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Memorandum

To/Attention Municipality of Meaford **Date** 2021-05-18
From IBI Group **Project No** 124140
cc
Subject **Meaford Transportation Master Plan
Traffic Calming**

1 Introduction

Traffic calming is a topic of growing public interest in Meaford. Municipality staff often receive complaints relating to speeding or cut-through traffic and other requests for traffic calming. However, Meaford does not have a traffic calming policy or process to respond to these requests in a systematic, transparent and data-driven manner. As such, traffic calming often becomes politically-driven, rather than assessed on its safety merits and network-wide impacts. A standardized approach is needed.

The memo provides Meaford with the following:

- Background information regarding traffic calming;
- A primer on common traffic calming elements and their pros and cons;
- A review of peer communities' approaches to traffic calming; and
- The recommended traffic calming policy, process and other considerations.

2 Background

Traffic calming is a means of reducing traffic speeds, through volumes and collisions in residential neighbourhoods. Traffic calming can be applied to local streets and collector roads but is typically not recommended for arterial roads. These considerations are integrated into Meaford's road classification system, also developed as part of this TMP. It can be applied in both rural and urban scenarios, but differing approaches are often needed.

Traffic calming treatments can be separated into two categories: soft calming (passive) and physical intervention.

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Soft calming measures look to improve driver awareness or reduce speeding through visual cues. Examples include enhanced signage, pavement markings and reduced lane widths.

Physical treatments alter the roadway to create deflections or obstacles to prevent vehicles from traveling in a straight line at excessive speeds. Examples include speed humps, median islands and roundabouts.

It is important to avoid improper application of other traffic control measures not considered true traffic calming treatments, such as installing stop signs for the sole purpose of slowing down drivers when not otherwise justified. This type of application can lead to driver non-compliance and present safety concerns.

There is a direct trade-off between traffic calming and traffic flow, as effective traffic calming measures will typically reduce traffic flow. For local streets this may not be an issue and is often a desirable outcome. However, for arterial roads and collector roads this can increase congestion and cause driver frustration, possibly leading to low compliance and decrease in safety. Therefore, it is important to select suitable traffic calming treatments based on the road type and characteristics.

Sections 3 and 4 highlight different approaches that may be applied to calm traffic. Each of these apply to different contexts and it is important to apply the most appropriate measure responding to the unique circumstances of a specified location. Further detail on these approaches, as well as other speed reduction mechanisms, can be found in various design guidelines documents, including:

- National (U.S.) Association of City Transportation Officials (NACTO) Urban Street Design Guide – Speed Reduction Mechanisms: (<https://nacto.org/publication/urban-street-design-guide/design-controls/design-speed/speed-reduction-mechanisms/>)
- Transportation Association of Canada (TAC) Canadian Guide to Traffic Calming (<https://www.tac-atc.ca/en/publications/ptm-trafcalm18-e>)

3 Soft Calming Measures

Soft or passive traffic calming measures are applied without physical construction or re-construction of the roadway. They can consist of signage, enforcement and other low-cost interventions. Soft measures may be applied as a first attempt to introduce traffic calming measures, followed by a period of monitoring to determine if further measures are needed.

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Enhanced Warning Signage

Enhanced warning signs serve to warn drivers of conditions ahead that require increased attention. Additional speed limit signage can also serve as a method of enhanced warning, reconfirming the speed limit to drivers. Enhanced warning signage can be applied in both rural and urban settings and is detailed in the Ontario Traffic Manual (OTM) Book 6. The addition of flashing beacons could be considered if signage alone has proven ineffective. Further guidance on flashing beacons is provided in OTM Book 5 and OTM Book 6.

Advantages include: Rapid implementation, low cost.

Disadvantages include: Requires police presence to be enforced, requires compliance to be effective.

Narrow Lane Widths

Narrowing lane widths by painting lines closer together is a form of road diet that can influence driver perception and result in lower speeds. Narrow lanes require more accurate steering and greater concentration, decreasing the perception of safety, which drivers respond to by lowering operating speeds. This treatment can be applied in both rural and urban settings.

