



DISTRICT OF NORTH VANCOUVER

PEDESTRIAN MASTER PLAN

FINAL REPORT



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EXECUTIVE SUMMARY

The District of North Vancouver has stated its goals of promoting walking as a form of transportation. The District's Official Community Plan outlines the objectives of creating a sustainable transportation system which can include a complete sidewalk and footpath system linked to the transit system.

The purpose of this study is to make recommendations that will improve conditions for pedestrians in the District of North Vancouver through policies, standards, maintenance, best practices and future pedestrian infrastructure expenditures.

The overall study method has been structured into three parts:

- Part 1 - *Foundation Activities*: Collect and review background information on existing pedestrian policies and practices in North Vancouver and other municipalities through the review of literature and public consultation as well as interviews with similar municipalities. Based on this review a method was developed to identify necessary pedestrian links for the pedestrian master plan.
- Part 2 – *Development of the Master Plan* including a review of existing facilities, land use, and transportation data and collision trends. Using this data, the pedestrian priority indices were applied and links were ranked.
- Part 3 - *Plan Refinement* including recommendations for policy change, spot-checking, project implementation and documentation.

The following relevant literature was reviewed in order to develop the Pedestrian Master Plan:

- District Documents;
- Best Practices in Pedestrian Realm Design; and;
- Emerging Trends and Innovative Practices.

Municipal interviews

Nine municipalities were chosen to be interviewed in order to understand what the current practices are with respect to pedestrians and sidewalks in other municipalities. Some of the municipalities were selected because they had similar population, demographics and climate as the District. Others were chosen because they were considered to be innovators in the field of pedestrian planning.

Public Consultation

In the spring of 2007, District of North Vancouver staff engaged in a public consultation process in order to identify use of the existing pedestrian network, and to consider priorities for improvement among those District residents that currently walk, and those that would like to walk more. The goals of public consultation were to assess how often and for what purposes residents currently walk, and what prevents them from walking more.

Overall, a significant proportion of the respondents indicate that they walk on a regular basis. Walking for exercise, leisure, and to parks and recreation centers are the most popular reasons. As such, respondents indicated a need to prioritize improvements for pedestrian facilities near schools, recreation centers and on neighborhood streets.

Respondents were uncomfortable walking in some situations because of safety concerns around drivers, a lack of sidewalks, inadequate lighting, and an incomplete sidewalk network.

Sidewalk Priority Index

This study uses the Sidewalk Priority Index developed by the City of Portland, which has also been adapted and refined for use in the cities of Kelowna, Prince George and Victoria, British Columbia. The index provides a method for assigning a score to each potential location for a new or extended sidewalk. The method combines two indices to form the final Sidewalk Priority Index:

- Pedestrian Potential Index; and
- Deficiency Index.

The Pedestrian Potential Index measures the strength of environmental factors that favour walking. In other words, it evaluates the need for a sidewalk based on how likely it is that people will be walking there. For example, having a school or business nearby can influence walking levels in an area.

The Deficiency Index measures the level of necessity for pedestrian improvements. Factors for the Deficiency Index were chosen to measure how difficult or dangerous the street is for walking. For instance, factors such as speed limit for vehicles can influence pedestrian safety and consequently the suitability of the street segment for walking.

Scores are calculated based on land use and transportation characteristics and the combined score is used to establish priorities. The index has been tested and proven by a variety of municipalities as being able to identify the link improvements that are most likely to increase walking trips. The Sidewalk Priority Index was applied to block faces within the District that do not currently have a sidewalk. This plan focuses on providing sidewalks on the highest classification roads, specifically on:

- ✓ Both sides of all minor and major arterial roads; and
- ✓ One side of all collector roads and both sides of collectors within 100 meters either direction of a school, extending to the end of the block face.

The Sidewalk Priority Index has been sorted based on the total index score for each missing sidewalk. TABLE ES.1 shows the priority groupings, which were assigned based on the scoring results and number of links. A graphic summary of the results is shown in FIGURE ES.1.

