



CITY OF RICHMOND

REPORT TO COMMITTEE

TO: Public Works and Transportation Committee
FROM: Gordon Chan, P. Eng.
Director, Transportation
RE: **ARTERIAL CROSSWALK UPGRADES**

To PW+T - Nov. 21/01
DATE: September 23, 2001
FILE: 6450-17-01

STAFF RECOMMENDATION

1. That staff be directed to develop a comprehensive program involving education, engineering and enforcement initiatives to raise the level of driver compliance and promote safe pedestrian usage at amber flasher-controlled crosswalks on arterial roads and report back to Council on the proposed initiatives.
2. That Council endorse the list of candidate locations for crosswalk upgrades on arterial roads, as proposed in the attached report, as part of an annual crosswalk upgrade program to be considered further in the 2002 capital budget review process.
3. That staff be directed to pursue cost-share funding sources such as ICBC, TransLink or the Federal Government Infrastructure Grant Program to support the above recommended crosswalk upgrades on arterial roads.

Gordon Chan, P. Eng.
Director, Transportation

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STAFF REPORT

ORIGIN

A staff report to Council in November 1997 provided information on the hierarchy of traffic control devices used within the City, including the introduction of an upgraded pedestrian crossing standard. The new standard has these features: overhead internally illuminated pedestrian signs with pushbutton activated and timed amber flashers. Since that time, this type of crosswalk control has been installed at selected sites. Further installations of the device as an upgrade of existing crosswalks on arterial roadways is part of an on-going strategy to enhance pedestrian and traffic safety in the City and is an initiative identified in the Traffic Safety Advisory Committee work plan for 2001.

This report provides the rationale for the proposed pedestrian crosswalk upgrade program. The report also discusses potential education, enforcement and engineering initiatives that could be implemented in conjunction with the phased crosswalk upgrades in order to raise awareness of the new standards, improve driver compliance at the crosswalks and educate pedestrians on the correct usage of the crosswalks.

ANALYSIS

1. Hierarchy of Crosswalk Controls

Traffic control signs and signals for crosswalks are installed for pedestrian and vehicle safety and traffic flow control. A hierarchy of devices exists to enable an appropriate match between the control device and local conditions to achieve reasonable 24-hour traffic control for varying levels of roadway activity. The installation of a signal device that enforces greater control than required over local traffic conditions contributes to driver and pedestrian frustration and ultimately increased disobedience of the device. Matching an appropriate control device to local conditions provides improved safety and equitable access for all users of the roadway.

The crosswalk controls on existing arterial roads are illustrated in Attachment 1 and comprise the following types:

- Type 1 - full traffic signal;
- Type 2 - pedestrian-activated traffic signal;
- Type 3 - overhead illuminated pedestrian crossing signs with amber flashers and pushbuttons;
- Type 4 - overhead pedestrian crossing signs (with no illumination or pushbuttons); and
- Type 5 - shoulder-mounted pedestrian crossing signs (minimum standard).

2. Existing Crosswalks on Arterial Roads

Currently, there are 97 pedestrian crosswalks on arterial roads that are not located at the intersection of two arterial roads (i.e., they are not controlled by full traffic signals). Of these 97 crosswalks, 41 sites have pedestrian-activated traffic signals and 14 locations have overhead illuminated signs with pedestrian-activated amber flashing lights. The remaining 42 crosswalks have either overhead signs or shoulder-mounted signs. The majority of the crosswalks on four-lane arterial roads are marked with overhead signage while the crosswalks on two-lane and three-lane arterial roads are marked with shoulder-mounted signs.

3. Advantages of Overhead Illuminated Flasher-Controlled Crosswalks (Type 3)

3.1 Principles of Pedestrian Crossing Applications

Traffic signals at crosswalks typically would effect greater driver compliance than would crosswalks with pedestrian-activated overhead flashing amber lights due to their use of a red light to stop motorists. However, the blanket application of pedestrian-activated signals (Type 2) on all arterial crosswalks may not necessarily achieve the best balance between the needs of all road users. Given the varying level of traffic conditions at these sites, the use of Type 2 devices at all locations may be excessive. Indeed, the installation of unwarranted traffic control devices can result in poor compliance and negative traffic safety consequences. Crosswalks with overhead flashers and downward lighting (Type 3) are less disruptive to traffic flows and render pedestrians more visible to motorists than shoulder-mounted controls, particularly at night.

