Vision: *The City of Greater Sudbury is a growing, world-class community bringing talent, technology and a great northern lifestyle together.*

Vision: *La Ville du Grand Sudbury est une communauté croissante de calibre international qui rassemble les talents, les technologies et le style de vie exceptionnel du Nord.*

Agenda
Ordre du jour

Councillor / Conseillère
Janet Gasparini

Chair / Président(e)

Councillor / Conseiller
Jacques Barbeau
Vice-Chair / Vice-président(e)



For the **Priorities Committee** meeting to be held

Pour la réunion du **Comité des priorités** qui aura lieu

Wednesday, November 19th, 2008

mercredi 19e novembre 2008

at 6:00 pm

à 18h 00

St. Francis School, 691 Lilac Street, Sudbury

Ecole St. Francis, 691, rue Lilac, Sudbury

Greater Sudbury

PRIORITIES COMMITTEE AGENDA

For the 39th Priorities Committee Meeting
to be held on **Wednesday, November 19, 2008**
St. Francis School, 691 Lilac Street, Sudbury at **6:00 pm**

COUNCILLOR JANET GASPARINI, CHAIR

Jacques Barbeau, Vice-Chair

(PLEASE ENSURE CELL PHONES AND PAGERS ARE TURNED OFF)

St. Francis School is wheelchair accessible. Copies of Agendas can be viewed at www.greatersudbury.ca/agendas
www.greatersudbury.ca/agendas

COMMUNITY TOUR - 4:30 p.m. - 5:15 p.m.

1. Rematech, 777 Martindale Road, Sudbury

   - Ivo Beljo, Vice-President, Ramatech Industries

DECLARATIONS OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF

OPENING REMARKS - COUNCILLOR JOE CIMINO, WARD 1

CITIZEN DELEGATIONS

2. Ward 1 Community Action Network (CAN)
   (ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

   - Tom Murphy, Chair, Ward 1 CAN

   (Ward 1 CAN is made up of dedicated volunteers who are working towards a safe and visually appealing neighbourhood. The CAN has set priorities and started to work with local business, community partners and various city departments. The presentation will identify short term goals and provide information on the CAN's long term vision for the enhancement of the Lorne Street Corridor.)

3. Coalition to End Violence Against Women **10 - 12**
(VERBAL PRESENTATION) (FOR INFORMATION ONLY)

- Ginette Demers, Co-Chair, Sudbury Coalition to End Violence Against Women and Executive Director of Genevra House

(The month of November is Woman Abuse Prevention Month. The member agencies of the Sudbury Coalition to End Violence Against Women have requested to make a presentation to the Priorities Committee regarding their most recent achievement, the "Our Community Our Precious Lives" publication.)

COUNCILLOR BRIEFING SESSIONS

4. 2008 Ward 1 Capital Improvement Projects
(ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

- Robert Falcioni, Director of Roads and Transportation Services
- Nick Benkovich, Director of Water/Wastewater Services

(Electronic Presentation to Council outlining 2008 Ward 1 Capital Improvement Projects.)

5. Ward 1 Development Activity
(ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

- Helen Mulc, Manager, Business Development

(A presentation will be made to highlight the development activity across all sectors represented in Ward 1)

6. FCM, Sustainable Community Mission, August 16 - 24, 2008
(ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

- Councillor Frances Caldarelli

(Councillor Caldarelli attended the Federation of Canadian Municipalities (FCM) Sustainable Community Mission on August 16 - 24, 2008. She will present a brief report on the information provided at the conference which will affect the way we think about our community.)

7. Progress Report on 3-1-1 and City Call Centre
(ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

- Ron Henderson, Director of Citizen Services

8. Pothole Patching - Current Practices
(ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

- Nathalie Mihelchic, P. Eng., Manager of Operations.
- Robert M. Falcioni, P. Eng., Director of Roads and Transportation

(Overview of City's current standards and practices.)

POLICY DISCUSSION PAPERS - PRELIMINARY DISCUSSION

9. Report dated November 4, 2008 from the General Manager of Infrastructure Services regarding Traffic Calming Policy. **13 - 132**
(ELECTRONIC PRESENTATION) (RECOMMENDATION PREPARED)

- Thomas Prestia, IBI Group

(The City of Greater Sudbury has retained IBI Group to prepare a Traffic Calming Policy to reduce the negative impacts of motor vehicle traffic.

The overall objective of this study is to develop a formal Traffic Calming Policy for the City of Greater Sudbury. This Policy details the goals and objectives of traffic calming, the planning process and a list of acceptable measures with guidelines for their implementation.

Greater Sudbury's Policy contains its own traffic calming warrant that allows the City to score, rank and prioritize traffic calming requests. This process quantifies the perceived problems and ensures that all sites are evaluated against the same set of criteria and that traffic calming measures can be applied first and foremost to those locations that receive the highest scores.

This report was discussed by the Traffic Committee who are recommending that the Traffic Calming Policy be approved.)

POLICY DISCUSSION PAPERS - DECISION REQUESTED

CORRESPONDENCE FOR INFORMATION ONLY

MANAGERS' REPORTS

ADDENDUM

CITIZEN PETITIONS

MOTIONS

COMMUNITY INPUT

CLOSING REMARKS - COUNCILLOR JOE CIMINO, WARD 1

ADJOURNMENT (9:00 P.M.) (RECOMMENDATION PREPARED)

{TWO-THIRDS MAJORITY REQUIRED TO PROCEED PAST 9:00 P.M.)

Councillor Gasparini
Chair

Franca Bortolussi
Council Secretary

COMITÉ DES PRIORITÉS
ORDRE DU JOUR

Pour la 39e réunion du Comité des priorités
qui aura lieu le **19 novembre 2008**
Ecole St. Francis, 691, rue Lilac, Sudbury, à **18h 00**

CONSEILLÈRE JANET GASPARINI, PRÉSIDENT(E)

Jacques Barbeau, Vice-président(e)

(VEUILLEZ ÉTEINDRE LES TÉLÉPHONES CELLULAIRES ET LES TÉLÉAVERTISSEURS)
Ecole St. Francis est accessible en fauteuil roulant. Vouz pouvez consulter l'ordre du jour au site Web de la Ville à l'adresse www.grandsudbury.ca.

VISITE DE LA COMMUNAUTÉ - 16 h 30 - 17 h 15

1. Rematech, 777, chemin Martindale, Sudbury
    - Ivo Beljo, Vice-président, Ramatech Industries

DÉCLARATION D'INTÉRÊT PÉCUNIAIRE

ALLOCUTION D'OUVERTURE - LE CONSEILLER JOE CIMINO, QUARTIER 1

DÉLÉGATIONS DE CITOYENS

2. Présentation du conseil municipal sur le Réseau d'action communautaire du quartier 1 (RAC)
(PRÉSENTATION ÉLECTRONIQUE) (A TITRE D'INFORMATION)

    - Tom Murphy, président du RAC du quartier 1

    (Le RAC du quartier 1 se compose de bénévoles dévoués qui travaillent afin d'obtenir un voisinage sûr et de lui donner un aspect esthétique. Le RAC a établi ses priorités et il a commencé à travailler avec des entreprises de la localité, des partenaires communautaires et divers services municipaux. La présentation dégagera les buts à court terme et donnera des renseignements sur la vision à long terme du RAC pour l'embellissement du corridor de la rue Lorne.)

3. La Coalition de Sudbury pour éliminer la violence faite aux femmes **10 - 12**
(PRÉSENTATION ORAL) (A TITRE D'INFORMATION)

    - Ginette Demers, coprésidente de La Coalition de Sudbury pour éliminer la violence faite aux femmes et directrice générale de la Maison Genevra

    (Novembre est le mois de la prévention des mauvais traitements des femmes (Woman Abuse Prevention Month). Les organismes membres de La Coalition de Sudbury pour éliminer la violence faite aux femmes ont demandé de faire une présentation au Comité des priorités au sujet de sa plus récente réalisation, soit la publication intitulée Our Community Our Precious Lives (notre communauté, nos précieuses vies).)

SÉANCES D'INFORMATION DES CONSEILLERS

4. Chantiers d'amélioration des immobilisations de 2008 dans le quartier 1
(PRÉSENTATION ÉLECTRONIQUE) (A TITRE D'INFORMATION)

    - Robert Falcioni, directeur des Services des routes et des transports
    - Nick Benkovich, directeur des Services des eaux et des eaux usées

    (Présentation électronique au Conseil municipal décrivant brièvement les chantiers d'amélioration des immobilisations de 2008 dans le quartier 1.)

5. Activité de développement dans le quartier 1
(PRÉSENTATION ÉLECTRONIQUE) (A TITRE D'INFORMATION)

    - Helen Mulc, gestionnaire de l'Expansion commerciale

    (Une présentation sera faite pour souligner l'activité de développement dans tous les secteurs représentés dans le quartier 1.)

6. FCM, Mission sur les collectivités viables, du 16 au 24 août 2008
(PRÉSENTATION ÉLECTRONIQUE) (A TITRE D'INFORMATION)

- La conseillère Frances Caldarelli

(La conseillère Caldarelli a assisté à la Mission de la Fédération canadienne des municipalités (FCM) sur les collectivités viables, du 16 au 24 août 2008. Elle donnera un bref compte rendu sur les renseignements donnés à ce congrès qui auront un effet sur ce que nous pensons de notre communauté.)

7. Rapport d'étape sur le 3-1-1 et le centre d'appels de la Ville
(PRÉSENTATION ÉLECTRONIQUE) (A TITRE D'INFORMATION)

- Ron Henderson, directeur des Services aux citoyens

8. « Rapiéçage » des nids-de-poule - pratiques actuelles
(PRÉSENTATION ÉLECTRONIQUE) (A TITRE D'INFORMATION)

- Nathalie Mihelchic, ing., gestionnaire des Opérations
- Robert M. Falcioni, ing., directeur des Routes et des Transports

(Survol des normes et des pratiques actuelles de la Ville.)

DOCUMENTS DE TRAVAIL SUR LES POLITIQUES – DISCUSSION PRÉLIMINAIRE

9. Rapport du directeur général des Services d'infrastructure, daté du 04 novembre 2008 portant sur Politique en matière de modération de la circulation **13 - 132**
.
(PRÉSENTATION ÉLECTRONIQUE) (RECOMMANDATION PRÉPARÉE)

- Thomas Prestia, IBI Group

(La Ville du Grand Sudbury a retenu les services de l'IBI Group en vue de rédiger une politique en matière de modération de la circulation afin de réduire les impacts négatifs de la circulation automobile. L'objectif global de cette étude, c'est d'élaborer une politique en matière de modération de la circulation pour la Ville du Grand Sudbury. Cette politique donnera en détail les buts et les objectifs de la modération de la circulation, la démarche de planification et la liste de mesures acceptables accompagnés des principes directeurs de leur mise en œuvre. La politique du Grand Sudbury contiendra son propre mandat de modération de la circulation qui permettra à la Ville de coter, de classer et d'établir l'ordre de priorité des demandes de modération de la circulation. Cette démarche quantifiera les problèmes perçus et veillera à ce que tous les lieux soient évalués selon les mêmes critères et que les mesures de modération de la circulation puissent d'abord et avant tout être mises en œuvre aux endroits qui obtiennent les cotes les plus élevées. Ce rapport a fait l'objet d'une discussion au sein du Comité sur la circulation qui a recommandé l'approbation de la politique en matière de modération de la circulation.)

DOCUMENTS DE TRAVAIL SUR LES POLITIQUES – DEMANDE DE DÉCISION

CORRESPONDANCE À TITRE DE RENSEIGNEMENTS SEULEMENT

RAPPORTS DES GESTIONNAIRES

ADDENDA

PÉTITIONS DE CITOYENS

MOTIONS

COMMENTAIRES DE LA COMMUNAUTÉ

ALLOCUTION DE FERMETURE DE LA CONSEILLER JOE CIMINO, QUARTIER 1

LEVÉE DE LA SÉANCE À 21 H (RECOMMENDATION PRÉPARÉE)

(UNE MAJORITÉ DES DEUX TIERS EST REQUISE POUR POURSUIVRE LA RÉUNION APRÈS 21 h.)

La Conseillère Gasparini,
Présidente

Franca Bortolussi,
Secrétaire du conseil

Citizen Delegations

Presented To:	Priorities Committee
Presented:	Wednesday, Nov 19, 2008
Report Date	Thursday, Oct 30, 2008
Type:	Citizen Delegations

Request for Recommendation

Coalition to End Violence Against Women

Recommendation

For Information Only

Signed By

No signatures or approvals were recorded for this report.

For immediate release November 4th, 2008

The Sudbury Coalition to End Violence Against Women and the M'nidoo Minissing Coalition Against Domestic Violence recently launched the long-waited "*OUR COMMUNITY OUR PRECIOUS LIVES"* publication on violence against women. The project was proudly sponsored by the Ontario Ministry of Community and Social Services.

The information in the *"OUR COMMUNITY OUR PRECIOUS LIVES"* publication outlines issues surrounding violence against women and its effects on children and the community as a whole. This one-of-a kind publication features articles in English, French and Ojibway. The objective was to develop a resource tool containing information in the form of articles from frontline agency workers to assist women experiencing intimate partner abuse and/or family friends and neighbours that know a woman experiencing abuse at the hands of an intimate partner.

The "*OUR COMMUNITY OUR PRECIOUS LIVES'*" publication is being distributed throughout various press outlets, community events and functions in the City of Greater Sudbury and Manitoulin Island areas. Ginette Demers co-chair of the Sudbury Coalition To End Violence Against Women, says that the launch of this long-awaited resource tool is timely. The month of November is Woman Abuse Prevention Month and our local efforts are twofold: first, our respective member agencies will be out in full force creating awareness about the programs and services available to assist those affected by woman abuse and the Coalition to End Violence Against Women will continue its mandate to promote an end to violence.

We hope YOU, your families, friends and neighbours will take a stand with us, and declare that violence in all its forms is not tolerated in our community!

For your copy of the publication or for more information please contact: GINETTE DEMERS, CO-CHAIR or visit www.northernlife.ca

THE SUDBURY COALITION TO END VIOLENCE AGAINST WOMEN

Ginette Demers, Manager Genevra House VAW Services - YWCA Sudbury

705-674-2210 ext 303 Email: g.demers@ywca.sudbury.com or CO-CHAIR

Francine Boudreau, Program Director, Sudbury Counselling Centre

705-524-9629 ext. 212 E-mail: fboudreau@counsellingccs.com

M'NIDOO MINISSING COALITION AGAINST DOMESTIC VIOLENCE

Pat Giroux, Co-chair 705-859-3184

Kiki Peltier 705-285-4354

POUr DIFFUSION IMMÉDIATE - Le 4 novembre 2008

La Coalition de Sudbury pour éliminer la violence faite aux femmes et la Coalition contre la violence conjugale de M'nidoo Minissing annonce le lancement de leur publication qui s'intitule « *OUR COMMUNITY OUR PRECIOUS LIVES* ». Le projet a été parrainé fièrement par le ministère des Services sociaux et communautaires de l'Ontario.

L'information dans la publication « *OUR COMMUNITY OUR PRECIOUS LIVES* » soulève des questions sur la violence faite aux femmes et l'impact sur les enfants et la communauté en général. Cette publication unique propose des articles en anglais, en français et en Ojibway. L'objectif est de créer une ressource d'information sous forme d'articles issus de travailleurs d'organismes de première ligne afin de soutenir les femmes victimes de mauvais traitements de la part de leur partenaire intime, ainsi que des membres de famille, des amis ou des voisins qui connaissent une femme abusée par leur conjoint.

La publication « *OUR COMMUNITY OUR PRECIOUS LIVES* » est distribuée aux médias et dans le cadre de nombreuses activités et événements communautaires dans les régions du Grand Sudbury et de l'Île Manitoulin. Ginette Demers, coprésidente de la Coalition de Sudbury pour éliminer la violence faite aux femmes, affirme que le lancement de cette ressource tant attendue est fort opportun. Le mois de novembre est le mois de la prévention de la violence faite aux femmes et les initiatives locales comportent deux volets : nos organisations membres participeront en grand nombre aux efforts de sensibilisation sur les programmes et les services disponibles pour aider ceux qui sont touchés par des cas de violence faite aux femmes et la Coalition pour éliminer la violence faite aux femmes poursuivra son mandat de promouvoir l'élimination de la violence.

Nous souhaitons que VOUS, votre famille, vos amis et vos voisins, rendez témoignage en déclarant que la violence sous toutes ses formes n'est pas tolérée dans notre communauté!

Pour obtenir une copie de la publication ou pour obtenir de plus amples renseignements, veuillez communiquer avec GINETTE DEMERS, COPRÉSIDENTE, ou visitez le www.northernlife.ca.

COALITION DE SUDBURY POUR ÉLIMINER LA VIOLENCE FAITE AUX FEMMES

Ginette Demers, Gestionnaire, Maison Genevra, Services – YWCA Sudbury

705-674-2210, poste 303 - Courriel : g.demers@ywca.sudbury.com

Francine Boudreau, Directrice des programmes, Centre de counselling de Sudbury

705-524-9629, poste 212 - Courriel : fboudreau@counsellingccs.com

COALITION CONTRE LA VIOLENCE CONJUGALE DE M'NIDOO MINISSING

Pat Giroux, coprésidente, 705-859-3184

Kiki Peltier, coprésidente, 705-285-4354

-30-

Policy Discussion Papers - Preliminary Discussion

Presented To:	Priorities Committee
Presented:	Wednesday, Nov 19, 2008
Report Date	Tuesday, Nov 04, 2008
Type:	Policy Discussion Papers - Preliminary Discussion

Request for Recommendation

Traffic Calming Policy

Recommendation

That the Priorities Committee adopt the Traffic Calming Warrants and Processes as the City of Greater Sudbury's Traffic Calming Policy, all in accordance with the report from the General Manager of Infrastructure Services dated November 4, 2008.

Signed By

Report Prepared By
David Shelsted, MBA P.Eng.
Roads Engineer
Digitally Signed Nov 13, 08

Division Review
Robert Falcioni, P.Eng
Director of Roads and Transportation
Digitally Signed Nov 13, 08

Recommended by the Department
Greg Clausen, P.Eng
General Manager of Infrastructure Services
Digitally Signed Nov 13, 08

Recommended by the C.A.O.
Doug Nadorozny
Acting Chief Administrative Officer
Digitally Signed Nov 13, 08

Background

The City's Traffic and Transportation Engineering Section receives numerous requests each year to install Traffic Calming measures such as speed humps and traffic circles to reduce speeding and improve safety on its roadways. The City currently has no process for responding to Traffic Calming requests. In February, 2008, the City of Greater Sudbury retained IBI Group to develop a Traffic Calming Policy which will aid staff in evaluating requests and the application of Traffic Calming devices.

The need and justification for Traffic Calming and remedial measures varies considerably from one jurisdiction to the next. The overall objective of the Study is to develop a Traffic Calming Policy for the City of Greater Sudbury that builds on the foundation of other jurisdictions. The following are the four (4) main tasks of the Study:

1. Review current Best Practices with respect to Traffic Calming Devices, Warrants and Policies.
2. Develop a comprehensive Traffic Calming Warrant that can be applied to requests received by the City.
3. Develop an appropriate Traffic Calming Policy for the City.
4. Undertake a Traffic Calming Pilot Project for Southview Drive/Bouchard Street that is consistent with the recommended Traffic Calming Policy.

The Current Best Practices, Traffic Calming Warrant, and Traffic Calming Policy memorandums from IBI

Group can be found in Exhibits "A", "B", and "C". The Pilot Project for Southview Drive is still on going, and will be reported on at a later date.

What is Traffic Calming?

"Traffic Calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users".

The goals of Traffic Calming are to reduce vehicle speeds, improve safety for all road users and improve quality of life for neighbourhood residents.

Types of Traffic Calming Measures

Horizontal Deflection	**Vertical Deflection**
Curb Extension	Speed Humps/Tables
Mini Roundabout/Traffic Circle	Speed Cushion
Median Island	Raised Crosswalk
Chicane	Raised Intersection
On-Street Parking	
Obstruction/Closure	**Signing**
Directional Closure	Regulatory Signs
Raised Median	"Traffic Calmed Neighbourhood"
Channelization	Warning Signs
Full Closure	Turn Restrictions

Current Best Practices

The purpose of this document is to review the best practices of 24 jurisdications throughout North America to form the basis for an appropriate Traffic Calming Policy for the City of Greater Sudbury. The review focused on communities that represent the forefront of Traffic Calming or share similar characteristics with the City such as size and climate.

The following is a summary of the Best Practice Findings:

- No standard Traffic Calming Warrant exists.
- Most common criteria considered is traffic volumes, speed and collisions. Pedestrian generators and facilities are also considered.
- Traffic data can often be collected quickly and inexpensively.
- Public involvement is universal.
- Indicate a strong desire to ensure safety of neighbourhoods.

Traffic Calming Warrant

The Traffic Calming Warrant builds upon the results of the Best Practice review. In addition, public input was solicited through surveys posted on the City's website and at the Citizen Service Centres. Two (2) stakeholder workshops were also held with City departments and agencies including City Councillors, Police, Fire, EMS, Planning, Roads and Engineering.

The Traffic Calming Warrant consists of an initial screening where a combination of requirements must be met for a site to be eligible for Traffic Calming. The following criteria must be satisfied in order to advance to the next stage:

- Grade must be less than eight (8) percent; and,
- Number of collisions within the last three (3) years involving vulnerable road users and/or which could be corrected by Traffic Calming measures is six (6) or more on local roads and twelve (12) or more for collector road; or,
- The 85th percentile speed recorded must be greater than the posted speed limit; and,
- Daily traffic volumes are greater than 900 for local roads, 3,000 for collector roads and 5,000 for tertiary arterial roads; or,
- Non-local traffic must be greater than or equal to 30 percent.

Sites that pass the initial screening are then ranked against each other using a weighted criteria that includes:

Speed and traffic volumes	35%
Collision history	20%
Non-local traffic	15%
Pedestrian generators and facilities	15%
Emergency/transit routes	-6%
Block length and adjacent land use	15%

IBI Group has developed a spreadsheet for the City to assist with the initial screening and ranking of the sites.

Traffic Calming Process

There will be a six (6) step process for the implementation of Traffic Calming measures on City roads.

Step 1. Request for Traffic Calming

- Formal request in writing from residents, business owners, schools, City Staff or members of Council.

Step 2. Traffic Calming Screening Process

- In order to advance to the next stage, the site must satisfy at least one of the following:
    - minimum number of collisions
    - speed plus non-local traffic is greater than threshold values
    - speed plus volume is greater than threshold values
- Different thresholds are applied for local roads versus collectors and tertiary arterials.

Step 3. Evaluation Scoring and Ranking

- Sites that pass initial screening are scored independently and ranked against each other.

Step 4. Recommended Available Traffic Calming Measures

- Select appropriate Traffic Calming Measure by type of roadway being considered.
- Gather information and begin to develop budget estimates for potential projects to be submitted to Council for consideration.

Step 5. Project Selection and Council Approval

- Staff prepare preliminary estimates for higher ranking projects.
- Also for projects that may be served through signing alone.
- Staff forward a list of recommended projects to Council for approval.

Step 6. Design, Public Support, Final Council Approval and Implementation

- Council gives initial approval for projects.
- Residents polled for support.
- A minimum 50 percent response rate from affected residents with 60 percent support is recommended to proceed with plan development.
- Plan development includes input from City departments.
- If public and Council approves plan, the project is tendered, constructed and monitored.
- Requests can be denied in this stage for lack of public support or Council rejection.

Staff recommend that the Priorities Committee adopt the Traffic Calming Warrants and Traffic Calming Process as outlined above and developed by IBI Group that will form the City of Greater Sudbury's Traffic Calming Policy.

City of Greater Sudbury

DEVELOPMENT OF TRAFFIC CALMING POLICY & PILOT PROJECT REVIEW FOR SOUTHVIEW DRIVE / BOUCHARD STREET
TRAFFIC CALMING WARRANT

TECHNICAL MEMORANDUM #2

OCTOBER 2008

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Appendix A: Traffic Calming Survey Responses
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1. INTRODUCTION

City of Greater Sudbury staff receive numerous requests each year for traffic calming features such as speed humps, curb extensions and raised intersections. The city currently has no process for responding to traffic calming requests. IBI Group has been retained by the City of Greater Sudbury to develop a traffic calming policy, including a warrant and prioritization process, which will aid City staff in the evaluation of these requests and the application of traffic calming devices.

1.1 Study Background and Objectives

The need and justification for traffic calming and remedial measures varies considerably from one jurisdiction to the next, and in response, a number of jurisdictions have developed their own traffic calming 'warrants' based on traffic/pedestrian volumes, operating speeds, collisions/conflicts and a number of other factors. Much like traffic signal warrants, traffic calming warrants provide guidance for the appropriateness and implementation of traffic calming measures. In most cases, traffic calming warrants were developed to quantify the problems and complaints that residents raise in their traffic calming requests. In many jurisdictions, the warrants go beyond a simple minimum score required for traffic calming and also offer a means to rank or prioritize potential traffic calming sites through secondary evaluation criteria.

The overall objective of this study is to develop a formal traffic calming policy for the City of Greater Sudbury. This policy will detail the goals and objectives of traffic calming, the planning process and a list of acceptable measures with guidelines for their implementation.

Sudbury's policy will contain its own traffic calming warrant that will allow the city to score, rank and prioritize traffic calming requests. This process will quantify the perceived problems and ensure that all sites are evaluated against the same set of criteria and that traffic calming measures can be applied first and foremost to those locations that receive the highest scores.

1.2 Report Overview

This document builds on a Best Practices Report (submitted by IBI Group to Sudbury in May 2008), assessing the practices of other jurisdictions, and develops a traffic calming warrant that provides appropriate guidance for the implementation of traffic calming measures in the City of Greater Sudbury. The warrant methodology consists of two primary steps, namely:

1. Initial screening; and

2. Scoring and ranking.

The overall traffic calming process, from initial public request to Council approval and implementation, is a six-step process that will be described in detail in the traffic calming policy prepared for Task 4 of this assignment. **Section 3** of this report describes the screening, scoring and ranking methodology in detail.

In order to determine the effectiveness of the warrant, a pilot test was conducted with traffic data supplied by the City. Part of the intent of a traffic calming warrant, much like a traffic signal warrant, is to strike a balance whereby the chosen criteria is stringent enough that some requests for traffic calming will be denied, yet lenient enough that some requests will qualify. Simply put, the warrant is ineffective if it creates an all or nothing situation. The purpose of this testing, discussed in **Section 4**,

is therefore to ensure that the developed warrant strikes this balance between no/few pilot test sites meeting the criteria and most/all of the sites meeting them.

Finally, IBI Group has developed spreadsheet tools to assist the City in the screening and evaluation process. The first tool creates an individual file for each candidate site and scores the site based on the warrant criteria discussed within this report. A separate tool aggregates the individual sites into a summary report for City use. The spreadsheet tools are discussed in **Section 5**.

1.3 List of Terms and Acronyms

The following is a list of acronyms and 'technical' or otherwise ambiguous terms used in this report, presented for the readers' convenience:

- **85th Percentile Speed** – The speed separating the fastest 15% of vehicles from the slowest 85%;
- **ADT** – Average daily traffic, recorded over a 24-hour period;
- **Cut Through Traffic** – Traffic determined to neither begin nor end a trip within a defined study area. Typically synonymous with "non-local traffic";
- **EMS** – Emergency medical services;
- **FSA** – Forward Sortation Area; the first three characters of a postal code;
- **Local Road, Collector, Tertiary Arterial** – Three of the roadway classifications used by the City of Greater Sudbury, in increasing order of volume and importance within the overall roadway network;
- **MTO** – Ontario Ministry of Transportation;
- **OTM** – Ontario Traffic Manual;
- **Pedestrian Facilities** – Sidewalks;
- **Pedestrian Generators** – Schools, parks, etc to be defined by Sudbury; and
- **VPD** – Vehicles per day.

2. PUBLIC CONSULTATION PROCESS

Rather than hold public meetings for the traffic calming warrant and policy, IBI Group developed online survey materials requesting public input on the warrant criteria. A link to the survey was posted to the City of Greater Sudbury's new traffic calming website[1], and hard copies of the survey were also distributed to Citizen Service Centres. Additionally, the City of Greater Sudbury and IBI Group held two public meetings for the Southview Drive / Bouchard Street pilot project component of this study. The citywide traffic calming policy surveys were distributed at these meetings, along with Southview Drive-specific surveys, and the website was discussed.

[1] http://www.greatersudbury.ca/cms/index.cfm?app=div_transportation&lang=en&currID=7783&parID=0

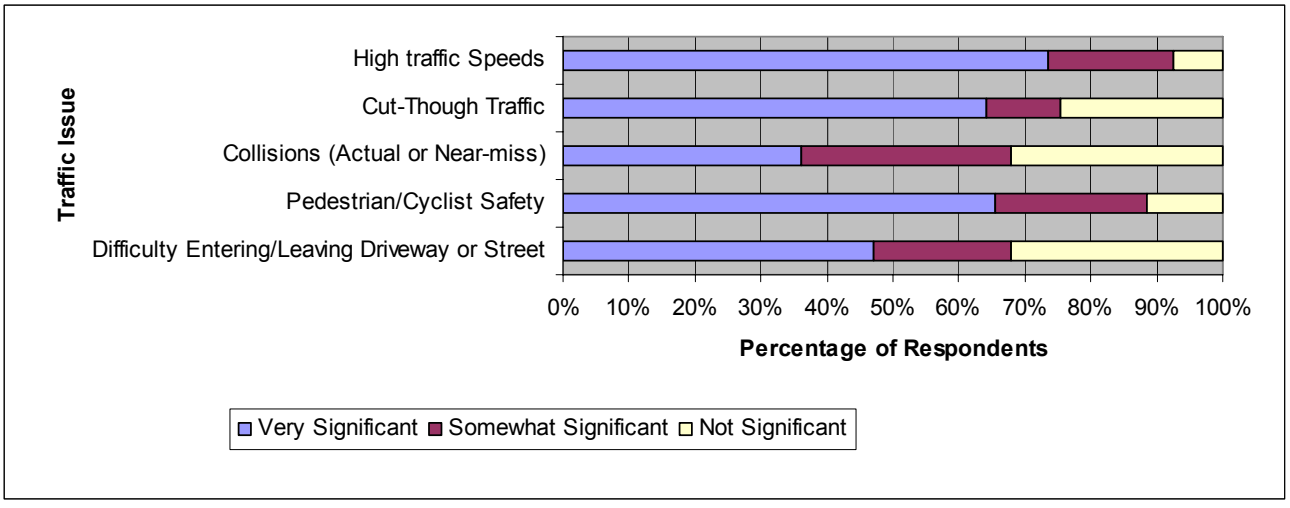
The citywide survey was used to assess the public's familiarity with traffic calming, as well as gain an understanding of which factors are most important to city residents. The survey responses and comments received at the meeting were used as additional inputs into the warrant development.