TABLE ES.1 PRIORITY GROUPINGS USED

PRIORITY	INDEX SCORE RANGE	COLOUR USED
Priority 1 (Highest)	>35	red
Priority 2	30-35	blue
Priority 3	27-30	brown
Priority 4	24-26	pink
Priority 5 (Lowest)	0-23	green

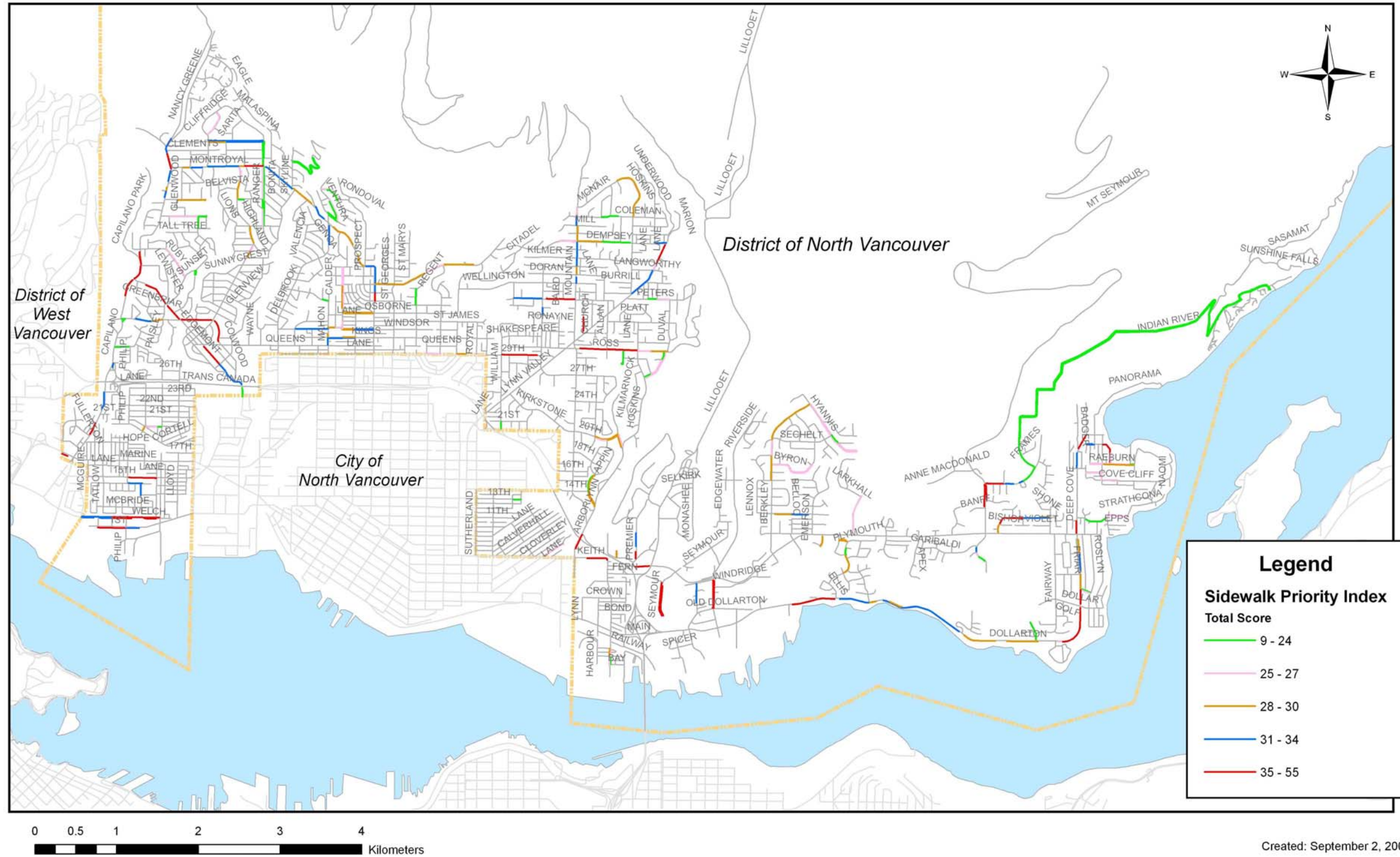
Recommendations for Policy Change

The following TABLE ES.2 is a summary of all policy and practice changes that are recommended in order to implement and support the Pedestrian Master Plan. The goal of these policy and practice changes is to make the District of North Vancouver a safe, convenient and pleasant environment for pedestrians, and thus make walking a preferred mode of transportation.

