- Speed Cushion Pilot Project
- Mary St W Traffic Calming
- Automated Speed Enforcement
- Traffic Management Directive

Engineering

Technical Services

September 20, 2017

KAWARTHA LAKES

Speed Cushion Pilot Project

On May 26, 2015 Council passed the following resolution:

- THAT removable speed cushions be installed on William Street N. in the vicinity of Pottinger Street, Lindsay for a period of two (2) years as a pilot project with the speed cushions to be removed during the winter snow removal season;
- THAT removable speed cushions be installed on Victoria Avenue N. in the vicinity of Pottinger Street, Lindsay for a period of two (2) years as a pilot project with the speed cushions to be removed during the winter snow removal season;
- THAT removable speed cushions be installed on Clifton Street, Fenelon Falls at an appropriate place for a period of two (2) years as a pilot project with the speed cushions to be removed during the winter snow removal season;
- THAT funding for the purchase of removable speed cushions be from the Public Works Operating Budget, if available, or alternatively from the Working Capital Reserve, at an upset limit of $12,000.00 plus HST; and
- THAT staff be directed to develop a Citywide Speed Bump/Speed Cushion Policy no later than the end of the first quarter 2016.

This presentation addresses that direction.

Mary St and Photo Radar

On July 11, 2017 Council passed the following resolution:

- CC2017-20.10.1.2
- RESOLVED THAT the memorandum from Mayor Letham dated July 11, 2017 regarding Mary St. West, Lindsay, be received;
- THAT staff present a report in Q3 2017 outlining safety and traffic control options for Mary St. West, Lindsay; and
- THAT staff provide an update on new legislation allowing photo radar in school and community zones including costing options and the administration aspects of the project.

This presentation also addresses that direction.

Refresher

What is Traffic Calming

The Institute of Transportation Engineers define traffic calming as “the combination of mainly physical measures that reduce the negative effects of motor vehicles use, alter driver behavior and improve conditions for non-motorized street users.”

What is the Purpose of Traffic Calming

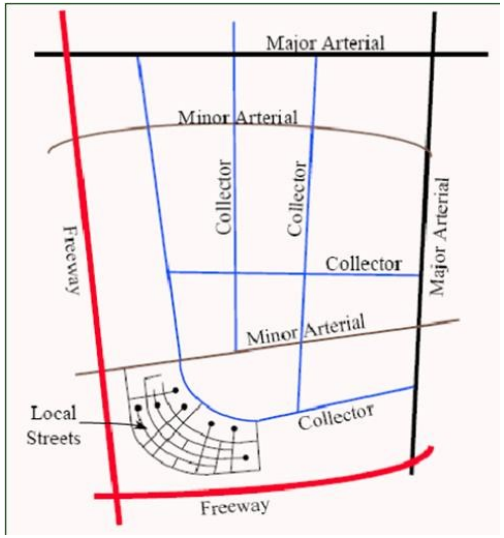
The purpose of traffic calming is to restore the streets to their intended function.

What is the Function of the Road

Local Road: Designed to provide access to property. Not intended for use as through routes or as important links to move traffic within an area's overall network

Collector Road: Access to adjacent property is balanced by a need to collect and distribute traffic travelling into and out of a neighbourhood.

Arterial Road: Through roads designed to carry large volumes of traffic. Traffic movement it a primary function.



What is not Traffic Calming

Unwarranted All-Way Stop: Established criteria exist. Unwarranted all-way stops come with a host of undesirable side effects.

Unwarranted 40 Zone: Established criteria exist. Speed zones not effective in changing driver behavior without aggressive enforcement.

Children at Play Sign: Since there is potential for children on all streets, they are reserved for parks, schools, and other unexpected child pedestrian generators. Unwarranted children at play signs reduce the credibility of warranted signs.

Community Safety Zone: Effectiveness is debatable. Requires aggressive enforcement to change driver behavior.

Traffic Calming - Vertical Deflections

Speed Hump/Cushion: A Raised area of a roadway, which deflects both the wheels and frame of a traversing vehicle.

+ Reduces vehicle speeds
+ Reduces volumes
- Some traffic may be diverted to parallel streets that do not have traffic calming measures
- Delayed emergency response (Scarborough Fire Dept. reported a delay of 8 to 10 seconds per speed hump, less with speed cushion)
- Increased noise
- $1300 to $5000 per hump depending on length of road

Speed Hump

Speed Cushion

Results

Mild to significant decrease in speed approaching the speed cushion. Unchanged 100m and more from the cushion.

Traffic volumes unchanged

Road	85% Before Installation	85% With Speed Cushion (Close)	85% With Speed Cushion (300m from cushion)	Avg. Daily Volume Before	Avg. Daily Volume After	Change	Commnts
William St North	55.8 km/h	52.9 km/h	55.8 km/h	4119	4215	**-2.9 to 0 km/h, +96 Veh**	
Victoria Northbound	58 km/h	50 km/h	57.2 km/h	1501	1494	**-8 to -0.8 km/h, -7 veh**	
Victoria Southbound	60.1 km/h	52.6 km/h	55.1 km/h	1437	1533	**-7.5 to -5 km/h, +96 Veh**	Southbound 300m speeds accelerating from stop sign on Orchard
Clifton St Fenelon Falls	50.8 km/h	n/a		563		n/a	Cliffton St was re-constructed and speed cushions were not installed more than one summer

Recommendations

Public reaction was mixed to negative. Most complaints were due to noise at the site (bump bump) or of the acceleration, and complaining that it didn't work or to do it better.

