CITY OF **VANCOUVER**

POLICY REPORT
TRANSIT AND TRAFFIC

Report Date: January 26, 2007
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Meeting Date: February 13, 2007

TO: Standing Committee on Transportation and Traffic

FROM: General Manager of Engineering Services,
in consultation with the Director of Planning

SUBJECT: Neighbourhood Collector Streets
Traffic Calming Toolkit and Priority Guidelines

RECOMMENDATION

A. THAT Council endorse the following traffic calming measures, described further in Appendix A, as acceptable for use on Neighbourhood Collector streets, subject to the considerations described herein:

i. Corner and Mid-block Bulges
ii. Medians
iii. Intersection Re-alignments
iv. Roundabouts
v. Narrow Travel Lanes
vi. Curved Streets
vii. 30 km/h Speed Limits in School and Playground Zones

AND THAT these measures, in combination with existing approved traffic control devices, form the basis for a Neighbourhood Collector Traffic Calming Toolkit.

B. THAT Council endorse the guidelines for determining priorities for traffic calming on Neighbourhood Collector Streets as outlined in Appendix B, Neighbourhood Collector Traffic Calming Priority Guidelines.

GENERAL MANAGER'S COMMENTS

The General Manager of Engineering Services and the Director of Planning recommend approval of Recommendations A and B.

COUNCIL POLICY

In 1995, Council adopted CityPlan as its vision for the future of Vancouver. CityPlan supports the regional transportation objective of placing a greater emphasis on transit, walking and cycling ahead of cars to slow traffic growth in neighbourhoods and improve the environment.

In 1997, Council approved the Vancouver Transportation Plan, which identified a number of Secondary Arterial streets throughout the city as candidates for reclassification to Neighbourhood Collectors.

Between 1997 and 2005, Council approved eight Community Visions. Six Visions include directions which support the reclassification of Secondary Arterials to Neighbourhood Collectors.

In 2005, Council approved the re-classification of seven road segments as Neighbourhood Collectors. Other Council decisions, before and since, have re-classified other road segments (see Appendix C).

PURPOSE

This report seeks Council endorsement of a toolkit of traffic calming measures and of guidelines for determining priorities for traffic calming on Neighbourhood Collector streets.

BACKGROUND

In 1997, Council approved the Vancouver Transportation Plan which established the following:

> Secondary arterial roads which currently carry relatively low volumes and pass through predominantly residential areas may be reclassified as neighbourhood collectors. Neighbourhood collectors are intended to give local traffic access to the arterial road network and are not intended to carry a greater volume of traffic than they do now, except for trips generated by growth in the local neighbourhood, or to act as arterials. (Action R9)

The Plan identified a number of secondary arterial streets to be considered for re-classification. Several of these have since been re-classified as Neighbourhood Collectors. The remainder are currently under review.

The Vancouver Transportation Plan also established that:

> On neighbourhood collector streets and secondary arterials with less than 10,000 vehicles a day, traffic calming can be a part of the approach to transportation. Measures generally would be aimed at slowing traffic to 50 km per hour, not diverting traffic onto other streets. The results should be less impact on neighbourhoods and increased safety, with small or no increases in average journey times.

The Transportation Plan defined collectors as "streets that collect traffic from local streets to access arterial streets." Conversely, collectors distribute traffic from arterial streets to local streets.

In February 2006, Council approved a traffic calming plan for Blenheim Street between West 16th Avenue and Southwest Marine Drive. This plan was to form the template for traffic calming of other Neighbourhood Collector streets throughout Vancouver. The Blenheim Street traffic calming plan included the following measures:

- Narrow (3m) travel lanes
- Road-narrowing and medians where pavement width exceeded the needs for parking and travel lanes
- Road-narrowing and a refuge median at a marked school crossing
- Corner bulges at most intersections
- Traffic circles at three intersections (on a trial basis, subject to review)
- Mid-block medians (where parking requirements allow)
- Entrance medians at the intersections with two arterial streets
- 30 km/h speed limits in school zones
- a bike route on parallel local streets

DISCUSSION

The Vancouver Transportation Plan established that "traffic calming can be a part of the approach to transportation" on Neighbourhood Collectors and that "measures generally would be aimed at slowing traffic to 50 km per hour, not diverting traffic onto other streets". It did not define what traffic calming measures could be used on these streets, which streets should receive traffic calming or how the City should determine its priorities among streets eligible for traffic calming.

To address these issues, City staff initiated two separate processes: 1) the Blenheim Street Traffic Calming pilot project, and 2) a consultation with CityPlan Vision implementation committees.

The Blenheim Street pilot project involved consultation with local residents and stakeholders such as emergency services. One of its goals was to determine what types of traffic calming measures could be applied to collector streets to address local concerns about traffic while maintaining the street's function of providing access between the neighbourhood and arterial streets. This process culminated in early 2006 with Council's approval of a traffic calming plan for Blenheim Street.

In 2005 and 2006, staff met with a group of Vancouver residents representing the five CityPlan implementation committees. These meetings were designed to facilitate community

discussion of the various traffic calming measures which staff believed could work on collector streets and of the criteria to be used to determine priorities among collector streets. This process is detailed in Appendix D.

The recommendations detailed below have been guided by the results of these two public processes.

Collector Streets

Collector streets act to connect local streets with the arterial street network. In Vancouver, Neighbourhood Collector streets typically have the following characteristics:

- one moving lane in each direction (except for some accommodation of turning vehicles at major intersections)
- traffic signals at intersections with arterial streets

Neighbourhood Collector streets should not be changed to increase their vehicular capacity or the volume of traffic they carry, except to accommodate trips generated by growth in the neighbourhood. They should not be changed in ways which would compromise their viability as emergency response routes.

As these streets are re-developed, they should be designed with the goals of:

- limiting vehicle speeds to 50 km/h, or 30 km/h in school zones
- improving pedestrian facilities
- providing or improving cycling facilities (see Appendix E)
- improving transit operations (where applicable)
- maintaining connectivity between local and arterial streets

Toolkit

The proposed Traffic Calming Toolkit contains six measures which should be considered for traffic calming on Neighbourhood Collector streets. Each measure has limitations and may not be suitable on every Neighbourhood Collector street. The choice of appropriate measures and the specific application of those measures should be developed with due consideration of safety, traffic impact on adjacent local streets and emergency vehicle operation, and in consultation with local residents who will be affected by changes to the street.