Advantages include: Can be effective in decreasing speed, low cost to implement, can rapidly be implemented, does not impact large vehicles or road maintenance.

Disadvantages include: Reduced separation between oncoming vehicles, may be less effective than physically narrowing lane widths, less effective in the winter when lines are not visible.

Radar Message Board

A radar message board shows drivers their current speed in comparison to the posted speed limit. Radar message boards can be set up as permanent installations or can be temporary installations that rotate to various locations throughout the Municipality as needed. This treatment works well on low-volume roads and can be applied in both rural and urban settings.

Advantages include: Alerts drivers to speeding conditions, generally solar-powered, portable mounting can be immediately applied in numerous locations, less costly, can work in conjunction with other programs. Temporary installation at key areas and times (i.e. return to school, start of summer tourism season, etc.) can help to remind drivers of need for slower speeds.

Disadvantages include: Limited long-term effectiveness as drivers become immune, is only effective for one direction of travel. If temporary, there may be no longer-term impact to driver behaviour.

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Speed Limit Bollard

A speed limit bollard (see right) is a type of collapsible plastic bollard that is typically placed on the centre line and incorporates a speed limit sign. They serve to remind drivers of the posted speed limit and act as a pinch point requiring additional driver attention.

Advantages include: Can be installed at low cost, improve driver compliance with posted speed limit.

Disadvantages include: Has to be removed in the winter to allow for typical operating and maintenance activities and may not have the same impact as other physical (permanent) interventions due to the collapsible nature of the bollards (i.e. drivers can hit them with only a minimal risk of damage to their vehicle).

Exhibit 3.1: Example of Speed Limit Bollard



Targeted Enforcement Program

Police presence is used to monitor problematic roadways and issue tickets for violations. This acts as a visible deterrent and may elicit driver compliance both with other treatments or on its own. This treatment can be applied in both rural and urban settings.

Advantages include: Can temporarily reduce speeds, can be used to target different locations, increases speed compliance.

Disadvantages include: Studies show benefits are temporary especially without additional treatment, may only represent a fraction of the time when speeding occurs, there is a limit to the amount of enforcement that can occur.

Traffic/Truck Diversion

Diverting traffic onto alternate routes can decrease through traffic volumes. This can be used as a traffic calming strategy as it diverts noise, heavy vehicles and danger caused by inappropriate driving behaviour to alternate routes that are better suited to that type of traffic. This can be accomplished using signage or introducing a truck route by-law to alternate roads. This treatment works well in urban areas with available alternate routes. It may also work in rural areas, but extended detours may result in non-compliance.

Advantages include: Can be cost effective as only signage and driver education are required, can effectively address issues by removing traffic from the problematic area.

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Disadvantages include: Requires driver compliance to be effective, suitable diversion routes are not always available or possible, does not address inappropriate driving behaviour.

4 Physical Measures

Physical treatments look to reduce speed by introducing physical obstacles that divert traffic horizontally or vertically, requiring slower speeds and increased concentration from drivers to navigate. Unlike passive treatments, however, construction and maintenance costs as well as secondary impacts may be a concern.

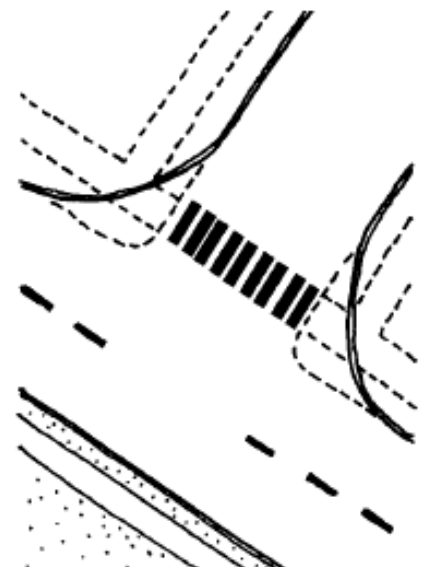
Reduced Curb Radii

The curb radius at an intersection impacts how fast turns can be made by right-turning traffic. Large curb radii pose a risk to pedestrians crossing and can increase crossing distances within the crosswalk. Reducing curb radii at intersection can force drivers to make turns at slower speeds. This is effective at skewed intersections where turning radii can be very large, resulting in higher turning speeds. Redesigning intersections to have angles of 90 degrees can also solve this problem.