One row of speed cushions is ineffective for meaningful change on a section of roadway.

As part of a Traffic Management Directive, speed cushions can be an effective tool in reducing speeds and volumes

- Use Transportation Association of Canada's (TAC) Canadian Guide to Neighbourhood Traffic Calming recommendations
- Space humps along entire roadway to achieve the desired 85th percentile speeds (125m for 50 km/h, 80m for 40 km/h)
- On local and residential collector roads only
- Must be near street lighting
- Must be on a flat grade
- Must have curb or use bollards

Mary St W Traffic Calming

Mary St W has been studied for speed the last three years and 85th percentile speeds have not been above the speed limit. (Similar resolution in January 12, 2016, Appendix A, and multiple studies before that brought on by inquires.

Designed to be naturally calmed due to its curvature (chicanes). Further calmed near Angeline due to parked cars.

- Latest data shows 85% speeds of 49.3 km/h
- Average daily traffic during study of 2623 vehicles per day

Staff performed gap study to determine if there are sufficient gaps in traffic for pedestrians to cross.

- Using 1.1 m/sec for speed of children and seniors
- Safe gap time of 17.2 seconds required to cross safely
- Peak hour was measured in five minute intervals, where there were only three intervals with less than four safe gaps

Mary St W Rationale

Residents may be frustrated with both gradual and sudden volume increases due to development.

Regardless, Mary St W has the capacity and is classified as a future collector under our Transportation Master Plan.

Sidewalk are on both sides of the streets and it appears the natural curvature is effective in keeping speeds at or below the speed limit.

Traffic flow is good and volumes are below capacity. The needs of residential access and traffic movement are both serviced well as it should be on a collector road

The purpose of traffic calming is to restore the streets to their intended function.

Mary St W is not recommended for traffic calming measures.

A pedestrian warning sign with a seniors tab is recommended in front a Caressant Care or where seniors are known to cross

Photo Radar at School Zone and CSZ

The Ministry of Transportation Ontario (MTO) amended the Highway Traffic Act (HTA) to allow Municipalities to install an "automated speed enforcement system" in School Zones and Community Safety Zones (CSZ).

Under the HTA Council may by by-law designate a CSZ if, public safety is of a special concern on that part of the road or

that part of the road adjoins or is adjacent to land on which a school, schoolyard, daycare, seniors residences, community centre or playground is located.

Photo Radar at School Zone and CSZ

Traditionally, CSZ are ineffective are changing driver behavior without aggressive enforcement. Automated enforcement via camera and radar is very aggressive and could have a considerable effect on speeds.

Could have negative public opinion. Recommend public participation.

Potential to be abused (make all roads CSZ)

The Ontario Traffic Council will be having its annual conference on October 19th. Changes to the HTA and the implications of photo radar will be on the agenda. Staff will be attending and asks for a deferral on the matter while best practices will be discussed, and opinions are gathered from the many municipalities that will be in attendance.

Traffic Management Directive

Staff will bring forward a report for a Traffic Management Directive (TMD) which will include:

- All-way Stop Warrants tailored for CKL needs
- Speed Postings and Reduction Warrants
- Traffic Calming Warrant