The following measures are recommended for use on Neighbourhood Collector Streets:

- Corner and Mid-block Bulges
- Medians
- Intersection Re-alignments
- Roundabouts
- Narrow Travel Lanes
- Curved Streets
- 30 km/h Speed Limits in School and Playground Zones

These measures and related issues are discussed in Appendix F.

In addition to the measures listed above, two others warrant further investigation or trial to determine whether they should be included with the recommended measures. They are:

- Traffic Circles
- Speed Cushions

Issues related to these two measures are outlined in Appendix G.

A number of other measures were considered but are not recommended for use on Neighbourhood Collector Streets because they would divert traffic to local streets or would hinder emergency response. These measures include:

- Traffic Diverters (e.g. partial closures, right-in/right-out diverters, etc.)
- Vertical Deflections (e.g. speed humps, raised crosswalks, etc.)

Issues related to these types of measures are outlined in Appendix H.

In addition to the recommended traffic calming measures listed above, there are other measures which can be applied to Neighbourhood Collector streets under existing City programs, including:

- Crosswalks
- Pedestrian-controlled traffic signals
- 4-way stop signs
- Sidewalk in-fill
- Speed display boards (Police)

The installation of crosswalks, traffic signals and stop signs is subject to existing policy and guidelines. The construction of sidewalks are also subject to existing policy and practices and usually require financial contribution from benefiting property owners. The speed display board program (Speed Watch) is operated by the Vancouver Police Department.

Priority Guidelines

Each Neighbourhood Collector in the city has different street characteristics (e.g. adjacent land use, proximity to schools, etc.) and different traffic conditions. It is not feasible to address the traffic calming needs on all these streets concurrently. Staff, in consultation with community groups, have developed guidelines for setting traffic calming priorities among Neighbourhood Collector streets.

City staff consulted with community groups from a number of neighbourhoods to determine what street, traffic and neighbourhood characteristics should be considered when setting priorities. A ranking system was developed which includes an assessment of existing conditions on Neighbourhood Collector streets and consideration of pending changes and opportunities (see Appendix B). The purpose of this system is twofold: first, to identify those Neighbourhood Collector streets most in need of traffic calming, and second, to optimize the

benefits of traffic calming on all Neighbourhood Collector streets given limited financial and other resources.

The first part of the ranking system uses six measurable criteria (listed below) to provide an assessment of the relative livability and the severity of existing traffic conditions on Neighbourhood Collector streets. Where the criteria are not directly measurable, related measures act as proxies (and are listed in parentheses below). This process which yielded these criteria is detailed in Appendix D.

1. Non-local Traffic Volume (total traffic volume)
2. Traffic Speed
3. Pedestrian Crossing Demand (elementary school catchment)
4. Number of Collisions
5. Bicycle Facilities
6. Residential Density

A point-based ranking system was developed which incorporates the six objectively measurable criteria. It provides a measure of the relative severity of existing traffic and livability issues on Neighbourhood Collector streets.

Differentiating local and non-local serving traffic presents several challenges. To the extent possible, staff will attempt to distinguish between them. When this is not possible, total traffic volume will be used as a proxy.

In addition to the six measurable criteria listed above, three qualitative criteria were identified which will be considered when setting priorities. These criteria are:

1. Impending Community Change (e.g. significant land use or community change)
2. External Funding Opportunity (e.g. Community Amenity Contribution)
3. Other Construction (e.g. water main replacement)

The purpose of these criteria is to identify opportunities, changes or impacts that will affect the priority assigned to a Neighbourhood Collector street, but cannot be quantified. Consideration of these additional criteria will supplement the point-based ranking system, providing a more complete understanding of a street's priority.

Impending Community Change goes beyond the assessment of current conditions provided by the point-based ranking. It looks to the future, focusing on coming changes which will affect safety or traffic volumes.

The two remaining criteria, External Funding Opportunity and Other Construction, should be considered when construction coordination or other funding sources provide opportunities to leverage traffic calming funds. Taking advantage of these opportunities will accelerate implementation of traffic calming on Neighbourhood Collector streets.

Appendices B and D provide more detailed discussion of these criteria and the ranking process.

FINANCIAL IMPLICATIONS

Funding for Neighbourhood Collector traffic calming was included in the 2005-2008 Capital Plan. Implementing traffic calming on Neighbourhood Collector streets will require continued funding.

CONCLUSION

The following measures should be included in a toolkit for traffic calming on Neighbourhood Collector Streets:

- Corner and Mid-block Bulges
- Medians
- Intersection Re-alignments
- Roundabouts
- Narrow Travel Lanes
- Curved Streets
- 30 km/h Speed Limits in School and Playground Zones

In determining priorities for traffic calming on Neighbourhood Collector streets, staff will use a ranking system which uses measurable street, traffic and neighbourhood criteria to produce a relative measure of existing conditions. This will be supplemented by qualitative criteria which provide a more complete picture of the community and its interests by taking into account future opportunities and changes that may affect traffic on collector.

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Neighbourhood Collector Traffic Calming Measures

The following pages are an example of the type of document staff will use to describe traffic calming appropriate for Neighbourhood Collector streets. Such a document will be used during future public consultation aimed at developing traffic calming plans for these streets.

Corner Bulges

Existing or new curbs can be extended out to create a bulge on one or both sides of the street at intersections. This narrows the street at intersections.

- decreases crossing distances for pedestrians
- increases green space
- improves sight lines for pedestrians
- can be combined with beautifications elements
- improves safety for pedestrians, cyclists and motorists by restricting parking within corner clearance areas

Mid-block Bulges

Existing or new curbs can be extended on one or both sides of the street near the middle of a block to narrow the street.

- increases green space
- can be combined with beautifications elements
- can increase danger to pedestrians if motorists are not expecting them to be crossing in the middle of a block

Medians (Pedestrian/Cyclist Refuges)

Concrete curbs can be placed along the centre of a collector streets at an intersection with a local street. This blocks through movement across the arterial and left turns onto the local street.