3.2 Visibility

Poor visibility due to inadequate lighting and driver inattention are two of the most frequently reported contributing factors to pedestrian-related traffic accidents. The greatest advantage of the overhead illuminated flasher-controlled crosswalks is that the entire crossing is well lit 24-hours a day, thus making pedestrians much more visible to drivers. The flashing amber lights also serve as an active device to alert drivers that the crosswalk is being occupied by pedestrians.

3.3 Costs

Pedestrian-activated signals are more costly to install than pedestrian-activated overhead flashers and downward lighting. The City currently has 42 arterial road crosswalks with the minimum standard of overhead or shoulder-mounted signs. The enhancement of these crosswalks to overhead illuminated signs with amber flashers will enable the City to upgrade more crosswalks in a shorter time frame than if the new standard was a pedestrian-activated signal. Except for a recent isolated incident, most of the existing locations with this standard have been successful in alerting drivers to the presence of pedestrians waiting to cross the roadway and accommodating the safe passage of pedestrians across busy arterial roads.

3.4 Comparison of Traffic Accident Statistics

Due to a recent pedestrian accident at an amber flasher-controlled crosswalk, there is a public perception that this new crosswalk application may be unsafe due to poor compliance of approaching drivers. In light of this perception, staff conducted a comparison of the number of pedestrian accidents recorded from 1995 to 2000 at crosswalks controlled by the new amber flashers, pedestrian-actuated signals and full traffic signals.

The results indicate that during this 6-year period prior to 2001:

- on average, 70-80 pedestrian accidents are reported each year with about 40 percent of these occurring within a fully signalized intersection (the highest proportion by location) and the remaining 60 percent dispersed across various locations such as mid-block, driveways, etc;
- a total of 14 pedestrian accidents occurred within a crosswalk controlled by a pedestrian-activated signal (Type 1); and
- one accident involving a pedestrian was reported to have occurred within a crosswalk controlled by pedestrian-activated amber flashing lights (Type 3).

The table below summarizes the accident statistics at the three types of crosswalks.

Type of Control	Number of Recorded Pedestrian Accidents					
	1995	1996	1997	1998	1999	2000
Full Traffic Signal (Type 1)	42	29	37	24	32	17
Pedestrian Signal (Type 2)	3	3	1	4	2	1
Amber Flashers (Type 3)	N/A	N/A	0	0	0	1
Overhead Signs (Type 4) & Shoulder-mounted Signs (Type 5)	5	6	8	8	13	5

4. Initiatives to Achieve Increased Driver Compliance at Arterial Crosswalks

Notwithstanding the relatively low pedestrian-related accident history recorded at amber flasher-controlled crosswalks during the 1995 to 2000 period, staff propose a combination of possible education, enforcement and engineering initiatives to raise awareness of the new standards, reinforce driver compliance at crosswalks and educate pedestrians on the safe and correct use of crosswalks with pedestrian-activated amber flashing lights.

4.1 Education

As arterial crosswalks with amber flashers are both relatively new in the City (the first was installed in 1997 on Minoru Boulevard) and few in number (14 of a total of 97 arterial crosswalks), many drivers may still be unfamiliar with the device. Efforts to increase awareness and provide both pedestrian and driver education may help shorten the learning cycle with respect to the use of the device by pedestrians and driver compliance with the device. Potential education initiatives include:

- Newspaper and Web Site Notices – At the time of the introduction of this type of new crosswalk, the City placed notices in a local newspaper. Reminder notices could be placed in the City Notice Board of the *Richmond News* and on the City's web site that highlight the new crosswalk standards and explain the responsibilities of pedestrians and drivers when the device is in use. These notices could form an on-going campaign that is co-ordinated with the proposed upgrade of arterial crosswalk standards.
- Traffic Safety Brochures – Pamphlets could be sent to households and businesses (such as Autoplan brokers, driving schools, Motor Vehicle Branch, etc) that provide safety tips for pedestrians and motorists and address some of the common causes of traffic accidents involving pedestrians and how to avoid them.
- Road Signage – Large signs could be erected at high profile locations that provide feedback on the percentage of drivers yielding to pedestrians during the past week along with the overall record. The numbers would be changed on a weekly basis.
- Signage for Pedestrians – Small signs could be erected at a number of crosswalks that instruct pedestrians how to cross the street safely (e.g., extend arm to indicate desire to cross, wait until cars stop and make eye contact with drivers if possible before proceeding, and wave to thank drivers for yielding).