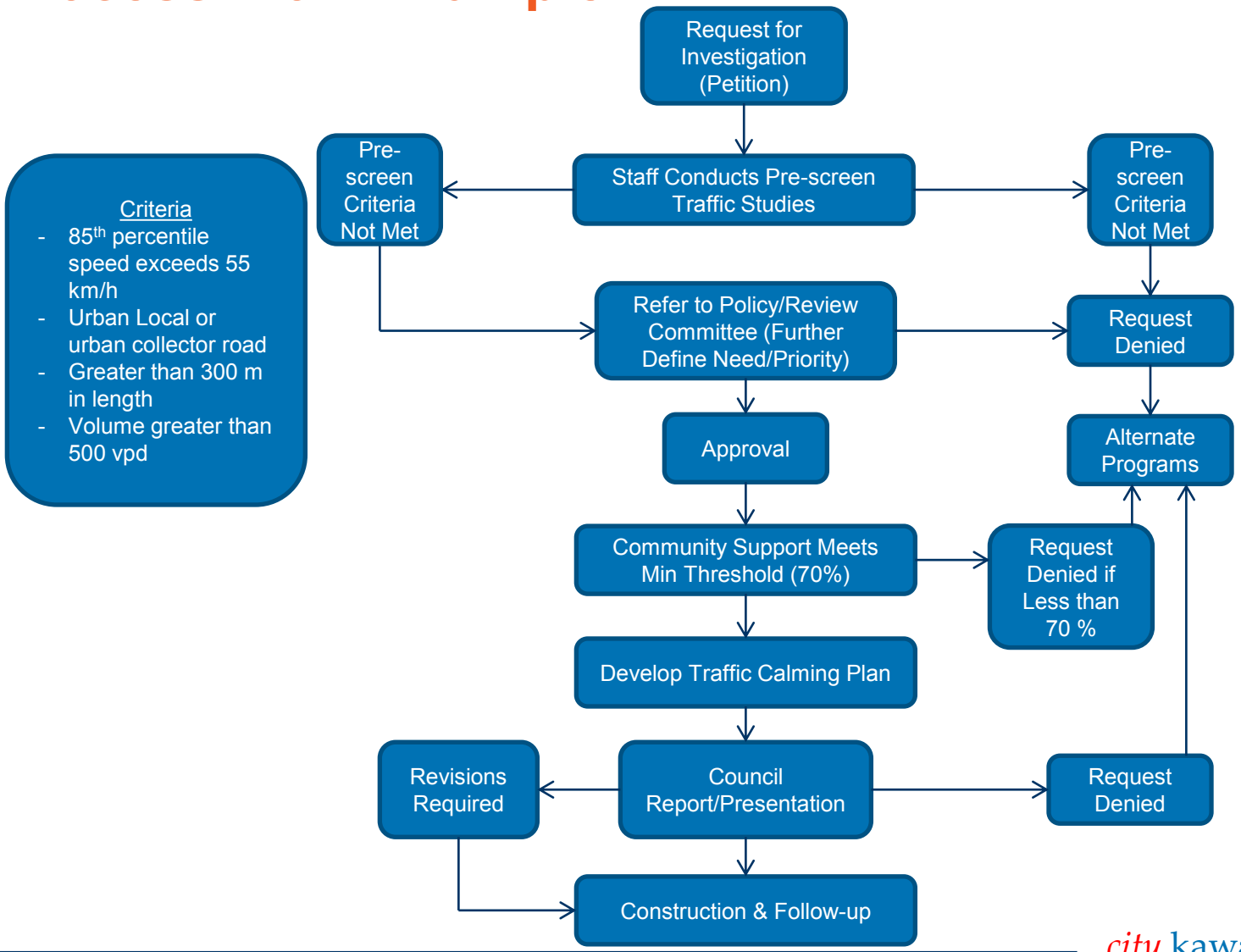
A management directive will allow the TMD to be a living document to make changes to suit our needs as they become apparent. Being able to use good engineering judgment and recognize unique situations due to peak summer traffic, rural areas, and ageing populations will be an important part of the TMD.

Traffic Management Directive

Implementation Process:

- Petition from residents
- If All-way stop request, perform OTM warrant to 80% volumes as per TMD
- If speed reduction or posting request perform TAC Guidelines as per TMD
- If traffic calming refer to implementation process flow chart as per TMD

Traffic Management Directive– Implementation Process Flow Example



Traffic Management Directive

Implementation Process - Prescreen:

Traffic Calming Review Pre-screening Checklist		
1. Is road a Local or Residential Collector	Pass	Fail
2. Is AADT>500	Pass	Fail
3. Does the 85th percentile speed exceed the speed limit by more than 5 km/h for a local road OR more than 7km/h for a collector road	Pass	Fail
4. Is the road primarily residential	Pass	Fail
5. Does the street provide an obvious by-pass to a major intersection	Pass	Fail
6. Is the road assumed	Pass	Fail
7. Is the section of road greater than 300m	Pass	Fail
8. Has previous measures failed to solve the problem	Pass	Fail
If the road fails any of the above pre-screening criteria it does not qualify for traffic calming		

Traffic Management Directive

Secondary Criteria scored for:

- **Discussion**
- **Reporting**
- **Prioritization**
- **Does not affect the warrant being satisfied**

Secondary Criteria				Points
Transit Route	Yes (0 Points)	No (1 Point)		
Emergency Route	Yes (0)	No (1)		
Collision Experience	Less than 3/year (0)	More than 3/year (1)		
Pedestrian Generators	Yes (5)	No (0)		
Residential Frontage	<60%(0)	>60%(1) + (1)/10%		
Service Function	Traffic (0)	Lane Use (1)	Combination (.5)	
Traffic Volumes	_____v/d	>Capacity (1)	< Capacity (0)	
Roadway Grade	<5% (1)	<10% (.5)	>10% (0)	
			Total Points	_____
Low Priority 0-5	Medium Priority 6-10		High Priority 11+	

Traffic Management Directive

Failed Prescreening?

- **Alternate programs will be considered**
- **Speed board**
- **Education (Warning Signs)**
- **Pavement markings**
- **Spot enforcement**
- **Ect.**

Passed Prescreening?

- **Prioritized based on secondary criteria**
- **Engineering or Committee further define need and choose calming method based off options in TAC Guidelines and the TMD. See options in Appendix A.**
- **Community notified and must meet 70% support threshold**
- **If met, Traffic Calming Plan developed based on design specifications in TAC Guidelines**
- **Council Approval then required**
- **Construction and follow-up**

Appendix A – Original Presentation

Traffic Calming Options and Methodology

Engineering

Technical Services

March 15, 2016

KAWARTHA LAKES

Traffic Calming

On January 12, 2016 Council passed the following resolution:

REPORT ENG2016-003

Moved by Councillor Dunn, seconded by Councillor Breadner,

RESOLVED THAT Report ENG2016-003, Request for Traffic Calming on Mary Street West, Lindsay, be received; and THAT staff prepare a list of traffic calming options to be retuned to Council by the end of Q2 2016.