- self enforcing
- can allow bicycle access
- can provide a safe haven for pedestrians and cyclists to wait while crossing the street
- reduces distance pedestrians and cyclists have to cross
- difficult to install on a narrow street without removing parking
- may make access difficult for emergency vehicles

Intersections Re-alignments

Irregularly configured intersections can be realigned to create more conventional and understandable intersections.

- reduces pedestrian crossing distance
- can improve safety by improving site lines and forcing vehicles to make a full 90 degree turn
- can be expensive

Roundabouts

Roundabouts are circular intersections with specific design and traffic control features. These features include yield control of all entering traffic, channelized approaches, and appropriate geometric curvature to slow vehicle speeds.

- can provide better traffic safety than stop signs or signals
- reduce vehicle speeds
- pedestrians cross one lane at a time, but must "detour" around intersection
- expensive to construct
- require much more space than signalized intersections, perhaps requiring land acquisition

Narrow Travel Lanes (3.0 m, 3.2 m on bus routes)

An existing street can be narrowed to decrease the width of travel lanes and increase the boulevard space, or provide bike lanes.

- allows for increased green space
- reduces pedestrian crossing distances
- may reduce vehicle speeds
- expensive if not done as part of other construction work
- reduces safety for cyclists if not combined with bike lanes

Curved Street

Where space allows streets can be constructed with curves in them.

- can reduce speed
- can improve aesthetics
- may reduce visibility
- expensive

30 km/hr Speed Limit in School and Playground Zones

The general 50 km/h speed limit on streets is reduced to 30 km/h at schools and playgrounds.

- increases safety by reducing vehicle speeds
- increases motorists' ability to see and react to potential conflicts with children

- raises motorists' awareness that they are in a zone where more care and attention is required
- requires additional signage
- ignored by some motorists unless enforcement is done; enforcement is costly and difficult due to limited resources

For each location, City staff would need to review and consider the number of travel lanes, whether it is adjacent to school, park use, etc.

Neighbourhood Collector Traffic Calming Priority Guidelines

A. Existing Conditions

The following describes a ranking system which factors six measurable characteristics of traffic, streets and neighbourhoods to determine the relative need for traffic calming on Neighbourhood Collector streets.

Criteria Descriptions

Non-Local Traffic Volume (Total Traffic Volume)

Maximum Points - 25

Traffic volume can act as an amplifier to other traffic problems on the street, especially speeding. In the absence of a reliable measure of non-local traffic, total traffic volume is used as a proxy for this criterion. For every 500 vehicles/day, one (1) point is added until a maximum of 25 points (12,500 vehicles/day) is reached.

Traffic Speed

Maximum Points - 25

Traffic Speed is considered a significant contributor to reduced safety and livability. The *85^{th} percentile speed* is compared to the speed limit plus 5 km/h (55 km/h). For every km/h over 55 km/h, three (3)points are added until a maximum of 25 points (63 km/h) is reached.

Pedestrian Crossing Demand (Elementary School Catchment)

Maximum Points - 25

Because the desire of pedestrians to cross a street is not measurable, *Elementary School Catchment* is used as a proxy for this criterion. Elementary school catchment areas are calculated from the Vancouver School Board's School Locations and Boundaries map. The portion of the elementary school catchment area from which students must cross the segment in question is divided by the length of the segment. For every 5 ha/km of school catchment area, one (1) point is added until a maximum of 25 points (125 ha) is reached.

Number of Collisions

Maximum Points - 15

The livability of a neighbourhood can be greatly influenced by the number of traffic accidents which occur. The collision rate is also one indicator of the safety of a street. Collision data is provided by the Vancouver Police Department and by ICBC and the most recently available data for a 10 year sample is used. Collision data is standardized using *Collisions/Million Vehicle Kilometres (Collisions/MVK)*. Million Vehicle Kilometres are the sum of all of the

distances covered by every vehicle to pass through that segment in a set time period in millions. For every 1 Collision/MVK, one (1) point is added until a maximum of 15 points is reached.

Bicycle Facilities
Maximum Points - 5

Street segments which have designated bicycle facilities, or are crossed by designated bicycle facilities, are given five (5) points. Segments without any of these facilities are given no (0) points.

Residential Density
Maximum Points – 5

Residential Density reflects the number of people affected by traffic on a street. Density information is obtained from zoning data. The number of dwelling units adjoining the collector street is divided by the length of the segment. For every 100 dwelling units (DU) per km, one (1) point is added until a maximum of 5 points (500 DU/km) is reached.

Summary Table

Summary of the Ranking System		
Criteria	**Point Allocation**	**Maximum Points**
Volume	1 point for every 500 vehicles/day	25
Speed	3 points for every km/h the 85th percentile speed exceeds 55 km/h	25
Pedestrian Crossing Demand	1 point per 5 hectare/km of elementary school catchment area	25
Number of Collisions	1 point for every Collision/MVK	15
Bicycle Facilities	5 points if bicycle facilities exist on the segment, or cross the segment	5
Residential Density	1 point for every 100 DU/km	5
	Maximum Total Points	**100**

B. Other Considerations

In addition to the measurable criteria which form the basis of the point-based ranking system described above, staff will also consider three other criteria when determining priorities for traffic calming on Neighbourhood Collector streets. In considering each criterion, a number of questions must be answered.

Impending Community Change

- Will the impending change affect local traffic conditions in a negative way (e.g. increased volumes or speeds)?
- Can traffic calming on a nearby Neighbourhood Collector street be expected to mitigate these traffic impacts?

External Funding Opportunity

- Will the funding source (e.g. Community Amenity Contribution) provide an opportunity to leverage additional traffic calming?

Other Construction

- Will other construction (e.g. water main replacement, repaving, etc.) provide an opportunity to leverage additional traffic calming?
- Will coordinating traffic calming with other construction provide an opportunity to provide additional neighbourhood amenities?
- Will coordinating traffic calming with other construction minimize the impact on the subject street or surrounding neighbourhood?