57 residents responded to all or part of the survey. Detailed survey results are included in **Appendix A**. The survey results are unedited except for format and removal of respondents' personal information. It will be seen when reviewing the survey responses that a large number of the respondents are from the Southview Drive community, and the responses in many cases reflect their particular concerns. While a higher response rate was originally anticipated, the survey responses were consistent with expectations. In general, the responses indicate:

- High traffic speeds and non-local volume are seen as the two most significant traffic issues;
- Pedestrian and cyclist safety is also very important to Sudbury residents;
- Many respondents have difficulty entering or exiting their driveways;
- General unfamiliarity with traffic calming devices, given the lack of such installations in Sudbury;
- Desire to implement traffic calming if it offers a solution to concerns; and
- Common misconceptions concerning some traffic calming devices.

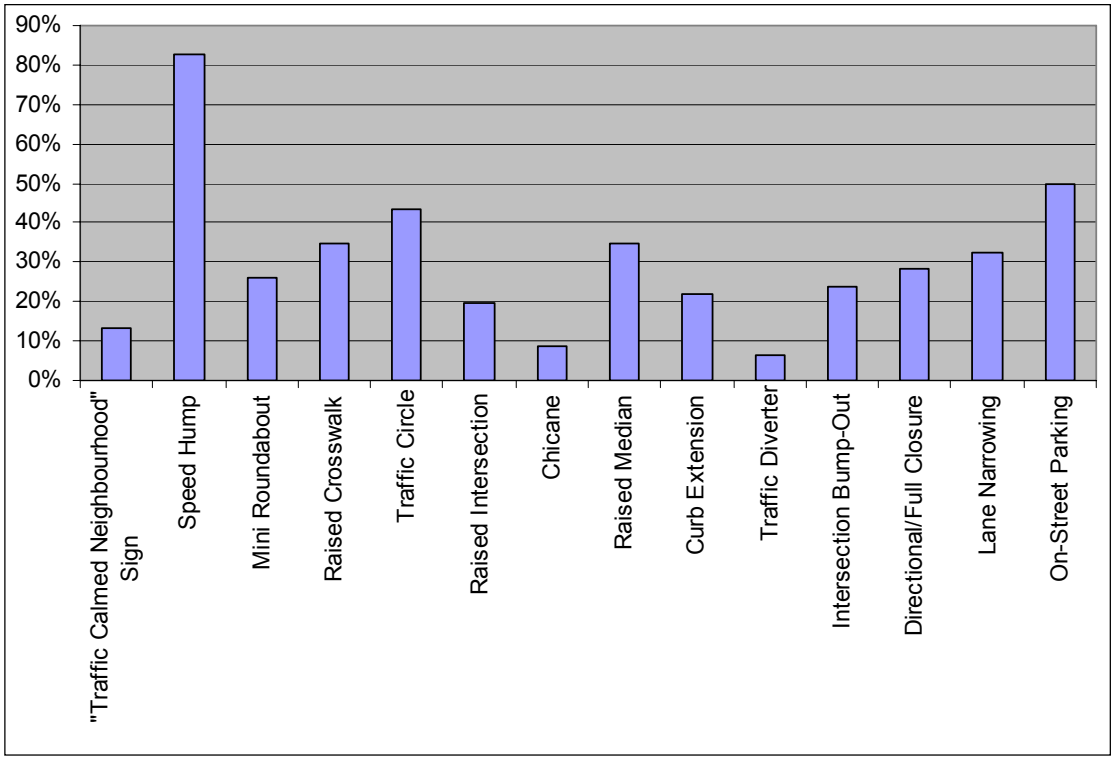
Responses to three of the questions are illustrated below. **Exhibit 2-1** shows that respondents place high significance on each of the five traffic issues presented for consideration. As expected, high traffic speeds scored the highest on the survey, while cut-through traffic and pedestrian/cyclist safety were in a near tie for second place.

Exhibit 2-1: Survey Response: Significance of Traffic Issues



Respondents were asked to state which traffic calming devices they have experienced, either in Sudbury or elsewhere. As shown in **Exhibit 2-2**, it is unsurprising that respondents are most familiar with speed humps and least familiar with those devices that are either lesser used or have technical names, such as chicanes and traffic diverters.

Exhibit 2-2: Survey Response: Experience with Traffic Calming Devices



Finally—and pertaining directly to the warrant process—respondents were asked to rank the traffic calming criteria that was under consideration for the warrant. The sample size for this response is smaller than for the other questions, as a number of respondents who filled out surveys by hand misinterpreted the question, and their responses were discarded. **Exhibit 2-3** is based on 22 surveys (not all respondents ranked each criteria) and shows that traffic speeds were ranked the number one criteria by 50 percent of respondents, and within the top three criteria by all but one respondent. The results show that other traditional criteria such as traffic volumes and pedestrians are generally important to respondents. The results were mixed when it came to criteria such as residential consultation/support, transit services and collision history, with some respondents ranking the criteria very high and others ranking them very low.

Exhibit 2-3: Survey Response: Traffic Calming Criteria Ranking

Criteria	Most Important → Least Important									
	1	2	3	4	5	6	7	8	9	10
Traffic Speeds	50%	19%	25%	---	---	---	6%	---	---	---
Traffic Volumes	24%	29%	---	29%	18%	---	---	---	---	---
Residential Consultation and Support	13%	7%	---	---	---	20%	13%	13%	20%	13%
Emergency Services and Routes	13%	7%	7%	7%	20%	20%	13%	7%	7%	---
Pedestrian Generators and Facilities	13%	19%	19%	6%	25%	6%	13%	---	---	---
Cut-Through Traffic	7%	7%	14%	21%	21%	---	7%	---	7%	14%
Transit Services and Routes	12%	---	18%	12%	6%	12%	---	18%	12%	12%
Collision History	---	15%	23%	15%	---	8%	23%	8%	8%	---
Road Classification and Grade	---	---	8%	8%	17%	---	25%	25%	8%	8%
Adjacent Land Uses	---	---	8%	8%	---	15%	---	23%	8%	38%

3. TRAFFIC CALMING WARRANT METHODOLOGY

The two-part screening and ranking process is part of a larger six-step framework recommended for traffic calming requests, as shown in the following list:

1. Request for Traffic Calming;

2. **Traffic Calming Screening Process;**

3. **Evaluation Scoring and Ranking;**

4. Available Traffic Calming Measures;

5. Project Selection and Council Study Approval; and

6. Design, Final Approval, Implementation.

Appendix B contains a flowchart of the entire framework, which will be discussed in full detail in the Traffic Calming Policy deliverable of this assignment.

3.1 Traffic Calming Screening Process

Step 2 of the overall process is the first of two warrant steps, an initial screening process undertaken by City staff. The screening process sets requirements in five areas. A combination of these requirements must to be met for a site to be eligible for traffic calming. **Exhibit 3-1** defines the screening criteria and associated thresholds. Screening criteria are tailored to local and Collector/Tertiary Arterial streets, each of which have different functional characteristics.

Exhibit 3-1: Criteria and Thresholds

Criteria	Threshold		Notes
	Local Road	Collector / Tertiary Arterial	
Grade	< 8%		If the grade is equal to or greater than 8%, traffic calming is not permitted
Collision History	≥ 6	≥ 12	Number of collisions within the last three years involving vulnerable road users and/or which could potentially be corrected by traffic calming measures
Volume	≥ 900 vpd	≥ 3,000 vpd (Collector) ≥ 5,000 vpd (Tertiary Arterial)	Two-way ADT volume
Speeds	≥ posted speed limit		85th percentile speed
Non-Local Traffic	≥ 30%		'Cut-through traffic'

The screening can be summarized as follows:

- **Grade:** if the grade of the roadway is equal to or greater than the maximum threshold of 8%, then traffic calming is not permitted on the roadway at all. This is consistent with other jurisdictions and is due to the fact that traffic calming devices implemented on steep grades could cause safety concerns.

- **Collision History:** if the number of collisions within the past three years involving vulnerable road users (primarily pedestrians and cyclists) and/or which could be potentially corrected by traffic calming measures is equal to or greater than the minimum threshold, then the volume, speed and non-local traffic requirements do not need to be met, and the site moves directly to the ranking process.

  Tertiary Arterials and Collectors are required to have 12 collisions to satisfy this component of the warrant and bypass the volume, speed and non-local traffic requirements. This value is midway between the number of collisions within the past three years required to satisfy OTM Book 5 criteria for all-way stop signs (three or more right angle or turning collisions per year over a three year period) and former OTM Book 12 criteria for traffic signals (five 'correctable' collisions per year over a three year period)[2], and has been used by IBI Group in the past for traffic calming applications. The minimum threshold was also set high enough so that relatively few sites will be expected to qualify for traffic calming measures on the basis of collisions alone.

  Given the difference in minimum volume thresholds for local roads compared to collectors, a minimum of 6 collisions within the last three years was accordingly selected as the threshold. This is consistent with the City of Greater Sudbury's own all-way stop control warrant, which requires an average of two collisions per year over a three year period.

[2] The November 2007 update to OTM Book 12 has since changed the collision signal warrant from raw 'correctable' collisions to a collision severity index.

Collision statistics are often recorded as a rate, expressed as collisions per million vehicles entering an intersection, or collisions per million vehicle-kilometres for a roadway segment. Given that the collision criteria of the traffic calming warrant is only intended to address a specific subset of collisions, raw numbers are preferable to a rate.

- **Speeds and Non-Local Traffic:** at least one of these must meet the minimum threshold for further consideration; and

- **Volume:** regardless of speed and percentage of non-local traffic, the minimum volume threshold must be met. Only a high frequency of collisions can qualify a site for traffic calming without meeting the volume threshold. It is recognized that there may be roads that have very high speeds, but do not meet the volume criteria, and therefore do not qualify for traffic calming under the formal warrant process. Rural roads would be most likely to fall under this category. For these roads, it may be appropriate to implement other solutions, such as speed enforcement or Sudbury's Speed Watch Program. Changes to a rural road's design may also be warranted in some situations.

Exhibit 3-2 graphically represents the screening process, while **Exhibit 3-3** shows the possible scenarios that can arise from application of this screening process.

Exhibit 3-2: Step 2: Screening Process

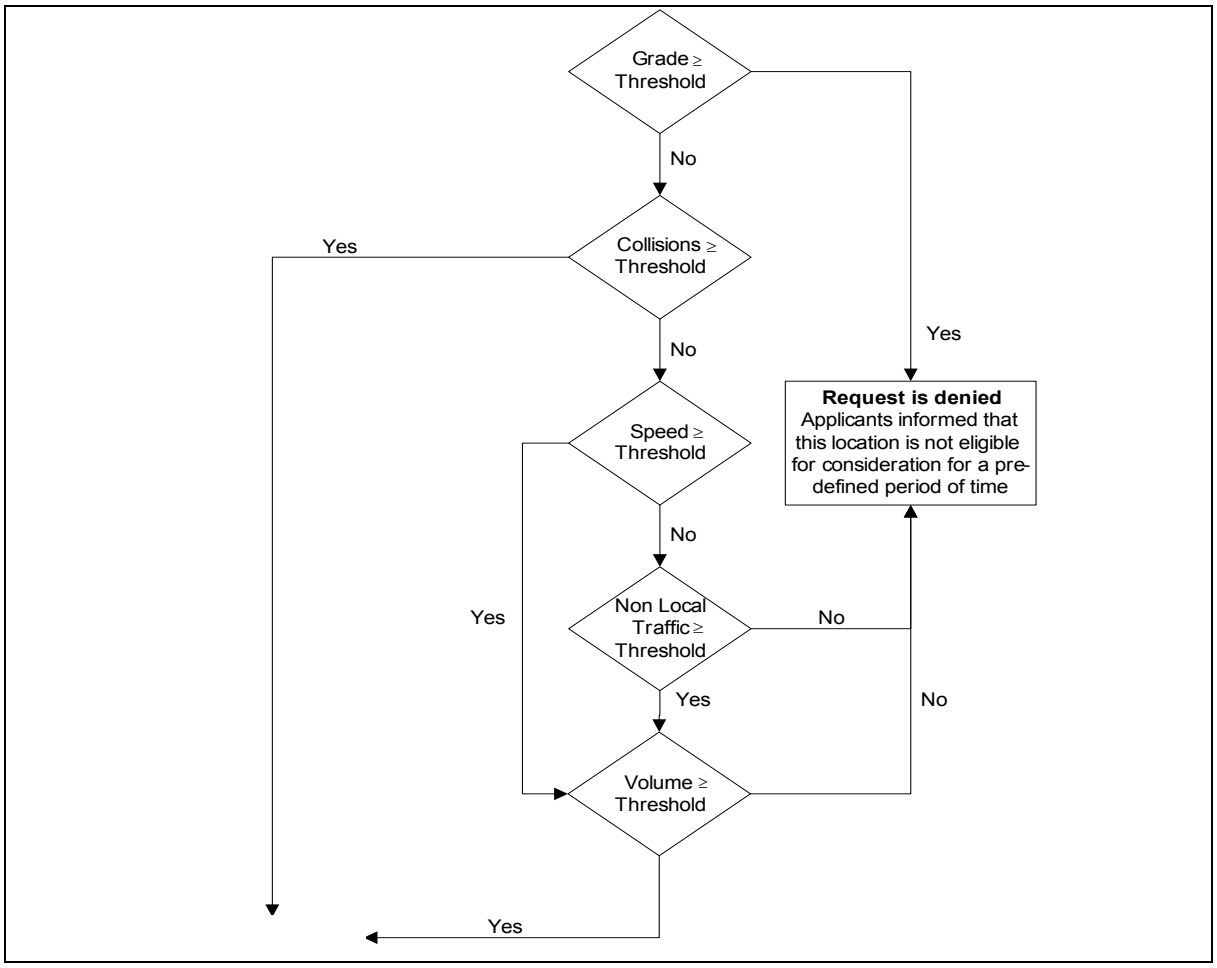


Exhibit 3-3: Possible Screening Scenarios

Scenario	Grade	Collisions	Speed	Non-Local	Volume	Result
1	**≥ Max**	Any	Any	Any	Any	Not eligible for traffic calming
2	< Max	**≥ Min**	Any	Any	Any	Eligible; continue evaluation
3	< Max	< Min	**≥ Min**	Any	**≥ Min**	Eligible; continue evaluation
4	< Max	< Min	Any	**≥ Min**	**≥ Min**	Eligible; continue evaluation
5	< Max	< Min	Any	Any	**< Min**	Not eligible for traffic calming

3.2 Evaluation Scoring and Ranking

Sites that pass the initial screening are then ranked against each other in Step 3. The evaluation, scoring and ranking process incorporates 10 criteria, established through discussions between IBI Group and the City of Greater Sudbury, with appropriate weighting applied to each. Each eligible traffic calming request is awarded points based on its score for each factor, with a maximum score of 100 points. Based on an objective analysis of the evaluation scoring, a score of 30 points has been established as a minimum threshold to qualify for traffic calming consideration.

3.2.1 SCORING

A separate evaluation of Local Roads and Collectors/Tertiary Arterials is recommended due to the intended function of each road classification, including transit service and emergency services needs. **Exhibit 3-4** and **Exhibit 3-5** show the scoring for Local Roads and Collectors/Tertiary Arterials, respectively.

Exhibit 3-4: Scoring: Local Roads

Factor	Point Criteria	Maximum Points
Collision History	4 points for each qualifying collision in the past three years	20
Traffic Speeds	1 point for each km/h above posted speed	15
Non-Local Traffic	3 points for each 10% of non-local traffic above 20% (maximum reached at 60% non-local traffic)	15
Traffic Volumes	1 point for each 50 vehicles above 900	20
Pedestrian Generators	5 points for each school or park within the study area (other Pedestrian Generators may be defined by Sudbury)	10
Pedestrian Facilities	5 points if there are no sidewalks in the study area	5
Emergency Services and Routes	-4 points if the study area is a primary EMS route	0
Transit Services and Routes	-2 points if the study area is an existing or planned transit route	0
Block Length	1 point for each 50m increment between stop-controlled points	10
Adjacent Land Uses (residential)	1 point for each 20% of residential land use	5
		100

Exhibit 3-5: Scoring: Collectors and Tertiary Arterials

Factor	Point Criteria	Maximum Points
Collision History	3 points for each qualifying collision in the past three years	15
Traffic Speeds	1 point for each km/h above posted speed	20
Non-Local Traffic	2 points for each 10% of non-local traffic above 20% (maximum reached at 60% non-local traffic)	10
Traffic Volumes	1 point for every 100 vehicles above the Collector/Tertiary Arterial volume threshold	20
Pedestrian Generators	5 points for each school or park within the study area (other Pedestrian Generators may be defined by Sudbury)	10
Pedestrian Facilities	10 points if there are no sidewalks within the study area, 5 if only on one side	10
Emergency Services and Routes	-6 points if the study area is a primary EMS route	0
Transit Services and Routes	-4 points if the study area is an existing or planned transit route	0
Block Length	1 point for each 50m increment between stop-controlled points	10
Adjacent Land Uses (residential)	1 point for each 20% of residential land use	5
		100

3.2.2 EMERGENCY AND TRANSIT ROUTES

Traffic calming devices are often considered to be a problem for emergency vehicles and buses. The scoring system developed for Sudbury recognizes this concern and scores potential sites accordingly. Under this scoring system, if a particular road is not an emergency or transit route, it receives zero points in each category, i.e. the maximum. The presence of one or more of these routes would therefore subtract points from the overall score. The scoring also reflects that these routes are more likely to be present on Collectors or Tertiary Arterials than on Local Roads, and subtracts more points for those roadway classifications. Further considerations of the impacts of traffic calming devices on emergency and transit vehicles are addressed in the policy document, in Step 4 of the framework, which guides the selection of measures.

3.2.3 NON-LOCAL TRAFFIC

It is also understood that determining the percentage of non-local traffic within a study area may be a costly and time-consuming process. The City may not have the resources to conduct a full survey and may be required to estimate the percentage of cut-through traffic. As a result, the scoring for non-local traffic falls into 'bins' of 10 percent each. The following list contains four recommendations of how non-local traffic may be recorded or estimated, beginning with the method requiring least effort. Each alternative requires that the City determine an appropriate 'local' area prior to estimation.

1. Determine the peak hour trip generation potential of the local area based on its land uses and compare it to the recorded peak hour traffic counts;

2. Apply the following formulas:

$$\text{Local Road Non- Local Traffic Percentage} = 1 - \left(\frac{1{,}000}{ADT}\right)$$

$$\text{Collector Non- Local Traffic Percentage} = 1 - \left(\frac{3{,}000}{ADT}\right)$$

This formula implies that a Local Road with an ADT less than 1,000 vehicles as a low potential for cut-through traffic. The formula may also be applied to Tertiary Arterials using a numerator volume of 5,000; however, given the function of a Tertiary Arterial and the variation in typical arterial volumes, other methods should be explored.

3. Record the license plates of all vehicles that pass through one or more points of the local area. The recorded license plates are then submitted to MTO, which in turn will supply the Forward Sortation Area (FSA) of the address where each vehicle is registered. The FSA is the first three characters of the postal code, and each FSA represents a geographical area of the province. It can then be determined which of these trips originate or end within the local area. It should be noted however, that the urban area of the Sudbury is covered by a total of five FSAs, so this approach will not accurately identify traffic that is explicitly local to the study area; or

4. Conduct a full origin-destination study at all entry and exit points of the local area. Match the license plates of entering and exiting vehicles to determine the percentage of vehicles that pass through the entire local area compared to those that begin or end their trips within. This approach is the most accurate of the four approaches, and it recommended if staff/budget resources are available.

3.2.4 DETERMINING THE 'LOCAL AREA'

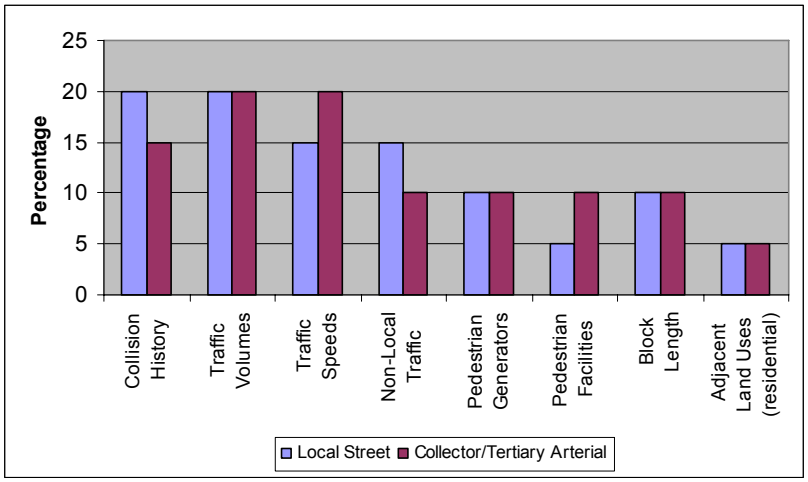
For a Local Road, the local area should be comprised of the Local Road, at a minimum; while for a Collector or Tertiary Arterial, the local area may be defined as the section of the roadway that connects the nearest higher-order roads, as well as the other intersecting roadways.

3.2.5 RANKING COMPARISON BETWEEN LOCAL ROADS AND COLLECTORS/TERTIARY ARTERIALS

Exhibit 3-6 compares the ranking criteria for Local Roads and Collectors/Tertiary Arterials. It can be seen that for Local Roads, more emphasis is placed on factors such as non-local traffic and the collision history of the street.

The primary function of a Tertiary Arterial is to connect with other arterial and collector roads and have limited local road access, while the primary function of a Collector is to move traffic from Local Roads to higher-order roads. As such, higher volumes and perhaps higher speeds are expected. More weight is therefore given to the speed of these roadways, as well as the presence or lack of pedestrian facilities on a Collector, because of the associated safety risks of higher speeds and volumes.

Exhibit 3-6: Comparison of Local Roads vs. Collectors/Tertiary Arterials



4. PILOT TESTING

IBI Group conducted sensitivity analysis in the form of a pilot test of the volume and speed warrants to determine their appropriateness for the City of Greater Sudbury. To support this task, Sudbury provided speed and/or volume data for 63 locations throughout the city. Fifteen of the locations are secondary arterials. Given that traffic calming measures would not typically be installed on this type of roadway, these streets were not included in the analysis. The remaining 48 locations were comprised of 41 collectors and 7 local roads.

While collision data and distance between controlled intersections were provided for all locations, only 10 sites had both volume and speed data. Of the remaining sites, 30 were volume-only, while 8 were speed-only.

The original goal of the sensitivity testing was to analyze the number of sites that would qualify for traffic calming based on a combination of the speed and volume warrants. As indicated in **Exhibit 3-2**, a site qualifies for traffic calming if both the recorded speed and two-way ADT volumes are above the minimum thresholds. Given that so few sites had both volume and speed data, alternative pilot testing analysis was performed, as discussed in the following sections.

Caution should be exercised when interpreting the results, given the small sample sizes.

4.1 Speed

The first pilot test was undertaken to determine the appropriate minimum speed for the initial qualification discussed in **Section 3.1**. It is likely that the majority of streets where traffic calming is requested will have posted speed limits of 40 km/h or 50 km/h. The first step was to calculate the average, median, maximum and minimum speeds of the studied roadways, and categorize them by both posted speed and classification.

Exhibit 4-1 indicates that with the exception of Local Roads posted at 50 km/h, the average 85th percentile speed of all roadways is above the posted speed. The results also indicate a maximum 85th percentile speed of 65 km/h (Collectors posted at 40 km/h), and a minimum 85th percentile speed of 45 km/h (Collectors posted at 50 km/h).

Exhibit 4-1: Pilot Testing: 85th Percentile Speeds

Roadway Type	85th Percentile Speed (km/h)			
	Average	Median	Max	Min
Overall	56	58	65	45
All Collectors	58	59	65	45
All Local Roads	51	51	56	46
Collectors - 50 km/h	57	58	63	45
Local Roads - 50 km/h	48	48	50	46
Collectors - 40 km/h	64	64	65	64
Local Roads - 40 km/h	54	54	56	53

When determining the minimum qualification threshold, it is important to select a value that will neither include nor exclude an unfair number of sites. It was seen that for the two classifications and two likely posted speeds, no single speed threshold would suffice. **Exhibit 4-2** shows the cumulative frequency of the 85th percentile speed for each of the two roadway classifications. It can be seen that for Local Roads in particular, setting a threshold of 40 km/h would include all of the studied roads, while setting it at 50 km/h would include about 50% of the roads. Likewise, a minimum threshold of 40 km/h would qualify every Collector. Again, caution should be exercised when interpreting the data presented in the exhibit, particularly with the local roads, given the small sample size.

Exhibit 4-2: 85th Percentile Speed Cumulative Frequency Curves

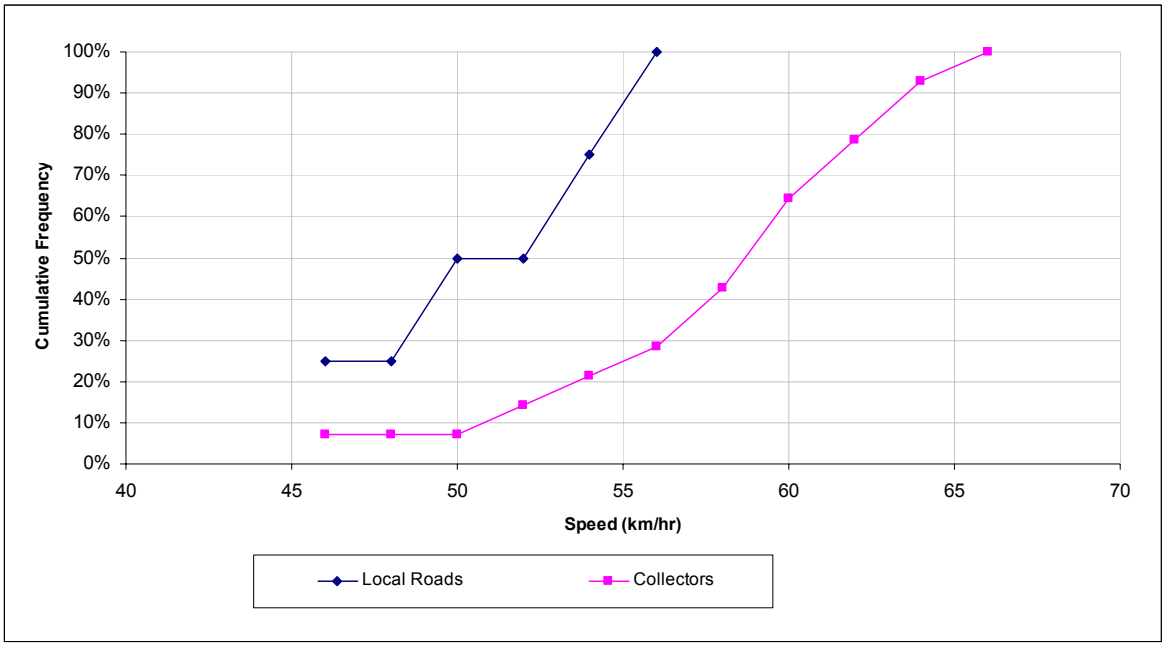


Exhibit 4-3 shows that when the posted speed limit is used as the speed threshold, 89% of the studied roadways will meet this portion of the traffic calming warrant. 100% of 40 km/h roadways satisfy the criteria, as well as 92% of 50 km/h Collectors. These results do not mean that the roads will automatically qualify for traffic calming, as the volume component of the warrant must also be satisfied. Pilot testing of volumes is discussed in the following section. **Based on the results of the pilot testing, IBI Group recommends using the posted speed limit as a minimum threshold for this warrant.**

Exhibit 4-3: Pilot Testing: Qualification Based on 85th Percentile Speed Greater Than Posted Speed

Roadway Type	Posted Speed	Total Sites	Number Qualifying	Percentage Qualifying
Collectors	40 km/h	2	2	100%
Local Roads		2	2	100%
Collectors	50 km/h	12	11	92%
Local Roads		2	1	50%
All Roads	**Varies**	**18**	**16**	**89%**

4.2 Volume

As with speeds, pilot testing the volume component of the warrant consisted of determining the appropriate minimum threshold for qualification. The previously completed Best Practices Report notes that many jurisdictions use two-way ADT volumes of 900 vehicles for Local Roads and 2,000 vehicles for Collectors. There is no prevailing convention for arterial roadways, as many jurisdictions do not permit traffic calming on any arterial roadways. However, roads in Sudbury that are classified as Tertiary Arterials are similar to (major) Collectors in other jurisdictions.

For this pilot test, the percentage of qualifying sites was plotted against various volume thresholds, as shown in **Exhibit 4-4**. It can be seen that nearly 60% of analyzed local roads would qualify with a minimum threshold of 900 vehicles. Given the small sample of local roads, it is anticipated that this percentage would decrease if more sites were analyzed, and therefore, **it is recommended that Sudbury use 900 as the minimum AADT for qualifying local roads**.

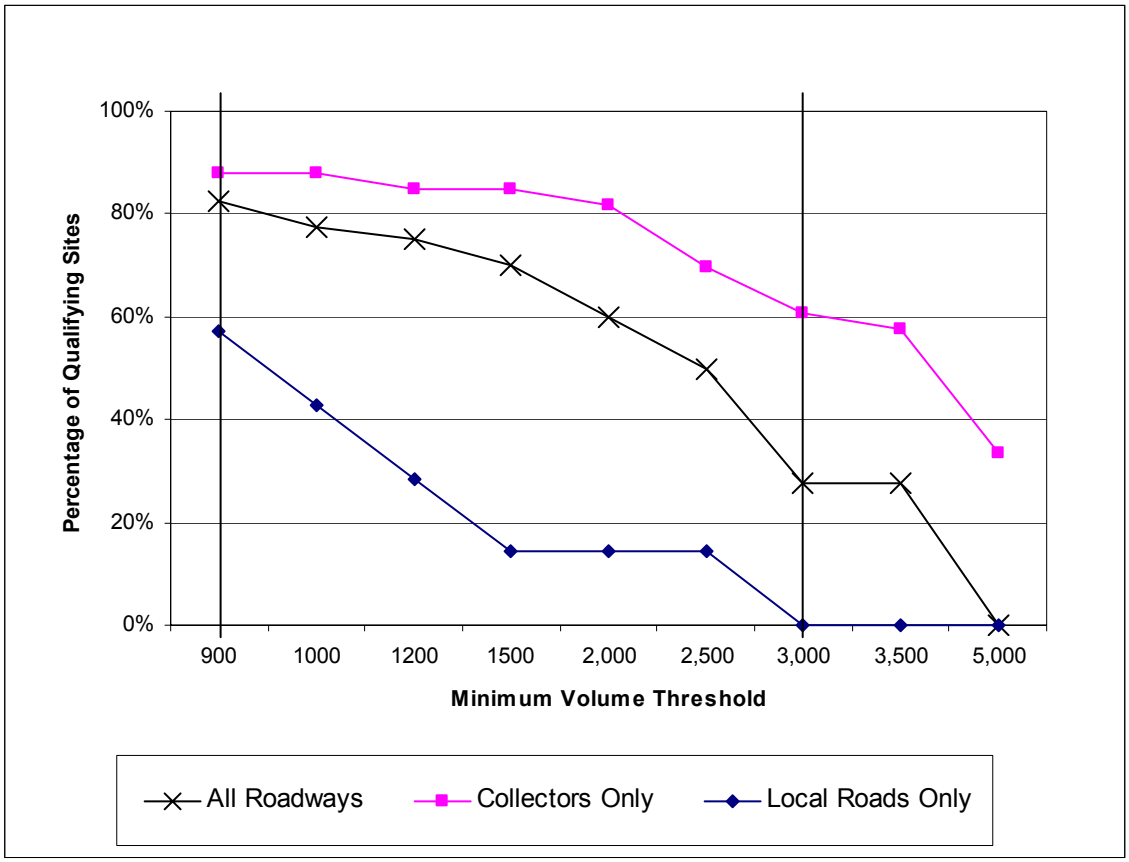
3,000 vehicles is an appropriate threshold for Collectors, with 60% of sites qualifying. Once the threshold reaches 3,500 vehicles, the number of qualifying sites drops significantly. As previously noted, 2,000 vehicles is a common threshold in other jurisdictions. If the city undertakes additional pilot testing of collectors and it is determined that too few sites qualify for traffic calming, this threshold can be lowered, although it is not recommended to lower it below 2,000 vehicles.