Advantages include: Reduced turning speeds, improved pedestrian safety, shorter pedestrian crossing distance, reduced likelihood of high-speed collisions, can be implemented at a low cost with interim measures (e.g. bollards, paint).

Disadvantages include: Can be costly to implement if rebuilding curbs or redesigning intersections entirely, may impede large vehicle movements, does not impact speeds between intersections.

Exhibit 4.1: Impacts of Reduced Curb Radii



Source: US Department of Transportation Federal Highway Administration

Horizontal Deflection

Measures that require drivers to alter their path and slow down are referred to as horizontal deflection measures. Examples include pinch points, neckdowns, chicanes and neighbourhood traffic circles. Introducing obstacles that require additional attention from drivers typically result in drivers reducing their speeds. Curb extensions (or bump outs) are a type of pinch point that serves to narrow the roadway and decrease pedestrian crossing distances. Mid-block pedestrian

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refuges can also act as horizontal deflection measures by narrowing the travel lanes at the point of the mid-block crossing. This measure tends to work best in urban settings. It does not typically apply in rural settings.

Advantages include: Reduced speeds, improved safety for pedestrians and other vulnerable road users, may be implemented at low cost with interim materials (e.g. bollards).

Disadvantages include: Possible loss of on street parking, may be costly to implement, may impact winter maintenance and may interrupt drainage.

Roundabout

Roundabouts are circular intersections designed to allow for continuous circular traffic flow. They are designed to reduce collision severity by removing potential conflicts between left-turning vehicles and removing the potential of head-on collisions. Roundabouts force drivers to reduce speeds as they enter the circulatory roadway. Roundabouts can be applied in both rural and urban settings.

Advantages include: Can moderate traffic speeds, safer than traditional traffic signals.

Disadvantages include: Can be costly to construct, may be difficult for larger vehicles to navigate, can be difficult for pedestrians to navigate, especially the visually impaired.

Raised Median Island

Elevated road medians located at the centerline of a roadway act to reduce the lane width, making drivers feel constrained results in drivers reducing operating speeds. The islands also provide a refuge area for pedestrians, reducing conflicts with vehicles. Median islands can be used in both rural and urban settings.

Advantages: Slows down traffic and provides a physical separation between lanes, creates a refuge area for pedestrians, reduces head on collisions.

Disadvantages include: Road must be wide enough to accommodate the median, may impact drainage, restricts driveway access along a continuous stretch.

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Vertical Deflection

Vertical deflection measures include speed humps, speed tables, raised crosswalks and raised intersections that are intended to slow drivers down or risk an uncomfortable traversal. These measures can be used in both rural and urban settings.

Advantages include: Effective self-enforcing speed reduction.

Disadvantages include: Increase noise from additional acceleration, increase in maintenance costs, potential impacts to emergency vehicles, transit vehicles and cyclists.

Exhibit 4.2: Raised Pedestrian Crossing



5 Peer Review

The following section provides a high-level review of traffic calming policies and procedures in peer communities, including rural contexts. The intention is to provide a foundation from which Meaford's policy and procedure can be structured and adapted. Different communities undertake different approaches and have differing triggers and warrants. Key takeaways from each of the peer community processes and policies are discussed below.

Durham Region Traffic Management Guideline for Hamlets

While urban traffic calming is a well-developed practice area, rural areas and hamlets have more limited resources. Meaford has several settlement areas within its rural land where traffic calming may be desirable. As such, it is an important consideration in Meaford's traffic calming policy and procedure. Durham Region's Traffic Management Guideline for Hamlets provides a strong basis for considering rural traffic calming and potential approaches.