- School Programs – In co-operation with the Richmond School Board, an information kit could be developed for elementary schools that contains safety pamphlets and a lesson plan explaining the proper way to cross the street. Posters illustrating the correct way to cross the street could be sent to secondary schools.

Education efforts could also be incorporated into existing activities in the City that have a focus on pedestrians such as *Traffic Safety Awareness Week*, *International Walk to School Day* and ICBC's *Yellow Ribbon Campaign*.

4.2 Enforcement

Staff would work with RCMP to consider a number of complementary enforcement initiatives such as:

- Crosswalk Campaign – A specific campaign targeted at enforcing driver compliance at high volume pedestrian crosswalks and educating pedestrians on how to cross the street safely could be undertaken. This campaign could be held in conjunction with on-going pedestrian-oriented events in the City.
- Traffic Safety Flyer – A potential element of the campaign could include the production of flyers that contain information on the number of children and adults struck in crosswalks each year as well as the human and financial costs of these crashes. Police could hand out these flyers to motorists that fail to yield to pedestrians in crosswalks.
- Corridor Enforcement Program – RCMP could monitor motorist and pedestrian compliance at the crosswalks within its existing targeted corridor enforcement program.

4.3 Engineering

Staff are currently assessing the feasibility of a number of potential enhancements that could improve driver compliance at arterial crosswalks including:

- differentiated pavement surface within the crosswalk to improve its visibility;
- advance stop bars with signage indicating where the motorist is to stop; and
- advance pavement markings, warning signs or beacons to warn motorists of the upcoming crosswalk and/or use of the crosswalk by a pedestrian. Research has shown that driver compliance at crosswalks with amber flashers improves with the installation of an advance sign that prompts motorists to stop when the amber beacons are flashing.

5. Recommended Upgrade of Minimum Standard for Arterial Crosswalks

In recognition of the advantages of overhead illuminated crosswalks discussed above, staff propose a multi-year phased upgrade of those crosswalks on arterial roads with either overhead signs or shoulder-mounted signs. Attachment 2 lists the locations of these 42 crosswalks.

5.1 Phase 1 – From Overhead Signs (Type 4) to Overhead Flashers (Type 3)

Phase 1 of the program would comprise the upgrade of the 27 crosswalks on four-lane arterial roads from overhead signage to overhead illuminated signs with pedestrian-activated amber flashing lights to enhance the level of safety and visibility of pedestrians. Staff have received complaints from the public that drivers do not see pedestrians waiting to cross the road without any special lighting and signage control, particularly at night.

5.2 Phase 2 – From Shoulder-Mounted Signs (Type 5) to Overhead Flashers (Type 3)

Phase 2 of the program would comprise the upgrade of the 15 crosswalks on two- or three-lane arterial roads from shoulder-mounted signs to overhead illuminated signs with pedestrian-activated amber flashing lights. The upgrade of these sites will be pursued in Phase 2 of the program due to lower traffic and pedestrian volumes.

FINANCIAL IMPACT

The estimated cost to upgrade a single four-lane arterial crosswalk location to overhead illuminated pedestrian crossing signs with amber flashers is \$35,300 with the total cost for all 42 locations estimated at \$1.48 million.

Due to the large scale of the project, staff propose implementing the upgrades under a multi-year program and seeking external funding from agencies such as ICBC, TransLink and the Federal Government Infrastructure Grant Program. The first year of this proposed program, which is estimated at approximately \$200,000, can be considered further in the upcoming review of the 2002 Major Capital Works Program.