As noted above, no data was provided for tertiary arterials. IBI Group recommends that Sudbury follow the approach of other jurisdictions when dealing with major collectors or minor arterials and set a minimum threshold of 5,000 vehicles per day.

To summarize, the following volume thresholds were carried forward:

- Local Roads: 900 vehicles per day;
- Collectors: 3,000 vehicles per day; and
- Tertiary Arterials: 5,000 vehicles per day.

Exhibit 4-4: Pilot Testing: Volume Threshold Curves



4.3 Speed + Volume

The warrant is structured such that a site needs a combination of both speed and volume to pass the initial qualification process. The next step in the pilot testing was to use the thresholds discussed in **Sections 4.1** and **4.2** to determine how many of the 10 analyzed sites with both volume and speed data would qualify for traffic calming based on their two-way ADT and 85th percentile speeds, as well as the range of points the sites would receive based on the scoring process discussed in **Section 3.2**.

Exhibit 4-5 shows that 40% of all pilot tested sites would qualify for traffic calming based on these thresholds. The qualification percentage of the individual classifications is also shown.

Exhibit 4-5: Pilot Testing: Qualification & Scoring Based on Speed and Volume

Classification	Number of Sites	Number Qualifying	Percentage Qualifying	Minimum Score	Average Score	Maximum Score[3]
Collector	6	2	33%	26.11	29.28	32.44
Local Road	4	2	50%	17.88	20.79	23.70
All Roads	10	4	40%	17.88	25.03	32.44

[3] Combination of speed and volume. Remaining score out of 100 is made up of other factors discussed in **Section 3.2.1.**

Despite the small sample size, 40% qualification based on a combination of speed and volume is in line with similar work in other jurisdictions. The percentage may appear high, but it is important to note the range of scores shown in **Exhibit 4-5** and consider that simply qualifying for traffic calming is no guarantee that a site will ever rise to the top of the candidate sites and actually proceed to the design and implementation phase. When all factors are considered, the maximum score for any site is 100 points. Up to 40 points may be received for speed and volume alone for a collector (up to 35 points for a local road). It is unlikely that most sites receiving an average or below average score for speed and volume will be able to make up the points elsewhere.

In conclusion, it was determined that if the 85th percentile speed of a site is higher than the posted speed limit, and if the road is carrying volumes higher than a determined threshold, it is prudent to at least consider it for traffic calming.

4.4 Inclusion of Crashes and Block Length

As noted above, all 48 collector roadways included collision data and block length, two additional components of the warrant process. **Exhibit 4-6** shows the scores of these 48 collectors when all provided information is incorporated into the recommended warrant scoring. As indicated in **Exhibit 3-5**, the maximum category scores for collectors and tertiary arterials are as follows:

- Traffic Volumes – 20 points;
- Traffic Speeds – 20 points;
- Collisions – 15 points; and
- Block Length – 10 points.

It can be seen that applying the warrant criteria to these sites yields a wide scoring range, which satisfies the intent of the warrant to create a process whereby some sites qualify for traffic calming, but not all of those sites will score so highly as to rise to the top of the implementation list.

Exhibit 4-6: Pilot Testing Including Crashes and Block Length

Category	Number of Sites	Possible Score	Minimum Score	Average Score	Maximum Score
Volume Only	30	45.00	2.00	21.74	36.60
Speed Only	8	45.00	7.66	16.24	32.90
Volume + Speed	10	65.00	10.00	29.60	50.24

5. TRAFFIC CALMING WARRANT SPREADSHEET TOOLS

As part of this assignment, IBI Group developed two spreadsheets for the City of Greater Sudbury to use in the traffic calming warrant process. These spreadsheets consist of an analysis worksheet tool and a summary report generator. The two files, along with a City of Greater Sudbury logo, should be saved to the same folder on the City of Greater Sudbury network.

5.1 Traffic Calming Warrant Analysis Worksheet

The Traffic Calming Warrant Analysis Worksheet is designed to aid City staff in determining if a site is eligible for traffic calming. The worksheet is divided into four sections, as shown in **Exhibit 5-1**.

Exhibit 5-1: Traffic Calming Analysis Worksheet

Greater Sudbury
Roads and Transportation Services
Traffic Calming Warrant Analysis Worksheet

1.

Today's Date (yyyy-mm-dd)	
Analyst	
Location	
Road Type	Local Road
Posted Speed	
Requested By	
Description of Complaint	

2.

Preliminary Screening		
Criteria	**Value**	**Result**
Grade		
Collision History		
Traffic Speeds		
Non-Local Traffic		
Traffic Volume		

3.

Evaluation Scoring and Ranking		
Criteria	**Value**	**Points**
Collision History		
Traffic Speeds		
Non-Local Traffic		
Traffic Volumes		
Pedestrian Generators (school, park, etc to be defined by Sudbury		
Does the location have sidewalks?		
Is the location a primary EMS Route?		
Is the location an existing or planned Transit Route?		
Block Length		
Adjacent Land Uses (residential)		

4. Save File and Start Another | Save File and Close | Clear All

1. General Information

– **Today's Date:** used for sorting and determining the new eligibility date for sites that fail to meet the minimum criteria;

- **Analyst:** City of Greater Sudbury staff name;
- **Location:** Descriptive information about the site;
- **Road Type:** Drop-down box with five choices: Local Road (default), Collector, Tertiary Arterial, Arterial, Other;
- **Posted Speed:** Speed limit in km/h. (Do not type 'km/h' when entering data into this field; it will be automatically added by Excel);
- **Requested By:** The name of the resident, group or business requesting traffic calming; and
- **Description of Complaint:** Text field for entry of problem/complaint.

2. **Preliminary Screening.** This is the initial criteria that will determine if the site is eligible for traffic calming:

   - **Grade:** Enter The grade of the subject roadway as a percentage (do not type '%'; it will be automatically added by Excel);
   - **Collision History:** The number of collisions in the past three years involving vulnerable road users (primarily pedestrians and cyclists) and/or which could be potentially corrected by traffic calming measures;
   - **Traffic Speeds:** The 85th percentile speed of the subject location (do not type 'km/h'; it will be automatically added by Excel);
   - **Non-Local Traffic:** Percentage of traffic as defined in **Section 3.2** (do not type '%'; it will be automatically added by Excel); and
   - **Traffic Volume:** Two-way ADT of the road.

   Built-in logic provides instructions and guidance to the analyst when entering data into this portion of the spreadsheet. For example, if the grade is greater than eight percent, the spreadsheet will indicate that the location is not eligible for traffic calming. Similarly, the spreadsheet tracks the compliance of the speed and non-local traffic prior to the user entering the ADT of the road.

   The spreadsheet also validates the entered data to ensure that it falls within pre-defined ranges, in order to limit improper data entry.

3. **Evaluation Scoring and Ranking.** If Section 2 of the spreadsheet indicates "Proceed to ranking section," the site is eligible for traffic calming.

   If Section 2 reads: "This location is not eligible for traffic calming," Section 3 does not need to be completed.

   This section is then used to enter additional data that will score and rank the site against other sites. It incorporates the following:

   - **Collision History, Traffic Speeds, Non-Local Traffic and Traffic Volumes:** These values are automatically imported from Section 2 of the spreadsheet;

- **Pedestrian Generators:** The drop-down box lets the user select between '0', '1' or '2 or more.' Pedestrian generators are defined as schools and parks, although the City of Greater Sudbury may choose to add additional generators to the approved list;

- **Sidewalks:** A drop-down box offers the choice of 'Yes – Both Sides,' 'Yes – One Side' or 'No' and assigns the appropriate points;

- **Emergency/Transit Route:** drop-down boxes allow the user to select 'Yes' or 'No' for these categories;

- **Block Length:** this is the length in metres of the subject block between stop-control points (do not type 'm'; it will be automatically added by Excel); and

- **Adjacent Land Uses:** Enter the percentage of residential land use within the study area (do not type '%'; it will be automatically added by Excel).

Logic built into the spreadsheet will populate the 'Points' column and maintain a running sum as the user moves through this section. Data validation similar to Section 2 again attempts to limit the entry of incorrect data.

*If the total score is less than 30 points, the spreadsheet will indicate that the site is not eligible for traffic calming based on score, as discussed in **Section 3.2**.*

4. **Macro buttons.** Since the Analysis Worksheet is read-only and protected, these buttons are used to save individual files and clear the worksheet.

   - **Save File and Start Another:** This button saves the current file into the current directory with a pre-determined naming convention of '[location] – [date].xls.' The location and date are automatically inserted into the filename from data entered in Section 1. The newly saved file is then closed, and the Analysis Worksheet is cleared of data and re-opened for analysis of the next site.

     Example: if the location is Southview Drive and the analysis date is August 12, 2008, clicking this button will save the file as 'Southview Drive 2008-08-12.xls'

   - **Save File and Close:** This button will save the file as described above, clear the data and close the analysis worksheet. It is intended to be used when the last site is entered in a particular session.

   - **Clear All:** This button will clear all fields of their data and reset the Road Type field to 'Local Road.' It does not save the worksheet.

5.2 Traffic Calming Warrant Summary Table Generator

This file contains code that generates a summary report of the Traffic Calming Warrant Analysis Worksheets. This file must be saved in the same folder as the worksheets. The macro extracts data from the worksheets, summarizes it in a new sheet within the same file and sorts it based on total score, as shown in **Exhibit 5-2**.

Exhibit 5-2: Traffic Calming Warrant Analysis Summary Report

City of Greater Sudbury
Roads and Transportation Services
Traffic Calming Warrant Analysis Summary Report

Analysis Date	Analyst	Location	Road Type	Posted Speed	Requested By	Nature of Complaint	Score	Eligibility Date
2008-07-04	AA	Test 5	Collector	50	Resident	[Issue]	89.7	
2008-07-03	AA	Test 4	Collector	40	Resident	[Issue]	72.4	
2008-07-02	AA	Test 3	Local Road	40	Resident	[Issue]	67.8	
2008-08-07	AA	Test 6	Tertiary Arterial	50	Resident	[Issue]	43.1	
2008-07-02	AA	Test 2	Local Road	50	Resident	[Issue]	35.8	
2008-06-25	AA	Test 1	Collector	50	Resident	[Issue]	Not Eligible	2010-06-25
2008-08-08	AA	Test 7	Collector	50	Resident	[Issue]	Not Eligible	2010-08-08

The header and footer are automatically generated, and the new worksheet is ready for printing. The new worksheet can also be copied and pasted into another Excel file or other document.

The code extracts data from any spreadsheet in the folder containing a worksheet named 'input sheet.' Care must therefore be taken in worksheet naming if the City wishes to include other (i.e. non Traffic Calming) spreadsheets in the same folder.

The number of years of ineligibility for sites that fail the warrant is user-defined by the value in cell C15 of the worksheet. The summary table will use this number to determine the new eligibility date.

If more than one report is to be generated in the same day (e.g. after new sites have been entered) the summary sheet must be renamed or deleted before the second report is generated.

6. ANTICIPATED LEVEL OF STAFF EFFORT

This traffic calming warrant has been specifically designed to require a similar level of effort to a traffic signal warrant. That is, once all of the required input data has been collected, running the warrant spreadsheet should only be a matter of minutes. Much of the required input data is information that is expected to be readily available, e.g.:

- Presence or absence of transit or emergency routes;
- Block length between controlled intersections;
- Land use data;
- Pedestrian facilities and pedestrian generators; and
- Collision data.

In many cases, the city will have volume and speed data already on hand for the location. For those locations where this data is not available, it will need to be collected prior to warrant analysis. As discussed above, the most resource-intensive component of the data collection will be the determination of non-local traffic. This report provides guidance on four different methods of estimating non-local traffic percentages.

Once a site is selected for further study, additional effort will be required. The anticipated extent of this effort will be discussed in the traffic calming policy deliverable of this assignment.

7. CONCLUSION

This report represents a major component of the City of Greater Sudbury's upcoming Traffic Calming Policy. It provides a framework by which requests for traffic calming can be screened for consideration and then scored and ranked against each other. The policy document, when complete, will also provide guidance for the selection of appropriate traffic calming measures and outline a process by which sites selected for consideration will move through the design, approval and implementation stages.

As noted elsewhere in this report, no standard traffic calming warrant exists in North America, and various jurisdictions have developed their own warrants tailored to suit their particular needs. While the traffic calming warrant developed through this study incorporates elements of other jurisdictions' warrants, care was taken to ensure that the warrant meets the needs and concerns of Sudbury, through:

- The inclusion of screening and evaluation factors approved by City of Greater Sudbury staff;
- A consultation process between IBI Group, the City of Greater Sudbury and the public; and
- Extensive pilot testing of warrant criteria based on traffic and roadway data collected by the City.

Exhibit 3-4 and **Exhibit 3-5**, discussed previously, summarize the scoring criteria for Local Roads and Collectors/Tertiary Arterials, respectively. When properly applied, the warrant and associated spreadsheet tools will assist the City of Greater Sudbury's response to future traffic calming requests through a standardized and streamlined process.

APPENDIX A

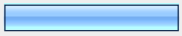
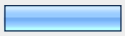
TRAFFIC CALMING WARRANT SURVEY RESPONSES

Sudbury City-Wide Traffic Calming Policy - Summary of 23 Online Questionnaire Responses

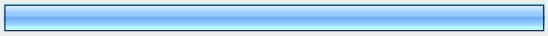
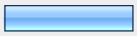
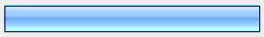
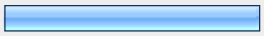
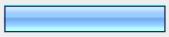
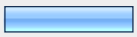
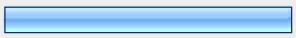
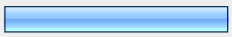
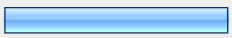
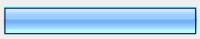
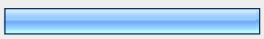
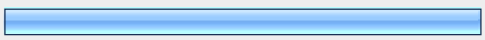
1. Based on your observations, please tell us how significant the following traffic issues are in your neighbourhood:				
	Very Significant	**Somewhat Significant**	**Not Significant**	**Response Count**
High traffic speeds	**77.3% (17)**	13.6% (3)	9.1% (2)	22
High volume of cut-though (non-local) traffic	**63.6% (14)**	4.5% (1)	31.8% (7)	22
Crashes (actual or near-misses)	**45.5% (10)**	27.3% (6)	27.3% (6)	22
Danger to pedestrians and bicyclists	**59.1% (13)**	18.2% (4)	22.7% (5)	22
Difficulty in leaving or entering your driveway or street	**45.5% (10)**	13.6% (3)	40.9% (9)	22
			answered question	**22**
			skipped question	**1**

2. Please describe the perceived issue in detail. For example, include a description of the issue, the location, time of day, and days of week. If you perceive an issue that is different from those listed above, please describe it.		
#	**Response Date**	**Response Text**
1.	5/12/2008 9:11:00 PM	high volume of industrial vechicles,high volume of all types of vechicles
2.	5/13/2008 11:49:00 PM	Very difficult exiting driveway during peak hours 8:00 to 9:00 a.m. and 5:00 to 6:00 p.m.
3.	5/15/2008 1:19:00 PM	Motor vehicles are bypassing slow traffic on Southview Drive and re-routing to Robinson Drive to get to Kelly Lake Road.
4.	5/16/2008 8:59:00 PM	We have to back into the driveway as we are not able to back out on to the street most of the time. Both the amount of traffic and the speed makes it very difficult to back out. Some drivers are very courteous while many others are not. A slow down -hidden driveway sign would be helpful.
5.	6/2/2008 2:19:00 PM	alternate roue to Lasalle Blvd
6.	6/3/2008 1:47:00 PM	A few years ago, in crossing Bouchard St. from Southview Dr. I was nearly hit by fast moving vehicle swinging around the Southview curve heading down Bouchard St. hill. A serious car accident occurred at that 3 way intersection awhile ago with a driver suffering a back injury. It used to be difficult to cross during the hours between 4 and 6 P.M., but now it's all the time; a steady stream of cars coming all 3 ways. Because of the steep hill cars speed up starting at Marcel St. Please remove the Bouchard St./Marcel St. playground as it is too dangerous an area now with so much fast traffic going up and speeding down that Bouchard St. hill.
7.	6/25/2008 5:10:00 PM	Thre is no stop sign from Gloria's Restaurant to the convenience store at Kelly Lake Road. We live on Cranbrook Cres & I have had cars pass me on the left hand side while I was at a full stop waiting for oncoming traffic to clear before making a left hand turn onto my street. Our son was hit by a car at age 11 at the stop on Kelly lake rd & southview while delivering flyers for the Northern life. Drivers have NO consideration for pedestrians, bike riders or older adult walkers. There are few crosswalks on Southview which has many students walking to Lockerby, MacLeod Public, Corpus Christi and the school on Stephen street. Drivers ignore the crosswalks that are there. And if you stop for a pedestrian already in the crosswalk you risk being rear ended by an impatient driver. There is a park (Robinson Lake) & lots of people use it for sports, to play on the equipment (or bocce or skating) & Southview is a great walking/biking route except for the drivers. (You guys did a GREAT job in getting rid of the big trucks -Thanks!)
8.	7/2/2008 3:26:00 PM	I'm at 1495 Southview, near Bouchard St. The traffic from Bouchard comes up an incline on a curve, making it hard to see. Added to that is Southview curves again just as the traffic enters off Bouchard. My home is within the curve, i.e. Southview curves again just past my home so I'm also blind to traffic on that side. Pulling out of my driveway is a life-threatening experience due to the high speeds, high volume at peak times and high snow banks in the winter. The new "slow down" flashing signs worked for a couple of days to somewhat ease the problem, but they don't address the main issue of the curve in the road and the traffic coming from the Bouchard end of the street.

2. Please describe the perceived issue in detail. For example, include a description of the issue, the location, time of day, and days of week. If you perceive an issue that is different from those listed above, please describe it.		
9.	9/3/2008 12:58:00 PM	Coming up or Down Lasalle Blvd(by pass) to Notre Dame is HORRIBLE. The lights only stay green for maybe 10 vehciles (5 per lane) to get through before it turns red. Why not let people sit another 30 seconds to 1 min and let 50 vehciles through... To sit on Lasalle to do up the bypass and v.s. for 20 mins is totally unnecessary. Sudbury has the WORST light system I and may others have encountered, if you have a turn left light let the through wait and let both sides turn left, then RED that light and let both sides go through, this waiting 4 lights to let 10 cars through is pure noncense!!!! have someone sit at this intersection on a work morning and night and access this situations

3. Have you or anyone you know requested traffic calming for your street or neighbourhood?			
		Response Percent	**Response Count**
Yes		**54.5%**	12
No		27.3%	6
Unknown		18.2%	4
	answered question		**22**
	skipped question		**1**

4. What was the outcome or current status of the request?		
#	Response Date	Response Text
1.	5/12/2008 9:12:00 PM	nothing, we missed the deadline for stop signs, i request stop signs and this is what i got calming study
2.	5/13/2008 12:32:00 PM	None at first. Temporary radar sign indicating speed being travelled on 2 separate occasions.
3.	5/13/2008 11:49:00 PM	Pilot project being conducted for my street (Southview Drive between Janmar & Bouchard).
4.	5/16/2008 9:00:00 PM	A number of years ago, my nextdoor neighbour and I went to the police station to complain about the speeding and traffic. I volunteered to have the police set up in the driveway and was told they could not as it was too dangerous.
5.	6/3/2008 1:47:00 PM	It is being worked on, but not fast enough for my liking.
6.	6/17/2008 2:45:00 AM	none
7.	6/20/2008 10:06:00 AM	no action.
8.	6/24/2008 11:50:00 PM	city is working on it
9.	6/25/2008 2:18:00 AM	unresolved
10.	6/25/2008 5:13:00 PM	Aparent lack of traffic on Cranbrook to warrant a stop sign. We know that- that is the appeal of the neighbourhood. What we want is a stop sign so the drivers will slow down. Please put in a crosswalk so we can get to the bus stop safely & so the school kids can cross the street. Or get our police to patrol the area more frequently & fine some speeders!
11.	7/2/2008 3:28:00 PM	New signs near Cranbrook calmed the traffic at that end for a few days but nothing is done at the Bouchard end of the street.

5. Please check the traffic calming devices you have experienced, either in Sudbury or elsewhere:			
		Response Percent	Response Count
"Traffic Calmed Neighbourhood" Sign		35.0%	7
Speed Hump		**85.0%**	17
Mini Roundabout		20.0%	4
Raised Crosswalk		40.0%	8
Traffic Circle		40.0%	8
Raised Intersection		25.0%	5
Chicane		20.0%	4
Raised Median		45.0%	9
Curb Extension		35.0%	7
Traffic Diverter		5.0%	1
Intersection Bump-Out		35.0%	7
Directional/Full Closure of Roadway		30.0%	6
Lane Narrowing		40.0%	8
On-Street Parking		75.0%	15
	answered question		**20**
	skipped question		**3**

6. Please describe your experiences -- positive or negative -- with one or more of the measures you checked in Question 5:		
#	**Response Date**	**Response Text**
1.	5/12/2008 9:15:00 PM	vechicle will get hit by other vechilces if parked on the street two accedints in front of 1642 southview dr in the past 4 years is this acceptable
2.	5/13/2008 11:56:00 PM	Traffic Calming in Toronto on Yonge Blvd between Yonge St. & Wilson. Speed humps and four way stops on Jedburgh Rd which runs parallel to Yonge St. in the Yonge/Lawrence/ Yonge Blvd area of Toronto.
3.	5/15/2008 1:23:00 PM	All were positive in that they seemed to slow traffic down.
4.	6/3/2008 1:47:00 PM	I didn't have a problem with any of the above devices. Windemere St in Beaconsfield Quebec recently put in speed bumps and they are annoying, but slow down traffic.
5.	6/17/2008 2:46:00 AM	positive
6.	6/20/2008 10:06:00 AM	their effective ways to control traffic
7.	7/2/2008 3:30:00 PM	Most of the measures I've experienced are in communities that don't get the level of snow we do, so I think snow removal would be an even bigger problem than it is now. Perhaps a chicane just before my home would give me a chance at pulling out of the driveway safely.

7. Please rank the traffic calming criteria that Sudbury may consider as part of its policy and ranking/prioritization process. The criteria should be ranked from 1 (Most Important) to 10 (Least Important) in their order of importance to you.

	1 (Most Important)	2	3	4	5	6	7	8	9	10 (Least Important)	Response Count
Traffic Speeds	**46.2% (6)**	23.1% (3)	23.1% (3)	0.0% (0)	0.0% (0)	0.0% (0)	7.7% (1)	0.0% (0)	0.0% (0)	0.0% (0)	13
Traffic Volumes	**28.6% (4)**	21.4% (3)	0.0% (0)	**28.6% (4)**	21.4% (3)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	14
Collision History	0.0% (0)	20.0% (2)	**30.0% (3)**	20.0% (2)	0.0% (0)	0.0% (0)	20.0% (2)	10.0% (1)	0.0% (0)	0.0% (0)	10
Diverted ("Cut-Through") Traffic	9.1% (1)	9.1% (1)	18.2% (2)	18.2% (2)	**27.3% (3)**	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	18.2% (2)	11
Road Classification (Arterial, Collector, Local Road) and Grade	0.0% (0)	0.0% (0)	11.1% (1)	11.1% (1)	**22.2% (2)**	0.0% (0)	**22.2% (2)**	**22.2% (2)**	0.0% (0)	11.1% (1)	9
Adjacent Land Uses	0.0% (0)	0.0% (0)	10.0% (1)	10.0% (1)	0.0% (0)	20.0% (2)	0.0% (0)	**30.0% (3)**	10.0% (1)	20.0% (2)	10
Pedestrian Generators (e.g. parks, schools) and Facilities (e.g. sidewalks)	15.4% (2)	15.4% (2)	15.4% (2)	7.7% (1)	**30.8% (4)**	0.0% (0)	15.4% (2)	0.0% (0)	0.0% (0)	0.0% (0)	13
Residential Consultation and Support	16.7% (2)	8.3% (1)	0.0% (0)	0.0% (0)	0.0% (0)	16.7% (2)	16.7% (2)	0.0% (0)	**25.0% (3)**	16.7% (2)	12
Emergency Services and Routes	16.7% (2)	8.3% (1)	8.3% (1)	0.0% (0)	8.3% (1)	**25.0% (3)**	16.7% (2)	8.3% (1)	8.3% (1)	0.0% (0)	12
Transit Services and Routes	7.1% (1)	0.0% (0)	14.3% (2)	14.3% (2)	0.0% (0)	14.3% (2)	0.0% (0)	**21.4% (3)**	14.3% (2)	14.3% (2)	14
										answered question	**19**
										skipped question	**4**

8. If there is any other criteria that you think we have missed, please describe it here and also tell us how important it is to you on a scale of 1-10.		
#	**Response Date**	**Response Text**
1.	5/12/2008 9:18:00 PM	industrial traffic rated a 4
2.	5/15/2008 1:31:00 PM	Iit would be important to include a supporting policy for maintanence of the traffic calming item as well as an evaluation component.
3.	6/25/2008 5:17:00 PM	consideration for the largest segment of the population driving -the older adults who may be driving slower. Our roads are not a raceway- Please get drivers to slow down10
4.	9/3/2008 1:00:00 PM	traffic light timining

9. Please provide any other comments you feel may be relevant to the development of a traffic calming policy -- including a warrant, ranking and prioritization process -- for the City of Greater Sudbury.		
#	**Response Date**	**Response Text**
1.	5/12/2008 9:19:00 PM	Circle of study has to be larger
2.	5/15/2008 1:36:00 PM	It would be important to abide by the pholosophy that dangerous areas should be managed as a priorty instead of removing pedestrian infrastructure.
3.	5/16/2008 9:04:00 PM	It is important to maintain parking on one side of the road or the other.
4.	6/25/2008 5:19:00 PM	consider working with the police to assist in your traffic calming policies. Perhaps just in the beginning to let drivers know that lifestyle issues are important in our cities.
5.	7/2/2008 3:36:00 PM	It isn't enough for the decision makers at City Hall to look at a map. They need to get out a visit the areas and watch the traffic and see for themselves where road design is contributing to the problem.

Summary of 34 Handwritten Questionnaire Responses

1. Based on your observations please tell us how significant the following traffic issues are in your neighbourhood.

	Very Significant	Somewhat Significant	Not Significant
High Traffic Speeds	22	7	2
High volume of cut-through (non-local) traffic.	20	5	6
Crashes (actual or near misses)	8	10	10
Danger to pedestrians and bicyclists	21	8	1
Difficulty in leaving or entering your driveway or street.	15	8	8

2. Have you or anyone you know requested traffic calming for your street or neighbourhood?

Yes: 13 **No:** 18 **No reply:** 1

3. If so, what was the outcome or current status of the request?

This meeting.
None.
Joe Cimino has held meetings.
Unknown.
Still being considered.
Mr. Cimino organized last meeting – he was listening to constituents problems.
Very little.
Nothing Done.
Don't know. Spanish River has been allowed to have MINE trucks trucking 24/7, going stupid speeds on a small road. Nothing (has been done).
City police set up trap at Kelly Lk & Southview periodically but they can't be there all the time. Therefore alternative solutions required.

Nothing.
Traffic hazards were reduced for a time.

4. Please check the traffic calming devices you have experienced, either in Sudbury or elsewhere:

Traffic Calmed Neighbourhood Sign	6	Speed Hump	21
Mini roundabout	8	Raised Crosswalk	8
Traffic Circle	12	Raised intersection	4
Chicane	0	Raised Median	7
Curb Extension	3	Traffic Diverter	2
Intersection Bump-Out	4	Directional/Full Closure of Roadway	7
Lane Narrowing	7	On-Street Parking	6

5. Please describe your experiences – positive or negative – with one or more of the measures you checked in Question 4.

If trucks can not be stopped from going through – not much else can be done. I have been complaining about trucks for 5 years.
The circle was a pain to drive through, so we avoided it. Speed reduction (not mentioned above) – only one we saw evidence of success.
The traffic and speed on this street is a joke!
All were positive in Ottawa – we just slowed down.
Trouble to get in and out of driveway
Speed Humps – does slow traffic – but very dangerous for those not familiar with location.
Obviously traffic has to slow down to navigate these devices.
Very little experience to make an opinion.
1. Traffic circles create car merging problems especially if people are not familiar with the area. 2. Speed humps cause maintenance problems with small tires. The mud flaps on each wheel hit the humps and get damaged.
Did Slow Traffic

Speed hump - Very effective
Only one I have issue with is the speed bump. Some of them seem too rough even at low speeds.
The 'speed hump' method out in New Sudbury residential area and numerous "Stop Signs" tends to persuade people to use alternative main routes instead…
Humps are too high causing car damage to surprised drivers.
(Speed hump) useful near pedestrians/children.
Tankers, transports should not be allowed to pass thru Lively. Most other cities do not allow this. Reasons – air pollution, noise pollution, hazardous chemicals – INCO, heavy traffic. Existing by-pass adds approx. 1 km to INCO and Tankers full of waste…
Signs are easily ignored, maybe combined with reduced residential speed limits – see 30km/h in T.O.
Speed humps – positive. Slows traffic down. Traffic Neighbour sign – works only for local traffic.
Lane Narrowing and closure of roadways are frustrating. Roundabouts are good.
Traffic circles – positive since you have to yield to oncoming traffic therefore have no choice but to slow down.
Mostly negative.
Speed bump: forces drivers to slow down temporarily.