The report provides a process to responding to traffic concerns within hamlets located throughout the Region. Their process outlines a three-stage approach starting with assessment, plan development and implementation.

The first step of the assessment phase is an internal review to determine whether soft traffic calming such as education and enforcement are enough to address the concern. If not, the candidate location proceeds to two screening tests used to assess merit for engineering intervention. These tests are displayed in Exhibit 5.1. The assessment phase requires that both tests be met to move forward to the next stage (plan development).

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Exhibit 5.1: Screening Tests Undertake as Part of Durham Region's Three-Stage Traffic Calming Process

TEST 1 - Has one serious collision (personal injury or fatality) involving a vulnerable street user (pedestrian or cyclist) occurred within the past three years?

TEST 2 - Are at least two of the following criteria met?

- a) **Inappropriate Driver Behaviour** - At least 5 recorded complaints verified through enforcement efforts (example Road Watch entries and police follow-up).
- b) **Excessive Speed** - Either:
 - 15% of vehicles traveling at or above the posted speed limit **OR**
 - 5% of vehicles traveling 10 km/h or more above the posted speed limit.
- c) **Collision History** - Frequency of collisions involving motorized vehicles, pedestrians and/or cyclists is above the Potential for Safety Improvement (PSI) value for similar locations.
- d) **Excessive Heavy Vehicle Traffic** - Volume of heavy vehicles exceeds 10% of the total traffic volume.

Source: Traffic Management Guideline for Hamlets, Durham Region, Hatch Mott MacDonald (2014)

City of Cambridge

The City of Cambridge has endorsed¹ traffic calming as a way of reducing speeding and collisions in residential neighbourhoods as part of their Traffic Management Plan. They take a simplified approach which considers two levels of traffic calming treatments: Level 1 Soft Calming and Level 2 Physical Intervention.

Treatment determination is dependant on traffic volume, average traffic speed and neighbourhood commitment. To qualify for Level 1 traffic calming, the corridor must meet the all the following warrants: 800 vehicles per day or more, 85th percentile speed 10 km/h or more above the posted speed limit and 85th percentile speed at least 55 km/h. For Level 2 physical treatments, traffic volume warrants are increased to 1,000 vehicles per day or more on a local road or 2,500 vehicles per day or more on a collector road. Traffic speed warrants remain the same. A third condition must be met, called neighbourhood commitment. To meet this warrant, Level 1 treatments must have been in place

¹ https://www.cambridge.ca/en/learn-about/resources/Transportation/TTR_CambridgeTMP_Appendix-I_Phase3_TrafficCalmingPolicy_Final_2020-03-19.pdf

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for more than one year and a neighbourhood petition must be completed. The petition requires support from 51% of properties within the application zone. For all criteria, there are exceptions made for designated school and park zones.

The City consults with emergency services when considering Level 2 treatments to ensure emergency vehicles are considered in the design along emergency priority routes. The City also requires developers to design streets to limit the potential for excessive speeding and volume so that traffic calming will not be required as a retrofit application.

Town of Lakeshore

The Town of Lakeshore has conducted a traffic calming study on Caille Avenue, a lakefront, urban residential street with similarities to those found in Meaford (e.g. Grandview Dr, Lakeshore Rd and Bayshore Rd). Residents were concerned over high traffic speeds and lack of suitable infrastructure for pedestrians and cyclists. Building on the traffic calming strategy outlined in the Town's 2008 Transportation Master Plan², the study recommended a two-stage approach, beginning with soft traffic calming measures, evaluating and assessing its impact, and moving on to hard measures should the soft measures prove unsuccessful. For Caille Ave, the study concluded that operating speeds were slightly above posted speed limits and recommended that a speed display device in conjunction with police enforcement was an appropriate treatment. Additionally, due to the absence of pedestrian and cyclist facilities, the study recommended that the Town consider reconstructing the road in the long term to add active transportation facilities. No specific warrants were discussed within the Caille Ave study or the TMP's traffic calming strategy.