Example 1: Calculation for Hypothetical Street Segment, 99th Ave

Segment Profile:

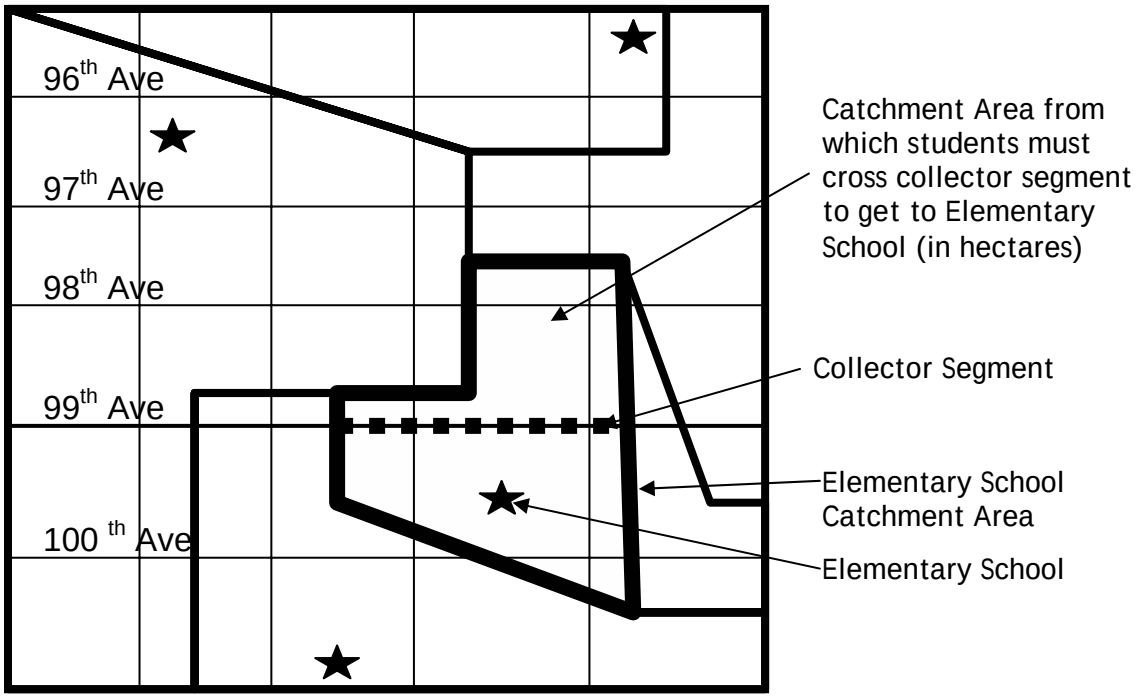
Segment Length	0.6 km
Traffic Volume	5,500 Vehicles Per Day (vpd)
Traffic Speed (85th percentile)	58.3 km/h
Adjacent School Catchment Area	36 ha
Number of Collisions (past 10 years)	6 collisions
Bicycle Facilities	Yes
Number of Residents	92 Dwelling Units (DU)

Calculation Details:

Criteria	Data	Points Calculation	Points
Traffic Volume	5,500 VPD	5,500 vpd ÷ 500 vpd = 11 points	**11**
Traffic Speed	58.3 km/h	58.3 km/h - 55 km/h = 3.3 km/h 3 points x 3.3 km/h = 10 points	**10**
Pedestrian Crossing Demand	36 ha	36 ha ÷ 0.6 km = 60 ha/km 60 ha/km ÷ 5 ha/km = 12 points Note: Refer to figure on following page for a sample on how to calculate the portion of catchment area from which students must cross the collector segment to access the elementary school.	**12**
Number of Collisions	6 accidents	$Accidents/MVK \equiv \frac{Number\_of\_Accidents}{\left(Length\_of\_Segment \times Vehicles\_Per\_Day \times Days\_in\_Sample\right)/10^6}$ 6 collisions / [(0.6 km x 5,500 VPD x 3650 days)/10^6]= 0.5 collisions/MVK 1 point x 0.5 collisions/MVK = 0.5 points	**0.5**
Bicycle Facilities	Yes	5 points	**5**
Residential Density	92 DU	92 DU ÷ 0.6 km = 153 DU/km 153 DU/km ÷ 100 DU/km = 1.5 points	**1.5**
		Total Points (Maximum Points 100)	**40**

Rank:

99th Avenue has a score of 40 out of 100 and will be ranked among all other streets with collected data. Segments with the highest scores are given priority to receive traffic calming.



Example 2: Considering Impending Neighbourhood Change

Three Neighbourhood Collector streets have been studied and ranked based on measurable existing conditions, yielding the following ranking:

1. Lee Street (70 points)
2. 107th Avenue (50 points)
3. 99th Avenue (40 points)

The neighbourhood near 99th Avenue is undergoing significant redevelopment. A new school is to be built with a catchment area which will straddle 99th Avenue and traffic volumes on 107th are expected to rise. All three ranked streets currently see some speeding.

A traffic calming effort on 99th Avenue could be expected to temper traffic speeds and improve pedestrian crossing safety and convenience, but would likely have no effect on expected traffic volumes. Post development traffic conditions on 99th, even without traffic calming, are expected to be friendlier than on Lee Street, but worse than on 107th Avenue.

In this hypothetical case, a re-ranking to move 99th Avenue to second position would be appropriate, yielding the following ranking:

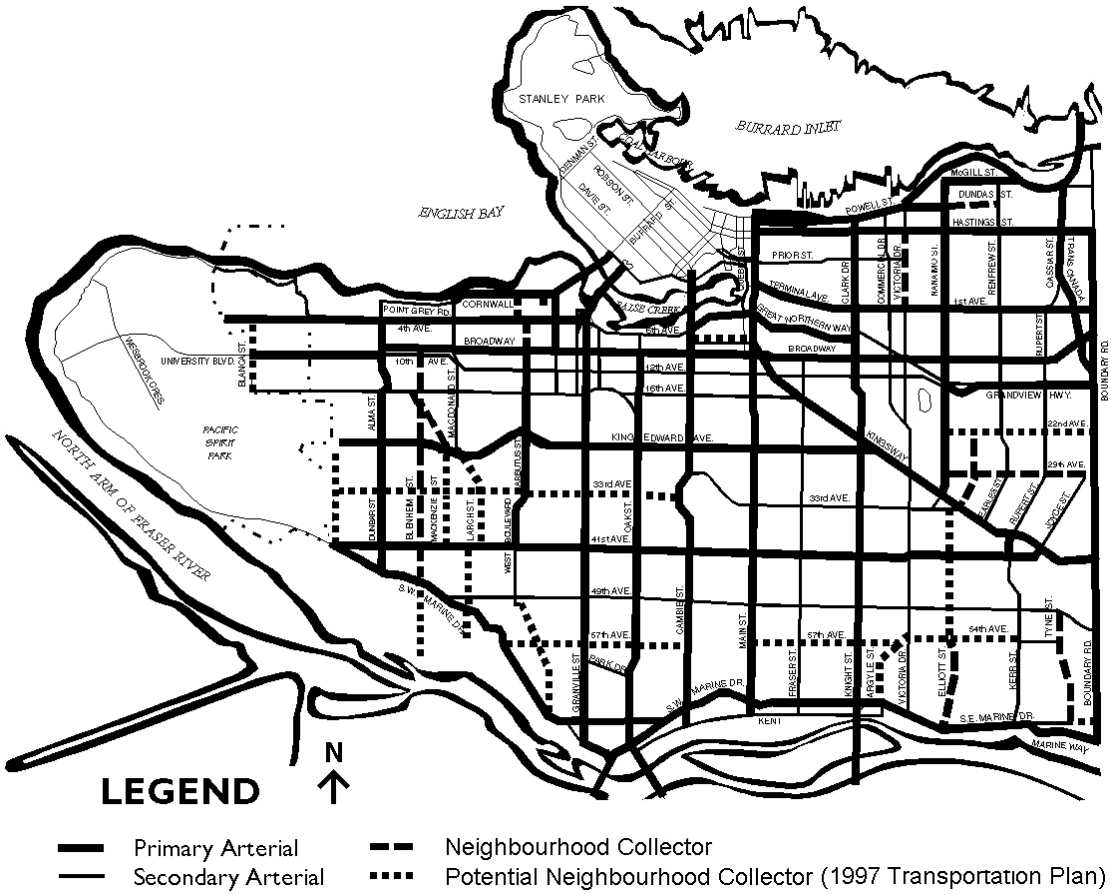
1. Lee Street
2. 99th Avenue
3. 107th Avenue

Example 3: Considering Funding and Construction

As the planning for the 99th Avenue neighbourhood redevelopment progresses, it becomes apparent than 99th Avenue will have to be dug up to replace undersized water and sewer mains. In addition, new Community Amenity Contribution funding has emerged which could be used for traffic calming on 99th.

If 99th Avenue is moved to first priority, traffic calming can be implemented at much less cost to the City's capital budget, because of the savings due to coordination with utility replacement and the external funding. Reconstruction of Lee Street will have to be delayed, but all three streets will be traffic calmed earlier than original planned and funding is then available for a fourth street.

Current Neighbourhood Collector Streets



Arbutus Street, West 4th Avenue to West Broadway
Blenheim Street, West Broadway to Southwest Marine Drive
Champlain Crescent, E 54th Avenue to Matheson Crescent
Cypress Street, Cornwall Avenue to West 1st Avenue
Dundas Street, Nanaimo Street to Renfrew Street
Elliott Street, East 54th Avenue to Southeast Marine Drive
East 29th Avenue, Nanaimo Street to Joyce Street
Matheson Crescent, Champlain Crescent to Southeast Marine Drive
Quesnel Street, Blenheim Street to West King Edward Avenue
Slocan Street, East 22nd Avenue to Kingsway
Tyne Street, E 49th Avenue to 54th Avenue
Victoria Drive, Hastings Street to East 1st Avenue
Yew Street, Cornwall Avenue to West 4th Avenue

Public Consultation

The following summarizes the public consultation which contributed to the development of the recommendations in this report.

Nov 2005 **Notification of Neighbourhood Collectors Workshop**

Residents from each CityPlan Committee (Kensington – Cedar Cottage, Renfrew-Collingwood, Sunset, Victoria-Fraserview/Killarney, and Hastings-Sunrise) received an invitation and information package. The package included an invitation to a workshop and a set of fact sheets describing different traffic-calming measures the City was considering for Neighbourhood Collector streets.

Nov 30, 2005 **Neighbourhood Collectors Workshop # 1**

The purpose of the workshop was to provide input on appropriate traffic-calming measures for collector streets and to establish a set of criteria for determining a priority system.

At the workshop, residents discussed different traffic-calming measures appropriate to Neighbourhood Collectors. They reviewed, commented, and added to the list of measures proposed by the City.

Participants also brainstormed and prioritized a list of criteria that would determine the order in which streets receive traffic-calming measures.

Over 50 residents attended the meeting held at Kensington Community Centre.

Mar 2006 **Notification of March 30 Neighbourhood Collectors Workshop**

Residents who attended the November 30 Workshop were sent an invitation. Announcements were made at all CityPlan Committee Meetings.

Mar 30, 2006 **Neighbourhood Collectors Workshop # 2**

Based on the results from the November 30 Workshop, staff put together a proposed traffic-calming toolkit and Criteria system.

The purpose of the 2nd Workshop was to share these results, provide participants with an opportunity to review and offer feedback to the proposed Traffic Calming Toolkit, and to further discuss and re-confirm the order of the Criteria System.

There were 25 residents in attendance.

Neighbourhood Collectors Workshop
November 30, 2005
Summary of Comments

A. Participants were divided into four facilitated groups. The following is a composite of all comments.

1. Summary of comments -- proposed traffic calming measures on collector streets
Participants were asked to comment on the proposed traffic calming toolkit and 'dot' their top three priorities.