6. Please rank the traffic calming criteria that Sudbury may consider as part of its policy and ranking/prioritization process. The criteria should be ranked from 1 (most important) to 10 (least important) in their order of importance to you:[1]

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Traffic Speeds	22	2	1		2	1				
Traffic Volumes	20	3	1	1	2	1				
Collision History	5	4	1	1	4	2	2		1	1
Diverted ("Cut-Through") Traffic.	12	1	2	1	3	1	1	1	1	
Road Classification (arterial, collector, local road) and Grade	9	2		2	3		1	1	1	2
Adjacent Land Uses	7	3	1	1	4					5
Pedestrian Generators (e.g. parks, schools) and Facilities (e.g. sidewalks)	11	6	2	1	2	2				
Residential Consultation and Support	11	4	1	1	1	3		2		
Emergency Services and Routes	10	5	1	1	5	1			1	
Transit Services and Routes	11	4	5	1	3					1

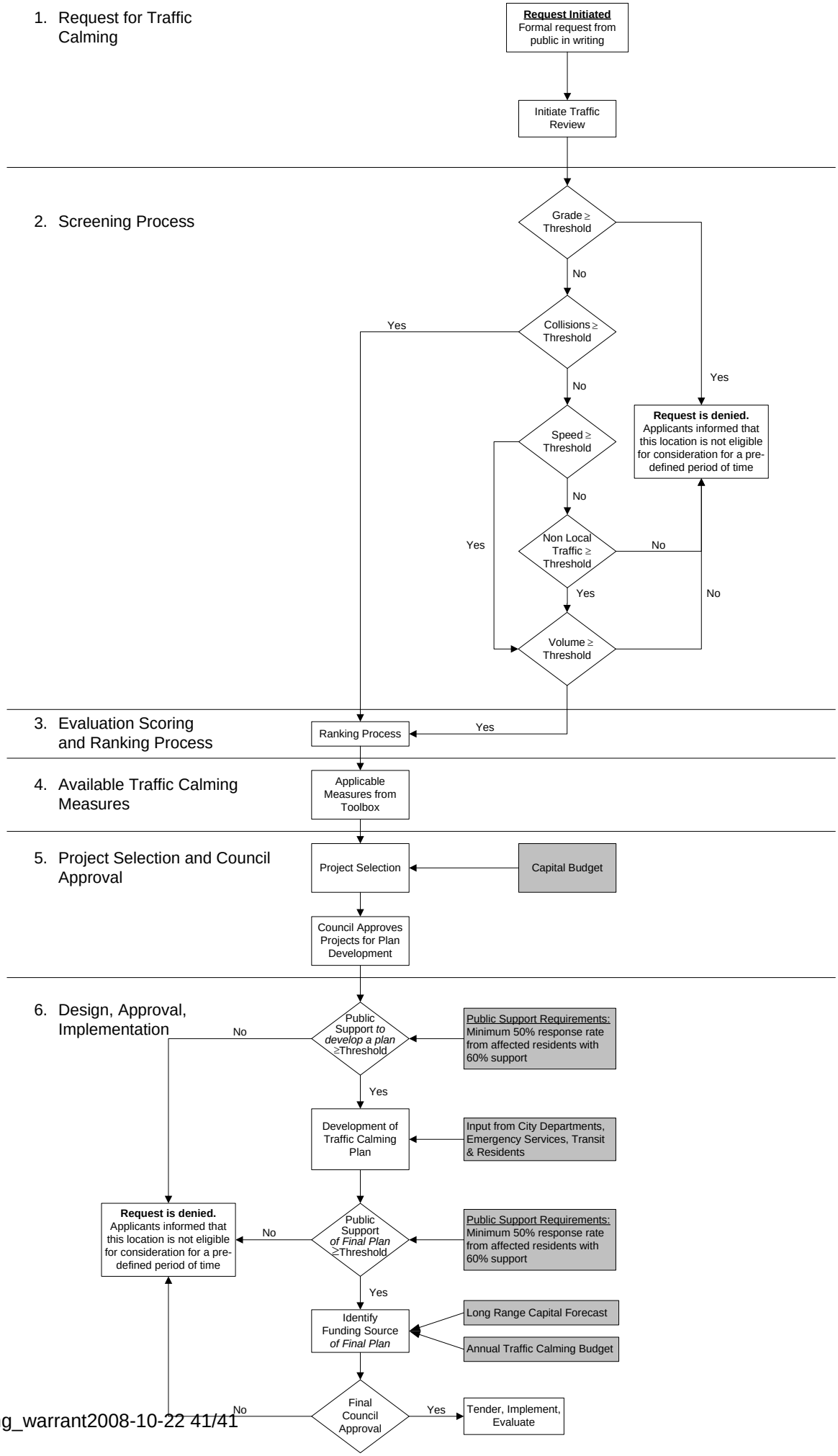
[1] 19 respondents answered this question; however, only three answered the question as it was presented. Respondents were to select one criteria for each ranking, i.e. one criteria would be 'most important' (rank #1), one criteria would be 'least important' (rank #10), etc. 19 respondents selected multiple criteria for a given ranking, e.g. some respondents selected each criteria as 'most important.' The results in this table are the raw rankings as submitted by the respondents. The online responses were collected as intended, as the program forced respondents to only select one criterion for each rank. This is discussed further in **Section 3** of this report.

7. Please provide any other comments you feel may be relevant to the development of a traffic calming policy – including a warrant, ranking and prioritization process – for the City of Greater Sudbury.

You must keep in mind people will walk & bike if space is created. One example of that is the boardwalk in Bell Park. People use it. Sudbury wants an improved image from a 'moonscape'. Creating non-motorized trails and routes will help that.
1.) The weight and the physical size of the city buses causes high vibration in my house when passing on the street. 2.) Years ago, City buses didn't run on Stephen St. as there are no bus signs on the street. 3.) The street is rough and the large buses create excessive vibration in people's homes.
There would be less traffic if the Barrydowne extension went through.
More enforcement.
Traffic Volume (#1) and Traffic Speed (#2) are the top priorities!!! Between the hours of 8:30 -9:30 am and 2:45 to 3:45 pm it is particularly busy due to schools and Bale Inco employees get off from work and traffic from outlying areas ie. Lively etc.
Policy needs to consider smooth flow of traffic; with the needs of the residents within the area of concern, to be respected.
Radar?
(Traffic issues are a) danger to pedestrians…particularly school children and elderly.
High traffic speeds on Elmview Dr. Just concerned with parking issues in summer at soccer time (evening). Soccer is behind the Valley East Library and people park all over. Including private property, daycare, public lawns, even the sidewalk.
Slow things down in residential areas. Promote **driver** responsibility in residential areas.
Please get the people going through yellow and red lights.
Get **"full"** service for buses out to Dowling. Students are **"forced"** to drive for lack of support from city.

APPENDIX B

RECOMMENDED TRAFFIC CALMING FRAMEWORK


1. Request for Traffic Calming
Request Initiated
Formal request from public in writing
Initiate Traffic Review
2. Screening Process
Grade ≥ Threshold
No
Yes
Collisions ≥ Threshold
No
Yes
Request is denied.
Applicants informed that this location is not eligible for consideration for a pre-defined period of time
Speed ≥ Threshold
No
Yes
Non Local Traffic ≥ Threshold
No
Yes
No
Volume ≥ Threshold
3. Evaluation Scoring and Ranking Process
Yes
Ranking Process
4. Available Traffic Calming Measures
Applicable Measures from Toolbox
5. Project Selection and Council Approval
Project Selection
Capital Budget
Council Approves Projects for Plan Development
6. Design, Approval, Implementation
Public Support to develop a plan ≥Threshold
No
Public Support Requirements: Minimum 50% response rate from affected residents with 60% support
Yes
Development of Traffic Calming Plan
Input from City Departments, Emergency Services, Transit & Residents
Request is denied.
Applicants informed that this location is not eligible for consideration for a pre-defined period of time
Public Support of Final Plan ≥Threshold
No
Public Support Requirements: Minimum 50% response rate from affected residents with 60% support
Yes
Identify Funding Source of Final Plan
Long Range Capital Forecast
Annual Traffic Calming Budget
Final Council Approval
No
Yes
Tender, Implement, Evaluate

City of Greater Sudbury

TRAFFIC CALMING POLICY

TECHNICAL MEMORANDUM #4

OCTOBER 2008

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1. INTRODUCTION

City of Greater Sudbury staff receive numerous requests each year for traffic calming features such as speed humps, curb extensions and raised intersections. The city currently has no process for responding to such requests. IBI Group has been retained by the City of Greater Sudbury to develop a traffic calming policy, including a warrant and prioritization process, which will aid City staff in the evaluation of these requests and the application of traffic calming devices.

1.1 What is Traffic Calming?

Communities throughout North America have experienced significant growth in traffic due to automobile dependence and urban sprawl. These trends in automobile travel have placed considerable strain on the roadway network's ability to safely accommodate all road users within the public right-of-way. In many cases, a lack of arterial road capacity has resulted in motorists choosing to use collector and residential roadways to circumvent a congested turning movement, intersection or corridor.

A number of negative traffic impacts result in some communities from inappropriate use of neighbourhood streets by drivers, including:

- Arterial road congestion results in motorists looking for parallel or alternative routes to reach their destinations;
- These parallel/alternative roads accommodate greater traffic volumes and begin to function as they were never intended. For example a local residential or collector roadway becomes a mid-block arterial road;
- Motorists operate vehicles at speeds which are not appropriate for the residential roadway and/or the roadside environment;
- The safety of all road users is decreased due to volume, speed and other compliance issues; and/or
- Enforcement resources are called upon to provide frequent enforcement of numerous problem areas and cannot sustain the level of enforcement to effectively address these traffic related issues.

In general, the above impacts typically occur in older established neighbourhoods next to busy traffic areas. However, traffic issues may also occur in newer subdivisions depending on the road network and adjacent activities. One response to these problems is the self-enforcing option of traffic calming devices. Traffic calming represents a component of traffic management techniques to reduce the impacts of traffic on neighbourhood communities and other public facilities such as parks, school areas, and community centres. Traffic calming has been used in North America to:

- Improve neighbourhood liveability;
- Increase road user safety; and
- Promote urban redevelopment.

1.2 Why is a Traffic Calming Policy Necessary?

The roadway network within the City of Greater Sudbury is a five-category hierarchy. In any jurisdiction, the roadway classification system is designed to establish the intended function of a given road. Sudbury's roadway classification system and associated functions are described as follows[1]:

- **Primary Arterial (Major Highway):** Connecting City with other major centres outside the City and/or interconnecting communities. Long distance person or goods movement. Travel through the City or between major activity areas within the City. Traffic movement primary consideration.

- **Secondary Arterial**: Connecting two or more communities or major activity centres; or Connecting between two primary arterial roads; or Connecting a community or activity centre with a primary arterial road. Trip origin and/or destination along it, an intersecting tertiary arterial, intersecting collector or a local street intersecting with the collector. Traffic movement major consideration

- **Tertiary Arterial**: Connecting small communities or Connecting communities to primary or secondary arterial leading to a recreational area. Trip origin and/or destination along it, an intersecting collector or a local street intersecting with the collector. Traffic movement major consideration

- **Collector**: Connecting neighbourhoods or Connecting a neighbourhood with an arterial road. Trip origin and/or destination along it or an intersecting local street. Traffic movement and land access of equal importance

- **Local**: Connecting properties within a neighbourhood. Trip origin and/or destination along its right-of-way. Traffic movement secondary consideration, land access primary function.

As a jurisdiction develops, neighbourhoods begin to mature and travel patterns develop. Some motorists may use a road or series of roads in a manner inconsistent with intended usage. The most common example is using local roads for through traffic, although travelling at high speed on lower speed roadways is also very common. The installation of traffic calming measures is a typical response to these situations, e.g. install speed humps in a road to slow traffic speeds.

Unfortunately, when traffic calming measures are applied without a governing policy, new problems may be created just as old problems are solved. Examples of these potential problems include:

- Traffic calming measures may cause traffic to divert into a different neighbourhood;

- Improperly designed measures may need to be removed shortly after installation; or

- Funding may be spent on a minor problem, while a major problem that is discovered later has no funding available for mitigation.

In light of the above, the City of Greater Sudbury's traffic calming policy is intended to:

- Avoid the above mistakes and inconsistencies that may result from piecemeal traffic calming implementation;

[1] The City of Greater Sudbury Official Plan (Meridian Planning Consultants and the Planning Services Division, adopted by City Council June 2006).

- Provide a process for the application of traffic calming measures throughout the city in a manner that is fair, reasonable, consistent and cost-effective;
- Provide a standardized process to address complaints regarding speeding and safety concerns;
- Provide a proactive tool to address concerns before they become complaints;
- Reduce the workload and duplication of effort for city staff in responding to traffic calming requests; and
- Encourage public involvement in the traffic calming activities.

The policy is not intended to address traffic calming implementations in new subdivisions or future developments. Developers should be required to incorporate traffic calming measures throughout their subdivisions and ensure they are consistent with the policy, i.e. appropriate for roadway classification and function.

1.3 Canadian Guide to Neighbourhood Traffic Calming

The *Canadian Guide to Neighbourhood Traffic Calming* is a document developed jointly by the Transportation Association of Canada and the Institute of Transportation Engineers. Since its December 1998 publication, municipalities and consultants throughout Canada and abroad have used the Guide for traffic calming guidance and application. From the foreword of the Guide, its intent is to:

- "Develop a document to assist practitioners;
- Achieve and appropriate level of national standardization;
- Minimize liability; and
- Maximize safety."

To that end, the Guide provides a detailed introduction to traffic calming, discusses community involvement, the applicability and effectiveness of traffic calming, and offers technical guidelines. Many municipalities have adapted its guidelines to suit their own traffic calming needs and goals. The City of Greater Sudbury shall adopt the traffic calming guidelines contained within the Guide, except where it differs from this document and in specific, case-by-case installations where local conditions dictate.

1.4 Project Steering Committee

This policy was developed with the assistance of a project steering committee consisting of City of Greater Sudbury staff and City Councillors, as follows:

- Roads and Transportation Services;
- Fire;
- EMS;
- Transit; and

- Sudbury City Council.

2. TRAFFIC CALMING IN GREATER SUDBURY

2.1 Goals and Objectives

The two primary goals of Sudbury's traffic calming policy are to **improve safety and liveability** within the city. When properly designed and implemented, traffic calming measures have the ability to improve safety for all road users, particularly vulnerable users such as pedestrians and cyclists. Safety improvements are directly related to reducing vehicle speeds and volumes on traffic calmed roadways, while liveability may be improved by a reduction of traffic's negative impacts, namely noise, exhaust emissions and congestion. As well, many traffic calming features can be designed to improve the streetscape through plantings and decorative pavement treatments.

The objective of the policy is to restore roads to their original functions as defined by the established classification system and restore motorist behaviour to acceptable and appropriate levels of compliance within the system. Specific objectives for local streets and collectors include:

- Slower vehicular speeds;
- Fewer and less severe collisions;
- Increased safety for all road users, particularly vulnerable road users (pedestrians and cyclists);
- Reduced reliance on police enforcement;
- Enhanced roadway environment and streetscape;
- Improved access to all modes of transportation; and,
- Reduced 'cut-through' or non-local traffic.

Collectively, these factors determine how 'liveable' a street or community is.

2.2 Traffic Calming Principles

A number of principles are common to the application of all traffic calming measures, regardless of problem, type of road or mitigation measure. This traffic calming policy has been developed to ensure that these principles are applied in a consistent manner for all requests. These principles strive to be consistent with North American jurisdictions that have traditionally been at the forefront of traffic calming implementation, either through early adoption, comprehensive policies or innovative approaches. Consistent application of this traffic calming policy and the following principles will ensure that Sudbury does not repeat the often costly and disruptive mistakes that other jurisdictions have made in the past. These principles are also intended to foster community support to ensure that traffic calming plans meet the needs of those who made the initial request, as well as those of the affected local community.

- **Find out what the community thinks**: Community support may be the single most important principle when applying traffic calming measures. A citywide traffic calming policy is appropriate for general selection and implementation criteria and requirements, but every neighbourhood is different and experiences its own special

problems. When the entire community is given the opportunity for participation, it minimizes the chance that vocal residents, influential businesses or special interest groups can monopolize the dialogue to serve their own agenda without considering the needs and input of others. This leads to a plan that everyone can support—or at least have the opportunity to state their opposition. Furthermore, given that each community is different, there is a great chance that city staff and/or outside consultants will not recognize special attributes or problems that are unique to a particular request, unless the input of everyone is requested. Subsequent sections of this document will discuss the public support components and requirements of the policy.

- **Identify the real problem**: While it is critical to listen to and consider every issue raised by the community, care must be taken to separate the real problem(s) from the perceived problem(s). Incorrect assessment of a situation may lead to making problems worse than before, or possibly the introduction of new problems.

- **Quantify the problem**: How fast is “speeding”? How much traffic is “too much”? This policy describes a two-step warrant process by which the traffic conditions surrounding requests for traffic calming can be quantified. The process requires the collection of traffic volume, speed and collision data, along with an assortment of neighbourhood characteristics (e.g. sidewalks, pedestrian generators, land use) to score a particular location and rank it against other locations throughout the city. This process is designed to ensure that those locations with the most severe problems score the highest and receive priority over other locations. Residents are more likely to understand and accept why their request is not scheduled for implementation when a fair, equitable and defensible process can be demonstrated.

- **Consider improvements to the major road network first**: it is understood that Sudbury’s topography may limit the number and location of arterial roads in some parts of the city. This can be seen by the average daily traffic volumes of some collectors and local roads in the city. Simply put, there may not be enough arterial capacity in some locations, and drivers are therefore choosing other routes for their trips. Whenever possible, if a traffic problem at a particular location can be traced with some degree of certainty to a shortcoming of the arterial road network, every effort should be made to address the source of the problem, rather than applying a potentially short-sighted solution on the local or collector road. In some cases, fixing the problem could be as simple as changing the signal timing at an arterial intersection. In others, when it becomes clear that a simple arterial fix is not possible, then it is appropriate to consider what can be done on the lower-order roads.

- **Use self-enforcing measures**: As discussed above, one of the objectives of this traffic calming policy is to reduce reliance on police enforcement. In most communities, the police presence simply does not exist to enforce every speed limit sign and stop sign throughout the jurisdiction. Traffic calming measures are designed to be self-enforcing. Vehicles must slow down over speed humps, and more restrictive measures like diverters or partial closures prevent unwanted movements far more effectively than turn restriction signs.

- **Start with the least restrictive measures**: When considering the public support principle, it becomes clear that residents are less likely to support a plan that makes it more difficult for them to access their own neighbourhoods or homes. Restrictive devices such as full or partial closures should only be implemented with strong levels of community support, and only when it can be proven that other measures are unlikely to achieve desired results.

- **Do not impact cyclists or pedestrians**: Traffic calming should improve safety for all road users, but its application should not negatively impact pedestrians and cyclists. Some traffic calming measures may in fact make it more difficult for pedestrians and cyclists to navigate a neighbourhood, and such impacts should be considered equally as important as those to cars and trucks. As well, it is necessary to consider the impact to transit and emergency vehicles when implementing traffic calming, to ensure that service is not disrupted and emergency response times are not increased.

- **Trial and error (or, temporary measures)**: in some cases it may not be clear exactly what needs to be done to address a particular request. For example, the impacts of placing a curb extension at one location in a corridor versus another may not be known until the device is installed. Many traffic calming measures can be installed on a temporary basis and monitored for performance. These devices are recommended for use where possible. It is far less expensive to remove and replace a temporary device than a permanent device, and it demonstrates a willingness of the City to follow through with its commitment to address a problem to completion.

- **Implementation does not mean completion**: Conditions must be monitored to determine if the traffic calming devices fully addressed the problem, or if the problem was moved elsewhere, e.g. to a parallel street. Post-implementation data collection is equally important as pre-implementation.

2.3 Application

This traffic calming policy is designed for application to Local Roads, Collectors and Tertiary Arterials only. The logic behind the decision to limit the application of traffic calming policy is again based on the city's roadway classification system and the function of higher order arterials to move large volumes of people and goods throughout Greater Sudbury and beyond.

Application limitations exist within the accepted classifications, as follows:

- **Urbanized vs. Rural Areas**: traffic calming is typically applied only to roads in urban areas, and not in rural or agricultural areas. Speed reduction on rural roads presents specific challenges that may be better served through increased enforcement, Sudbury's Speed Watch Program or possibly even changes to the road's design. Some jurisdictions have experimented with traffic calming measures, generally speed humps, on rural roads and have found motorists often drive around the measure on the shoulder. In response, bollards were installed adjacent to the measure to prevent shoulder use. While this did force motorists to traverse the device, it presented specific challenges to pedestrians in winter, as the bollards prevented maintenance crews from pushing snow off the shoulder.

- **Cross Section**: Roads with rural cross-sections within urbanized areas should be given the same traffic calming consideration as those with urban cross-sections; however, the available options are limited due to the absence of a curb and gutter system. Horizontal deflection treatments such as median islands, traffic circles and lane narrowing shall be considered appropriate for all rural cross-sections, while vertical traffic calming measures may be appropriate for rural cross-sections within urbanized areas that do not serve as transit or emergency routes, on a case-by-case basis and in accordance with the traffic calming toolbox presented in **Exhibit 3-10**.

- **Posted Speed Limit**: traffic calming shall only be applied to roads with posted speeds of 50 km/h or below. Roads posted at 60 km/h or greater may be candidates for

greater police enforcement or changes to design in order to reduce speeding or collisions, but the techniques and measures described below are suited for lower-speed roads;

- **Grade**: if the grade of the subject segment of roadway is equal to or greater than of 8%, then traffic calming shall not permitted on the roadway at all. This is consistent with many other jurisdictions and is due to the fact that traffic calming devices implemented on steep grades may cause safety concerns, particularly during winter;

- **Transit and Emergency Routes**: Traffic calming devices shall be permitted on local roads or collectors that serve as transit routes or primary emergency routes. However, such devices shall be limited to horizontal measures and signing only, as discussed below. Studies and prior experience indicate that vertical traffic calming measures such as speed humps and raised crosswalks slow emergency vehicle response times, create uncomfortable rides for transit passengers and potentially increase the maintenance required to keep transit and emergency vehicles operational; and

- **New Developments**: while this policy is designed for existing roads, new developments should be required to follow its principles so that proactive measures can be applied before traffic problems manifest themselves.

3. PLANNING

3.1 Traffic Calming Process

The following sections describe a six-step process for the implementation of traffic calming measures on City roads, beginning with a request for traffic calming and ending with design, approval and implementation. **Appendix A** contains a flowchart of the entire framework, and the relevant sections of the flowchart are included within each step.

3.1.1 STEP 1: REQUEST FOR TRAFFIC CALMING

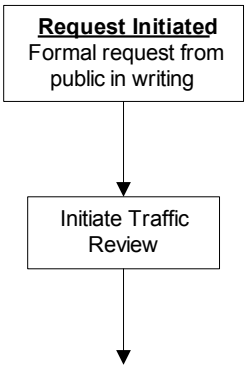
Requests for traffic calming typically come form City residents, business owners, schools or members of Council. Identification of potential locations may also come from on-going staff reviews. Roads and Transportation Division staff shall be responsible for the review of all requests.

Exhibit 3-1 describes the request process. In the case of a request from the public, a formal request in writing is required. City staff shall then respond in writing to inform the applicant that a Traffic Review will be initiated, described in **Sections 3.1.2 and 3.1.3**.

Some jurisdictions incorporate a public support requirement at this stage. If this requirement were implemented, the City would circulate a petition to affected residents. The petition would require a specific response rate from affected residents, with a specific percentage of support.

Through experience with other jurisdictions, it was determined that it is generally not desirable to conduct a resident poll prior to the detailed review of data. It is possible that residents would sign an initial petition, which would only serve to raise expectations of traffic calming. Alternatively, residents may not respond if they are not familiar with the purpose or origin of the request. As such, this approach was removed from consideration, and the simplified initiation process shown in **Exhibit 3-1** was carried forward for the policy.

Exhibit 3-1: Step 1: Request for Traffic Calming



3.1.2 STEP 2: TRAFFIC CALMING SCREENING PROCESS

Step 2 in the process is an initial screening process undertaken by City staff. The screening process sets requirements in five areas. A combination of these requirements must to be met for a site to be eligible for traffic calming. **Exhibit 3-2** defines the screening criteria and associated thresholds. Screening criteria are tailored to local and Collector/Tertiary Arterial streets, each of which has different functional characteristics.

Exhibit 3-2: Step 2: Criteria and Thresholds

Criteria	Threshold		Notes
	Local Road	Collector / Tertiary Arterial	
Grade	< 8%		If the grade is equal to or greater than 8%, traffic calming is not permitted
Collision History	≥ 6	≥ 12	Number of collisions within the last three years involving vulnerable road users and/or which may potentially be corrected by traffic calming measures
Volume	≥ 900 vpd	≥ 3,000 vpd (Collector) ≥ 5,000 vpd (Tertiary Arterial)	Two-way ADT volume
Speeds	≥ posted speed limit		85th percentile speed
Non-Local Traffic	≥ 30%		'Cut-through traffic'

The screening can be summarized as follows:

- **Grade:** if the grade of the roadway is equal to or greater than the maximum threshold of 8%, then traffic calming is not permitted on the roadway at all. This is consistent with other jurisdictions and is due to the fact that traffic calming devices implemented on steep grades may cause safety concerns, particularly during winter.

- **Collision History:** if the number of collisions within the past three years involving vulnerable road users (primarily pedestrians and cyclists) and/or which could be

potentially corrected by traffic calming measures is equal to or greater than the minimum threshold, then the volume, speed and non-local traffic requirements do not need to be met, and the site moves directly to the ranking process.

Tertiary Arterials and Collectors are required to have 12 collisions to satisfy this component of the warrant and bypass the volume, speed and non-local traffic requirements. This value is midway between the number of collisions within the past three years required to satisfy OTM Book 5 criteria for all-way stop signs (three or more right angle or turning collisions per year over a three year period) and former OTM Book 12 criteria for traffic signals (five 'correctable' collisions per year over a three year period)[2]. The minimum threshold was also set high enough so that relatively few sites will be expected to qualify for traffic calming measures on the basis of collisions alone.

Given the difference in minimum volume thresholds for local roads compared to collectors, a minimum of 6 collisions within the last three years was accordingly selected as the threshold. This is consistent with the City of Greater Sudbury's own all-way stop control warrant, which requires an average of two collisions per year over a three year period.

Collision statistics are often recorded as a rate, expressed as collisions per million vehicles entering an intersection, or collisions per million vehicle-kilometres for a roadway segment. Given that the collision criteria of the traffic calming warrant is only intended to address a specific subset of collisions, raw numbers are preferable to a rate.

- **Speeds and Non-Local Traffic:** at least one of these must meet the minimum threshold for further consideration; and

- **Volume:** regardless of speed and percentage of non-local traffic, the minimum volume threshold must be met. Only a high frequency of collisions can qualify a site for traffic calming without meeting the volume threshold. It is recognized that there may be roads that have very high speeds, but do not meet the volume criteria, and therefore do not qualify for traffic calming under the formal warrant process. Rural roads would be most likely to fall under this category. For these roads, it may be appropriate to implement other solutions, such as speed enforcement or Sudbury's Speed Watch Program. Changes to a rural road's design may also be warranted in some situations.

Exhibit 3-3 graphically represents the screening process, while **Exhibit 3-4** shows the possible scenarios that can arise from application of this screening process.

[2] The November 2007 update to OTM Book 12 has since changed the collision signal warrant from raw 'correctable' collisions to a collision severity index.

Exhibit 3-3: Step 2: Screening Process

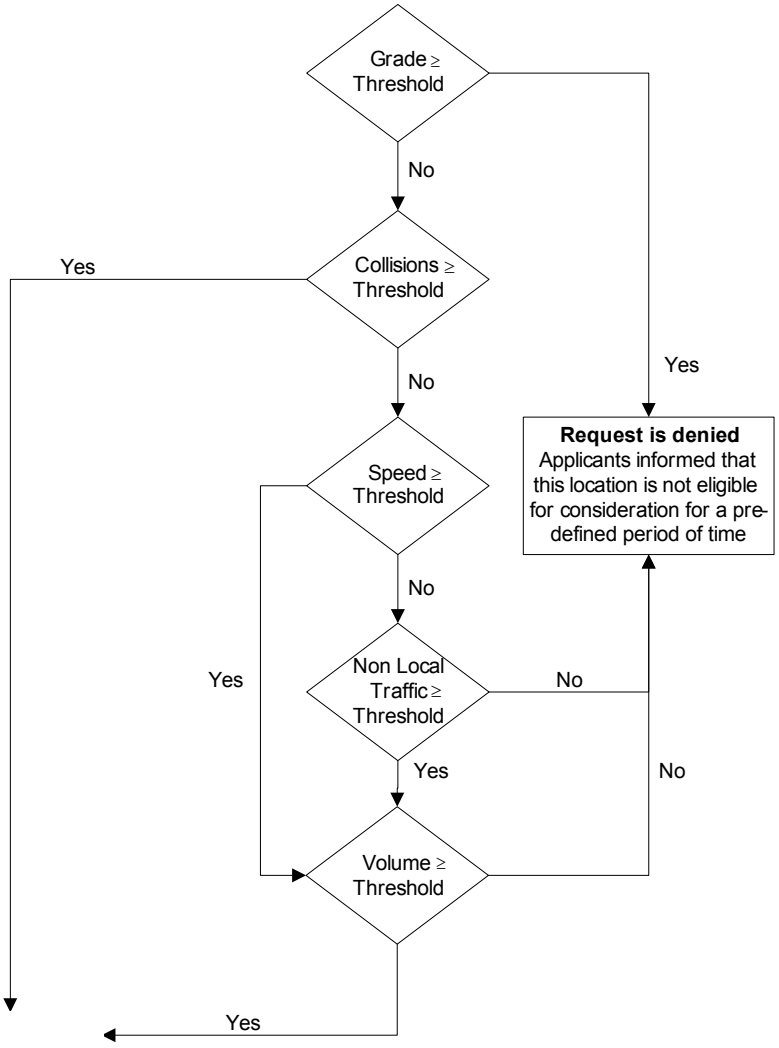


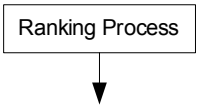
Exhibit 3-4: Step 2: Sample Screening Scenarios

Scenario	Grade	Collisions	Speed	Non-Local	Volume	Result
1	**≥ Max**	Any	Any	Any	Any	Not eligible for traffic calming
2	< Max	**≥ Min**	Any	Any	Any	Eligible; continue evaluation
3	< Max	< Min	**≥ Min**	Any	**≥ Min**	Eligible; continue evaluation
4	< Max	< Min	Any	**≥ Min**	**≥ Min**	Eligible; continue evaluation
5	< Max	< Min	Any	Any	**< Min**	Not eligible for traffic calming

3.1.3 STEP 3: EVALUATION SCORING AND RANKING

Sites that pass the initial screening are then ranked against each other in Step 3. The evaluation, scoring and ranking process incorporates 10 criteria, with appropriate weighting applied to each. Each eligible traffic calming request is awarded points based on its score for each factor, with a maximum score of 100 points. Based on an objective analysis of the evaluation scoring, a score of 30 points has been established as a minimum threshold to qualify for traffic calming consideration.

Exhibit 3-5: Step 3: Evaluation Scoring and Ranking



3.1.3.1 Scoring

A separate evaluation of Local Roads and Collectors/Tertiary Arterials is recommended due to the intended function of each road classification, including transit service and emergency services needs. **Exhibit 3-6** and **Exhibit 3-7** show the scoring for Local Roads and Collectors/Tertiary Arterials, respectively.