TABLE ES.2 SUMMARY OF POLICY RECOMMENDATIONS

POLICY / PRACTICE AREA	RECOMMENDATIONS
<i>PLANNING</i>	
<i>Target Mode Split</i>	10% of all trips by 2031.
<i>Pedestrian Collision Reduction</i>	Reduce the annual number of pedestrian-related collisions by half by 2018 (over the next 10 years).
<i>Funding</i>	Allocate \$330,000 annual budget for completion of all Priority 1 sidewalks within 20 years and divert the money spent on landscaping in boulevards to construction of new sidewalks.
<i>Explicitly Prioritizing Pedestrians</i>	Adopt a policy to prioritize pedestrians over all other modes of travel or to consider pedestrian needs in decision-making.
<i>Creating a Pedestrian Priority Area</i>	Marine Drive, Edgemont Village, Lynn Valley Town Centre, Maplewood and Parkgate are recommended as Pedestrian Priority Areas.

FIGURE ES.1 SIDEWALK PRIORITY INDEX MAP



ENGINEERING AND DESIGN	
Street Design Standards	Add more flexible options to Bylaw 7388 and apply it to all work in the District and allow for sidewalks to continue across driveways.
Implementation Plan	Implement the Sidewalk Priority Index to construct Priority 1 sidewalks within 20 years and encourage residents to apply for sidewalks through the Local Improvement Cost Sharing Bylaw.
Accessibility Standards	Implement the recommendations of TAC APS document.
Curb Extensions	Work with TAC and MMCD to develop standard layout drawings for curb extensions. Consider curb extensions at the time of development approvals.
Refuge Medians	Consider using refuge medians for pedestrians on high-volume, multi-lane facilities, as is being installed on Capilano Road in the vicinity of the Mount Crown Road and Capilano Park Road intersections.
Site Design of New Developments or Re-developments	Formally adopt a pedestrian audit checklist that must be completed by developers as part of their Transportation Impact Study (TIS) requirements..
Pedestrian Crossing Treatments	Conduct a crosswalk review and supplement the TAC crosswalk warrant with the FHWA guidelines.
Pedestrian Signal Timings	Equip all Pedestrian Priority Areas and Marine Drive with Pedestrian Countdown Timers when development occurs, possibly at cost to the developer. Install AP at all new intersections and upgrade signals which are within 200m of an existing or planned major pedestrian generator, and introduce specific guidelines for locations where slower walking speeds should be used.

ENGINEERING AND DESIGN	
Safe Routes to Schools	Work with one or two schools (both public and private) per year to make engineering and route improvements.
Trail & Transportation Network	Work with the District's Parks section to co-ordinate and integrate trail and transportation network.
POLICY / PRACTICE AREA	RECOMMENDATIONS
MAINTENANCE AND OPERATIONS	
Trip and Fall Hazard Prioritization	Continue to test and implement the use of handheld computers with GIS maps. Continue to have operations crews report new sidewalk deficiencies and monitor sidewalk hazard reports on the District's website.
Snow Clearing	Continue to educate snowplough operators to minimize the piling of snow at street corners, particularly on streets near schools, hospitals, seniors' centers or homes, and generally with high pedestrian activity.
Foliage Trimming	State a minimum distance landscaping must be planted from the sidewalk and maximum height for foliage at corner properties. Allow residents to submit complaints online.
Utility Pole Placement	Require utility poles obstructing sidewalks in high pedestrian areas to be relocated or have the utilities moved underground whenever a redevelopment of the area occurs.

Plan Implementation

For any plan to be successful, forethought must be given to how the plan will become a built reality. Plans should have:

- Responsibility for implementation assigned to specific departments or staff;
- An annual budget allocated over a determined term, such as 20 years;
- Regular monitoring of targets (approximately once per year); and
- Regular updates set for the plan (approximately every 5 years).

The Sidewalk Priority Index is a major tool in the development of this Pedestrian Master Plan. Its purpose is to help the District systematically plan and budget construction of new sidewalks.