CARRIED CR2016-023

This presentation addresses that direction.

Speeding Problem or Frustrated Caller?

- Frustrated residents call about speeding problems which could be isolated or systemic
- Reacting to them without all the data may not bring us to the appropriate solution
- Objectivity is required to determine if the problem actually exists as the caller suggests
- Costly engineering solutions are overkill for enforcement or educational problems

Traffic Calming in CKL

In 2015, Council passed a pilot project to install temporary speed cushions on William St. N., Victoria Ave N. in Lindsay and Clifton St. in Fenelon Falls. Data collected from project will be used to support development of traffic calming policy. Data collection will be complete in the fall of 2016.

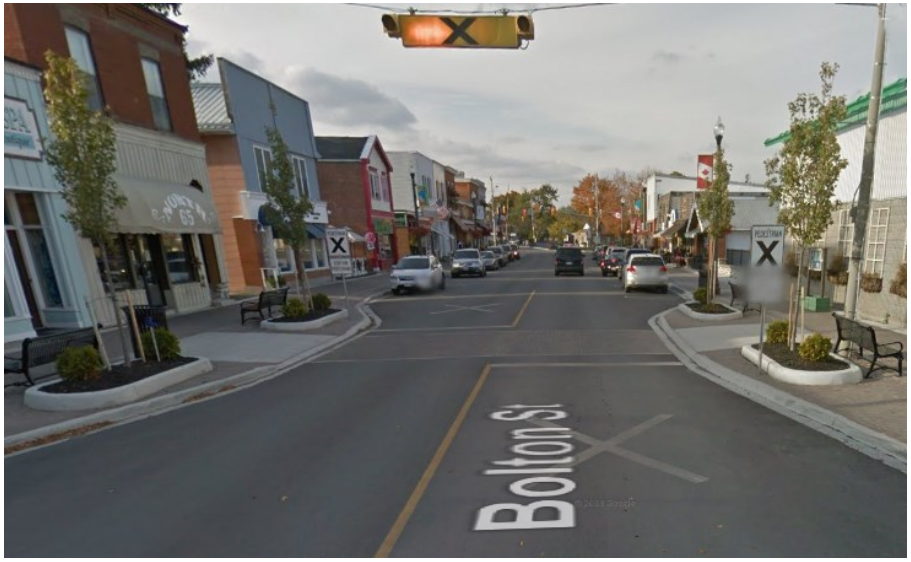
Preliminary findings

- Speeds reduced at site
- Speeds not effected upstream of cushions (more data is needed to see if speeds have increased)
- A series of speed cushions would be more effective
- Complaints have been received

Example

Traffic Calming in CKL

Bolton St. in Bobcaygeon and CKL Rd. 121 in Kinmount were redesigned and reconstructed to feature curb extensions (also know as “bump-outs”). This pinches traffic, slowing it down, and shortens the distance a pedestrian has to walk. It can also serve to beautify the neighbourhood.