Exhibit 3-6: Scoring: Local Roads

Factor	Point Criteria	Maximum Points
Collision History	4 points for each qualifying collision in the past three years	20
Traffic Speeds	1 point for each km/h above posted speed	15
Non-Local Traffic	3 points for each 10% of non-local traffic above 20% (maximum reached at 60% non-local traffic)	15
Traffic Volumes	1 point for each 50 vehicles above 900	20
Pedestrian Generators	5 points for each school or park within the study area (other Pedestrian Generators may be defined by Sudbury)	10
Pedestrian Facilities	5 points if there are no sidewalks in the study area	5
Emergency Services and Routes	-4 points if the study area is a primary EMS route	0
Transit Services and Routes	-2 points if the study area is an existing or planned transit route	0
Block Length	1 point for each 50m increment between stop-controlled points	10
Adjacent Land Uses (residential)	1 point for each 20% of residential land use	5
		100

Exhibit 3-7: Scoring: Collectors and Tertiary Arterials

Factor	Point Criteria	Maximum Points
Collision History	3 points for each qualifying collision in the past three years	15
Traffic Speeds	1 point for each km/h above posted speed	20
Non-Local Traffic	2 points for each 10% of non-local traffic above 20% (maximum reached at 60% non-local traffic)	10
Traffic Volumes	1 point for every 100 vehicles above the Collector/Tertiary Arterial volume threshold	20
Pedestrian Generators	5 points for each school or park within the study area (other Pedestrian Generators may be defined by Sudbury)	10
Pedestrian Facilities	10 points if there are no sidewalks within the study area, 5 if only on one side	10
Emergency Services and Routes	-6 points if the study area is a primary EMS route	0
Transit Services and Routes	-4 points if the study area is an existing or planned transit route	0
Block Length	1 point for each 50m increment between stop-controlled points	10
Adjacent Land Uses (residential)	1 point for each 20% of residential land use	5
		100

3.1.3.2 Emergency and Transit Routes

Traffic calming devices are often considered to be a problem for emergency vehicles and buses. The scoring system developed for Sudbury recognizes this concern and scores potential sites accordingly. Under this scoring system, if a particular road is not an emergency or transit route, it receives zero points in each category, i.e. the maximum. The presence of one or more of these routes would therefore subtract points from the overall score. The scoring also reflects that these routes are more likely to be present on Collectors or Tertiary Arterials than on Local Roads, and subtracts more points for those roadway classifications. Further considerations of the impacts of traffic calming devices on emergency and transit vehicles are addressed in **Section 2.3** of this report and in Step 4 of the framework, which guides the selection of measures.

3.1.3.3 Non-Local Traffic

It is also understood that determining the percentage of non-local traffic within a study area may be a costly and time-consuming process. The City may not have the resources to conduct a full survey and may be required to estimate the percentage of cut-through traffic. As a result, the scoring for non-local traffic falls into 'bins' of 10 percent each. The following list contains four recommendations of how non-local traffic may be recorded or estimated, beginning with the method requiring least effort. Each alternative requires that the City determine an appropriate 'local' area prior to estimation.

1. Determine the peak hour trip generation potential of the local area based on its land uses and compare it to the recorded peak hour traffic counts;

2. Apply the following formulas:

$$\text{Local Road Non- Local Traffic Percentage} = 1 - \left(\frac{1{,}000}{ADT}\right)$$

$$\text{Collector Non- Local Traffic Percentage} = 1 - \left(\frac{3{,}000}{ADT}\right)$$

   This formula implies that a Local Road with an ADT less than 1,000 vehicles as a low potential for cut-through traffic. The formula may also be applied to Tertiary Arterials using a numerator volume of 5,000; however, given the function of a Tertiary Arterial and the variation in typical arterial volumes, other methods should be explored.

3. Record the license plates of all vehicles that pass through one or more points of the local area. The recorded license plates are then submitted to MTO, which in turn will supply the Forward Sortation Area (FSA) of the address where each vehicle is registered. The FSA is the first three characters of the postal code, and each FSA represents a geographical area of the province. It can then be determined which of these trips originate or end within the local area. It should be noted however, that the urban area of the Sudbury is covered by a total of five FSAs, so this approach will not accurately identify traffic that is explicitly local to the study area; or

4. Conduct a full origin-destination study at all entry and exit points of the local area. Match the license plates of entering and exiting vehicles to determine the percentage of vehicles that pass through the entire local area compared to those that begin or end their trips within. This approach is the most accurate of the four approaches, and it recommended if staff/budget resources are available.

3.1.3.4 Determining the Local Area

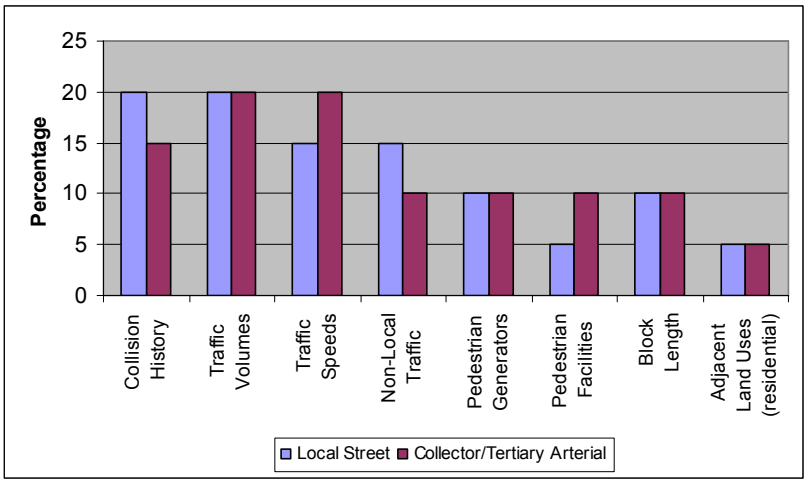
For a Local Road, the local area should be comprised of the Local Road, at a minimum; while for a Collector or Tertiary Arterial, the local area may be defined as the section of the roadway that connects the nearest higher-order roads, as well as the other intersecting roadways.

3.1.3.5 Ranking Comparison between Local Roads and Collectors/Tertiary Arterials

Exhibit 3-8 compares the ranking criteria for Local Roads and Collectors/Tertiary Arterials. It can be seen that for Local Roads, more emphasis is placed on factors such as non-local traffic and the collision history of the street.

The primary function of a Tertiary Arterial is to connect with other arterial and collector roads and have limited local road access, while the primary function of a Collector is to move traffic from Local Roads to higher-order roads. As such, higher volumes and perhaps higher speeds are expected. More weight is therefore given to the speed of these roadways, as well as the presence or lack of pedestrian facilities on a Collector, because of the associated safety risks of higher speeds and volumes.

Exhibit 3-8: Comparison of Local Roads vs. Collectors/Tertiary Arterials



3.1.4 STEP 4: AVAILABLE TRAFFIC CALMING MEASURES

Some jurisdictions throughout North America have used an approach whereby the final score awarded from the warrant evaluation would apply to a toolbox of traffic calming measures. Higher-ranking requests may be flagged for physical traffic calming measures, while lower-ranking requests would be restricted to less intrusive forms such as signing. This method is advantageous in that it does not dismiss the lower ranking request that may be accommodated through low cost and low maintenance traffic calming features.

Given that each road and surrounding neighbourhood is unique and presents individual characteristics, the toolbox approach of identifying traffic calming measures can be used as a guideline for the various types of traffic calming measures that may be applied to a particular case. An initial staff review of all outstanding requests is recommended at this point, before a public support component is implemented for selected projects. (Data collection for subsequent requests should be carried out on a semi-annual basis with the screening and evaluation process carried out on an annual basis.)

Exhibit 3-9: Step 4: Available Traffic Calming Measures

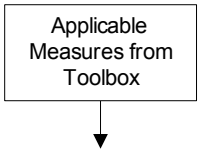


Exhibit 3-10 shows the recommended toolbox for the City of Greater Sudbury. This toolbox identifies a variety of traffic calming devices, as well as signage often used for traffic calming purposes. Care should be taken in the application of any measures marked with ◆, particularly in the case of designated emergency or transit routes. As well, vertical deflection measures are not permitted for application on existing or planned transit routes, or designated primary emergency routes. **Appendix B** provides information on the applicability and implications of each measure.

Exhibit 3-10: Step 4: Traffic Calming Toolbox

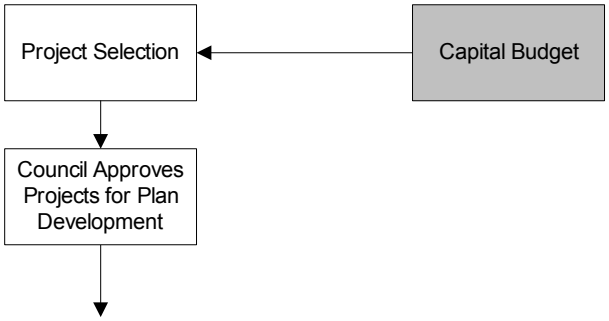
Measures		Local Road	Low-Volume Collector	Other Collector	Tertiary Arterial
Horizontal Deflection	Curb Extension	✔	✔	✔	✔
	Traffic Circle / Mini Roundabout	✔	✔	◆	✕
	Raised Median Island	✔	✔	✔	✔
	Corner Radius Reduction	✔	✔	✔	◆
	Chicane, 1-Lane	✔	✕	✕	✕
	On-Street Parking	✔	✔	✔	◆
Vertical Deflection	Speed Hump / Table	✔	◆	◆	✕
	Speed Cushion	✕	◆	◆	✕
	Raised Crosswalk	✔	◆	✕	✕
	Raised Intersection	◆	✕	✕	✕
Obstruction / Closure	Directional Closure	✔	◆	✕	✕
	Right-In/Right-Out Island	✔	◆	✕	✕
	Raised Median	✔	✔	✕	✕
	Intersection Channelization	✔	✔	◆	◆
	Full Closure	◆	✕	✕	✕
Signage (when primarily application is traffic calming)	Traffic-Calmed Neighbourhood	✔	✔	◆	◆
	Turn Prohibited	◆	◆	◆	◆
	Through Traffic Prohibited	◆	◆	◆	◆
	One Way	◆	◆	✕	✕
	Warning signs (playground, school, etc)	◆	◆	◆	◆
	Maximum Speed	◆	◆	◆	◆
	Yield	✕	✕	✕	✕
	Stop	✕	✕	✕	✕

✔ = Appropriate Measures ◆ = Use with Caution ✕ = Not Recommended

3.1.5 STEP 5: PROJECT SELECTION AND COUNCIL STUDY APPROVAL

In this step, staff prepare preliminary estimate ranges for the higher-ranking projects and for any projects that may be served through advisory, warning, or traffic control signage features. If a project can be tied into a current or following year's Capital Projects, it shall receive priority. Staff shall then forward a list of the recommended project(s) to Council for approval, in full awareness of the allotted Traffic Calming budget.

Exhibit 3-11: Step 5: Project Selection and Council Approval



3.1.6 STEP 6: DESIGN, PUBLIC SUPPORT, FINAL COUNCIL APPROVAL, IMPLEMENTATION

Exhibit 3-12 shows the final step of design, approval and implementation. Once Council approves a project or series of projects in principle and the funding envelope is established (Step 5), a public support component is to be initialized to determine residential support for traffic calming measures to be implemented. If the required support is realized, a detailed plan shall be developed. City staff or a consultant shall prepare a preliminary design receiving input from City departments, including emergency, fire and transit, as well as residents. This plan shall be sent back to the public for final comment and forwarded to Council for implementation approval.

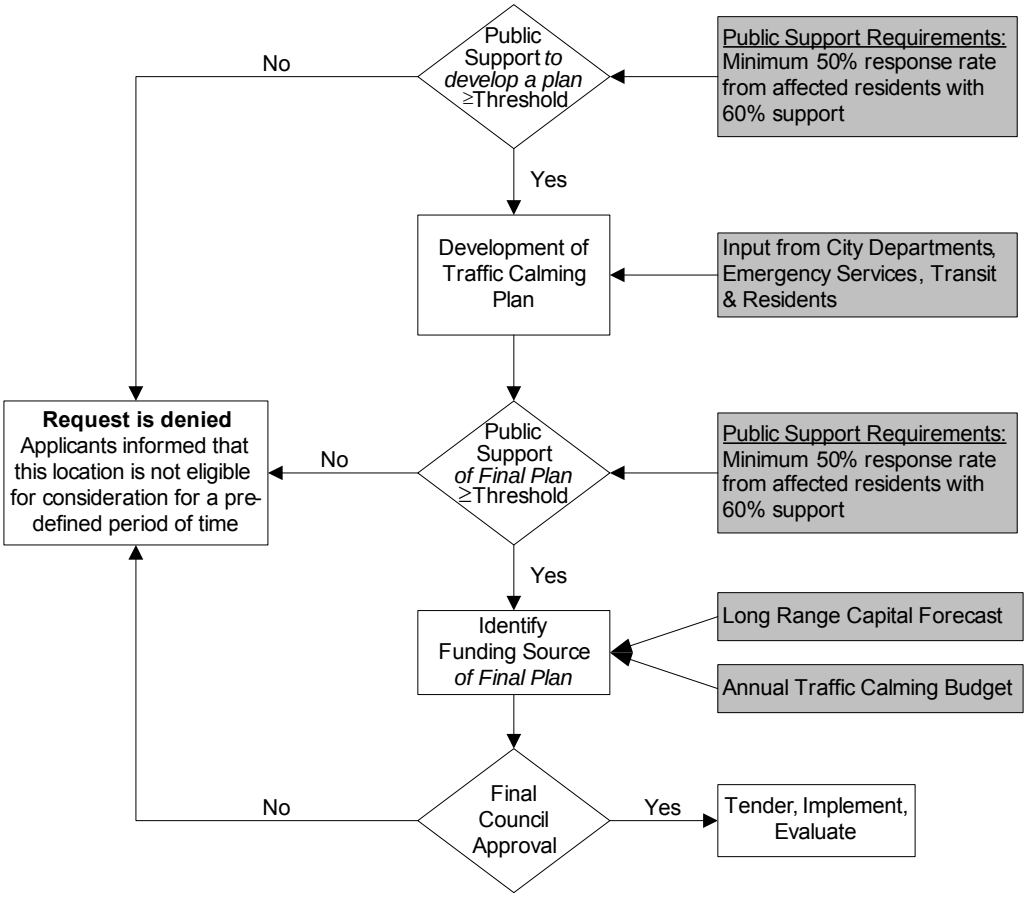
A minimum 50% response rate from affected residents with 60% support shall be required to proceed with the development of a Traffic Calming Plan. The same requirements shall apply to public approval of a recommended plan.

After the final plan is developed by the City or its consultant and is endorsed by the public, its funding source is to be identified. Possible funding sources include the Long Range Capital Forecast or an Annual Traffic Calming Budget. The plan shall then be sent to Council for final approval. Upon final Council approval, the process shall commence of tendering, implementing and evaluating/monitoring the plan.

If the request is rejected at any point in the process, the applicants and affected residents shall be notified in writing, and traffic calming shall not be considered for the same section of road for a pre-determined period of time. The recommended time frame is two years. Requests may be rejected on the basis of:

- Failure to meet the minimum screening criteria;
- Lack of public support; or
- Council rejection.

Exhibit 3-12: Step 6: Design, Approval, Implementation



3.2 Public Awareness and Involvement

As discussed throughout this policy, public involvement is critical to the traffic calming process. The same residents and community groups who object to traffic conditions in their neighbourhoods are the same residents and community groups who must live with whatever solution is ultimately implemented. The City of Greater Sudbury traffic calming policy shall continue to support and encourage public requests for traffic calming, as residents often have the greatest knowledge and understanding of traffic conditions in their neighbourhoods.

City staff shall initiate a public involvement process once a requested site has been established as a candidate for implementation in Step 5 of the process. At a minimum, two public meetings will be held with affected residents, as follows:

1. Project initiation meeting:
   - Describe the purpose, objectives, process and timelines of the study;
   - Describe the study approach and methodology;
   - Review initial preliminary findings based on a review of background information;

- Provide examples of typical solutions to traffic issues;
- Receive community input on current traffic and safety problems in the neighbourhood; and
- Initiate survey process for plan development.

2. If the public support level satisfies minimum criteria, a meeting shall be held after the draft traffic calming plan is developed:
   - Review the draft traffic calming plan and receive public input; and
   - Initiate survey process for final plan approval.

If input and comments received at meeting #2 suggest that the final plan will differ significantly from the draft plan, the plan approval petition process should be deferred and a third meeting should be held to review the revised plan.

All meetings are to be advertised in the newspaper, the City of Greater Sudbury website and in community centres or other places of interest within the affected neighbourhood. In addition, meeting notice flyers should be hand delivered to all homes in the study area whenever possible. Two weeks notice is required for all public meetings.

Neighbourhood and resident responsibilities include:

- Identify traffic related issues in the neighbourhood;
- Respond to all surveys;
- Attend public meetings for traffic calming studies;
- Approve or reject the development of a traffic calming plan;
- Select from the options presented by staff, traffic calming concepts which address the identified issues; and
- Approve or reject the implementation of the preferred traffic calming plan.

3.3 Community Initiatives

A number of community initiatives should be considered prior to the decision to implement traffic calming, or in conjunction with it. Often, these will incur little to no cost to the City using existing resources, frameworks and materials. Some possible initiatives that may address driver behaviour and traffic concerns include:

- **Community-Based Publications and Events:** Neighbourhoods and Business Improvement Areas often publish their own newsletters and bulletins, or maintain their own websites. These are excellent resources for spreading the word of traffic concerns within an area, especially to neighbourhood residents who may themselves be a component of the traffic problem, e.g. speeding on local roads. City staff could be invited to submit articles, advice or recommendations for the newsletters and websites, or to attend community meetings and events to listen to residents' concerns.

- **Speed Watch Program:** The Traffic and Transportation Section already invites City residents to participate in its Speed Watch Program, in partnership with the Greater Sudbury Police Service. Speed Watch is an initiative to reduce speeding on area roads through public awareness and community action. A portable radar unit is available for loan to citizens of the City of Greater Sudbury. Volunteers monitor traffic in their neighbourhood and submit results to the Traffic and Transportation section. If City employees confirm results, the Greater Sudbury Police Service will schedule and conduct, within a reasonable time frame, a "zero tolerance" speed enforcement campaign in the area identified by Speed Watch volunteers. Licence numbers of vehicles observed exceeding municipal speed limits will also be submitted to Greater Sudbury Police;

- **City of Greater Sudbury Publications**: the City provides a wealth of information on its website related to traffic and transportation, including the city's official plan, transit schedules, street and walking trail maps and information regarding the roadway classification system and its intended functions. Additional information may be available at City Hall or at various service centres. Residents should be aware of the availability of this material, inasmuch as some of it may begin to address concerns without the need to initiate a request for traffic calming;

- **Trip Reduction Initiatives:** The City maintains a ride-sharing website at http://greatersudbury.carpoolzone.ca. This website, along with business community initiatives including flex-time schedules and work from home arrangements, as well as other programs designed to reduce the reliance on single-occupant vehicle travel, can have a major impact on the number of trips on Greater Sudbury's streets, and may reduce or eliminate the need for many traffic calming requests.

4. TRAFFIC CALMING MEASURES

This section discusses traffic calming measures that have been identified as appropriate for the City of Greater Sudbury. The section aggregates each type of measure into one of four categories and describes the associated advantages and disadvantages. Technical guidelines and figures are provided for some of the more common traffic calming features. These guidelines and figures are based on those found in the *Canadian Guide to Neighbourhood Traffic Calming*, and modified where suitable to reflect needs and conditions of Sudbury.

4.1 Horizontal Deflection

Horizontal deflection measures are those devices which require a motorist to steer around them, altering the vehicle's path within the roadway cross section. Most horizontal deflection devices are appropriate for all roadways, although care needs to be taken when installing higher-deflection devices such as chicanes and traffic circles on higher volume roads.

Advantages

- Effective in reducing average and/or higher operating speeds;

- Devices such as curb extensions reduce road user conflict potential; and

- Devices typically do not impact emergency vehicle response times on lower order roads.

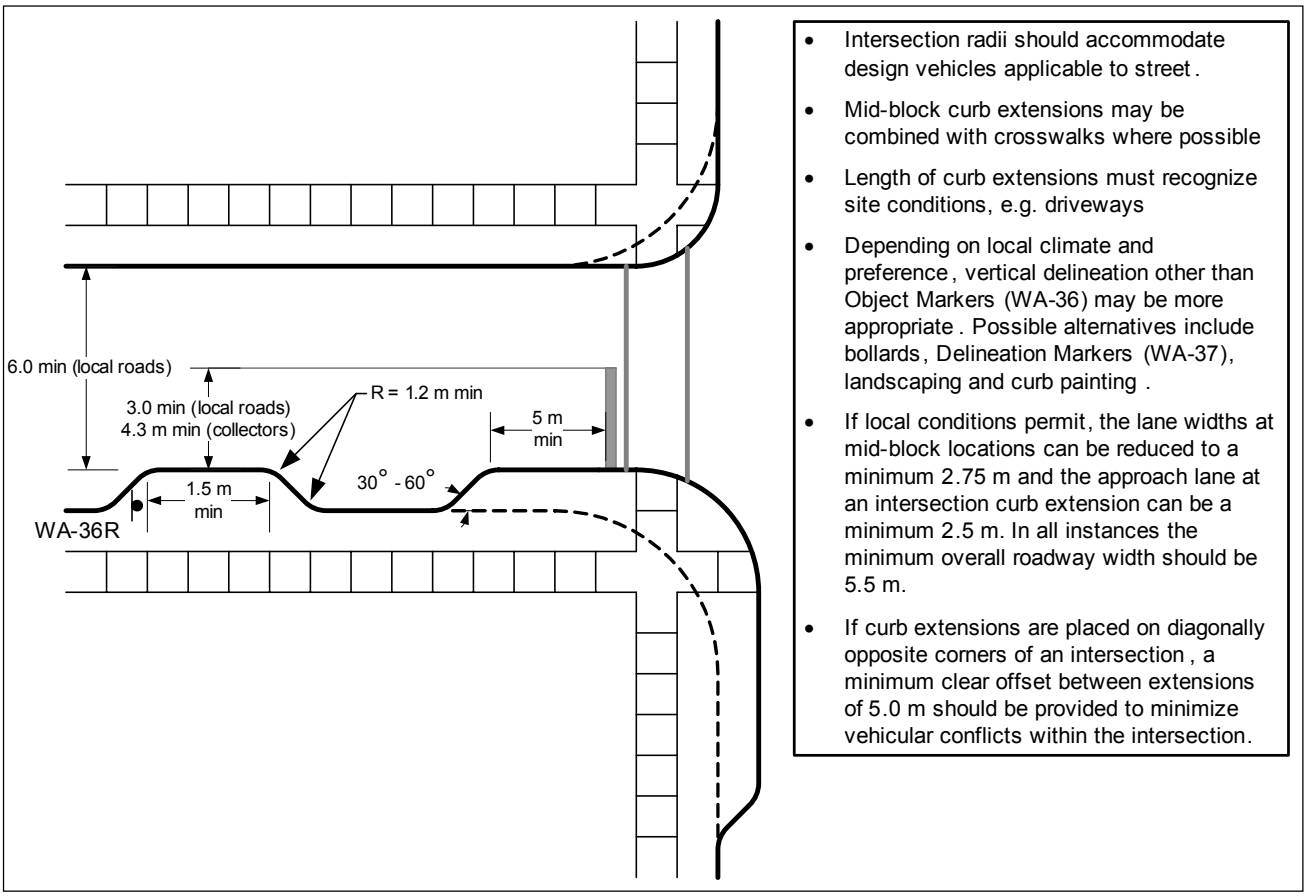
Disadvantages

- Maintenance activities such as street cleaning and snow removal may be complicated in the vicinity of the device;
- A number of the devices may impact transit and cyclist operations due to constrained travel portions of the roadway; and
- Typically do not impact through traffic volumes.

4.1.1 CURB EXTENSION

Curb extensions (also known as bump-outs) reduce the width of the roadway by extending the boulevard and/or sidewalk into what is currently either a travel lane or a parking lane. They are appropriate for all roadways. For maximum effectiveness, the approach lane width is typically reduced to 3.0 metres on local roads, as shown in **Exhibit 4-1**. For collector roadways and designated cycling routes, the lane width should be 4.3 metres to provide additional room for cyclists. On-street parking will typically be lost opposite a curb extension. Curb extensions are often used at intersections to reduce crossing width, or they can be used in conjunction with median islands or traffic circles.

Exhibit 4-1: Curb Extensions





IBI Group

4.1.2 TRAFFIC CIRCLE / MINI ROUNDABOUT

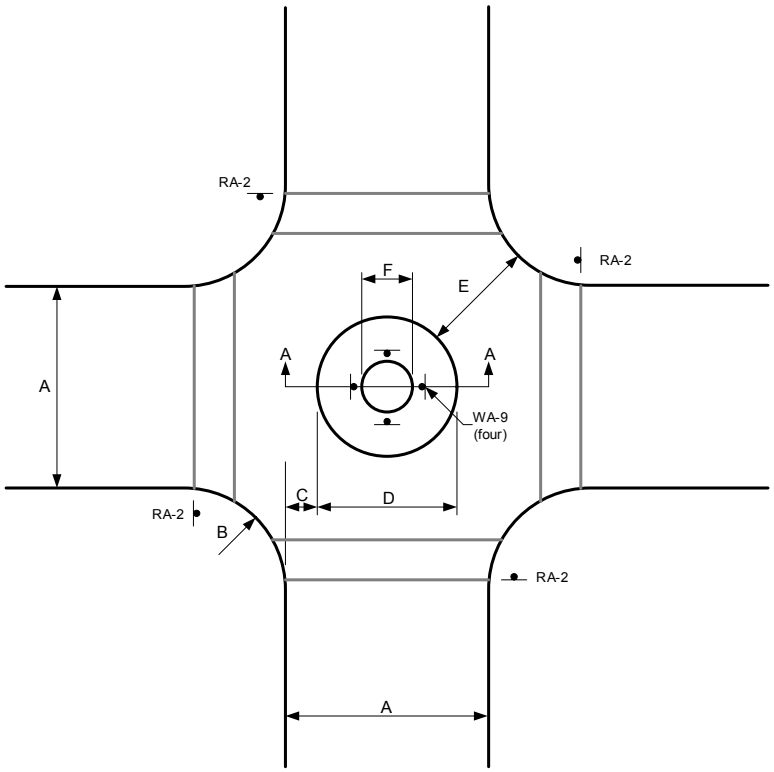
Traffic circles and mini roundabouts are not to be confused with modern roundabouts. Modern roundabouts are traffic control devices designed to replace or be used instead of traffic signals. Traffic circles, shown in **Exhibit 4-2**, consist of a raised island constructed in the centre of an intersection. The island is often landscaped. Depending on the location, stop signs at intersections retrofitted with traffic circles may be replaced with yield signs. Traffic circles are typically constructed with mountable curbs, to allow for larger vehicles such as buses to pass over them if necessary. While traffic circles are appropriate for local roads and most collectors, care should be taken to ensure the traffic circle design will accommodate the turning path of all vehicles that are expected to use a designated roadway.





IBI Group

Exhibit 4-2: Traffic Circle / Mini Roundabout

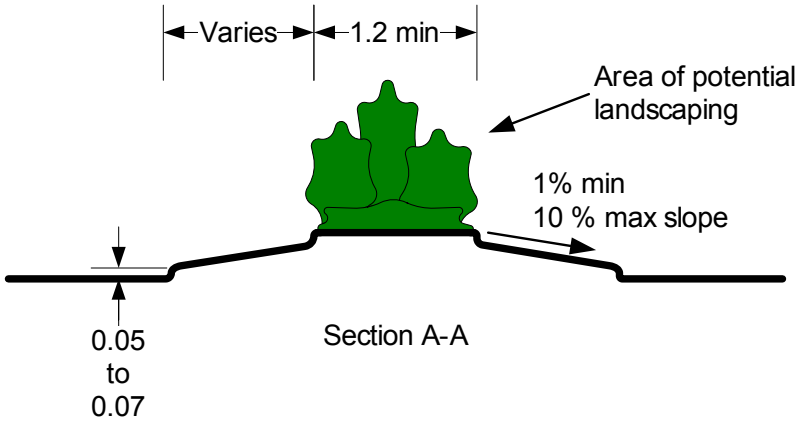


Dimension Chart for Varying Roadway Widths				
A Roadway Width	B Curb Return Radius	C Offset Distance	D Circle Diameter	E Minimum Opening Width
6.0	4.7	1.7	2.6	4.9
	5.3	1.6	2.8	5.0
	6.9	1.4	3.2	5.5
	8.1	1.2	3.6	5.8
7.0	4.2	1.7	3.6	4.9
	4.8	1.6	3.8	5.0
	6.4	1.4	4.2	5.5
	7.8	1.2	4.6	5.9
8.0	3.7	1.7	4.6	4.9
	4.3	1.6	4.8	5.0
	5.9	1.4	5.2	5.5
	7.3	1.2	5.6	5.9
9.0	3.2	1.7	5.6	4.9
	3.8	1.6	5.8	5.0
	5.4	1.4	6.2	5.5
	6.6	1.2	6.6	5.8
	7.6	1.0	7.0	6.0
10.0	3.0	1.7	6.6	5.0
	3.3	1.6	6.8	5.0
	4.9	1.4	7.2	5.5
	6.1	1.2	7.6	5.8
	6.9	1.0	8.0	5.9
11.0	3.4	1.5	8.0	5.2
	3.6	1.4	8.2	5.2
	5.6	1.2	8.6	5.8
	6.8	1.0	9.0	6.1
12.0	3.0	1.5	9.0	5.2
	3.9	1.4	9.2	5.5
	5.1	1.2	9.6	5.8
	6.3	1.0	10.0	6.1

Legend:
A Roadway Width
B Curb Return Radius (3.0m min)
C Off-Set Distance (1.7m max)
D Circle Diameter
E Opening Width (See table above)
F Raised Island Diameter (1.2m min)

Sign Descriptions:

RA-2 Yield
WA-9 Chevron Alignment



- Minimum opening width to be provided to all crosswalks.
- A deflection triangle painted on the pavement on each approach to the traffic circle may be appropriate

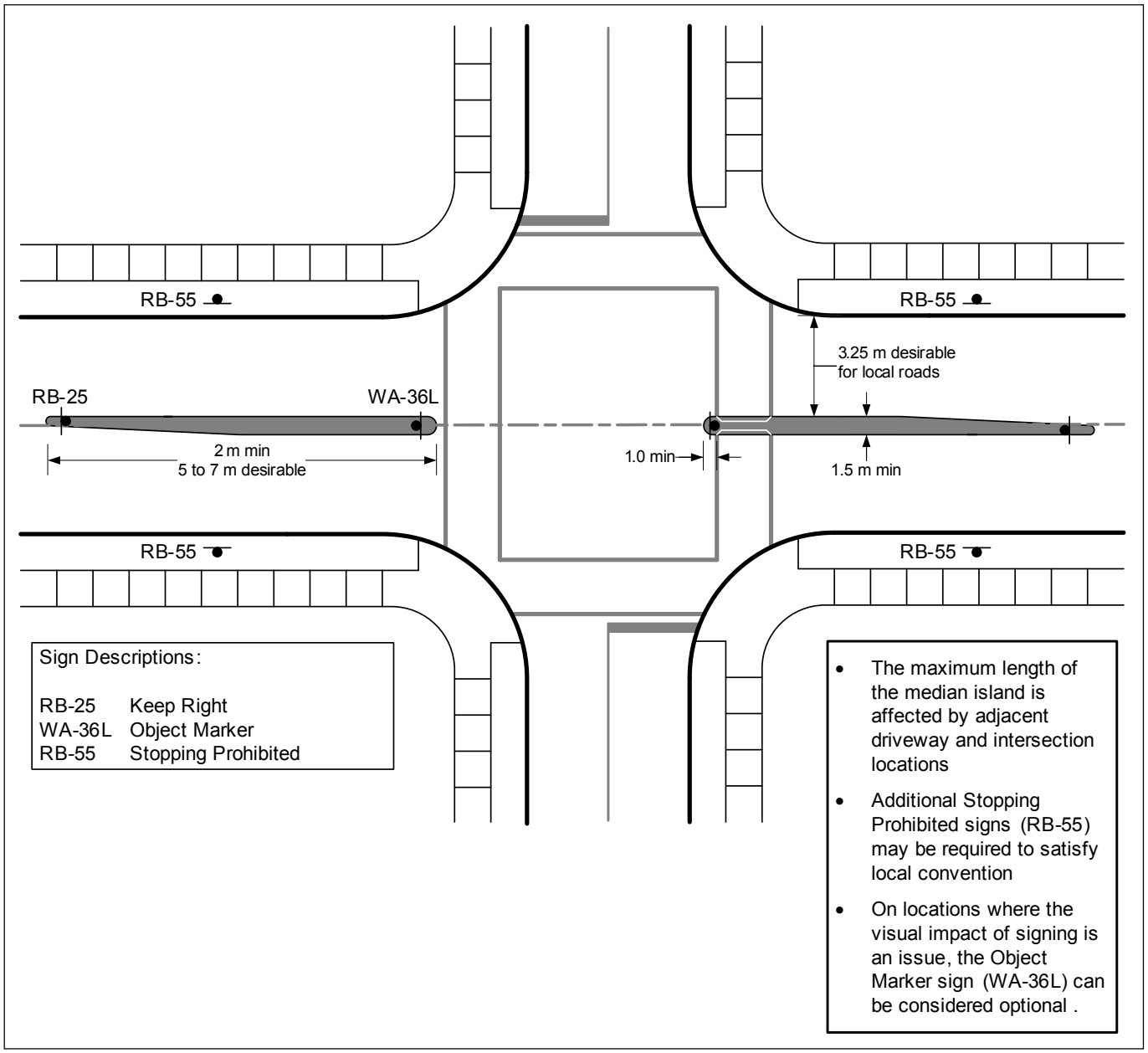
All dimensions in metres unless indicated.