Measures	Comments: What do you like about this measure? What are your concerns about this measure?	Dot your top 3 measures
Bulges -Corner -Midblock	- Great, fantastic, we 'love' them - Bulges placed on diagonal are very useful - Yes, support. - Makes shorter crossing distance for pedestrians and narrows the width (physically and visually) - effective if used with other elements e.g. Zebra crossing - vegetation stays low - 18" - More mid-block crosswalks (but not at expense of parking) - Bulges need to be longer, but yes very effective - Not at expense of local parking	**35**
30 km/hr. speed limit in school and playground zones	- Yes x 3, but need bigger more visible signs - This works for people who obey the speed limit. Enforcement is required for this to work effectively.	**18**
Narrowing travel lanes -3.0 m, or 3.2 m on bus routes	- Yes, but not very applicable in most cases - Yes, if traffic is slowed, this would be a very good measure - Yes, through the addition/installation of curbs to narrow the lane or maintaining existing gravel. (Don't let it deteriorate like Blenheim.) - Yes, we support this measure - add bike lanes - if too narrow, cars can clip each other	**11**
Round abouts	- Yes, support - If combined with education and if there is space, we support - Could be most effective, but is very (too) expensive - not multi-lanes - Not applicable	**10**
Realigning Intersections	- Yes x 2, support where appropriate. - add 4 way stops	**8**

Curved Streets	- Yes for local streets - Yes, but do not want to loose front lawns - Yes, but only a gentle curve - (group had mixed views) - Yes, support where there is width and in new neighbourhoods. - 'meandering streets' - No	**5**
Allowing on-street parking	- Yes x 2 - We like it because it's free - not too close to the crosswalk; should be used in conjunction with corner bulge or bollards	**8**
Medians	- Yes x 2, landscape them. Note – the median at Nanaimo & Dundas is not wide enough. - vegetation should not be too high - medians make it safer to cross - As refuge for pedestrians, these are great. Don't slow traffic, though.	**7**
Education	- Yes x 4, if free and if effective (speed watch) - Not effective in current form - difficult to sustain - 'bait pedestrian' program is effective	**1**
Enforcement	- Yes x 2 – this is almost our top priority * need steeper fines!! - Province should re-introduce photo radar	**8**

2. Summary of comments -- traffic calming measures that could be piloted on collector streets

Participants were asked to comment on the traffic calming measures that could be piloted and 'dot' their top three priorities.

Measures	Comments: What do you like about this measure? What are your concerns about this measure?	Please dot your top 3 priorities
Traffic Circles	- Priority: very effective measure - Circles spaced close together would be very effective - good – slows traffic - good anti-truck device - Yes x 2, keep considering this as a tool – it works to slow traffic. - concrete part invites children to play - need better visibility – lighting - can be dangerous – cars invade ped. path - need to be managed with pedestrian crossings, particularly at schools	**34**

	- But need to be bigger and combined with speed cushions or other measures - confusion	
Gateway Medians	- Yes x 2 - add public art to announce the neighbourhood – e.g. archway - Effective as a pedestrian refuge if designed as such - greenery should not too high - This doesn't work at Nanaimo & Dundas to calm traffic on Dundas because it was reduced in width. But it may work elsewhere.	**22**
Speed Cushions	- Yes, support, if you can make them work, but not if they're a barrier for emergency vehicles. - good - Yes, effective - Wider speed cushions - if City unwilling to put speed tables, then speed cushions are the best alternative	**20**
Rumble Strips	- No x 2, too loud noise - We prefer a kinder gentler form of rumble strips (e.g. perhaps with bricks) - dots with rounded tops on road are less noisy e.g. Deer Lake, border crossing	**2**
Pavement Markings	- Yes, with cats eyes - may work initially - 3D - Don't work as traffic calming tool. This is a safety tool.	**3**

1. Summary of comments -- traffic calming measures that are accessible through existing city programs

Measures	**Comments**
Zebra markings	-want in conjunction with Collectors toolkit -measures don't slow down traffic -effective when used in conjunction with bulges
Pedestrian signals	-want in conjunction with Collectors toolkit -need more enforcement and education -need to be brighter/clearer
Special Crosswalks	-want in conjunction with Collectors toolkit -don't always work; need more education
Four way stops	-want in conjunction with Collectors toolkit -effective and cost effective -too chaotic

	-can be noisy
Bike facilities	-want in conjunction with Collectors toolkit -need to be properly marked -should be part of toolkit -not safe
Sidewalk in-fill	-not applicable, not a pedestrian safety tool

2. Summary of Comments – Other Traffic Calming Measures that Engineering does not have a mandate to pay for, but could support where appropriate

Measures	**Comments**
Beautification elements	-especially in traffic circles and bulges -large sculpted rocks -planting must be managed -love these visually
Landscaping	-Yes, especially with medians - if you know the street, you know how fast you can go
Textured crosswalks	-different colours would be interesting -texture should occur before cars get to crosswalk
Street reclaiming	-name routes that drivers should use -use signs
Use of different pavement materials	-yes, but not if it makes the surface slippery like Water Street
Speed display boards	-very effective -need creative display boards

3. Other traffic calming measures proposed by Group

- Regulations
- Raised crosswalks
- Impressed black top/textured lines
- Street hockey
- Speed bumps
- Speed tables
- Diverters
- Meandering streets
- Enforce no parking
- Use lane like street

4. Other comments – principles and priorities for traffic calming on collector streets

- Measures should slow down traffic; help keep traffic on arterials;
- Priority measures: bulges; 30 km/hr Playground or School zones; on street parking
- Noting the limited budget for implementing collectors, the preference is for lower cost measures (e.g. prefer more measures for less, rather than a few measures for more)
- Add street trees where possible

B. Discussion: Establishing and Ranking Criteria to determine a Priority System for Traffic Calming Treatment on Collectors

In a facilitated plenary session with the whole group, participants brainstormed a list of criteria that could be used in determining a priority system. Through a choicing exercise, they ranked the criteria in order of importance, yielding the following prioritized list:

1. Non-Local Traffic
2. Elementary School Catchment area
3. Big Change Coming
4. Traffic Volume
5. Traffic Speed
6. Number of Collisions
7. Bike Routes Crossing
8. Residential Density
9. Road Width
10. Pedestrian Volume
11. Demographic Make-up
12. Identified as future bike-route
13. Funding Opportunities
14. Missing Sidewalks
15. Mixed Zoning
16. Pavement quality