CONCLUSION

The upgrade of 42 pedestrian crosswalks located on arterial roads to overhead illuminated signs with pedestrian-activated amber flashing lights will enhance the level of pedestrian safety at these locations. A proposed multi-year phased program would comprise the upgrade of 27 crosswalks on four-lane arterial roads from overhead signage in Phase 1 and the upgrade of 15 crosswalks on two- or three-lane arterial roads from shoulder-mounted signs in Phase 2. Staff propose to seek external funding to support the estimated \$1.48 million cost of the upgrades, which are intended to be carried out over the next several years.

Staff also propose a combination of education, enforcement and engineering efforts to raise awareness of the upgraded standards and improve both pedestrian and driver compliance. Potential education initiatives include a variety of media campaigns and a school program to raise awareness of the responsibilities of pedestrians and drivers at crosswalks. Staff would also work with RCMP to consider providing increased enforcement at crosswalks. Staff are also currently assessing various engineering enhancements. These collaborative efforts would further reinforce the City's commitment to enhancing community liveability through improved traffic safety.



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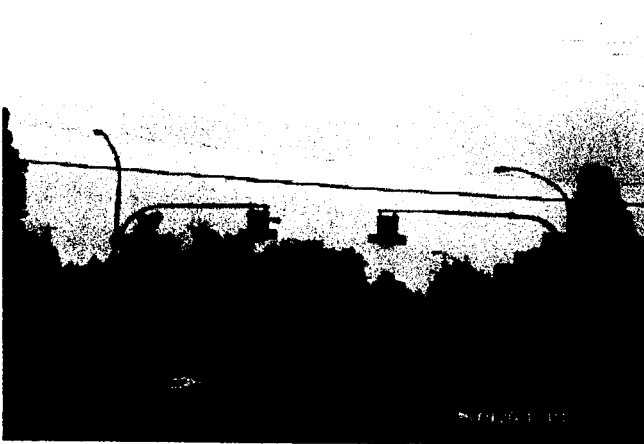
Types of Pedestrian Crosswalks



Type 1: Full Traffic Signal



Type 2: Pedestrian Signal



Type 3: Overhead Illumination with Amber Flashers and Pushbuttons



Type 4: Overhead Signs
(no illumination or flashers)



Type 5: Shoulder-mounted Signs

**Recommended Arterial Road Crosswalk Locations for Upgrade to
Overhead Illuminated Control with Amber Flashers and Pushbuttons**

Phase 1 Upgrades

Crosswalks on Four-Lane Arterials	
Major Street	Cross Street
Blundell Road	Cheviot Place
Blundell Road	Clifton Road
Blundell Road	Ash Street
Blundell Road	Montana Road
Bridgeport Road	Gage Road
Francis Road	Craigflower Drive
Garden City Road	Dixon Street
Garden City Road	Odlin Road
Gilbert Road	Maple Road
Gilbert Road	Lucas Road
Granville Avenue	Azure Boulevard
Minoru Boulevard	6900-block
No. 1 Road	Regent Street
No. 1 Road	Springfield Drive
No. 1 Road	Peterson Gate
No. 1 Road	Pacemore Road
No. 2 Road	Colville Road
No. 3 Road	Saunders Road
No. 3 Road	Broadmoor Boulevard
No. 4 Road	Dennis Crescent
No. 4 Road	Mortfield Gate
No. 5 Road	Seacliff Road
No. 5 Road	Bird Road
No. 6 Road	Commerce Parkway
Steveston Highway	Lassam Road
Westminster Highway	Riverdale Drive
Westminster Highway	Tiffany Boulevard

Phase 2 Upgrades

Crosswalks on Two- or Three-Lane Arterials	
Major Street	Cross Street
Francis Road	St. Albans Road
Francis Road	Ash Street
Francis Road	Carrick Street
Garden City Road	Glenallen Drive
Garden City Road	Saunders Road
Granville Avenue	McCallan Road
Granville Avenue	Mayflower Drive
Minoru Boulevard	Bennett Road
Railway Avenue	11100-block
Westminster Highway	Smith Street
Williams Road	Sheridan Road
Williams Road	Greenlees Road
Williams Road	Lassam Road
Williams Road	Deagle Road
Williams Road	Leonard Road