Funding

Estimates were made of the costs expected to provide the sidewalks identified in this plan. Unit costs were applied to each block face by assessing whether the average cost to construct a 1.5-metre wide sidewalk in each location would be considered low, medium or high. The unit prices are intended to reflect typical average costs to the District for the year 2007 for the conditions listed.

To complete the sidewalk network proposed in this plan, the total estimated cost is \$37.0 million (in 2007 dollars). This amount would provide sidewalks on both sides of all arterial roads and on one side of collector roads.

A more detailed breakdown of the expected costs for each of the five priority levels is provided as TABLE ES.4.

TABLE ES.4 COST ESTIMATES BY FUNDING LEVEL

PRIORITY	FUNDING ESTIMATE (2007 dollars)	COLOUR USED (Sidewalk Priority Index Map)
Priority 1 (Highest)	\$6,608,000	red
Priority 2	\$7,477,000	blue
Priority 3	\$7,756,000	brown
Priority 4	\$5,920,000	pink
Priority 5 (Lowest)	\$9,206,000	green
Total	\$36,966,000	

It would be preferable to schedule the sidewalk projects over a 10-year time frame, but it is recognized that a 20-year time frame may be required due to funding limitations. The options for annual funding levels are summarized in TABLE ES.5.

TABLE ES.5 OPTIONS FOR ANNUAL FUNDING

TARGET SIDEWALK COMPLETION	PROPORTION OF ALL SIDEWALKS	TOTAL COST (2007 dollars)	ANNUAL FUNDING LEVEL BY TIME FRAME	
			10 YEARS	20 YEARS
Priority 1 only	20%	\$6,608,000	\$661,000	\$330,000
Priorities 1 and 2	40%	\$14,085,000	\$1,409,000	\$704,000

For Priority 1 projects only, which constitute 20 percent of the new sidewalks identified, an annual budget of \$330,000 (in 2007 dollars) would be required to complete the program in 20 years.

In addition to capital costs, allowance should be made for the appropriate increase in sidewalk inspection and maintenance costs. For the purpose of this estimate, it was assumed that the average annual cost increase of 6 percent per annum could continue in the near term.

Next Steps

The District should plan to update the Sidewalk Priority Index every five years, as changing conditions may cause some sidewalk links to go up or down in priority relative to other missing links. The District will also need to update the index to remove from it those sidewalks which have been built. The updates to the plan will help the District to gauge success and set or maintain budgets appropriately. The District should celebrate its success on an annual basis by publishing a list of completed sidewalks and pedestrian improvements, and continuing to build on the list over the next 20 years.

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1.0 INTRODUCTION AND BACKGROUND

1.1 Background

The District of North Vancouver has stated its goals of promoting walking as a form of transportation. For example, local community plans frequently mention sustainability, environmental protection, improved air quality and support for walking as important goals; and the District's Official Community Plan states objectives of creating a sustainable transportation system which includes a complete sidewalk and footpath system linked to the transit system.

Benefits to making walking accessible, safe and enjoyable include:

- ✓ maintaining a high quality of life,
- ✓ improving public health and well-being,
- ✓ reducing greenhouse gas emissions,
- ✓ adding aesthetic value to communities,
- ✓ contributing to mobility, and
- ✓ increasing transportation choice.

1.2 Study Purpose

The purpose of this study is to make recommendations that will improve conditions for pedestrians in the District of North Vancouver, through policies, standards, maintenance, best practices and future pedestrian infrastructure expenditures.

1.3 Study Location

The study encompasses the roads within the District of North Vancouver. Some roadways operate under the jurisdictions of others, namely:

- British Columbia Ministry of Transportation;
- Two Indian Bands; and
- Port of Vancouver.

The road jurisdictions are illustrated in FIGURE 1.1 below.

