Routes Info</p>	<ul style="list-style-type: none"> • To be implemented based on community requirements • Preliminary estimation of installation costs – Low



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<p>Pace Car Program</p> <p>Description: Community awareness measure where local drivers sign a pledge to drive within the speed limit, effectively becoming mobile traffic calming devices. Bumper stickers are used to alert other drivers.</p>	 <p>Source: Cochrane Neighbourhood, CBC Calgary</p>	<ul style="list-style-type: none"> • In Canada main concept is to encourage drivers to sign a pledge and display a sign on car rear window or bumper to show commitment to drive within the speed limit • Preliminary estimation of installation costs – Medium • Reference: City of Kingston – Traffic Calming Guidelines (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890)
<p>Targeted Education Campaign</p> <p>Description: Community awareness measure where programs, event, or media campaigns are used to educate and raise awareness of road safety issues.</p>	 <p>Source: King Township Traffic Calming Strategy</p>	<ul style="list-style-type: none"> • To be implemented based on community requirements • Preliminary estimation of installation costs – High




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<p>Active and Safe Routes to School Program</p> <p>Description: A community-based program that promotes the use of active transportation for school trips and addresses traffic safety issues.</p>	 <p>Source: City of Toronto</p>	<ul style="list-style-type: none"> • To be implemented based on community requirements • Preliminary estimation of installation costs – High • Reference: The Canadian School Travel Planning Toolkit (Guide-for-Facilitators-STP-Toolkit-May-2018-En-1.pdf (ontarioactiveschooltravel.ca))
<p>Coloured/Textured Pavement</p> <p>Description: Pavement that incorporates texture, patterned, or coloured surfaces that contrasts with the surrounding roadway.</p>	 <p>Source: City of Vaughan</p>	<ul style="list-style-type: none"> • For textured crosswalks: <ul style="list-style-type: none"> ○ Minimum crosswalk width is 2.5 m (3-4 m is typical in urban areas with high pedestrian activity) ○ Parallel standard crosswalk lines that are 0.1-0.2 m wide are required to delineate outside edges of crosswalk if measure is implemented at a controlled crossing ○ If zebra crosswalk markings are used, configuration typically consists of block markings 0.6 m and spaced at 0.6 m • Preliminary estimation of installation costs – Medium • Reference: City of Kingston – Traffic Calming Guidelines (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890) • For coloured pavement: <ul style="list-style-type: none"> ○ Must be accompanied by appropriate regulatory signage ○ Maintain minimum required friction characteristics of pavement ○ Use the same colour for the same purpose to convey a message to roadway users • Preliminary estimation of installation costs – Medium • Reference: MUTCD




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<p>Transverse Rumble Strips</p> <p>Description: Grooves in the pavement or raised bars closely spaced at regular intervals on a roadway that create noise and vibration for a vehicle travelling over them.</p>	<p>Source: Center for Transportation Research and</p>  <p>Education – Iowa State University</p>	<ul style="list-style-type: none"> • Reference the Transportation Association of Canada - Best Practice Guidelines for the Design and Application of Transverse Rumble Strips • Preliminary estimation of installation costs – Medium • Note: These rumble strips in neighbourhoods can result in noise complaints.
<p>Sidewalk Extension/Texture d Crosswalk</p> <p>Description: Coloured/textured pavement applied to a crosswalk.</p>	 <p>Source: Endurablend Polymer Cement Surfacing</p>	<ul style="list-style-type: none"> • For sidewalks located at the curb line on approaches to intersection <ul style="list-style-type: none"> ○ Sidewalk must be lowered to 15 mm above the intersecting street ○ Slope of sidewalk transition approaching intersection must not exceed 6% • For sidewalk offset from the curb line on approaches to intersection <ul style="list-style-type: none"> ○ Sidewalk can be lowered to match intersection street ○ 40 mm curb face recommended • Design shown in Figure 4.19 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide



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<p>Directional Closures</p> <p>Description: Barrier that extends to the centerline of the roadway that prohibits one direction of traffic.</p>	 <p>Source: U.S. Department of Transportation Federal Highway Administration</p>	<ul style="list-style-type: none"> • Exit-only directional closure <ul style="list-style-type: none"> ○ Island width must be sufficient so traffic going straight through would conflict with opposing traffic ○ Dimensional requirements shown in Figure 4.21(a) of TAC Traffic Calming Design Guide ○ Signage – Right or Left Turn Only sign (RB-43) and Entry Prohibited signs (RB-23) required; Except Bicycles supplementary tab sign (RB-98) required for bicycle traffic; One-way signs (RB-21) must be used on the cross-street; Object Markers (WA-36) to be used • Entrance-only directional closure <ul style="list-style-type: none"> ○ Best implemented with hammerhead or cul-de-sac area ○ Dimensional requirements shown in Figure 4.21(b) of TAC Traffic Calming Design Guide ○ Signage – RB-21, RB-43, and WA-36 signs are NOT required; Cul-de-sac sign (ID-21) and Checkerboard sign (WA-8) are required • Openings in the closures to accommodate bicycle traffic should be approximately 1.5 min width • Preliminary estimation of installation costs – Medium • Reference: TAC Traffic Calming Design Guide
<p>Intersection Channelization</p> <p>Description: Raised islands at intersections used to obstruct certain movements and physically direct traffic through the intersection.</p>	 <p>Source: City of Campbell River Neighbourhood Traffic Management Procedures</p>	<ul style="list-style-type: none"> • Minimum island size of 6-10 m² required for pedestrian refuge • Selected right-turn radius should create a divisional island large enough to discourage left-turn and through movements • Width of turning lane designed to only accommodate vehicles that use segment of road on a regular basis • Effectiveness improved with an island size of 10 m² or greater • Signage – Entry Prohibited sign (RB-23) required on island facing the straight-through movement no longer permitted; Right or Left Turn Only lane sign (RB-43) on that approach; Left Turn Prohibited Sign (RB-11L) should be used on the cross-street on the far side of the intersection as well as the end of the divisional island; Keep Right sign (RB-25) and Object Marker (WA-36) placed on end of divisional island; Object Marker (WA-36) required at the corner of island facing traffic turning right from collector • Design shown in Figure 4.24 of TAC Traffic Calming Design Guide • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide

TRAFFIC CALMING MEASURE	EXAMPLE	DESIGN CRITERIA
<p>Raised Median Through Intersection</p> <p>Description: An island constructed on the centreline of a two-way road through an intersection used to restrict left turns and through movements to/from the intersecting roadway.</p>	 <p>Source: National Association of City Transportation Officials</p>	<ul style="list-style-type: none"> • Geometric Requirements: <ul style="list-style-type: none"> ○ Raised portion of median minimum width – 1.5 m ○ Single lane width on both sides beyond intersection – 3.5 m ○ Lane width adjacent to median – determined by turning vehicle requirements ○ Median extends 5-7 m beyond crosswalk outer edges ○ Reference Figure 4.25 in TAC Traffic Calming Design Guide • Signage – Keep Right sign (RB-25) and Object Markers (WA-36) for two ends of median; U-Turn Prohibited sign (RB-16) may be required; either Right Turn Required (RB-14R) or On-Way sign (RB-21) at center of protected cross-street on median facing both approaches; Stopping Prohibited signs (RB-55) may be required • Pavement markings – reference MUTCD • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide, MUTCD
<p>Right-In Right-Out Island</p> <p>Description: A raised triangular island at an intersection that restricts left turns and through movements to/from an intersection road.</p>	 <p>Source: National Association of City Transportation Officials</p>	<ul style="list-style-type: none"> • Intersection radii should create divisional island large enough to discourage through and left turn movements • Minimum island for pedestrian refuge = 6-10 m² • Design shown in Figure 4.26 of TAC Traffic Calming Design Guide • Signage – Right Turn Only Lane sign (RB-41R) for protected intersection approach in advance of intersection and on divisional island; Keep Right sign (RB-25) and an Object Marker (WA-36) on end of divisional island facing approach; Entry Prohibited sign (RB-23) on divisional island facing prohibited through movement; Left Turn Prohibited sign (RB-11L) on the cross-street and divisional island facing prohibited left turning traffic; Right or Left Turn Only sign (RB-43) on intersection approach facing divisional island • Preliminary estimation of installation costs – High • Reference: MUTCD for signage, TAC Traffic Calming Design Guide

TRAFFIC CALMING MEASURE	EXAMPLE	DESIGN CRITERIA
<p>Diverter</p> <p>Description: Raised barrier placed diagonally across an intersection that diverts traffic to turn rather than going straight through the intersection.</p>	 <p>Source: Global Designing Cities Initiative</p>	<ul style="list-style-type: none"> • Diversion alignment must make adequate provision for the turning paths of all vehicles • Parking should not be permitted within limit of diversion • Typical diverter requirements shown in Figure 4.22 of TAC Traffic Calming Design Guide • Special requirements for landscaping and/or bollards for areas where cyclists or sidewalks are present • Options available to accommodate emergency vehicles (break-away or lockable bollards or lockable gates) • Signage – Single Curve signs (WA-2) to advise motorists of turning requirement; Parking Prohibited sign (RB-51) • Preliminary estimation of installation costs – High • Reference: TAC Traffic Calming Design Guide
<p>Full Closure</p> <p>Description: Barrier that covers the entire width of a road restricting all vehicular traffic.</p>	 <p>Source: Roxborough and Province, City of Vancouver</p>	<ul style="list-style-type: none"> • Geometric requirements shown in Figure 4.23 in TAC Traffic Calming Design Guide • Must include provision of some form of cul-de-sac at end of closed roadway • Bollards or trees placed to discourage continued off-road travel to/from severed street • Rolled or mountable curbs recommended adjacent to bicycle lanes • Signage – Cul-de-sac sign (ID-31) required at entrance to full closure block; Checkboard sign (WA-8) recommended at center of severed roadway; Parking Prohibited signs (RB-51) may be required • Preliminary estimation of installation costs – Medium to High • Reference: TAC Traffic Calming Design Guide