With curb radius reduction on one side

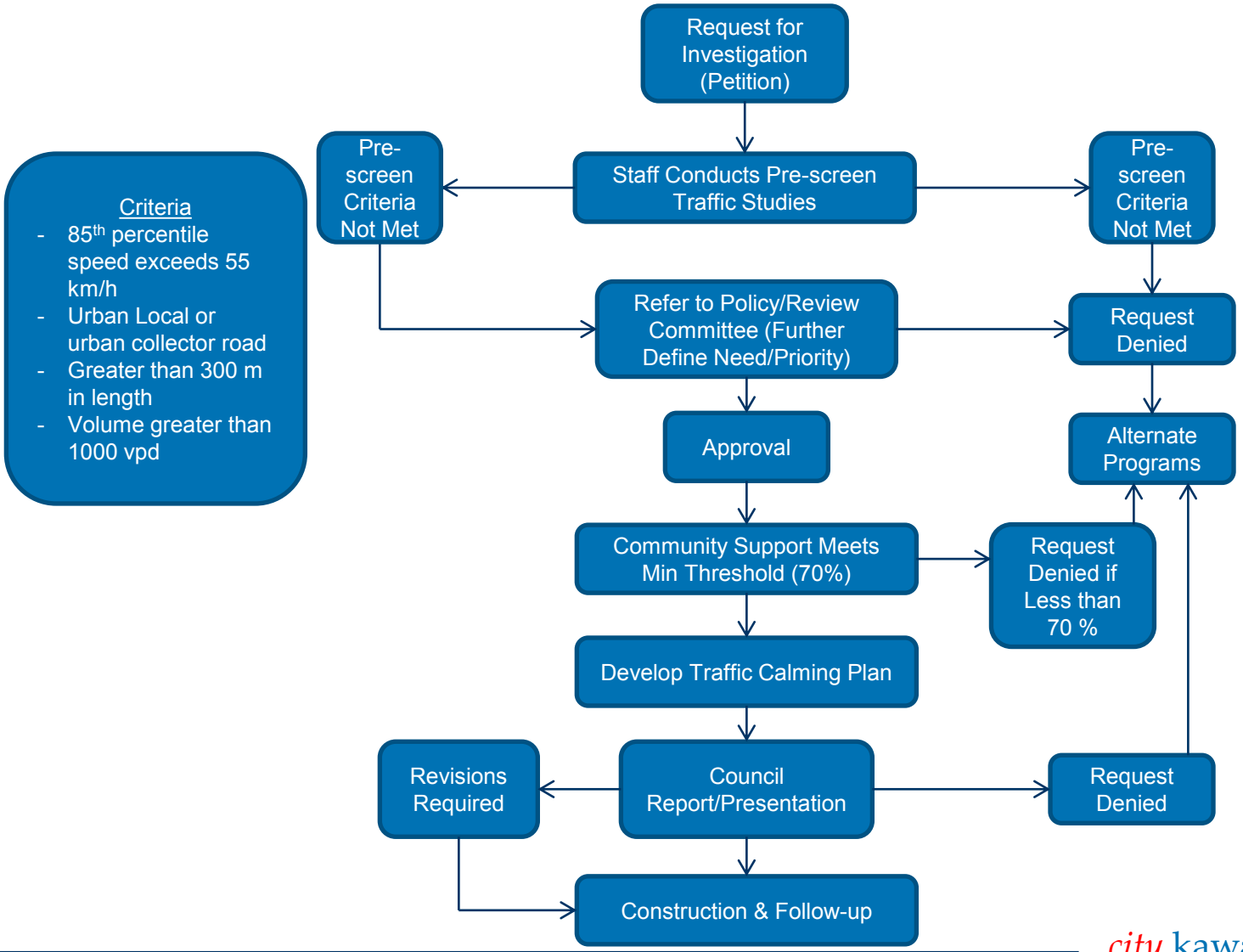
Traffic Calming in CKL

The intersection at Veterans Way and North St. in Fenelon Falls was redesigned and reconstructed to feature a traffic circle. This measure calms traffic that would have normally been a through on a T- intersection. Alternatively, it improves flow and reduces non-compliance should this intersection have been an all-way stop.

Traffic Calming Policy

- Allows for objective, repeatable, and defendable results
- Provides a system that screens, compares, ranks, and prioritizes streets for potential traffic calming measures
- Provides a means to manage budget constraints and resident expectations
- Enhances safety and convenience for all users
- Minimizes conflicts between users (motorists, cyclists, and pedestrians)
- Reduces the number and severity of collisions
- Reduces vehicular speed
- Discourages through traffic

Traffic Calming Policy – Investigation Flow Example



Traffic Calming Policy for CKL

Upon completion of data collection and analysis we expect to bring a comprehensive Traffic Calming Policy to Council in mid-2017.

Community Safety Zones and Reduced Speed Limits

The City of Kingston studied Community Safety Zones (CSZ) and found that without constant and aggressive enforcement by police, CSZ have not been effective at reducing vehicle speeds. They no longer support the installation of CSZ.

CKL uses a road risk method to determine appropriate speed limits as recommended by the Transportation Association of Canada's (TAC) "Guidelines for Establishing Speed Limits". A speed limit lower than that recommended using this method, without obvious justification, will be ignored by motorists.

Community Safety Zones and unwarranted reduced speed zones are not generally considered as traffic calming measures due to their ineffectiveness.

All-Way Stop Control

CKL uses the Ontario Traffic Manual (OTM) requirements for all-way stop warrants. The OTM, TAC, and CKL legal Council recommends against using unwarranted all-way stop control as a traffic calming measure.

The TAC Canadian Guide to Neighbourhood Traffic Calming States the following:

> "Stop signs used as a traffic calming measure may not be effective and may create compliance problems."
>
> "Unwarranted installations require regular police enforcement"
>
> "When stop signs are overused and/or unwarranted, compliance may decrease"
>
> "When stop signs are unwarranted, vehicle speeds at mid-block locations may increase"

Traffic Calming Options

Vertical Deflection: Traffic calming measure which cause a vertical deflection of the vehicle. This would be unpleasant to traverse at regular speeds. Reducing speed could also have the secondary effects of reducing traffic volumes and reducing conflicts.

However, the traffic may end up somewhere less desirable, or may speed up after the calming measures to make up for lost time.

Vertical Deflections

Raised Crosswalk: a marked pedestrian crosswalk at an intersection or mid-block location constructed at a higher elevation than the adjacent roadway.

+ Reduces vehicles speeds
+ Improves pedestrian visibility
+ Reduces pedestrian-vehicle conflict
- $3000-$14000 (Depending on drainage requirements)

168 Street, Surrey, BC

Vertical Deflections

Raised Intersection: an intersection, including crosswalks, constructed at a higher elevation than the adjacent roadways.