NOT TO SCALE

4.1.3 MEDIAN ISLAND

Median islands are constructed with either mountable or barrier curb and are appropriate for all roadways that have the width to support a minimum-1.5 metre island while still maintaining proper travel lane widths, as shown in **Exhibit 4-3**. They are often used in conjunction with curb extensions to create a chicane effect. Median islands can be constructed at any length; often driveway spacing is the limiting factor. Median islands can be landscaped and should be signed at either end to alert motorists. Consideration should be given to on-street parking that is lost with the construction of a median island.

Exhibit 4-3: Median Island



4.1.4 CORNER RADIUS REDUCTION

Corner radii should be designed as small as possible, only large enough to accommodate the largest design vehicle expected to use a particular road. Small-radius corners reduce crossing distance for pedestrians and force motorists to slow when turning.

4.1.5 CHICANES

A chicane can be used to reduce the width of a section of road to one lane, thereby forcing one direction of traffic to stop and allow the other to pass. One-lane chicanes shall only be used on local roads, and should only be used on those experiencing high volumes and with approximately equal directional splits, or the associated reduction in traffic volumes will be minor.

Two-lane chicanes offer little in the way of volume or speed reduction and should not be used as traffic calming measures. They often have the unintended consequence of allowing drivers to straddle the centre line, as one might do on a winding road, potentially increasing crash potential. A more suitable two-lane chicane effect can be accomplished through curb extensions and centre medians.

4.1.6 ON-STREET PARKING

On-street parking is an inexpensive and practical traffic calming measure. It reduces the width of the road and causes motorists to reduce their speeds. It should be considered wherever possible, prior to, and in conjunction with, the implementation of physical traffic calming devices.

4.2 Vertical Deflection

Vertical deflection devices change the motorist's path in the vertical plane. As such, they are primarily intended for use on local streets and low volume collector roads. Vertical deflection devices are not permitted for use on transit routes or designated primary emergency routes.

Advantages:

- Effective in reducing operating speeds
- Do not impact local access

Disadvantages:

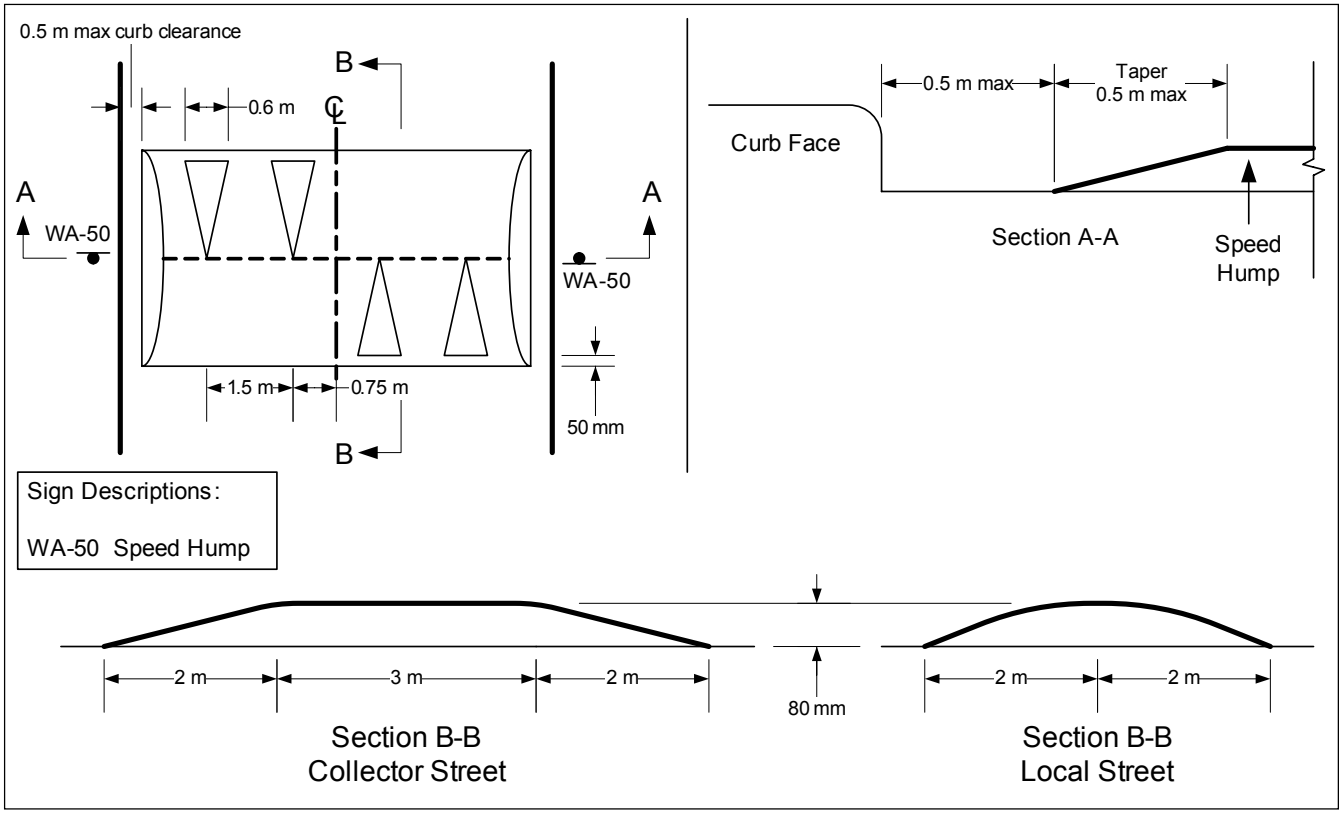
- Devices have the potential to impact emergency vehicle response times, as they are required to slow down for the devices to ensure they do not injure patients/passengers or damage their vehicles
- Devices may increase maintenance requirements
- Typically do not impact through traffic volumes significantly

4.2.1 SPEED HUMPS AND TABLES

Speed humps are appropriate for all local streets and low-volume collector roadways that do not serve as transit or primary emergency response routes. Speed tables, which have a longer profile, may be considered with caution on higher-volume collectors. Speed tables should not be used on

roads posted at 30 km/h, because vehicles will not have to slow down to pass over them. **Exhibit 4-4** shows the recommended dimensions of speed humps and tables.

Exhibit 4-4: Speed Humps and Tables



4.2.2 SPEED CUSHIONS

Speed cushions are similar to speed humps or tables, except that they have channels cut into them, approximately the width of a large vehicle, to allow such vehicles to pass over them without slowing down considerably. Some jurisdictions allow speed cushions to be used on transit or emergency routes. In Greater Sudbury, since no vertical deflection of any sort is to be used on transit or emergency routes, speed cushions should only be used, and with caution, on roads where truck traffic is permitted yet traffic calming is still warranted. The cushions will allow truck traffic to pass through relatively unencumbered.



San Francisco Municipal Transportation Authority

4.2.3 RAISED CROSSWALKS

Raised crosswalks, often constructed with decorative, textured pavement, serve three purposes: they highlight the functional area of an intersection and reduce vehicle speeds and depending on surface treatment, they may improve the streetscape. Raised crosswalks shall be installed consistent with the city's crosswalk policy, and only on local roads and low-volume collectors that do not serve as transit or emergency routes.



Richard Drdul (flickr.com/drdul)

4.2.4 RAISED INTERSECTIONS

Raised intersections are costly to retrofit and minimally reduce vehicle speeds and volumes. Therefore, they are not recommended for use on existing City streets, although the city may allow them at the intersection of two local roads in new developments.

4.2.5 OTHER DEVICES

Rumble strips and textured crosswalks should not be used as traffic calming measures. Rumble strips are designed to alert motorists to changes in roadway conditions by creating both noise and vibration in the vehicle. They are used as traffic calming devices in some communities, but their associated noise makes them largely unacceptable for this purpose. Rather, they should only be used as warning devices when conditions dictate.

Textured crosswalks should not be used alone as a traffic calming measure, but should be considered in conjunction with traffic calming implementations. Textured crosswalks, often constructed with interlocking pavers, can serve to highlight the functional area of an intersection and improve the streetscape. However, they do nothing to reduce vehicle speeds or volumes, and are often both expensive to maintain and limiting to some mobility-challenged pedestrians. Consideration should be given to other methods of creating textured pavement, such as stamped asphalt and concrete, whenever including textured crosswalks as part of a larger traffic calming plan.



IBI Group

4.3 Obstruction/Closure

Included in this category are partial and full roadway closures, intersection diverters, raised medians and right-in-right-out channelized islands. The main purpose of these devices is to reduce infiltrating traffic on neighbourhood streets.

Advantages:

- Reduces road user conflicts and volumes
- Requires little or no enforcement

Disadvantages:

- Penalizes local traffic access
- Reduces access to transit, emergency services, delivery service, etc.

- Complicates road maintenance efforts in the vicinity of devices
- Potential to divert both local and through traffic to parallel or alternative routes

4.3.1 DIRECTIONAL CLOSURES / RIGHT-IN, RIGHT-OUT ISLANDS

Compliance with these devices relies on the presence of other motorists to deter would-be violators from circumventing the device. As such, they should only be used at the intersection of local roads with lower-volume collector roads. They should also only be used when local traffic has another alternative to access the higher-order road in the direction prevented by the closure.

4.3.2 RAISED MEDIAN

These raised medians should not be confused with the raised medians discussed above in the horizontal deflection section. These raised medians effectively serve the same purpose as right-in, right-out islands, and should only be used to prevent left turns to and from local streets and low-volume collector roads. As with directional closures, this type of raised median should only be used when local traffic has another alternative to access the higher-order road in the direction prohibited by the closure.

4.3.3 CHANNELIZATION

Intersection channelization may be used on all roadways.

4.3.4 FULL CLOSURE

Full closure should only be considered for local roads and only as a last resort, as it has severe implications on local residents. If considered, care must be taken to ensure that the local traffic affected by the closure does not create unanticipated problems on adjacent local streets.

4.4 Signage

These devices are sometimes used as traffic calming devices and include both regulatory and warning signs, including stop and yield controls, maximum speed, turn prohibitions, 'traffic calmed neighbourhood” signs.

Advantages:

- Has the potential to reduce vehicle speeds and volumes
- Reduces road user conflicts
- Relatively inexpensive

Disadvantages:

- Frequent enforcement is required to be effective
- "Traffic calmed neighbourhood" and 'No through traffic” signs are not regulatory signs that can be enforced
- May reduce local access in the case of one-way streets and turn restrictions.

4.4.1 STOP, YIELD AND OTHER REGULATORY SIGNS

Regulatory signs, with the exception of speed limit signs, are not to be used as traffic calming devices within Greater Sudbury. Unwarranted all-way stop signs are not a valid method of calming traffic and should not be installed for that purpose. When intended as traffic calming, maximum speed signs are only to be used in conjunction with other physical devices.

4.4.2 TRAFFIC CALMED NEIGHBOURHOOD SIGNS

These signs should be considered as part of all traffic calming implementations.



Richard Drdul (flickr.com/drdul)

4.4.3 WARNING SIGNS

Warning signs shall be considered where appropriate as part of larger traffic calming plans. The *Canadian Guide to Neighbourhood Traffic Calming* offers guidance as to which signs are suggested/required for various installations.



Richard Drdul (flickr.com/drdul)



Richard Drdul (flickr.com/drdul)



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4.4.4 TURN RESTRICTIONS

Turn restrictions may be considered as traffic calming, but two important points highlight the caution that must be exercised:

- They are not self-policing devices, and when used on low-volume roads, do not by themselves deter motorists from making the prohibited movement; and

- While it is possible under the Highway Traffic Act to enforce turn restrictions at particular times of the day, it is not possible to enforce a "local traffic excepted" plate on a turn restriction sign. If a turning movement is prohibited for some traffic, it must be prohibited for all traffic.

5. PLANNING, ENGINEERING AND CONSTRUCTION COSTS

Most traffic engineering plans can be developed in-house, using existing City, Provincial and TAC guidelines, as well as best practices research from other jurisdictions. For particularly large or complex plans, or when staff resources are short, the services of a consultant may be considered, keeping in mind that consultant costs may range into the tens of thousands of dollars.

Typical recent construction costs are shown in **Exhibit 5-1**. Factors such as land acquisition, utilities, drainage and grading should be expected to influence construction costs.

Exhibit 5-1: Typical Traffic Calming Construction Costs

Measures		Unit Cost
Horizontal Deflection	Curb Extension	$3,000-$10,000 per side
	Traffic Circle / Mini Roundabout	$5,000 - $20,000
	Raised Median Island	$5,000-$15,000
	Corner Radius Reduction	$3,000 and up, depending on radius
	Chicane, 1-Lane	$10,000 - $30,000 per series
	On-Street Parking	Minor
Vertical Deflection	Speed Hump	$2,000-$5,000 (depending on width of roadway)
	Speed Table	$5,000-$20,000 (depending on width of roadway and material)
	Speed Cushion	$2,000-$5,000 (depending on width of roadway)
	Raised Crosswalk	$5,000-$20,000 (depending on width of roadway and material)
	Raised Intersection	$20,000 - $75,000
Obstruction / Closure	Directional Closure	$5,000 - $25,000
	Right-In/Right-Out Island	$5,000 - $10,000
	Raised Median Through Intersection	$10,000 - $30,000
	Intersection Channelization	$3,000 and up, depending on length
	Full Closure	$10,000 - $30,000
Signage	Traffic-Calmed Neighbourhood, Warning Signs, etc	$200

6. ANTICIPATED STAFF LEVEL OF EFFORT AND TIMELINES

The warrant component of the traffic calming process has been specifically designed to require a similar level of effort to a traffic signal warrant. That is, once all of the required input data has been collected, running the warrant spreadsheet should only be a matter of minutes. Much of the required input data is information that is expected to be readily available, e.g.:

- Presence or absence of transit or emergency routes;
- Block length between controlled intersections;
- Land use data;
- Pedestrian facilities and pedestrian generators; and
- Collision data.

In many cases, the city will have volume and speed data already on hand for the location. For those locations where this data is not available, it will need to be collected prior to warrant analysis. As discussed above, the most resource-intensive component of the data collection will be the determination of non-local traffic. This report provides guidance on four different methods of estimating non-local traffic percentages.

Additional staff effort will be required once a site is selected for further study. Project initiation, additional data collection, the public consultation process and plan development may take several months. Approval, tender, implementation and evaluation times would generally be consistent with similar-scale capital works projects.

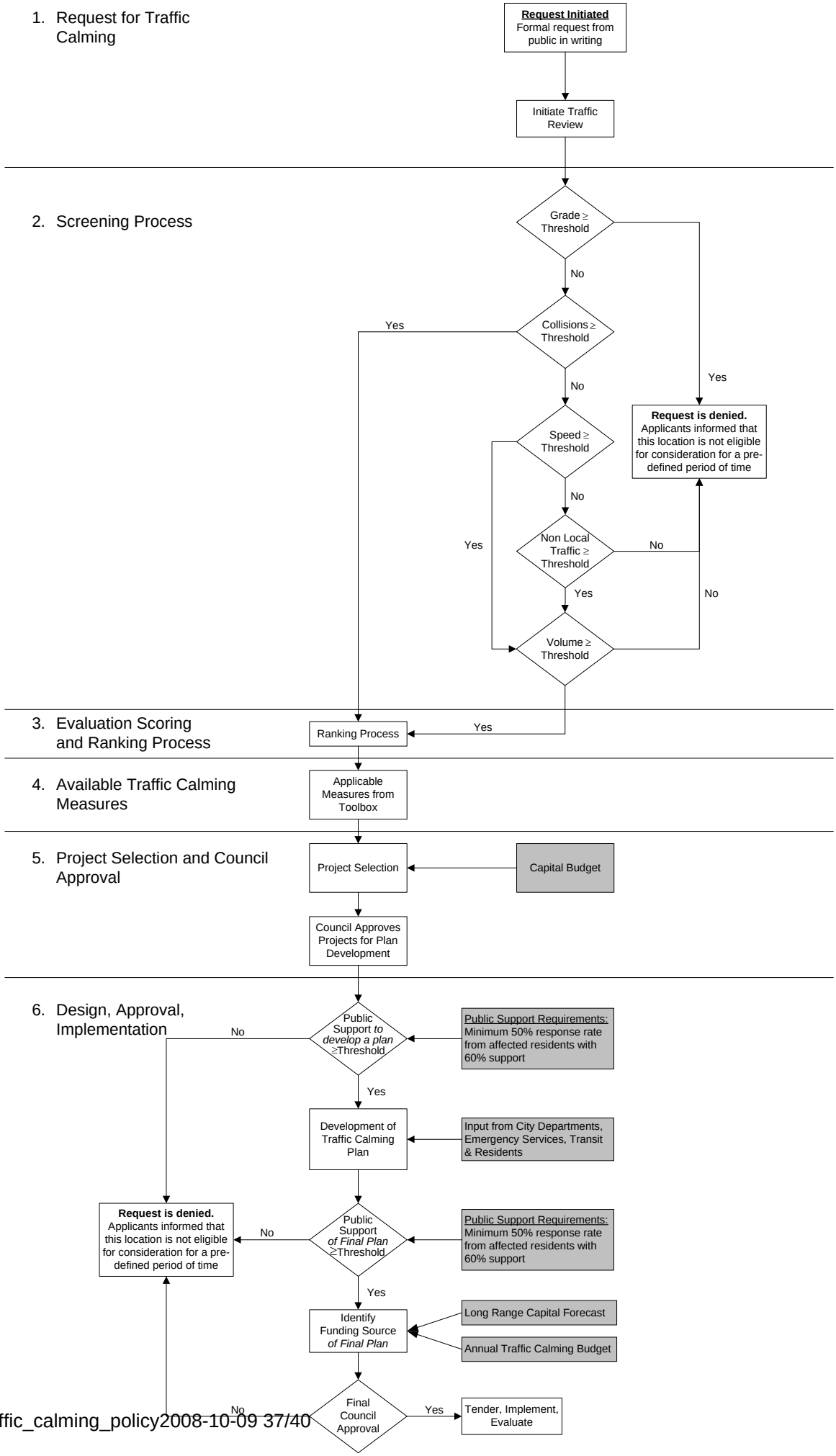
7. GLOSSARY

- **85th Percentile Speed** – The speed separating the fastest 15% of vehicles from the slowest 85%;
- **ADT** – Average daily traffic, recorded over a 24-hour period;
- **Cut Through Traffic** – Traffic determined to neither begin nor end a trip within a defined study area. Typically synonymous with “non-local traffic”;
- **EMS** – Emergency medical services;
- **FSA** – Forward Sortation Area; the first three characters of a postal code;
- **Local Road, Collector, Tertiary Arterial** – Three of the roadway classifications used by the City of Sudbury, in increasing order of volume and importance within the overall roadway network;
- **MTO** – Ontario Ministry of Transportation;
- **OTM** – Ontario Traffic Manual;
- **Pedestrian Facilities** – Sidewalks;
- **Pedestrian Generators** – Schools, parks, etc to be defined by Sudbury; and
- **VPD** – Vehicles per day.

APPENDIX A

RECOMMENDED TRAFFIC CALMING FRAMEWORK

1. Request for Traffic Calming



APPENDIX B

APPLICABILITY AND IMPLICATIONS OF RECOMMENDED TRAFFIC CALMING MEASURES

Potential Benefits of Recommended Traffic Calming Measures

Measures		Speed Reduction	Volume Reduction	Conflict Reduction	Environment
Horizontal Deflection	Curb Extension	◐	○	○	●
	Traffic Circle / Mini Roundabout	●	◐	●	●
	Raised Median Island	◐	○	◐	○
	Corner Radius Reduction	◐	○	○	◐
	Chicane, 1-Lane	●	●	●	◐
	On-Street Parking	◐	○	○	◐
Vertical Deflection	Speed Hump / Table	●	◐	●	◐
	Speed Cushion	●	◐	●	◐
	Raised Crosswalk	●	○	◐	◐
	Raised Intersection	◐	○	◐	◐
Obstruction / Closure	Directional Closure	○	●	◐	◐
	Right-In/Right-Out Island	○	●	◐	◐
	Raised Median	○	●	◐	◐
	Intersection Channelization	○	◐	◐	◐
	Full Closure	○	●	●	◐
Signage (when primarily application is traffic calming)	Traffic-Calmed Neighbourhood	◐	○	○	○
	Turn Prohibited	○	◐	◐	◐
	Through Traffic Prohibited	○	◐	◐	◐
	One Way	○	●	◐	◐
	Warning signs (playground, school, etc)	◐	○	◐	○
	Maximum Speed	◐	○	○	○
	Yield	○	○	◐	○
	Stop	○	◐	◐	○
● = Substantial Benefits ◐ = Minor Benefits ○ = No Benefit					

Potential Disbenefits of Recommended Traffic Calming Measures

Measures		Local Access	Emergency Response	Other Travel Modes	Enforcement	Maintenance
Horizontal Deflection	Curb Extension	○	○	◐	○	◐
	Traffic Circle / Mini Roundabout	○	◐	◐	○	◐
	Raised Median Island	◐	○	○	○	◐
	Corner Radius Reduction	○	○	○	○	◐
	Chicane, 1-Lane	○	◐	◐	○	◐
	On-Street Parking	○	◐	◐	○	◐
Vertical Deflection	Speed Hump / Table	○	◐	◐	○	◐
	Speed Cushion	○	○	◐	○	◐
	Raised Crosswalk	○	◐	◐	○	◐
	Raised Intersection	○	◐	◐	○	◐
Obstruction / Closure	Directional Closure	◐	○	◐	◐	◐
	Right-In/Right-Out Island	◐	◐	◐	◐	◐
	Raised Median	◐	◐	◐	○	◐
	Intersection Channelization	◐	◐	○	○	◐
	Full Closure	●	●	◐	○	◐
Signage (when primarily application is traffic calming)	Traffic-Calmed Neighbourhood	○	○	○	○	○
	Turn Prohibited	◐	○	○	●	○
	Through Traffic Prohibited	◐	○	○	●	○
	One Way	◐	◐	◐	○	○
	Warning signs (playground, school, etc)	○	○	○	○	○
	Maximum Speed	○	○	○	●	○
	Yield	○	○	○	○	○
	Stop	○	◐	○	●	○
● = Substantial Disbenefits ◐ = Minor Disbenefits ○ = No Disbenefits						

Source: *Canadian Guide to Neighbourhood Traffic Calming* (Transportation Association of Canada, Institute of Transportation Engineers, December 1998)

City of Greater Sudbury

DEVELOPMENT OF TRAFFIC CALMING POLICY & PILOT PROJECT REVIEW FOR SOUTHVIEW DRIVE / BOUCHARD STREET
CURRENT BEST PRACTICES

DRAFT TECHNICAL MEMORANDUM #1

APRIL 2008

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1. INTRODUCTION

As the need and justification for traffic calming and remedial measures varies considerably from one jurisdiction to the next, a number of jurisdictions have developed their own traffic calming 'warrants' based on traffic/pedestrian volumes, operating speeds, collisions/conflicts and a number of other factors. Much like traffic signal warrants, traffic calming warrants provide guidance for the appropriateness and implementation of traffic calming measures. In most cases, the warrants were developed to quantify the perceived problems that residents raise in their traffic calming requests. In many jurisdictions, the warrants go beyond a simple minimum score required for traffic calming and also offer a means to rank and prioritize potential traffic calming sites through secondary evaluation criteria, as well as offering guidance for the installation of appropriate traffic calming measures.

1.1 Study Background and Objectives

The City of Greater Sudbury currently has no formal policy with which to respond to, assess and address traffic calming issues raised by residents and key stakeholders. The overall objective of this study is to develop a traffic calming policy for the City. This study will build on the foundation of other jurisdictions to develop a traffic calming warrant and policy that provides appropriate guidance for the implementation of traffic calming measures in the City of Greater Sudbury.

The four tasks associated with the study are:

- Review current best practices with respect to traffic calming devices, warrants and policies;
- Develop a comprehensive traffic calming warrant that can be applied to requests received by the City;
- Develop an appropriate traffic calming policy for the City; and
- Undertake a traffic calming pilot project for Southview Drive / Bouchard Street that is consistent with the recommended traffic calming policy;

1.2 Document Purpose

The purpose of this document is to review best practices of jurisdictions throughout North America in the area of policy and warrants that evaluate, rank and prioritize traffic calming requests. The review will lay the foundation for an appropriate traffic calming policy for the City of Greater Sudbury.

Specifically, the review analyzes the state of traffic calming in Ontario, elsewhere in Canada and in the United States. Several jurisdictions are reviewed under each category. As it is infeasible to review the practices of every North American municipality that has implemented a traffic calming policy, these communities represent the forefront of traffic calming (through early adoption, unique practices or number of implementation sites), or they may share similar characteristics with Sudbury, e.g. similar size and/or setting.

2. REVIEW OF BEST PRACTICES

Transport Canada has identified a list of Canadian municipalities with significant traffic calming experience. The list, presented in **Exhibit 2-1**, was used as a starting point for the best practices review.

Exhibit 2-1: Canadian Municipalities with Significant Traffic Calming Experience

Municipality	Detailed Policy or Guidelines	Project Focus		Municipality	Detailed Policy or Guidelines	Project Focus	
		Street	Area			Street	Area
Alberta				**Nova Scotia**			
City of Calgary	■		■	Halifax Regional Municipality	■*		■
City of Edmonton			■	**Ontario**			
British Columbia				City of Toronto	■	■	
City of Burnaby			■	City of Ottawa	■*		■
City of Coquitlam	■		■	City of Waterloo	■	■	
Corporation of Delta	■		■	Town of Oakville	■		
City of Kelowna	■*		■	Town of Markham	■*		■
City of Langley	■		■	City of Pickering	■		■
City of North Vancouver	■		■	City of Vaughan	■		■
City of Port Moody	■	■		City of Windsor	■		■
District of Saanich	■		■	**Quebec**			
City of Surrey	■		■	Gatineau	■		■
City of Vancouver	■		■	Montreal			■
City of Victoria			■	Sherbrooke		■	
District of West Vancouver	■	■		Quebec			■
Manitoba				**Saskatchewan**			
City of Winnipeg	■+	■		City of Saskatoon			■
New Brunswick							
City of Fredericton	■		■				

* Component of broader policies or guidelines for traffic management or road safety

\+ Limited to the use of speed humps

Traffic Calming in Canadian Urban Areas. Transport Canada. May 22, 2007. March 24, 2008. <http://www.tc.gc.ca/programs/Environment/UTSP/trafficCalming.htm>

2.1 Ontario

Many major cities and population centres in Ontario use traffic calming to mitigate the negative effects of traffic within their neighbourhoods. These communities typically have official traffic calming policies, and most of them follow a warrant process for screening and prioritization. Some examples from Ontario are discussed below.

2.1.1 TORONTO

The City of Toronto has implemented traffic calming on existing roadways and laneways for a number of years. In February 2002, City Council adopted a new Traffic Calming Policy, which supports the on-going implementation of traffic calming on local and collector streets where local community support exists, existing traffic impacts are significant and where emergency and transit vehicles can be reasonably accommodated. There has been a steady increase in the demand for traffic calming installations in the City of Toronto. Accordingly, Toronto's policy includes a ranking system to prioritize potential projects. Primary retrofit traffic calming devices used in Toronto are curb extensions and speed humps. There are a limited number of cases where traffic calming has been secured or stipulated as part of the development approvals process, i.e., Deer Park Area. Other policy highlights include:

- Consideration of traffic calming on a street can be initiated by the local Councillor following a public meeting or upon a receipt of a petition signed by 25% of the affected residents. In the case of multiple family rental dwellings, receipt of a petition of 10% of the affected residents;

- Toronto has established a number of traffic calming warrants to determine:

  - The support needed to undertake a traffic management plan study;

  - Safety requirements including sidewalk, road grade and emergency response; and

  - Technical requirements including prevalent operating speeds, minimum and maximum traffic volumes, minimum block lengths and transit service.