Township of Essa

The Township of Essa traffic calming plan³ outlines a weighed point system to screen traffic calming requests. Requests are assessed through a points-based system that considers speed, volume, cut-through traffic, collisions, provision of sidewalks, sightlines, road allowance limitations and pedestrian generators. The scoring system is outlined in Exhibit 5.2.

A minimum point threshold of 35 for a local road or 52 for a collector road must be met to proceed with the traffic calming request. If a request is deemed suitable a public open house will be conducted to inform and confirm the support of residents. The treatment measure is determined from a list outlined in the policy and the decision is based on the judgement of Township staff. Once the

² <https://www.lakeshore.ca/en/municipal-services/resources/Documents/TransportationMasterPlan.pdf>

³ <https://www.essatownship.on.ca/traffic-calming>

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design is finalized and implemented, staff will monitor to determine the effectiveness of the treatment.

Exhibit 5.2: Township of Essa Traffic Calming Scorecard

Road Section: _____		Prepared By: _____	
Road Class: _____		Prepared On: _____	
Traffic Data			
Feature	Range	Criteria	Score
1. Speed	0 to 35	5 points for every 2 km/h that the 85th percentile speed is greater than 10 km/h over the posted speed limit	
2. Volume	0 to 20	Local Roadways: 5 points per 500 ADT Collector Roads: 5 points per 1000 ADT	
3. Short-Cutting Traffic	0 to 15	5 points if there is a presence of 25% or more shortcutting traffic, additional 5 points for every 10% increment above 25%	
4. Collisions	0 to 10	1 point for every collision/year over a 3-year period	
Road Characteristics			
Feature	Range	Criteria	Score
1. Sidewalks	0 to 5	5 points for no sidewalks with evidence of pedestrian activity	
2. Pedestrian Generators	0 to 15	5 points for each nearby (must have direct connection to subject roadway) pedestrian generator such as school, playground, community centre, libraries, retail, etc.	
3. Sight Lines	0 to 10	0 points for excellent sight lines, 5 points impaired sight lines, 10 points for very poor sight lines	
4. Road Allowance Limitations Paved Width \leq 6m	0 to 5	5 points for limited paved surface and/or boulevard width	
Overall Assessment			
Does the location meet the minimum requirement:			Total Score:
35 Points			Local Road
52 points			Collector Road

Source: Township of Essa Traffic Calming Policy (2018)

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Town of Caledon

The Town of Caledon traffic calming strategy⁴ aims to reduce traffic speed, collision severity and frequency and enhance safety for pedestrian and cyclists in both urban and rural settings. The Town utilizes a standardized traffic calming warrant process which involves a petition from residents, screening the location for suitability, conducting a traffic operations review, identifying a suitable treatment based on a ranking process, implementing and evaluating the treatment.

To be eligible for traffic calming, the following warrants must be met: The grade must be less than 8%, block length must be greater than 110 metres and local roads must carry more than 750 vehicles per day while collector roads must carry more than 1,500 vehicles per day. A second step considers either total number of collisions in the previous three years (more than 6 for a local road, more than 11 for a collector road) or 85th percentile speed (15 km/h or more over the posted speed limit). If either of those two criteria are met, along with the traffic, grade and block length criteria, the segment qualifies for the next step in the process.

The next step prioritizes applications through a scoring system, with evaluation rubrics customized for urban and rural roads. Elements that are considered are traffic speeds, volumes, collision data, pedestrian facilities or generators, bicycle facilities or routes and adjacent land use (urban roads) or driveway density (rural roads).

⁴ <https://pub-caledon.escribemeetings.com/filestream.ashx?DocumentId=10418>

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6 Traffic Calming Policy and Process

Meaford's traffic calming policy and process is a response to speeding and cut-through traffic complaints and requests for traffic calming measures. To be effective, the traffic calming policy and process must consider to the following key local issues:

- It must provide a transparent, systematic and defensible process to determine eligibility for traffic calming interventions;
- It must provide an affordable approach that prioritizes the most severe cases; and
- It must consider both urban and rural cases.