+ Reduces vehicles speeds
+ Better define crosswalk areas
+ Reduces pedestrian-vehicle conflict
- $27000 to $100 000

Franklin St & Ott St, Harrisonburg, VA

Ashbury Blvd and Audley Rd S, Ajax, ON

Vertical Deflections

Rumble Strip: Raised buttons, bars or grooves closely spaced at regular intervals on the roadway that create both noise and vibration in a moving vehicle.

+ Alert motorists to unusual conditions ahead
• Slight to no reduction in speed
- Noisy
- Snow removal may be affected
- Requires regular maintenance
• $300 to $1400 plus $700 per year in maintenance costs

Vertical Deflections

Sidewalk Extension: A Sidewalk is continued across a local street intersection. Can be raised or unraised.

- Slight to no reduction in speed unless raised or combined with other measures
+ Improves visual identification of the crosswalk area
+ Reinforces pedestrian priority
+ Reduces pedestrian-vehicle conflict
- $7000 to $15000

With curb radius reduction

Vertical Deflections

Speed Hump: A Raised area of a roadway, which deflects both the wheels and frame of a traversing vehicle.

+ Reduces vehicle speeds
+ Reduces volumes
- Some traffic may be diverted to parallel streets that do not have traffic calming measures
- Delayed emergency response (Scarborough Fire Dept. reported a delay of 8 to 10 seconds per speed hump)
- Increased noise
- $1300 to $5000 per hump depending on length of road

Speed Cushion

Vertical Deflections

Textured Crosswalk: A crosswalk incorporating a textured and/or patterned surface which contrast with the adjacent roadway.

- Slight to no reduction in speed unless combined with other measures
+ Improves visual and tactile identification of the crosswalk area
+ Reinforces pedestrian priority
+ Reduces pedestrian-vehicle conflict
- Requires maintenance
- Texturing may create traction and/or stability problems for seniors, the disabled, wheelchairs and bicycles if in state of disrepair.
- $70/sq. m. to $200 sq. m. depending on width and material

With raised median island
10 Concession St W
Bowmanville, ON

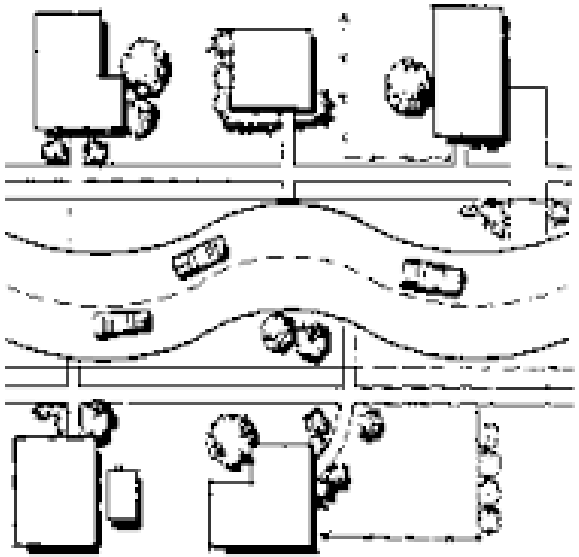
Traffic Calming Options

Horizontal Deflection: Traffic calming measure which cause a horizontal deflection of the vehicle. These discourage short-cutting or through traffic to a varying extent; measures which obstruct access achieve greater reductions in traffic volumes. Some measures may also reduce vehicle speeds, reduce conflicts or enhance the neighbourhood environment.

Horizontal Deflections

Chicane: A series of curb extensions on alternating sides of a roadway, which narrow the roadway requiring the driver to steer from one side to the other. One or two lane.

+ Reduces vehicle speeds
+ Reduces volumes
+ One lane chicane reduces conflicts
- Two lane chicane may increase conflicts
- Significant traffic diverted to streets without calming measures
- Relies on driver courtesy to remain one way or to not cross the centre line on two lane configurations.
• $15000 to $150 000 depending on width, extent of landscaping and material.



Horizontal Deflections

Curb Extension: A horizontal intrusion of the curb into the roadway resulting in a narrower section of roadway. On one or both sides of the roadway.

+ Reduces vehicle speeds
+ Reduces crossing distance for pedestrians
+ Increase pedestrian visibility
- Cyclists may feel forced into traffic
- Increased snow removal costs
- Parking reduction
- $4000 to $14000 per side depending on length, width and drainage

Horizontal Deflections

Curb Radius Reduction: The reconstruction of an intersection corner with a smaller radius.

+ Slows right turning traffic
+ Reduces crossing distance for pedestrians
+ Improves pedestrian visibility
- Effectiveness increased when used in combination with sidewalk extensions or textured crosswalks
- Large trucks may cross lanes or mount curb when turning
- $4000 per curb depending on radius, drainage and materials

With sidewalk extension

Horizontal Deflections

Raised Median Island: An elevated median constructed on the centreline of a two-way roadway to reduce the overall width of the adjacent ravel lanes.

+ Reduce vehicle speeds
+ Reduces pedestrian-vehicle conflicts
- Parking reduction
- Increased snow removal costs
• $7000 to $14000 per island depending on island width/location of utilities

With textured crosswalk

Horizontal Deflections

Traffic Circle: A raised island located in the centre of an intersection, which requires vehicles to travel through the intersection in a counter-clockwise direction around the island.