- The priority ranking system is based on speed, volume, collisions, and pedestrian and bicycle factors, as a function of roadway type;

- The City uses many of the traffic calming measures outlined in the *Canadian Guide to Traffic Calming* (TAC, 1999); however, it also uses edge lines, parking and "parking islands" as non-physical means of addressing traffic concerns; and

- Through a ballot process, 60% support from 51% or greater of the affected households is required to support the project.

There have been a limited number of cases where traffic calming devices have been removed from City of Toronto roadways due to design and aesthetic reasons. It should be recognized that these were older installations that were implemented when traffic calming in North America was in its infancy and comprehensive guidelines and public input mechanisms were not readily available.

2.1.2 OTTAWA

The City of Ottawa implements traffic calming measures as part of a broad Area Traffic Management program. Other measures within the program include enforcement, education, transportation demand management and regulation. The City has developed extensive principles and procedures surrounding the concept of equity for all users of City roads. The Ottawa program is too detailed for full exploration within this report. Instead, this section will focus on the screening and prioritization process used by the City.

Initial requests for traffic management must come from one of three categories:

- At least 10 households or businesses or 25% of the homes/businesses of the affected area;
- The City Councillor for the ward; or
- The community association, school council, or business association for the area.

All requests then follow the same process. Some requests can be addressed through a 'quick fix,' such as replacement of a missing sign or an increased enforcement campaign. Another category of requests needs to be referred to other City departments. The remaining requests are subject to the Area Traffic Management Project Screening. The screening process requires the City to collect a variety of traffic data and apply it to a three-step screening process, as described in **Exhibit 2-2**.

Exhibit 2-2: City of Ottawa Traffic Management Screening Process

	Screening Results (complete tests 1 and 2 listed below)
Yes/No	One serious collision involving a vulnerable street user within the past three years
Yes/No	At least ONE of the Context Criteria and at least TWO of the Traffic Criteria met. (See Test One and Test Two below)
If either of the above is answered with YES, the issue is carried forward as a project.	

Test One - Context Criteria: the street/area must have the proper context, demonstrating susceptibility to negative impacts associated with traffic by meeting at least one of the following criteria:

Check All that Apply	**Context**
	Presence of schools, parks, community centres, or cluster of vulnerable street users (e.g. care facility, childcare centres, seniors' residences)
	Primarily residential frontage.
	Pedestrian activity levels which are not adequately served by pedestrian facilities.
	Pedestrian-oriented retail (e.g. "main street" district).

Test Two - Traffic Criteria: the City will collect or extract from its records sufficient data to determine if at least two of the following indicators are satisfied:

Meets Threshold (Check all that apply)		**Indicator**	**Measure**
Local or Collector	**Arterial**		
		Inappropriate driver behaviour	There must be clear evidence of inappropriate driver behaviour, characterized by a history of complaints and verified through enforcement efforts.

		Speed	15% of vehicles are traveling at or above 50 km/h unless the street is posted at a higher speed limit, in which case 15 % of vehicles must be traveling at or above the posted speed limit (i.e. same as the 85th percentile measurement). - or - 5% of vehicles are traveling at or above 60 km/h, unless the posted speed is higher than 50 km/h in which case 15 % of vehicles must be traveling 10 km/h or more above the posted speed limit (i.e. same as 95th percentile measurement).
	N/A	Volume	The average motorized traffic volume is at least: – 1000 vehicles per day or 120 vehicles per peak hour, if the street is a local street – 2500 vehicles per day or 300 vehicles per peak hour, if the street is a collector street – 5000 vehicles per day or 600 vehicles per peak hour, if the street is a major collector street
	N/A	Through traffic volumes	There must be tangible evidence of "through" traffic (defined as motorized vehicles using a lower classification road during an intermediate portion of a trip) exceeding 20% of the total traffic volume. Through traffic may include vehicles circling a neighbourhood to find parking.

Exhibit 3-4 Sample - Screening Checklist. City of Ottawa. March 24, 2008.
<http://www.ottawa.ca/residents/onthemove/driving/traffic/atm/exhibits/ex_3_4_en.html>

If a request satisfies the screening criteria, the next step is to categorize it as a localized or comprehensive study, as follows:

- Localized Studies:
  - Confined to one or few streets;
  - Local, collector or major collector streets (i.e. no arterials);
  - One clearly defined problem and limited potential for wider problem statement or study area;
  - Few or minor competing interests;
  - Solution(s) can be reasonably anticipated; and
  - Limited time and effort expected for completion.

Twice yearly, newly identified localized studies are added to an existing list of localized studies based on the prioritization worksheet presented in **Exhibit 2-3**. The top ranked studies (number undefined) are to be investigated over the following six months. Studies of selected projects that are not undertaken within the six-month period will carry over, even if newer studies score higher on the next ranking.

Exhibit 2-3: City of Ottawa Localized Study Prioritization Worksheet

Indicator	Point Score / Maximum Score	Local Roads	Collector Roads	Major Collector Roads
Inappropriate driver behaviour	/10	Up to 10 points if there is a history of complaints that can be verified through enforcement efforts		
Generators of vulnerable street users	/10	5 points per generator of vulnerable street users (schools, parks and community centres) on or in close proximity to street		
Pedestrian facilities	/10 (5 for local)	5 points if no sidewalk exists	10 points if no sidewalk exists; 5 points if one sidewalk exists	
Abutting land use	/10	Up to 10 points based percentage of street frontage that is primarily residential or pedestrian-oriented retail (e.g. "main street")		
15% of vehicles traveling at or over 50 km/h or speed limit	/15	1 point for every km/h over 50 km/h (or over posted speed limit if it is greater than 50 km/h)		
5% of vehicles traveling at or over 60 km/h (or if speed limit is more than 50 km/h, 15% travelling 10 km/h or more the speed limit)	/15	1 point for every km/h over 60 km/h (or 1 point for every km/h greater than 10 km/h over the posted speed limit if it is greater than 50 km/h)		
Motorized traffic volumes	/15	1 point for every 100 vehicles per day over 1000 or 1 point for every 10 vehicles per hour over 120 (in the busiest hour)	1 point for every 250 vehicles per day over 2500 or 1 point for every 25 vehicles per hour over 300 (in the busiest hour)	1 point for every 350 vehicles per day over 5000 or 1 point for every 35 vehicles per hour over 600 (in the busiest hour)
Through traffic volumes	/15	1 point for every 2% in the proportion of through traffic over 20% (minimum 20 through vehicles per hour)		
Collisions	/30	Ratio of collision rate to average collision rate (for streets or intersections, whichever is greatest).		
			Less than 0.75	0 points
			0.75 to 1.25	5 points
			1.25 to 2.0	15 points
			2.0 to 3.0	25 points
			Greater than 3.0	30 points
		If a vulnerable street user is involved in a collision within the most recent three-year period, the maximum of 30 points are given.		

Exhibit 3-5 Sample Prioritization Worksheet - Localized Studies . City of Ottawa. March 24, 2008. <http://www.ottawa.ca/residents/onthemove/driving/traffic/atm/exhibits/ex_3_5_en.html>

- Comprehensive Studies:
  - Affect several streets or entire neighbourhood;
  - May include arterials;
  - Many concerns that may be poorly defined;
  - Many or severe competing interests;

- Solutions are not readily apparent; and
- Significant expected time and effort.

Comprehensive studies are ranked using a similar prioritization process, as described in **Exhibit 2-4**. All comprehensive studies up for evaluation are ranked against each other on an indicator-by-indicator basis. The study with the most severe concern receives the full score for a particular indicator. The highest-ranking studies are then selected for implementation, based on available funding and resources required for completion within five years.

Exhibit 2-4: City of Ottawa Comprehensive Study Prioritization Worksheet

Indicator	Point Score (Relative to Other Projects)	
	Local or Collector	Arterial
Inappropriate driver behaviour	/10	/15
Generators of vulnerable street users	/10	/15
Pedestrian facilities	/10 (5 for locals)	/15
Abutting land use	/10	/10
15% of vehicles traveling at or over 50 km/h or speed limit	/15	/20
5% of vehicles traveling at or over 60 km/h (or if speed limit is more than 50 km/h, 15% travelling 10 km/h or more the speed limit)	/15	/20
Motorized traffic volumes	/15	N/A
Through traffic volumes	/15	N/A
Collisions	/30	/40

Exhibit 3-6 Sample Prioritization Worksheet - Comprehensive Studies. City of Ottawa. March 24, 2008. <http://www.ottawa.ca/residents/onthemove/driving/traffic/atm/exhibits/ex_3_6_en.html>

2.1.3 HAMILTON

The City of Hamilton approved a new comprehensive traffic calming and traffic management policy in late 2007. It supersedes a speed hump policy adopted in 2000. The Hamilton policy states that alternative strategies should always be pursued before a decision is made to install traffic calming devices, including:

- "Reviewing, establishing and/or revising and enforcing general Highway Traffic Act regulations and municipal by-laws pertaining to speed limits and other traffic control management items;
- Educating residents and neighbourhood groups so that they can better understand causes of traffic problems, potential solutions to these problems, and the advantages and disadvantages of implementing different solutions; and
- Installing any applicable regulatory, warning, or guide message signs or other traffic control devices which comply with approved standards."

The policy goes on to state, "Traffic calming or traffic management measures will not be supported on streets that serve as primary EMS response routes or HSR routes. This is because emergency response time increases and, depending on the measures used, patients in ambulances and passengers riding on buses, particularly standing passengers, may be jostled or thrown about."

Hamilton makes a distinction between traffic calming and traffic management. Its policy states that traffic calming is intended to reduce vehicle speeds, typically through horizontal and vertical deflection. Traffic management is defined as techniques such as signing, diversion and closures designed to reduce vehicle volumes.

Hamilton has a two-stage process of 'prerequisites' and 'technical criteria' for the assessment of requests for traffic calming and management. Prerequisites consist of:

1. An informal survey/poll conducted by the Ward Councillor or a petition indicating a reasonable level of support from the affected residents;

2. The subject roadway must function as a local or minor collector roadway;

3. The speed limit on the subject roadway must be at least 50 km/h;

4. The subject roadway must not be a primary emergency response route or designated HSR bus route; and

5. The roadway gradient must not exceed 5%.

In order for a Hamilton street to qualify for *traffic calming*, it must then meet all of the following technical criteria:

1. The minimum 24 hour volume on the subject street must be at least 750 vehicles per day for a local road and between 2,500 – 5,000 vehicles per day for a minor collector roadway. In cases where 'cut-through' traffic is greater than 30%, no minimum volume threshold is required;

2. The 85th percentile speed must be at least 8 km/h above the posted speed limit. In cases where the 85th percentile speed is at least 15 km/h above the posted speed, no minimum volume threshold is required;

3. The minimum block length must be at least 200 m;

4. There must be a sidewalk on at least one side of the road; and

5. A minimum support rate of 70% of all directly affected residences and 50% of indirectly affected residences must be achieved. The 'affected' areas are determined by staff in consultation with the Ward Councillor(s).

In order for a Hamilton street to qualify for *traffic management*, it must meet all of the following technical criteria:

1. The minimum 24 hour volume on the subject street must be at least 500 vehicles per day for a local road, and the road should be act primarily as a local street or minor collector;

2. Any prior attempts to improve traffic flow on the arterial/collector street system were undertaken without success;

3. The 'cut-through' traffic is greater than 50% of the total volume; and

4. A minimum support rate of 70% of all directly affected residences and 50% of indirectly affected residences must be achieved.

Following this two-step process, sites qualifying for traffic calming or management are scored and ranked on the basis of four warrants:

1. Speed;
2. Volume;
3. Pedestrians/Cyclists; and
4. Collisions.

2.1.4 WINDSOR

The City of Windsor's traffic calming policy (September 2005) is one of the few policies reviewed for this project that differentiates policy in existing neighbourhoods from that of new neighbourhoods. The policy states that traffic calming should be constructed in all new neighbourhoods in accordance with the Official Plan road classification for the area. Selected policy statements for new developments include:

- Roundabouts or traffic circles at intersections between local roads;
- Curb extensions and sidewalk treatments at intersections of local roads with collectors;
- Chicanes are required on straight sections of roadway greater than 300m in length;
- Pedestrian generators require lane narrowings and pavement markings; and
- Extensive use of median islands, especially to discourage cut-through traffic.

The procedure for traffic calming on existing roads is more extensive in Windsor than in many other municipalities. Like many others, it begins with a resident request. The city then performs a detailed warrant study; however, this warrant study goes beyond the requested street to include other streets that may form the study area for a more comprehensive traffic calming project. Factors in determining the study area include school catchment areas, natural landforms and railways. If warrants are met, the City then requests the resident making the complaint to go door to door to with a petition that people must sign to initiate a further development of the traffic calming plan.

Windsor uses an extensive warrant process, considering the following factors, with a maximum score of 90:

- Excessive Speed – to a maximum of 20 points;
- Excessive Volume – to a maximum of 20 points;
- Bicycle Route – to a maximum of 10 points;
- Collisions – to a maximum of 15 points;
- Pedestrian Generators – to a maximum of 15 points; and
- Total Percentage Of Residential Frontage – to a maximum of 10 points.

Where the policy differentiates between collector and local roadways—and also from the policies of other jurisdictions—is how it then assigns the total score to appropriate traffic calming measures. **Exhibit 2-5** and **Exhibit 2-6** illustrate how the scores relate to the type of traffic calming that can be implemented, for local and collector roads, respectively, as well as the City's assessment of the impacts on speed, volumes, conflicts and the environment. For any project, traffic calming measures of a lower level can also be implemented.

Exhibit 2-5: City of Windsor Appropriate Traffic Calming Measures For Local Roads

Measure	Speed Reduction	Volume Reduction	Conflict Reduction	Environment
Level 1 Calming – Score 21<36 - Signing				
Maximum Speed	Minor	Nil	Nil	Nil
Right or Left Turn Prohibited	Nil	Minor	Minor	Minor
Through Traffic Prohibited	Nil	Minor	Minor	Minor
Passive signage (i.e.: Traffic Calmed Neighbourhood)	Nil	Nil	Nil	Minor
Level 2 Calming – Score 36<56 – Horizontal Deflection				
Chicane - Two Lane	Minor	Nil	Minor	Minor
Curb Radius Reduction	Minor	Nil	Nil	Minor
On Street Parking	Minor	Nil	Nil	Minor
Lane Narrowing	Minor	Nil	Nil	Minor
Raised Median Island	Minor	Nil	Minor	Nil
Level 3 Calming – Score 56<76 – Horizontal Deflection				
Chicane - One Lane	Substantial	Substantial	Substantial	Minor
Curb Extension	Minor	Nil	Nil	Substantial
Traffic Circle	Substantial	Minor	Substantial	Substantial
Level 3 Calming – Score 56<76 – Diversion				
Intersection Channelization	Nil	Minor	Minor	Minor
Raised Median Through Intersection	Nil	Substantial	Minor	Minor
Right in / Right out Island	Nil	Substantial	Minor	Minor
Level 4 Calming – Score 76 < Max - Vertical Deflection				
Raised Crosswalk	Substantial	Nil	Minor	Minor
Raised Intersection	Minor	Nil	Minor	Minor
Sidewalk Extension	Minor	Nil	Minor	Nil
Speed Hump	Substantial	Minor	Substantial	Minor
Textured Crosswalk	Nil	Nil	Minor	Minor
Level 4 Calming – Score 76 < Max - Diversion				
Directional Closure	Nil	Substantial	Minor	Minor
Diverter	Nil	Substantial	Minor	Minor
Full Closure	Nil	Substantial	Substantial	Minor

Traffic Calming For Residential Areas Policy Paper. City of Windsor. September 2005.

If the warrant study finds that traffic calming measures are applicable, a petition is circulated among the affected residents. Support from 66% of all affected residences is required for the project to continue. Windsor's policy dates to a time when an EA was required for traffic calming implementation. The Class EA process was followed if the required level of support was achieved. It is not known how the policy will change now that an EA is no longer required.

Exhibit 2-6: City of Windsor Appropriate Traffic Calming Measures For Collector Roads

Measure	Speed Reduction	Volume Reduction	Conflict Reduction	Environment
Level 1 Calming – Score 31<46 - Signing				
Maximum Speed	Minor	Nil	Nil	Nil
Right or Left Turn Prohibited	Nil	Minor	Minor	Minor
Through Traffic Prohibited	Nil	Minor	Minor	Minor
Passive signage (i.e.: Traffic Calmed Neighbourhood)	Nil	Nil	Nil	Minor
Level 2 Calming – Score 46<76 – Horizontal Deflection				
Chicane - Two Lane	Minor	Nil	Minor	Minor
Curb Radius Reduction	Minor	Nil	Nil	Minor
On Street Parking	Minor	Nil	Nil	Minor
Lane Narrowing	Minor	Nil	Nil	Minor
Raised Median Island	Minor	Nil	Minor	Nil
Level 3 Calming – Score 76 < Max - Horizontal Deflection				
Curb Extension	Minor	Nil	Nil	Substantial
Level 3 Calming – Score 76 < Max - Diversion				
Intersection Channelization	Nil	Minor	Minor	Minor
Raised Median Through Intersection	Nil	Substantial	Minor	Minor
Right In / Right Out Island	Nil	Substantial	Minor	Minor

Traffic Calming For Residential Areas Policy Paper. City of Windsor. September 2005.

Recent conversations with City of Windsor staff revealed that the warrants process is generally working well. One specific challenge is that streets that already have a 40 km/h speed limit meet the warrants more readily than streets posted at 50 km/hr, since the excessive speeding component of the warrant compares observed speeds to posted speeds. This places streets that already have a 40 km/h speed limit at an advantage, even though the severity of traffic problems on a street posted at 50 km/h may be greater. Another challenge in Windsor is that people are generally resistant to traffic calming as their opinions are based on a few non-aesthetically pleasing examples from the early days of traffic calming. This resistance, and the fact that the petition portion of the warrants process requires someone to go door to door, makes it difficult to gain neighbourhood acceptance. The City is currently looking into using the 311 system to make the petition process easier.

2.1.5 PICKERING

The City of Pickering implemented its traffic calming policy in January 2003. The policy limits physical traffic calming measures to local, collector and Type C arterial roadways in the city. Traffic calming requests are addressed on a first-come, first-served basis. The Safer Streets Traffic Calming Review Committee must approve all proposed sites before recommendation to Council. This committee includes representatives from each of the following areas or city departments: fire, police, ambulance, transit, Planning & Development, Roads, and Traffic, and one resident appointed from City Wards 1 – 3 each. The committee has the ability to deny requests based on factors such as emergency vehicle response times, maintenance or transit operations.

Those requests that are approved are sent to the city Traffic Section for further study, including traffic speed and volume. The site is compared against a checklist as shown in **Exhibit 2-7**. In order for the project to proceed further, 70% support from affected residents is required.

Exhibit 2-7: City of Pickering Traffic Calming Review Checklist

City of PICKERING

Traffic Calming Review Checklist

DATE: _____

STREET: _____

MINIMUM CRITERIA

Facility Type	☐ Local	☐ Collector	☐ Type 'C' Arterial
Length of Facility	☐ Greater than 300 metres		
Number of Lanes	☐ Maximum of 2		
Local Road			
85th Percentile Speed	_____ km/h	☐ Exceeds 55 km/h	
AND/OR			
Infiltrating Traffic	_____ v/d of	_____ v/d	☐ Exceeds 30%
Collector Road/Type 'C' Arterial			
85th Percentile Speed	_____ km/h	☐ Exceeds 57 km/h	
AND/OR			
Infiltrating Traffic	_____ v/d of	_____ v/d	☐ Exceeds 30%

Note: The Traffic Calming request will be denied if any of the above criteria is not 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)	☐ Land Use (1)	☐ Combination (.5)	_____
Traffic Volumes	_____ v/d	☐ > Capacity (1)	☐ < Capacity (0)	_____
Roadway Grade	☐ < 5% (1)	☐ < 10% (.5)	☐ > 10% (0)	_____
Posted Speed Limit	☐ 40 km/h (0)	☐ 50 km/h (0)	☐ 60 km/h (0)	_____

Point Assessment — Total Points _____

Low Priority 0-5 Medium Priority 6-10 High Priority 11+

Note: Point system is not a warrant but rather a mechanism for reporting and discussion.

Traffic Calming Request Status

☐ Approved for further review ☐ Request Denied

Safer Streets Traffic Management Strategy Traffic Calming Policy. City of Pickering. January 2003.

2.1.6 MARKHAM

Traffic calming in the Town of Markham is one component of the Markham Safe Streets Task Force (MSSTF). The goal of the MSSTF is to change driver behaviour through education, enforcement and engineering. Traffic calming falls under the engineering category.

Markham has a history of installing speed humps as their primary traffic calming measure on existing roadways. Before and after studies indicate an average speed reduction of 10 km/h. The MSSTF recommends that speed humps continue to be installed as part of the overall Town strategy. Measures such as horizontal deflection, short block lengths and connector roads are encouraged for new developments.

However, the Town has realized that physical traffic calming measures on their own are not a suitable solution to reducing speeds, aggressive driving and other traffic-related problems in on its roads. In addition, some measures, particularly speed humps, serve to hinder transit and emergency services operations, as well as the movement of goods and people through the town. As a result, the MSSTF has approved the following criteria for considering physical traffic calming measures:

- **Major 4-Lane Collector Roads –** These roads are geared towards the enforcement and education components of the MSSTF, and therefore no physical traffic calming measures are to be installed except for heritage districts, e.g. Unionville;

- **Industrial/Commercial Park Roads –** As above. Enforcement and education only;

- **Priority Routes (Emergency Services and Public Transit) –** Average speeds (not 85th percentile) must be greater than 55km/h to qualify for physical traffic calming. Otherwise, these roads will also be the target of education and enforcement campaigns; and

- **All Other Roads –** Average speeds must be greater than 50km/h to qualify for physical measures, **but only after the implementation of enforcement and education initiatives**.

An appendix attached to the MSSTF outlines a method of technical evaluation of neighbourhood traffic problems and the selection of appropriate corrective measures. The contents of the appendix are taken from the Markham Transportation Committee *Guidelines for Neighbourhood Traffic Improvement Projects* (September 22, 1998) and are modelled on ranking and scoring systems developed by ITE and the City of Seattle. As with many other municipalities, the model assigns points to the collision history, traffic volumes and traffic speeds of the identified roadway. The MSSTF does not describe how particular measures are chosen from a street's total score, but it does indicate that solutions have come out of various public meetings that require traffic calming and traffic management to be implemented on a broader scale, rather than just a particular street or block.

The end result is a traffic calming process as follows:

- Resident(s) request traffic calming on a particular street or neighbourhood;

- Town of Markham Transportation Safety Committee (TSC) conducts a traffic operational study;

- The road is classified (major 4-lane collector, industrial/commercial, priority route, other);

- The MSSTF ranking system is used to prioritize the request;
- TSC and Council approve or deny the request; and
- The Safe Streets strategy (education and enforcement first) is followed if the request is approved.

Finally, if the request reaches a point where a physical traffic calming plan is developed and presented at a public meeting, 60% of affected property owners—defined as having frontage on the "defined catchment area"—must approve the plan for it to be implemented.

2.1.7 VAUGHAN

The City of Vaughan implements traffic calming through two primary mechanisms, namely, the development approvals process and the Neighbourhood Traffic Committees. In the former case, the City stipulates the preparation of a Traffic Management Plan as part of residential subdivision approval. In the latter case, Neighbourhood Traffic Committees are formed through Council direction and members of the Committee work with the City's Engineering department to prepare a traffic calming plan to address volume, speeding and safety concerns.

The City has developed warrants for speed humps, raised intersections, curb extensions, road narrowing and chicanes, which are the primary types of installations used in their neighbourhoods. The warrant process used in Vaughan is not as complex as in many other jurisdictions, as shown in **Exhibit 2-8**.

Exhibit 2-8: City of Vaughan, Where Traffic Calming Measures are Permitted

Traffic Calming Measure	Through Traffic Committee Process (Existing Areas)	Through Traffic Management Plan (New Developments)
Speed Hump	Subject to Warrant 1	No
Raised Crosswalk	Subject to Warrant 1	With Pedestrian Signal Only on Primary Roads
Raised Intersection	Where Possible	Yes
Roundabout	Yes	Yes
Median	Subject to Warrant 2	Yes
Curb Extension/Road Narrowing	Subject to Warrant 2	Yes
Chicane	Subject to Warrant 2	Yes
Contrasting Materials	Yes	Yes
Pavement Markings	Yes	Yes
Warning Signage	Yes	Yes

Warrant 1 – Speed Humps and Raised Crosswalks

Speed humps and raised crosswalks can be considered in existing residential areas only where the following three warrants are met:

- The street is not a primary emergency response route. The determination of whether a street is a primary emergency response route shall be made in consultation with the Engineering and Fire Departments.
- The speed limit is 50 km/h or less.
- The average speed on the street is measured to be 10 km/h greater than the speed limit.

Warrant 2 – Medians, Curb Extensions/Road Narrowings and Chicanes

Medians, curb extensions/road narrowings and chicanes shall be considered in existing areas only where the following two warrants are met:

- The speed limit is 50 km/h or less.
- The average speed on the street is measured to be 10 km/h greater than the speed limit.

Primary Roads are roads in new developments having a pavement width of 11.5 metres. This provides one travel lane in each direction, and space for on-street parking.

Traffic Calming. City of Vaughan. 2007. April 1, 2008.
<http://www.city.vaughan.on.ca/vaughan/departments/traffic_transportation/traffic_3.cfm>

Vaughan Council approved an update to its traffic calming policy in June 2007. The policy change was a result of Vaughan Fire and Rescue opposition to vertical traffic calming devices, as well as York Region Transit policy whereby the agency opposes vertical measures and reserves the right to remove transit services from any streets with such measures. The Vaughan Council resolution states:

> "All vertical Traffic Calming Measures currently utilized in the City of Vaughan, such as speed humps, raised crosswalks and the like, be discontinued on feeder, collector and arterial roadways and further, their implementation be subject exclusively to the 'Warrants For the Use of Traffic Calming Measures' document."

2.1.8 OAKVILLE

The Town of Oakville approved its traffic calming policy in 2003. That year, city staff surveyed 130 locations using the warrant process described below and found that 78 locations qualified for some sort of remedial traffic calming implementation.

Like many other jurisdictions, the Oakville traffic calming policy includes initial warrants and a prioritization process. The warrants and methodology were developed via a best practices review and public workshop stakeholder input. Oakville uses two speed warrants, as shown in **Exhibit 2-9**.

Exhibit 2-9: Town of Oakville Speed Warrant

Number of Possible Points	40 km/h Posted Speed**	Number of Possible Points	50 and 60 km/h Posted Speeds
0 to 100	85th speeds (10 points for every km/h 10 km/h over posted speed	0 to 100	85th speeds (10 points for every km/h 11-12 km/h over posted speed
0 to 100	High End Speeds (1 point for every high end speeder)	0 to 100	High End Speeds (1 point for every high end speeder)

Town of Oakville Traffic Calming Policy for Retrofit Situations Final Report. iTRANS Consulting, Inc. May 2003.

High end speeders are defined as traffic exceeding the posted speed limit by 15, 17 or 20km/h, for a posted speed of 40, 50,or 60 km/h, respectively. For roads with less than 500 vehicles per day, a minimum of 25 vehicles must satisfy this criterion.

Roadways are then ranked within three categories, in order of most tolerance for speeding to least based on stakeholder input: arterials, local and collector roads, and roads fronting onto elementary schools. The roads are then ranked based on the exposure criteria shown in **Exhibit 2-10**.

Exhibit 2-10: Town of Oakville Traffic Calming Exposure Methodology

Possible Number of Points	Exposure Criteria
0 to 15	5 points assigned for every pedestrian public facility (such as parks, playground, community centers, schools, seniors centre, religious institutions or other public institution) that generates a significant number of pedestrians on the street
0 to 15	1 point assigned for every residential driveway per 100 metres (on both side of the roadway)
0 to 10	5 points assigned for streets without sidewalks on one side 10 points assigned for streets without sidewalks
0 to 30	Average of 1 to 3 collisions per year over the past 3 years - 10 points for each average collision
70	**TOTAL POINTS**

Town of Oakville Traffic Calming Policy for Retrofit Situations Final Report. iTRANS Consulting, Inc. May 2003.

The product of the warrant score and the exposure score are used to determine the rankings of the studied roads. The Town of Oakville requires passive traffic calming measures to be implemented on any qualifying roadways before physical measures.

2.1.9 GUELPH

The City of Guelph implemented its traffic calming policy in 1998, and it was revised in November 2006. The policy outlines criteria for the implementation of traffic calming measures on local roads and two-lane collector roads, explicitly excluding arterials and multi-lane roadways so that they can perform their primary functions of moving traffic through and around the city.

The goals and objectives of the Guelph policy are primarily to improve public safety and general liveability of neighbourhoods by reducing vehicle speeds, discouraging 'cut-through' traffic and minimizing conflicts between all road users.

The Guelph policy outlines 12 principles that are to be followed for the selection and implementation of traffic calming measures. These principles are generally in line with the Environmental Assessment (EA) process that was previously required for traffic calming implementation. It is not known at this time if the Guelph policy will change now that the EA requirement has been lifted.

Traffic calming requests that come from residents are handled on a first-come, first-served basis. The next step is data collection on the requested street(s). The collected data is used to quantify the problem with a simple volume and traffic speed warrant, as shown in **Exhibit 2-11**.

Exhibit 2-11: City of Guelph Neighbourhood Traffic Review Criteria

Road Classification	Speed		Short-Cutting Traffic		Volume			
Local Roadway	IF	85th percentile ≥ 55 km/hr	OR	Infiltrating traffic exceeds 30%	AND	> 900 vehicles per day	➔	Initiate Traffic Review
Two-lane Collector Roadway	IF	85th percentile ≥ 60 km/hr	OR	Infiltrating traffic exceeds 30%	AND	> 2000 vehicles per day	➔	Initiate Traffic Review

Neighbourhood Traffic Management Policy. City of Guelph. July 1998 (revised January 24, 2006).

If the above criteria of the warrant are not satisfied, city staff notify the applicant, and the requested streets are excluded from further review for 24 months.

If the criteria are met, the applicant is required to distribute a petition to households on staff-identified streets. A 60% response rate is required for further action, with a minimum of 60% of the responses in support of the request. Following a process of public meetings, development of a possible plans and the selection of a preferred draft plan, another survey is distributed. A minimum of 60% of all surveys returned to the city must be in favour of the recommended plan for implementation to occur.

2.1.10 KINGSTON

The City of Kingston currently does not have an official traffic calming policy. To date, the city has completed at least one pilot project, the installation of speed humps and curb extensions on Hudson Drive.

This project arose from resident complaints and requests for traffic calming measures to be implemented on Hudson Drive as well as two other city streets. In 2003, Council asked the Engineering Division to prepare a report to discuss the effectiveness of traffic calming on these streets, and to develop a system that could be used to prioritize and rank the three roads. Kingston modified the City of Toronto traffic calming warrants for their own needs, and produced a ranking table. As the table was designed to rank competing sites, no minimum score was required for traffic calming implementation; however, the volume and speed warrants needed to meet the established minimum criteria.