The intention of the traffic calming policy is to improve the safety and livability of Meaford's streets in both urban and rural contexts for all road users, particularly vulnerable road users (e.g. pedestrians, cyclists, elderly residents, people with disabilities, etc.). The potential passive and physical measures discussed in this paper should all be considered and the best fit selected at the judgment of Municipality staff and/or outside consultants.

Recognizing that physical traffic calming measures can be costly, Meaford's traffic calming process is designed with lower cost (i.e. passive or soft) measures as the first stage. Only if these approaches are not found to be sufficient, should physical interventions be considered.

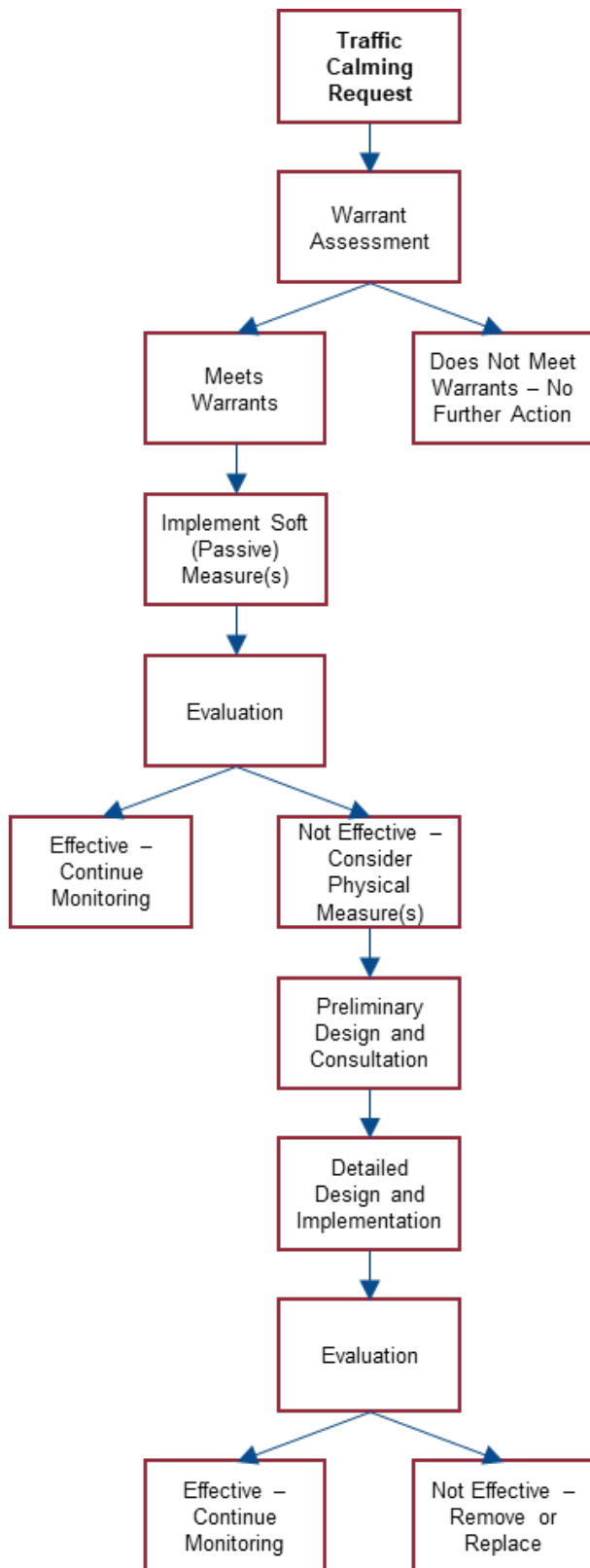
Guiding Principles

The following principles should be kept in mind when investigating, considering and implementing traffic calming measures.