+ Reduce vehicle speeds
+ Reduces volumes
+ Reduces frequency and severity of collisions
- Pedestrian crossing conflict potential
- May divert significant volumes to parallel streets without calming measures
- Large trucks, busses, emergency vehicles would require larger radius than intersection allows. They would make illegal left turn, or find alternate route.
- $7000 to $14000 per traffic circle, as much as $40000 depending on diameter of circle, location of utilities, extent of landscaping

Horizontal Deflections

Modern Roundabout: Like traffic circles but larger and typically require additional right-of-way. Central island diameter is much larger and roundabouts require raised splitter islands to channel approaching traffic to the right. Primarily used on arterial and collector roads, substituting for traffic signals or all-way stop signs.

+ Reduce vehicle speeds
+ Reduces severity of collisions
- Pedestrian crossing conflict potential
- May require major reconstruction of intersection
- Similar to the cost of installing a traffic signal not including land requirements. Could be drastically more depending on land requirements, however traffic signals require ongoing maintenance and energy costs that roundabouts do not

Alexander's Crossing
Ajax, ON

Pickering Beach Rd
Ajax, ON

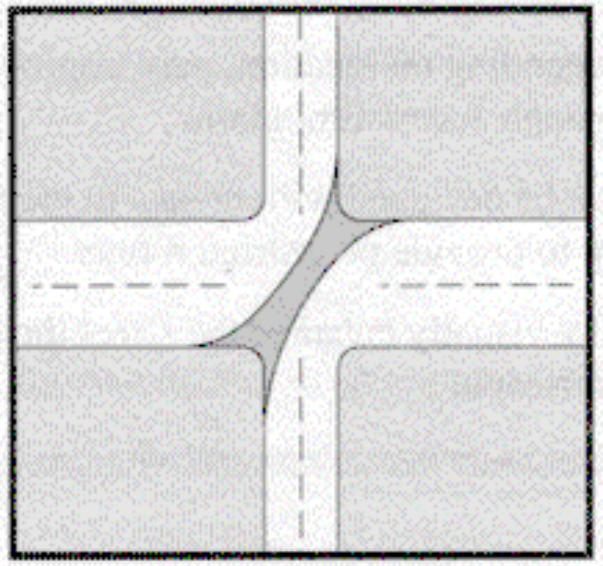
Traffic Calming Options

Obstruction: Traffic calming measure which obstruct specific vehicle movements, typically used at intersections. They discourage short-cutting or through traffic, and may also reduce conflicts.

Obstructions

Diverter: A raised barrier placed diagonally across an intersection that forces traffic to turn and prevents traffic from proceeding straight through the intersection. Can have gaps for pedestrians and be mountable by emergency vehicles.

+ Reduces volumes
- Restricts residential access
- May divert significant volumes to parallel streets without calming measures
- Emergency vehicles may be delayed
- $14000 to $30000, as much as $55000 depending on width of intersection and drainage requirements



Obstructions

Full Closure: A barrier extending the entire width of a roadway, which obstructs all motor vehicle movements. Changes a four-way intersection to a three-way intersection, or a three-way intersection to a non-intersection.

+ Eliminates all through traffic
- Restricts residential access
- May divert significant volumes to parallel streets without calming measures
- May prevent emergency access, unless closure is designed to be passable.
• $14000 to $40000 excluding possible property requirements

Obstructions

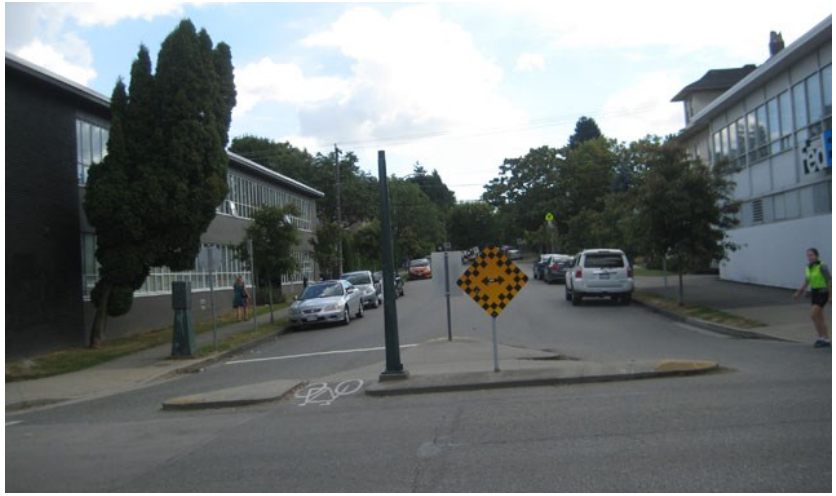
Raised Median Through Intersection: An elevated median located on the centreline of a two-way roadway through an intersection, which prevents left turns and through movements to and from the intersecting roadways.