Neighbourhood Collectors Workshop
March 30, 2006
Summary of Meeting

1. **Welcome/Workshop Purpose and Structure**
   The purpose of the workshop was:
   - to provide an update on the Neighbourhood Collectors Process;
   - to share the November 30, 2005 workshop results; and
   - to provide participants with an opportunity to review and offer feedback to the proposed Traffic Calming Toolkit and Criteria System

2. **Proposed Toolkit for Neighbourhood Collector Streets**
   There was a presentation of the proposed Traffic Calming Toolkit for Collector Streets. The proposed Toolkit was based on input/feedback from the November 30, 2005 workshop.
   - The traffic calming measures in the toolkit include: corner bulges, 30 km/hour school zones, narrow lanes, roundabouts, re-aligned intersection, and medians.
   - There are also a couple of measures that Engineering will consider piloting on Collector Streets -- traffic circles and speed cushions. Traffic circles will be installed on Blenheim (a collector street) on a trail basis. Their performance will be monitored and evaluated
   - Before making a decision about whether to pilot speed cushions, The City is awaiting data from other municipalities regarding their effectiveness.
   - There are other measures that can be obtained through other City-wide programs including: crosswalks, pedestrian controlled traffic signals, 4-way stop signs, and sidewalk infill.

3. **Discussion on Criteria for Determining a Priority System for Treatment on Collectors -- how do we determine who goes first?**
   There was a presentation of the proposed criteria for the priority system. The three goals of the priority system are to establish criteria that are fair, measurable, and understandable.

   At the November 2005 Workshop, workshop participants identified and ranked 17 criteria. A priority system consisting of 17 criteria would be unwieldy. Therefore, staff took the top 8 ranked criteria and studied them further to be the basis of the priority system. These were: 1) Non-neighbourhood traffic, 2) elementary school catchment 3) big change coming, 4) traffic volume, 5) traffic speed, 6) collisions, 7) bike routes crossing, and 8) residential density.

   During the study, staff identified a number of issues with some of these criteria. These included:

   Bike Route Crossings: Bike route crossings as a criteria that determines a priority system may not work as all Collector streets will eventually have a bike route crossing or be a

bike route in the future. That is, there is nothing that distinguishes bike route crossings as a comparison measure between streets.

Collisions: Staff would like to get more clarification about how to define collisions. There are three types: vehicle–vehicle, vehicle–pedestrian, vehicle–property. Some questions that staff have for the group are: Do we separate these different types of collisions into different criteria or do we include them in one criteria? When applied to a priority system, are some types of collisions more important than others? Or are they all equally as important?

Big Change Coming: It is difficult to measure 'big change coming.' How do we compare the magnitude of one big change vs. another? There is also no way to anticipate and account for all the 'big changes.' However, staff can still include 'big change coming' as an item that while not quantifiable, can still be considered when determining a priority system.

Non-neighbourhood traffic: It would be very difficult to both measure and define non-neighbourhood traffic. It is straightforward to define and measure non-neighbourhood traffic on a street like Dundas where the collector connects two arterials. However, on 29th Avenue, where the collector crosses four arterials and another collector, it becomes very difficult to define what is neighbourhood vs. non-neighbourhood traffic. Further it would be very expensive and time-consuming to implement. Where possible, staff can still include 'non-neighbourhood traffic' as an item that while not quantifiable, can still be considered when determining a priority system.

Given the above issues, staff narrowed the quantifiable criteria for the priority system to the following:

- elementary school catchment area
- traffic volume
- traffic speed
- collisions
- residential density

When determining the priority system, there will be other considerations taken into account alongside the quantifiable criteria. These are: 'big change coming', non-neighbourhood traffic, external funding, and utility or other construction.

Discussion: Questions and Issues Raised from Participants

Participants emphasized the importance of putting bike routes crossing back on the list. Although all Collector streets will become bike routes in the future, they do not all have bike route crossings now. Special consideration should be paid to the safety of cyclists who are on or crossing those collector streets now. Staff agreed to put it back on the list.

There was much discussion about whether vehicle-vehicle and pedestrian-vehicle accidents should be separated into two criteria or included as one criteria. Different opinions were expressed by the group. Some felt that they should be separated because

pedestrian-vehicle accidents were more serious than vehicle-vehicle accidents and more priority should be given to pedestrian safety. Others felt that all accidents should be treated equally and counted as one criteria – any accident is an indication about the lack of safety on the road for both pedestrians and drivers.

Residents were asked whether to separate the two types of accidents into two criteria or keep them as one criterion. By a show of hands, the majority of the group chose to keep both types of collisions in one criterion.

There was a question about whether staff could measure non-neighbourhood traffic in areas where it is easy to determine and define (e.g. Dundas Street). Staff responded that it would be unfair to measure non-neighbourhood traffic in some areas and not in others, so it would be unfair to include this in the quantifiable criteria list. However, staff can still include 'non-neighbourhood traffic' as an item that while not quantifiable, can still be considered when determining a priority system.

There was discussion about the 'big change coming' criteria. Some participants felt that timing of changes should be considered. That is, if a big change is immediate, it should be given more consideration. A question was asked about whether staff would consider the timing of the big change. That is, if the big change is immediate, would it be given more consideration? Staff responded that the timing and nature of the 'big change' would be considered alongside the quantitative criteria when determining a priority system.

4. Re-Confirming Order of Criteria to Determine a Priority System for Treatment on Neighbourhood Collectors

Following the presentation by the City about the final short list of criteria, the group was asked to re-confirm their rank. The results in order of importance are:

1. Traffic volume
2. Traffic speed
3. Elementary school crossings
4. Collisions – pedestrian and school
5. Bike routes crossing
6. Residential density

5. Different Ways to Apply the Criteria

There was a discussion about different ways in which criteria can be applied. Staff presented three models for participants to consider.

i. Equal Weighting

Equal weight is assigned to each criterion.

ii. Progressive Weighting

Highest ranked criteria are given higher weight, with lower ranked criteria receiving progressively lower weighting.

iii. Grouped Weighting

The two or three highest ranked criteria each receive the same high weighting and the remaining criteria each receive the same low weighting.

The majority of workshop participants preferred a progressive weighting scheme.