TRAFFIC CALMING MEASURE	EXAMPLE	DESIGN CRITERIA
<p>Gateways</p> <p>Description: A combination of traffic calming measures that provides a visual cue to help road users identify a transitional zone.</p>	 <p>Source: Global Designing Cities Initiative</p>	<ul style="list-style-type: none"> • Must be designed at appropriate scale and significance to attract drivers attention • Includes fixed roadside and/or overhead features • First determine physical space, utility, electrical, and other options before selecting most feasible gateway option • Preliminary estimation of installation costs – High • Reference: City of Ottawa Traffic Calming Design Guidelines
<p>Shared Space</p> <p>Description: A design concept where the priority is shifted from vehicular traffic to active transportation users, who are free to cross anywhere.</p>	 <p>Source: Global Designing Cities Initiative</p>	<ul style="list-style-type: none"> • Preliminary estimation of installation costs – High • To be implemented based on community requirements
<p>LED Pavement Marking</p> <p>Description: LEDs placed in the pavement that display a variety of messages to drivers.</p>	 <p>Source: TAPCO Safe Travels</p>	<ul style="list-style-type: none"> • Preliminary estimation of installation costs – Medium • To be installed as per manufacturer requirements

TRAFFIC CALMING MEASURE	EXAMPLE	DESIGN CRITERIA
<p>Traffic Calmed Neighbourhood Sign</p> <p>Description: Signs placed in conjunction with traffic calming measures that raise awareness that it is a traffic calmed area.</p>	 <p>Source: CBC City of Ottawa</p>	<ul style="list-style-type: none"> • Used to inform drivers that traffic calming measures are implemented within a neighbourhood • The ID-32 sign is always used in conjunction with the ID-32S supplementary tab sign • Installed at the entrance to the neighbourhood • Preliminary estimation of installation costs – Low • Reference: MUTCD (A4.6.6 Traffic-Calmed Neighbourhood Sign (ID-32))
<p>Community Safety Zones</p>	 <p>Source: City of Toronto</p>	<ul style="list-style-type: none"> • All zones require a sign with a BEGINS tab and an ENDS tab indicating the start and end of a designated community safe zone • Other signs can be used within the zone • Former sign is TC-46 from Ontario MUTCD • Preliminary estimation of installation costs – Low • Reference: Ontario MUTCD (Book 5 part 1.pmd (civicweb.net))
<p>Stop Signs</p>	 <p>Source: The Centre for Active Transportation</p>	<ul style="list-style-type: none"> • Preliminary estimation of installation costs – Low • Reference MUTCD

TRAFFIC CALMING MEASURE	EXAMPLE	DESIGN CRITERIA
<p>Maintenance and Signage</p>	 <p>Source: Minnesota's Best Practices for Traffic Sign Maintenance/Management Handbook</p>	<ul style="list-style-type: none"> • From MUTCD: <ul style="list-style-type: none"> ○ Signs should be kept clean, legible, and in proper position ○ Repair/replace damaged signs ○ Establish schedule for inspection (day and night), cleaning, and replacement ○ Remove weeds, shrubbery, construction materials, or piled snow that may obstruct sign • Preliminary estimation of installation costs – Medium • Reference: MUTCD
<p>Temporary/ Flexible Median</p> <p>Description: A temporary/flexible structure installed in the centreline of a roadway to act as a removable median.</p>	 <p>Source: Maple Ridge, BC Traffic Calming Policy</p>	<ul style="list-style-type: none"> • Used on roads with a grade of 8% or less • Vertical treatments are typically flexible post-mounted delineators • Installed on a temporary/seasonal basis • Preliminary estimation of installation costs – Medium <p>Reference: Ottawa Traffic Calming Design Guidelines (https://documents.ottawa.ca/sites/documents/files/traffic_calm_design_guide_en.pdf); City of Kingston – Traffic Calming Guidelines (https://www.cityofkingston.ca/documents/10180/15058/Traffic+Calming+Guidelines.pdf/804c309a-7195-ba08-e20e-dd17349f0a53?t=1629998980890)</p>

Note references:

¹ - Ottawa Traffic Calming Design Guidelines

² - Transportation Association of Canada (TAC) Canadian Guide to Traffic Calming