+ Reduces volume and through traffic
+ Provides refuge for pedestrians
- Restricts residential access
- May divert significant volumes to parallel streets without calming measures
- May prevent emergency access, unless closure is designed to be passable.
- $14000 to $40000

Obstructions

Right-In/Right-Out Island: A raised triangular island at an intersection approach which obstructs left turns and through movements to and from the intersecting street or driveway..

+ Reduces volume and through traffic
+ Provides refuge for pedestrians
- Restricts residential access
- May divert significant volumes to parallel streets without calming measures
- $7000 to $40000



Traffic Calming Options

Summary

Benefits*

CANADIAN GUIDE TO NEIGHBOURHOOD TRAFFIC CALMING

TABLE 3.2: APPLICABILITY OF TRAFFIC CALMING MEASURES

	Measure	POTENTIAL BENEFITS: Speed Reduction	Volume Reduction	Conflict Reduction	Environment	Page
Vertical Deflection	Raised crosswalk	●	○	◐	◐	3-5
	Raised intersection	◐	○	◐	◐	3-8
	Rumble strip	○	○	○	○	3-9
	Sidewalk extension	◐	○	◐	○	3-10
	Speed hump	●	◐	●	◐	3-12
	Textured crosswalk	○	○	◐	◐	3-15
Horizontal Deflection	Chicane — one-lane	●	●	●	◐	3-17
	Chicane — two-lane	◐	○	◐	◐	3-17
	Curb extension	◐	○	○	●	3-19
	Curb radius reduction	◐	○	○	◐	3-21
	On-street parking	◐	○	○	◐	3-22
	Raised median island	◐	○	◐	○	3-24
	Traffic circle	●	◐	●	●	3-25
Obstruction	Directional closure	○	●	◐	◐	3-29
	Diverter	○	●	◐	◐	3-30
	Full closure	○	●	●	◐	3-32
	Intersection channelization	○	◐	◐	◐	3-33
	Raised median through intersection	○	●	◐	◐	3-35
	Right-in/right-out island	○	●	◐	◐	3-36
Signing*	Maximum Speed	◐	○	○	○	3-39
	Right (Left) Turn Prohibited	○	◐	◐	◐	3-40
	One-Way	○	●	◐	◐	3-40
	Stop	○	◐	◐	○	3-41
	Through Traffic Prohibited	○	◐	◐	◐	3-43
	Traffic-Calmed Neighbourhood	○	○	○	◐	3-44
	Yield	○	○	◐	○	3-44

● = Substantial benefits ◐ = Minor benefits ○ = No benefit

* The primary purpose of signing is to regulate traffic movements, not to calm traffic.

Disbenefits*

CANADIAN GUIDE TO NEIGHBOURHOOD TRAFFIC CALMING

TABLE 3.3: IMPLICATIONS OF TRAFFIC CALMING MEASURES

	MEASURE	POTENTIAL DISBENEFITS: Local Access	Emergency Response	Other Travel Modes	Enforcement	Maintenance	Emplacement Cost
Vertical Deflection	Raised crosswalk	○	◐	◐	○	◐	$ to $$
	Raised intersection	○	◐	◐	○	◐	$$$
	Rumble strip	○	○	◐	○	●	$ to $$
	Sidewalk extension	○	○	○	○	◐	$$
	Speed hump	○	◐	◐	○	◐	$ to $$
	Textured crosswalk	○	○	◐	○	◐	$ to $$
Horizontal Deflection	Chicane — one-lane	○	◐	◐	○	◐	$$ to $$$
	Chicane — two-lane	○	○	○	○	◐	$$
	Curb extension	○	○	◐	○	◐	$ to $$
	Curb radius reduction	○	○	○	○	◐	$ to $$
	On-street parking	○	◐	◐	○	◐	$ to $$
	Raised median island	◐	○	○	○	◐	$ to $$
	Traffic circle	○	◐	◐	○	◐	$$ to $$$
Obstruction	Directional closure	◐	○	◐	◐	◐	$$
	Diverter	◐	◐	◐	○	◐	$$ to $$$
	Full closure	●	●	◐	○	◐	$$ to $$$
	Intersection channelization	◐	◐	○	○	◐	$$ to $$$
	Raised median through intersection	◐	◐	◐	○	◐	$ to $$
	Right-in/Right-out island	◐	◐	◐	◐	◐	$$
Signing	Maximum Speed	○	○	○	●	○	$
	Right (Left) Turn Prohibited	◐	○	○	●	○	$
	One-Way	◐	◐	◐	○	○	$
	Stop	○	◐	○	●	○	$
	Through Traffic Prohibited	◐	○	○	●	○	$
	Traffic-Calmed Neighbourhood	○	○	○	○	○	$
	Yield	○	○	○	○	○	$

● = Substantial disbenefits ◐ = Moderate disbenefits ○ = No disbenefits
$ = Low cost $$ = Moderate cost $$$ = High cost

*TAC Canadian Guide to Neighbourhood Traffic Calming

Thank You

In traffic engineering we must consider the safety of all users, the movement of traffic, the burden and cost of enforcement, and the cost/impact of potential solutions.

When all things can be considered against each other, and data can show action is warranted, we can truly meet our vision for a community pursuing quality of life, while providing safety and protection.

Sources

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