Cycling Facilities on Neighbourhood Collector Streets

The Network Sub-committee of the Bicycle Advisory Committee has recommended *:

> "that bikes be accommodated on all collector streets in the following ways, in order of preference:
>
> 1. Bicycle lanes;
> 2. Wide (4.3 m) curb lanes;
> 3. [Council] Approved, immediately adjacent bikeway."

In early 2006, when Council approved the redevelopment of Blenheim Street, it also approved the development of the Balaclava Bike Route, parallel to and one to two blocks east of Blenheim.

* December 12, 2001

Neighbourhood Collector Traffic Calming
Issues Related to Recommended Measures

Not all traffic calming measures are applicable in every situation. To be successful, their implementation must consider the full range of uses found on subject Neighbourhood Collector streets. The following is a description of some design issues that should be considered for each measure.

Corner and Mid-block Bulges

Corner bulges, or curb extensions, provide reduced pedestrian crossing distance and improved pedestrian visibility. Bulges, at intersections or mid-block, act to narrow the actual and perceived width of a street and can contribute to lower vehicle speeds.

On some Neighbourhood Collector streets, corner bulges could force trucks turning right off side streets into the oncoming lane. Corner bulges should be avoided in these circumstances.

Mid-block bulges will narrow the appearance of a street and provide for additional green space. The will also reduce the supply of parking.

Medians

Centre "gateway" medians can be built at major intersections where space allows. These will signal the change in street type from "cross-town" arterial street to "neighbourhood" collector street. Where parking needs allow, medians may help slow traffic and in some places aid pedestrian crossing.

Narrow Traffic Lanes

Lane width can affect vehicle speed and road safety. On most Neighbourhood Collector streets, lanes as narrow as 3.0m can contribute to lower vehicle speeds without compromising safety. To accommodate buses, 3.2m lanes are preferred on transit routes.

Intersection Re-alignments

At most intersections, the two intersecting streets cross at right angles. At others, irregular intersection configurations can lead to expanses of asphalt, long pedestrian crossing distances and turning movements that are possible at high speeds. Re-aligning such intersections can reclaim green space and improve safety.

Roundabouts

A roundabout is a circular intersection with design features that promote safe and efficient traffic flow. Vehicles travel counter-clockwise around a raised centre island, with entering traffic yielding the right-of-way to circulating traffic. Entering vehicles negotiate a curve sharp enough to slow speeds to about 30 km/h. Within the roundabout and as vehicles exit, slow speeds are maintained by the deflection of traffic around the centre island and the relatively tight radius of the roundabout and exit lanes. Slow speeds aid in the smooth movement of vehicles into, around, and out of a roundabout. Drivers approaching a roundabout must reduce their speeds to about 30 km/h, look for potential conflicts with vehicles already in the circle, and be prepared to stop for pedestrians and bicyclists.

Roundabouts can be appropriate treatments for Neighbourhood Collector intersections with arterial or other collector streets. Their size makes them impractical for intersections with local streets and limits the number of other collector intersections where they may be viable.

To date, only one roundabout has been built in Vancouver, in Stanley Park. There are several roundabouts elsewhere in the Lower Mainland.

School and Playground 30 km/h Speed Limit

The speed limit on most Neighbourhood Collectors is currently 50 km/h, as it is on most streets in Vancouver. School zones on arterial streets in Vancouver are typically signed as such, but do not normally have reduced speed limits. On Neighbourhood Collector streets, lower speed limits adjacent to playgrounds and schools with young children are appropriate where playgrounds or other actively used parts of the park or school grounds are adjacent to the street. Elsewhere, speed limits should remain at 50 km/h.

Neighbourhood Collector Traffic Calming
Issues Related to Trial Measures

Traffic Circles

Traffic circles were recommended as trial traffic calming measures in the Blenheim Street Traffic Calming Plan. To date, traffic circles have only been used on local streets. Staff therefore recommended that the traffic circles proposed for three intersections on Blenheim be installed as temporary measures for a minimum twelve month trial period, with permanent installation subject to a review of intersection safety, of traffic impact on the surrounding neighbourhood and of the impact on emergency response times in the area.

Until the review of the traffic circles on Blenheim is complete, traffic circles should not be included in the toolkit of traffic calming measures for Neighbourhood Collector Streets.

Speed Cushions

Speed Cushions are modified speed humps. Unlike speed humps they do not occupy the entire width of a road. They are narrower, usually installed in pairs, allowing larger vehicles such as buses and fire trucks to straddle them but requiring smaller vehicles drive over them. They have been use with some success in Europe. Their effectiveness with the North American vehicle fleet is less clear. Typical North American buses and emergency vehicles have dual rear tires and the average passenger vehicle is larger than in Europe. Consequently, speed cushions which are narrow enough to accommodate buses and emergency vehicles are not a deterrent to many passenger vehicles.

A nearby municipality has recently installed speed cushions on a collector type road adjacent to a school and park. To date, they have only mixed and anecdotal evidence regarding their effectiveness. City staff will be following up on this case study.

Until more information is available, speed cushions should not be included in the toolkit of traffic calming measures for Neighbourhood Collector Streets.

Neighbourhood Collector Traffic Calming
Issues Related to Other Measures (Not Recommended)

Traffic Diverters (Partial Closures, Right-in/Right-out Diverters, Etc.)

These are a class of traffic calming measure sometimes used on local, residential streets to address problems related to high traffic volumes and short-cutting traffic. Using such measures would be counter to the principle established by the Vancouver Transportation Plan that traffic calming measures on Neighbourhood Collector streets "would be aimed at slowing traffic to 50 km per hour, not diverting traffic onto other streets."

Vertical Deflection Measures (Speed Humps, Raised Crosswalks, Etc.)

Staff's consultation with emergency services revealed that most if not all neighbourhood Collector Streets are frequently used emergency response routes, particularly by the City's Fire and Rescue Services. Speed humps slow heavy vehicles such as fire trucks much more than they do regular traffic. Maintaining safe response times for emergency services is a priority.

Speed humps are not an appropriate measure for an emergency response route or for the traffic volumes typical of collector streets. Elsewhere in the city, speed humps have been installed only on local residential streets. Speed humps and similar vertical deflections such as raised crosswalks are not recommended for Neighbourhood Collector streets.