An EA was conducted for this study as was required at the time. The city has monitored the measures since installation and has deemed them a success. In February 2008, Kingston issued an RFP for Consulting Services for Traffic Calming Measures. The project was awarded to TSH and is currently underway.

2.1.11 WATERLOO

The City of Waterloo implements traffic calming measures contingent upon meeting the warrant criteria presented in **Exhibit 2-12**. Requests for calming are assessed against these warrants with input from Waterloo Regional Police Service, Ambulance Services, Grand River Transit, Waterloo Fire Department, school boards, the Region of Waterloo and adjacent municipalities.

Exhibit 2-12: City of Waterloo Traffic Calming Criteria

Warrant	Criterion	Requirement
Warrant 1 Survey	1.1 Survey	The City will conduct a survey of the affected residents on the street to determine if general support for traffic calming exists. In order to proceed, a minimum response rate of 40% of the affected residents is required, 60% of which must support traffic calming measures. Warrants #2 and #3 will not be considered until Warrant #1 is satisfied.
Impacts to Adjacent Street		Should the Traffic section anticipate that the proposed traffic calming will have significant traffic impacts on adjacent streets, the review of the traffic calming proposal shall be modified to include the proposed street as well as the adjacent streets where traffic is expected to divert.

Warrant	Criterion	Requirement
Warrant 2 Safety Requirements (Both criteria must be fulfilled to satisfy this warrant)	2.1 Road Grade	Traffic calming measures must not be installed at or near locations where the road grade exceeds 8%.
	2.2 Emergency Response/ Service Delivery	On streets where traffic calming is proposed, impacts on Emergency services and operational services will be not significant.
Warrant 3 Technical Requirements (All 3 criteria must be fulfilled to satisfy this warrant)	3.1 Minimum Speed	On streets where traffic calming is proposed, the 85th percentile is greater than 10 km/hr over the speed limit.
	3.2 Minimum Traffic Volume	Local Roads – For streets where traffic calming is proposed, the traffic volume must be at least 900 vehicles per day (vpd). Physical traffic calming measures as indicated in Appendix 2 will not be constructed on collector or arterial roadways.
	3.3 Transit Service	On streets where traffic calming is proposed, impacts on Grand River Transit will not be significant.

Traffic Calming Policy. City of Waterloo.

If the above warrants are met, the City carries out a survey of affected residents. It must be met with 60% support for the project to continue. If the warrants are not met, the street is ineligible for traffic calming consideration for two years. As with Windsor and Guelph, the Class EA process was still required for traffic calming implementation at the time the policy was enacted. The recommended plan put forth through the EA process was subject to another round of resident approval. A 40% response rate was required, with a minimum 60% support from those who respond. It is unclear how the City of Waterloo will change this portion of their policy to reflect the removal of EA requirements.

2.1.12 AJAX

In late 2007, IBI Group developed a traffic calming warrant process and framework for the Town of Ajax. The Ajax process and framework builds upon the "Final Traffic Calming Report" endorsed by Ajax Council on June 23, 2005. That report listed several recommendations for traffic calming initiatives on roads under the Town's jurisdiction but did not outline a process for the evaluation and prioritization for any of the initiatives. In response, IBI Group created a comprehensive warrant that will guide Town staff from initial request through to implementation. The six-step process consists of:

1. Request for traffic calming;

2. Traffic calming screening process;

3. Evaluation scoring and ranking;

4. Selection of available traffic calming measures;

5. Project selection and Council study approval; and

6. Design, public support, final Council approval, implementation.

At the heart of the warrant is the two-stage process similar to that of other jurisdictions. In order for a site to qualify for traffic calming consideration, a site must exceed a minimum:

- Number of collisions during a three-year time frame; or
- Volume threshold and one or both of the following:
  - Speed threshold; and/or
  - Non-local traffic threshold.

Once a site qualifies for consideration, it is scored against the following 11 categories. A maximum score in each category will result in a score of 100 points:

- Collision History
- Traffic Speeds
- Non Local Traffic
- Traffic Volumes
- Pedestrian Generators
- Pedestrian Facilities
- Emergency Services and Routes
- Transit Services and Routes
- Truck Routes
- Block Length
- Adjacent Land Uses (residential)

The scores are then used to rank candidate sites against each other and determine priority locations.

While the process developed for Ajax is based on those of other jurisdictions, care was taken to ensure that the final warrant met the needs and goals of Ajax. To that end, Town staff selected the evaluation criteria used in the qualification and ranking stages based its own needs. The result is a comprehensive traffic calming warrant unique to Ajax.

2.2 Elsewhere in Canada

On a neighbourhood level, the traffic calming policies, practices and implementation processes of large cities are often very similar to those of suburban communities and smaller towns. The research supports this assertion, as evidenced by various smaller communities in Ontario adopting and adapting the traffic calming policies of Toronto or Seattle, for example. However, in order to focus the research effort for the rest of Canada, emphasis was placed primarily on the practices and policies of communities that may be similar to Sudbury in terms of population and/or setting.

British Columbia has the most traffic calming experience outside of Ontario, and perhaps throughout the entire country. As such, this section includes of current practices in three of its municipalities, as well as those of Calgary, a recognized leader in Canadian traffic calming.

2.2.1 CALGARY, ALBERTA

The City of Calgary 2002 traffic calming policy is a thorough and comprehensive document discussing the goals, objectives and principles of traffic calming. It describes in great detail a screening, evaluation and prioritization process similar to that of other jurisdictions, but goes further to discuss elements that other jurisdictions may not consider explicitly in their policies, such as community initiatives, appropriate measures for various types of roadways and technical design guidelines for physical measures.

Calgary relies less on quantitative analysis for its screening and prioritization, and more on community support and staff analysis to determine an appropriate response for a given issue. **Exhibit 2-13** lists the evaluation criteria used in Calgary. Each point is evaluated on a subjective basis, depending on relative severity and importance. The listed criteria applies both to localized and area-wide studies.

Exhibit 2-13: City of Calgary Evaluation Criteria – Traffic Calming Issues

Criteria	Measurement	Rating	
		Scale	Indicator
Speed	24-hour 85th percentile speeds in both directions (during daytime hours for school and playground zones)	0 to 20	20 represents area with highest recorded speed differentials and greatest number of streets with speeding
Volume	Percentage short-cutting traffic in peak 2-hour period, in peak direction, on most significant short-cutting route, and daily traffic volume	0 to 20	20 represents area with highest volume of short-cutting traffic and highest daily traffic volume relative to road classification
Collisions	Collision rate and severity of reported collisions in 3 years at most significant location (most recent data available)	0 to 20	20 represents area with highest number and severity of collisions
Safety	Sidewalks—proportion of neighbourhood streets with continuous sidewalks on at least one side	0 to 5	5 represents area with fewest sidewalks
	Pedestrian—number of schools and major pedestrian generators in area, and numbers of pedestrians	0 to 10	10 represents area with highest number of pedestrian generators and highest level of pedestrian use
	Cyclists—number of designated bicycle routes in area, and number of cyclists	0 to 5	5 represents area with highest number of bicycle routes and highest level of bicycle use
Community Support	Percentage of households supporting requested action	0 to 20	20 represents area with highest level of support

Traffic Calming Policy, The City of Calgary, December 10, 2002.

2.2.2 DELTA, BRITISH COLUMBIA

Delta is a district municipality in the British Columbia lower mainland, located midway between Vancouver and the Washington border. Its population is approximately 103,000. Its traffic calming policy, established in March 2003, applies only to its urban roads, and not rural or agricultural roads. Traffic calming studies can be initiated by staff, Council or by resident request. When initiated by residents, requests are evaluated based on the screening process shown in **Exhibit 2-14**.

Exhibit 2-14: Delta, British Columbia Preliminary Scoring for Local Roads

Criteria	Points	Basis for Point Assignment
Speed	0 to 25	85th percentile traffic speeds more than 5 km/h above the posted limit. (5 points for every km/h)
Volume	0 to 25	Average daily traffic volumes (1 point for every 100 vehicles)
Total Points Possible	50	

Neighbourhood Traffic Calming Policy and Procedures, The Corporation Of Delta, British Columbia, March 2003.

Any requests that do not score at least 25 points are removed from consideration. Council prioritizes the candidate projects for funding during their annual budget process. Surveys are sent to all households and businesses in the study area of candidate sites that score at least 25 points. Study areas are defined as the residents and businesses of a street with traffic speed problems, or the residents and businesses of a neighbourhood, if the problem is traffic infiltration. A 50 percent survey rate of return is required, and a majority of responses must be in favour of the project in order for it to advance to the budget consideration stage.

Further prioritization criteria include the following, but the quantification method is not explained:

- Safety performance;
- Traffic characteristics;
- Physical characteristics; and/or
- Environment.

2.2.3 KELOWNA, BRITISH COLUMBIA

The City of Kelowna's Neighbourhood Traffic Management Policy (June 2001; last reviewed April 2006) does not include a warrant process for traffic calming implementation, but it does describe the prioritization process. The first prioritization criterion is the resident request. Locations that do not receive requests for traffic calming will not be considered by the city. Secondary criteria include:

- Number of request locations. Note: refers to number of issues or locations within a neighbourhood, not the number of requests for calming;
- Number of reported collisions within each neighbourhood (excluding arterials);
- Sidewalks in pedestrian areas;
- Locations where road geometry is known to be poor;
- Pending road improvements that may address resident concerns; and
- Planned roadway rehabilitation that may offer an opportunity to implement traffic calming measures.

The secondary criteria are rated on a significance scale of 1 through 5.

Kelowna will only develop traffic calming plans on an area-wide, neighbourhood basis, even if the measures can be implemented at a single point. This ensures that selected measures are appropriate for the whole neighbourhood and that the implementation of calming in a particular

location does not simply shift the problem to adjacent streets. To address this, the City has developed boundaries for 50 neighbourhoods. These boundaries will serve as the study area for traffic calming requests. Where necessary, the City will merge neighbourhoods for a particular request.

2.2.4 SAANICH, BRITISH COLUMBIA

The District of Saanich is located just north of Victoria on Vancouver Island. Its population is approximately 110,000. Under its traffic calming policy (2000), resident requests for traffic calming are first evaluated against the criteria in **Exhibit 2-15**, with a minimum score of 40 required for traffic calming consideration. For area-wide requests or those consisting of more than one location, scoring is done for the location with the greatest problems, as perceived by the resident(s) submitting the request.

Localized requests are processed on a first-come, first-served basis; however, wide area requests are ranked and prioritized on the basis of **Exhibit 2-16**. The street with the worst traffic calming situation is used in the assessment.

Exhibit 2-15: Saanich, British Columbia Criteria for Determining Eligibility of Traffic Calming Applications

Criteria	Points	Basis for Point Assignment
Speed	0 to 50	85th percentile speed of traffic. (1 point will be allocated for every kph the 85 percentile speed is over stated speed limit, based on speed reader board information supplied by applicant)
Volume	0 to 50	Average daily traffic volumes (1 point assigned for every 100 vehicles, based on traffic count done whilst using speed reader board)
Education	10	Motorist education program used to no avail.
Enforcement	10	Enforcement program used to no avail.
Total Points Possible	**120**	

Manual on Policy and Procedures for Traffic Calming in Saanich, The District of Saanich, British Columbia, June 2000.

Exhibit 2-16: Saanich, British Columbia Ranking of Area Wide Traffic Calming Applications

Criteria	Points	Basis For Point Assignment
Speed	0 to 50	85 percentile speed of traffic. 5 points will be allocated for every kph the 85 percentile speed is over stated speed limit
Volume	0 to 50	Average daily traffic volumes (1 point assigned for every 100 vehicles
Vehicle Collisions	0 to 25	Average number of vehicle collisions over the last 3 years, based on police reports. Five points will be allocated for every collision in an average year.
Elementary Schools	0 to 10	5 points assigned for each school zone in the street
Pedestrian Generators	0 to 15	5 points assigned for each public facility (such as parks, community centres, and high schools) that generates a significant number of pedestrians on the street
Safe Route to School	0 to 5	5 points assigned for a safe route to school on the street
Bicycle Routes	0 to 5	5 points assigned if the street is a designated bicycle route
Transit Streets	0 to 5	5 points assigned if the street is a designated transit route

Criteria	Points	Basis For Point Assignment
Pedestrian Facilities	0 to 5	5 points assigned if there is no continuous sidewalk on at least one side of the street.
Total Possible Points	170	

Manual on Policy and Procedures for Traffic Calming in Saanich, The District of Saanich, British Columbia, June 2000.

2.3 United States

A 1998 survey by the University of California at Berkeley cited approximately 350 U.S. cities and counties that engaged in some form of engineered or non-engineering traffic calming measures. In a similar survey of 153 city and county jurisdictions in the 13 western US states, the ITE determined that 110 reported the use of one or more engineering methods for traffic calming. Given the age of these surveys, it can be expected that the number of jurisdictions who have implemented traffic calming will have increased significantly. With this wealth of experience and interest it would be expected that a national standard or guideline document would provide directions for the implementation of traffic calming. What appears to be the case instead is myriad traffic calming policies, guidelines, designs, and programs based on individual jurisdictional practices.

The most comprehensive US document to date addressing traffic calming is still *Traffic Calming: State of the Practice* published by ITE and FHWA in August 1999. Twenty-five traffic calming programs from across the US were featured in the document, which covers all aspects of arterial and neighbourhood traffic calming.

Some of the more ambitious programs/initiative are outlined below.

2.3.1 SARASOTA, FLORIDA

The City of Sarasota is located on the Gulf Coast of Florida and has an approximate population of 55,000. Traffic calming requests in Sarasota are initiated by residents through their Neighborhood Traffic Calming Task Force, if one exists. If the neighbourhood does not have a task force or other Neighborhood Association, requests can be sent directly to the City Engineering Department. Requests are addressed in the order received, and if it is found that traffic calming is unwarranted, the streets are ineligible for consideration for a period of five years, unless the residents pay for the collection of new traffic counts. In addition, residents may directly fund unwarranted traffic calming devices (with the exception of speed tables), provided the City Engineer deems the device feasible.

Sarasota uses a warrant approach that differentiates between major collectors, minor collectors and local streets. The warrants and associated minimum criteria are described for collectors in **Exhibit 2-17**. The Sarasota *Traffic Calming Manual* does not indicate how many warrants need to be met in order to qualify for traffic calming.

Exhibit 2-17: Sarasota, Florida Traffic Calming Warrants for Collectors

Warrant	Major Collector	Minor Collector
Warrant 1 - Minimum Vehicular Volume	> 4,000	> 8,000
Warrant 2 - Calculated Cut-Thru Traffic	40%	50%
Warrant 3 - 85th Percentile Speed	10 mph over posted speed	10 mph over posted speed
Warrant 4 - Pedestrian Volume	50 per hour	100 per hour
Warrant 5 - Crash Data	6	6

Traffic Calming Manual, City of Sarasota, Florida, September 2003.

Most requests for traffic calming in Sarasota are for local streets. The warrants for local streets are tailored to preserve the function of these streets—to get residents to and from their homes—and are described in **Exhibit 2-18**.

Exhibit 2-18: Sarasota, Florida Traffic Calming Warrants for Local Streets

Warrant	Criteria	Points
85th Percentile Speed Residential roadways have a speed limit of 25 mph unless posted otherwise.	1-5 mph (above posted speed)	2
	6-10 mph	3
	≥ 11 mph	5
Percentage of Cut-Through Traffic Cut-through traffic is determined using the following calculation: Volume minus the number of resident trips (# of homes on block X 10) divided by the volume.	25% - 49%	1
	≥ 50%	2
Vehicle Volume Per Day (AADT) Average annual daily traffic counts adjusted seasonally.	1000 - 1499	1
	≥ 1500	2
One Way Streets Percentage of vehicles traveling the wrong way based on daily traffic volume	≥ 10%	2
Pedestrian Volume Based on 25 > students per peak hour. Pedestrian volumes for parks are counted on an individual basis.	Elementary & Middle Schools within a 1/4 mile radius	2
Crash Data per Year Collected from the City of Sarasota Police Department	1 - 3	1
	≥ 4	2
***Minimum of six (6) Points**		

Traffic Calming Manual, City of Sarasota, Florida, September 2003.

2.3.2 TALLAHASSEE, FLORIDA

The City of Tallahassee is the capital of Florida. It has a population of approximately 160,000 and is located in the Florida Panhandle. Tallahassee has a particularly extensive traffic calming warrant process, the result of over 15 years of traffic calming planning and 11 years of traffic calming installations. The most recent revisions to their policy were made in June 2001. In order to initiate the traffic calming process, a petition must be signed by 75% of 'adjacent' residents. The term 'adjacent' is undefined in the policy, although it appears to be the residents of the block or street that is the subject of the petition. Tallahassee's traffic calming website describes a variety of reasons why a study may still not be initiated even with 75% support. Some of these reasons include:

- Roadway classification is not appropriate for traffic calming;
- The requested street may be part of an area-wide plan or the increase in volumes may be due to construction elsewhere in the city; and
- Increased enforcement may be a better solution.

While not exactly a warrant process, the Tallahassee Residential Traffic Calming Program Priority Ranking incorporates much of the same data that other jurisdictions use in their warrants, as shown in **Exhibit 2-19**. Once the score of a petitioned site is calculated up to a maximum of 105 points, it moves into its place on the Residential Area Traffic Calming Priority Listing. Higher-priority requests on this list are addressed first.

Exhibit 2-19: Tallahassee, Florida Residential Traffic Calming Program Priority Ranking

Traffic Volumes

Volumes (vehicles/day)	Points
0-500	0
501-1500	5
1501-2500	10
> 2500	20

Speeds

Points = 85th percentile speed (mph) - 25 mph.
Not to exceed 20 points

Accidents

Number of mid-block accidents over a 3-year period, divided by 3, divided by the roadway length in miles. Accidents at intersections are not counted.

Average annual accident rate/mile	Points
0.0-0.9	0
1.0-1.9	5
2.0-2.9	10
3.0-3.9	15
> 3.9	20

Schools

Each school within 1 mile of impact area is 5 points. Not to exceed 10 points. If there are more than two schools within 1 mile of impact area, the extras are added to "Other pedestrian generators".

Other Pedestrian Generators

5 points per pedestrian generator, including extra schools, parks, and playgrounds. Not to exceed 10 points.

Sidewalks

No sidewalk: 10 points.
Sidewalk on one or both sides: 0 points.

Density

Calculated by dividing the number of residential units fronting the roadway by the length of the roadway in miles.

Residential units/mile	Points
0-33	0
34-67	5
68-99	10
> 99	15

Residential Traffic Calming Program Priority Ranking. City of Tallahassee, Florida. March 24, 2008. <http://www.talgov.com/pubworks/traffic_calm_priority.cfm>

Following City field review, conceptual plan development and a public meeting, another round of resident voting is conducted. Again, 75% support of all residents on the roadway is required for final design and construction.

Tallahassee previously published a list of streets on its Traffic Calming Priority List. The most recent data year was 2002, and at the time, there were 76 streets on the list. Points for these streets ranged from a high of 78 to a low of 20. The median score was 50. The City's website now states that all traffic calming projects—with the exception of one project currently on hold—were completed.

2.3.3 AUSTIN, TEXAS

The City of Austin has developed a process to identify and address problems related to speeding motorists, excessive volume and overall road user safety in residential areas. The City initiated a speed hump program in 1994 and has had over 1,100 requests for speed humps or traffic calming in the past ten years. To address this demand, the City has established selection criteria for the prioritization of traffic calming studies as a function of the quantity of complaints, speed data and collision data. The City uses speed humps, speed cushions, traffic circles, chicane, semi-diverters and curb extensions as the primary means of traffic calming in their neighbourhoods.

2.3.4 PORTLAND, OREGON

The City of Portland has an extensive traffic management policy including traffic calming applications. The City takes a proactive approach to traffic calming and maintains a citywide list of neighbourhoods that could benefit from traffic calming devices. Their ranking system is based on a primary (short-listing) screening process based on traffic speed and volume, followed by a detailed ranking system based factors including: speed, volume, pedestrian generators, routes and facilities, elementary schools and, bicycle and transit routes. The City maintains a website which provides detailed information on the traffic calming process and the advantages/disadvantages of the various devices considered for Portland's streets.

At this time, the program has been suspended due to a lack of funding; however, residents can directly fund traffic calming devices for their neighbourhoods.

2.3.5 ORLANDO, FLORIDA

The City of Orlando has established a neighbourhood traffic management process, which begins with the formation of a traffic committee of residents from the streets or area of concern. All forms of traffic management including education, enforcement and engineering are considered in developing an action plan to address neighbourhood concerns. Once a traffic management plan is completed, it is presented to the neighbourhood and subsequently supported through a petition, requiring 65% support of the landowners within the designated affected area. The City employs a full range of traffic calming devices with speed humps, median islands and mini-roundabouts as the primary devices. Policies guidelines have been established relating to:

- Maintaining local and emergency services access;
- Considering the impacts of a plan and "moving the problem" to adjacent neighbourhoods and streets;
- Acceptable types of traffic calming measures for City roadways; and
- Reviewing arterial road improvements prior to undertaking neighbourhood traffic management projects.

2.3.6 TULSA, OKLAHOMA

Tulsa's traffic calming policy (June 2003) includes a warrant process that is somewhat unique when compared to the other policies reviewed in this document. When the two primary warrants cannot be met, it allows for a percentage of the required volume warrant, plus two additional criteria, as shown in **Exhibit 2-20**. It also provides a mechanism where excess speed can be 'traded' for additional volume as a further means of satisfying the warrant criteria.

Exhibit 2-20: Tulsa, Oklahoma General Traffic Calming Warranting Criteria

The following must be met to qualify a street segment for traffic calming:

Warrant No. 1
- and -
Warrant No. 2

- or -

Warrant No. 1
- and -
0.80 x Warrant No. 2
- and -
Warrant No. 3
- or -
Warrant No. 4

Warrant	**Street Classification[1]**	
	Residential Collector	**Local Residential Street**
1. 85th-percentile speed	≥ 8 mph over posted speed	
2. Minimum 24-hour traffic volume[2]	≥ 1,800 vpd	≥ 900 vpd
3. Total crashes[3] (Two most recent consecutive years)	5	
4. Peak hour volume[4]	phv ≥ 1.5 x 0.10 x vpd	

vpd = vehicles per day; phv = peak hour volume

[1] As determined by Public Works staff

[2] For every additional 1 mph speed over the 8 mph speed threshold, 100 vehicles per day can be added to the 24-hour traffic volume to help facilitate the warrant meeting requirements.

[3] Only those crashes correctable by the installation of traffic calming devices will be considered in the warrant considerations for the site-specific application

[4] As rule-of-thumb, peak hour volume for a segment is estimated at 10% of the 24-hour volume. If excessive non-local cut-through traffic is using the segment, this peak hour volume will be exaggerated. Hence, Warrant no. 4 is met when the actual peak hour volume is greater than or equal to 1.5 times this computed peak hour volume value.

Neighborhood Traffic Calming Manual, City of Tulsa, Oklahoma, July 1, 2003.

2.3.7 OTHER JURISDICTIONS

This section consists of the criteria for traffic calming implementation and ranking for additional selected municipalities in the United States.

Madison, Wisconsin

- Average Daily Traffic Volume;
- Speed;
- Crash Record (Police Reported);
- Elementary, Middle and High Schools;

- Other High Pedestrian Generating Areas;
- School Walk Route;
- Designated Bicycle Routes;
- Scheduled Road Reconstruction; and
- Time on Project List.

Colorado Springs, Colorado

- Neighbourhoods with an evident cut-through traffic problem;
- Areas with a large number of pedestrian collisions, bicycle collisions, and vehicle collisions (in that order);
- Projects where problems with vehicle speed and traffic volumes are severe;
- Problems in close proximity to schools, hospitals, or parks (in that order); and
- Areas with a large amount of pedestrian and bicycle traffic.

Boulder, Colorado

- Speed;
- Volume;
- Housing Density; and
- Bike/Pedestrian Activity.

Napa, California

- **Speeding** – 85th percentile speeds exceed the posted speed limit by more than six mph;
- **Traffic Volumes** – traffic volumes exceed 2,500 vehicles per day on a local street, or 5,000 vehicles per day on a residential collector;
- **Pedestrian Volumes** – pedestrian volumes at a particular crossing exceed 40 pedestrians during a one-hour period or 25 pedestrians per hour for a four-hour period and sidewalks or stop-controlled crossings are not provided; and
- **Safety** – three or more reported collisions per year that may be correctable through traffic calming measures over a three-year period at a specific location.

3. SUMMARY AND CONCLUSIONS

Exhibit 3-1 summarizes many of the major traffic calming criteria used by the jurisdictions reviewed in this report. It should be noted that the list is not comprehensive: some of the jurisdictions use screening criteria not on the list below, while other jurisdictions may in fact use some of the

unchecked criteria but do not make it clear either in their policies or their websites. The City of Kingston is not included in this table since the literature reviewed does not explicitly indicate their warrant criteria; instead, it indicates that the City of Toronto was used as a model.

Exhibit 3-1: Studied Jurisdictions vs. Major Traffic Calming Criteria

Jurisdiction	Criteria																
	Operating Speed	Traffic Volumes	Block Length	Transit Route	Collision History	Land Use	Facility Type	Emergency Route	Grade	Pedestrian and/or Bicycle Concerns	Sidewalks	Cut-Through Traffic	Pending or Planned Improvements	Other Programs	Schools	Residential Units/Frontage	Number of Requests / Complaints
Toronto	X	X	X	X	X			X	X	X	X						
Ottawa	X	X			X	X	X			X		X				X	
Hamilton	X	X	X	X	X	X	X	X	X	X			X		X		X
Windsor	X	X			X					X						X	
Pickering	X	X	X	X	X		X		X	X		X				X	
Markham	X	X			X		X										
Vaughan	X							X									
Oakville	X				X					X	X					X	
Guelph	X	X										X					
Waterloo	X	X		X				X	X								
Ajax	X	X	X	X	X	X	X	X	X	X	X	X			X	X	
Calgary	X	X			X		X			X	X	X					X
Delta	X	X			X												
Kelowna					X						X		X				X
Saanich	X	X		X	X					X				X	X		
Sarasota	X	X			X		X			X		X					
Tallahassee	X	X			X					X	X				X	X	
Austin	X				X												X
Portland	X	X		X						X					X		
Orlando	X	X			X			X									
Tulsa	X	X			X												
Madison	X	X			X					X			X		X		
Colorado Springs	X	X			X					X		X			X		
Boulder	X	X								X						X	
Napa	X	X			X					X							

It can be seen that while no standard traffic calming warrant exists, most jurisdictions offer variations on a theme. Traffic volumes, speeds and collision histories are the most commonly used criteria, each used by at least 67% of the studied jurisdictions. Pedestrian and/or bicycle concerns (not including sidewalks) are also used in over 60% of the jurisdictions. These predominant criteria

indicate a strong desire to ensure safety of neighbourhoods and local communities, as traffic calming measures are most often applied to local roadways.

The community-based impetus behind traffic calming measures is further illustrated in the number of jurisdictions that rate cut-through traffic, schools and residential frontage/density as important factors in their warrant processes.

There is also no standard application of traffic calming measures for local versus collector roads, or for local versus area-wide studies. While many jurisdictions do implement different warrant criteria based on facility or area type, no standard practice prevails.

Other points from the research include:

- Public involvement is universal, as all studied municipalities use the public consultation and support process;
- All jurisdictions with the exception of Kelowna take vehicle speeds and/or volumes into account;
- Collision history is the next highest-utilized factor, used in all but five jurisdictions;
- Pedestrian generators and facilities (sidewalks), and adjacent land uses, typically specified as residential or schools, are widespread in their application;
- No jurisdictions except Ajax explicitly consider whether a road is a truck route. This may be taken into consideration by the roadway type, e.g. limited traffic calming implementation on arterials and industrial collectors (Markham); and
- The number of jurisdictions that explicitly consider emergency and transit facilities is lower than expected, although many jurisdictions may consult with their EMS and transit agencies during the study process.

While not addressed explicitly in most traffic calming policies or warrants, it is understood that minimizing staff time and effort is a critical step in the process. The very nature of a traffic calming warrant, in addition to presenting an equitable procedure for the need and justification of traffic calming measures, is to minimize the level of effort necessary to reach a decision. The warrant process is designed for ease of application, as in many cases the traffic data required for the warrant process can be collected quickly and inexpensively, and much of the other information (e.g. adjacent land uses, roadway classification, collision history) is data that may already be on file.

An example that stands out as being potentially onerous towards staff effort is Windsor. The complexity of its warrant process means that more work may be required by staff to evaluate the warrants; however, this was not raised as a concern in discussions with Windsor staff.

4. NEXT STEPS

1. Review resident traffic complaints, traffic calming requests received by the City of Greater Sudbury and other traffic data to determine how they would correspond to the 'typical' warrant structure;
2. Develop on-line survey and consultation materials to identify what traffic calming warrant criteria is most important to the residents of Sudbury. The materials will be

used as a traffic calming primer for residents and to help build consensus and public buy-in to the warrant process;

3. Incorporate comments and feedback from the March 26, 2008 staff workshop with various departments and agencies within the City of Greater Sudbury. The feedback will ensure that the traffic calming warrant that is developed for this project fulfills their needs and requirements to the extent possible; and

4. Use all of the information collected to date to develop a traffic calming warrant, ranking and prioritization process that is appropriate for the City of Greater Sudbury.

5. LINKS TO MUNICIPAL TRAFFIC CALMING WEBSITES

The following municipal websites were consulted in preparing this document. Specific policy and other documents are directly referenced in the text above.

- **Toronto**—http://www.toronto.ca/transportation/traffic/traffic_calming.htm
- **Hamilton**— http://www.myhamilton.ca/NR/rdonlyres/2E7EB619-F5D7-40B5-93FA-4C8E17A8FD03/0/Dec03PW07150.pdf
- **Ottawa**—http://www.ottawa.ca/residents/onthemove/driving/traffic/atm/index_en.html
- **Windsor**—http://www.citywindsor.ca/001440.asp
- **Pickering**—http://cityofpickering.com/standard/services/traffic/calming.html
- **Markham**— http://www.markham.ca/Markham/Departments/Eng/Trnsp/TrafficCalming.htm
- **Vaughan**— http://www.city.vaughan.on.ca/vaughan/departments/traffic_transportation/traffic_index.cfm
- **Oakville**—http://www.oakville.ca/trafficcalming.htm
- **Guelph**—http://guelph.ca/living.cfm?itemid=46346&smocid=1809
- **Kingston**— http://www.cityofkingston.ca/residents/transportation/streets/trafficcalming/index.asp
- **Waterloo**—http://www.city.waterloo.on.ca/DesktopDefault.aspx?tabid=1097
- **Ajax**— http://www.townofajax.com/Page98.aspx
- **Calgary**— http://www.calgary.ca/portal/server.pt/gateway/PTARGS_0_0_104_0_0_35/http%3B/content.calgary.ca/CCA/City+Hall/Business+Units/Transportation+Infrastructure/Construction+Projects/Traffic+Calming/Traffic+Calming.htm
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- **Sarasota**—http://www.sarasotagov.com/InsideCityGovernment/Content/Engineering/Programs/TrafficCalming.html
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