- Public safety is the first and foremost consideration.
- Problems should be clearly identified, and data sufficient to quantify the issue.
- Physical treatments should only be considered after education, enforcement and traffic engineering have not sufficiently addressed the issue.
- Self enforcing treatments should be considered before treatment requiring police presence to enforce compliance.
- Treatments should not hinder cyclists, pedestrians, emergency vehicles or transit vehicles without alternate accommodations agreed upon during consultation.
- The public and stakeholders should be sufficiently consulted.
- Effectiveness shall be monitored after implementation and reported to stakeholders and ineffective treatments should be removed or replaced.

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Exhibit 6.1: Traffic Calming Process Flow Chart



Process

The traffic calming process is intended to provide a transparent, traceable and data-driven response to traffic calming requests. It is depicted in Exhibit 5.1. The first step is to assess the corridor against the warrant criteria (see below). If these warrants are met, soft (passive) measures should be implemented. Soft measures may include notice and advertisement (e.g. online, social media) to raise awareness.

When considering soft traffic calming, Municipality staff should review the corridor for factors that warrant warning signage (e.g. slow-moving vehicles, playgrounds, etc.) per OTM Book 6. This can be a starting point to help determine appropriate warning signage or if other traffic calming measures should be considered.

Following implementation, the corridor should be evaluated to determine the efficacy of the measures applied. If the measures have been effective in addressing the speeding and/or cut-through traffic issues, no further action needs to be taken (though periodic monitoring and evaluation should continue).

If the soft measures are not effective, physical measures should be considered. At this stage, an analysis should be undertaken to identify the preferred physical intervention and develop the preliminary design. Staff may consult with the public and stakeholders at this stage.

Following consultation, detailed design is completed, and the measures are implemented. Monitoring and evaluating the impacts of the intervention are critical. If the physical measures are deemed effective, the process stops. If they are not effective, the Municipality should consider removing the measures or replacing the measures with a new approach. Ongoing monitoring should continue in all cases.

The traffic calming process is not intended to restrict other interventions not covered in this document such as the temporary placement of

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portable message boards or other signage. The process is intended to provide data-driven justification for and guide the application of costlier soft and hard traffic calming measures.

If multiple requests are pending, particularly as it applies to hard or physical traffic calming implementations, the warrants below can serve to help prioritize the corridors where resources are limited. These locations should also be cross-checked with collision data being collected as part of Meaford’s road safety monitoring program.

Warrant Assessment

The warrants below were identified following the review of peer communities but adapted to local conditions and Meaford’s urban and rural contexts. The warrants consider only traffic volume and speeds within the urban area and only traffic speeds within the rural area. This focuses the traffic calming assessment on what can be considered the largest risk to other road users: excessive speeds. Other information, such as collision data or cut-through traffic observations can be used to augment the analysis or help prioritize otherwise similar corridors.

These warrants are the first decision point in the process to determine whether traffic calming may be an appropriate response to a specific request or safety concern. They are presented in Exhibit 5.2 and Exhibit 5.3.

Exhibit 6.2: Volume and Speed Warrants for Urban Traffic Calming Application

Traffic Volume	400+ vehicles per day on a local road OR 1000+ vehicles per day on a collector road
AND	
Traffic Speed	85th percentile speed is >10 km/h over the posted speed limit

Exhibit 6.3: Speed Warrants for Rural Traffic Calming Application

Traffic Speed	85th percentile speed is >10 km/h over the posted speed limit
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Corridors that do not meet the above thresholds may still be considered for traffic calming at the discretion of Municipality staff, provided there is other compelling evidence or mitigating factors.

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Public and Stakeholder Consultation

Consultation with public and stakeholders is typically undertaken if physical interventions are being considered. As with soft measures, implementation of physical measures would usually include notice and advertisement (e.g. online, social media) to raise awareness.

Emergency Services

Consultation with emergency service will occur when considering physical treatments. Fire and ambulance services may have concerns about increased response times if traffic calming measures are installed.

Preventative Traffic Calming

Design standards will be updated to require developers to design new streets to lower design speeds where desired, to minimize the need for future traffic calming interventions.