District of North Vancouver - Street Classifications

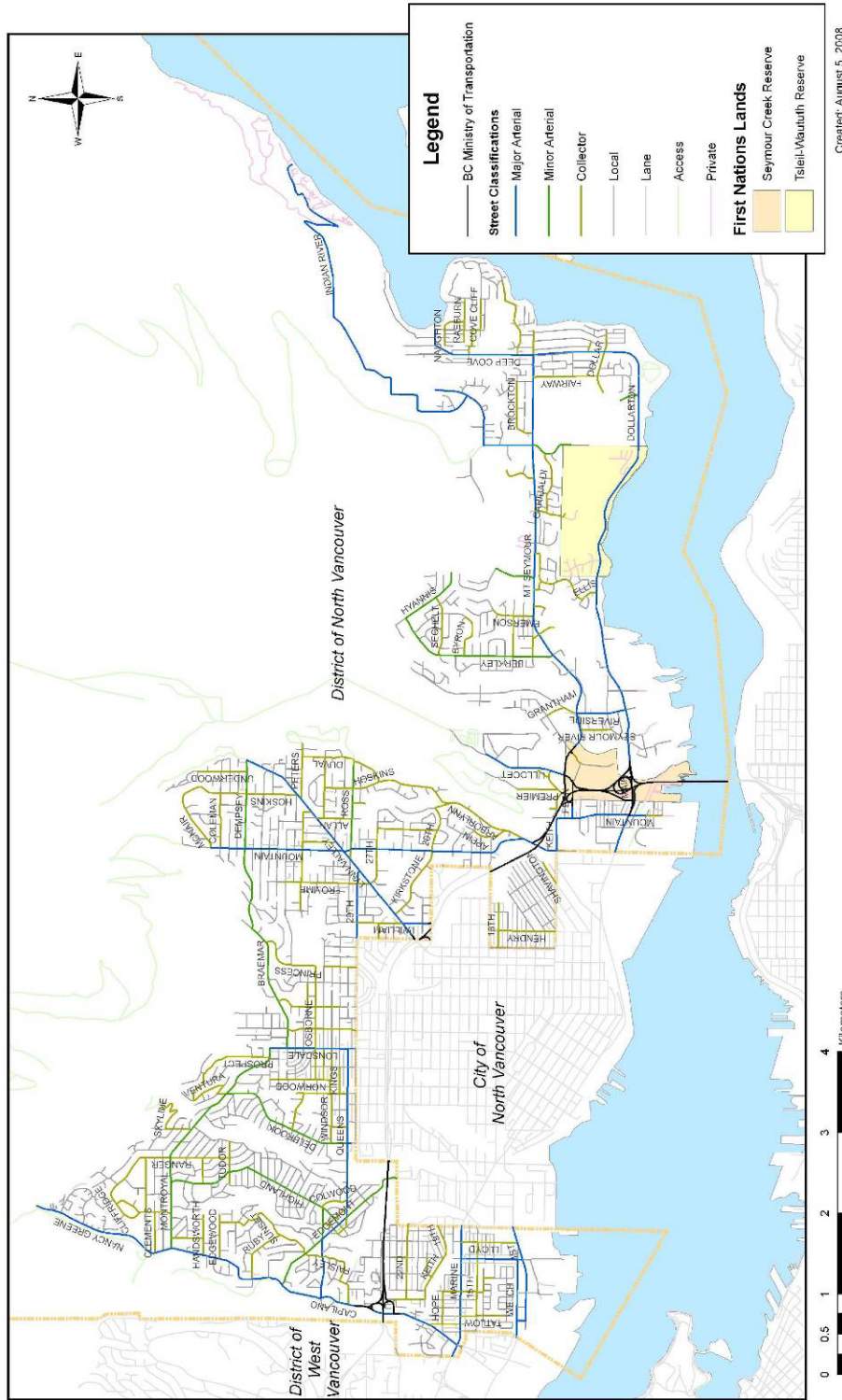


FIGURE 1.1 STUDY ROADWAYS

1.4 Method

The overall study method has been structured into three parts:

- Part 1 - *Foundation Activities*: Collection and review of background information including:
 - Public Consultation
 - Project meetings
 - Literature review
 - Summary of consultation
 - Interviews with similar municipalities
 - Development of indices
 - Progress report

- Part 2 – *Development of Master Plan* including:
 - Pedestrian transportation review
 - Collection of land use and transportation data
 - Collision location cluster analysis
 - Application of indices and ranking
 - Pedestrian zone identification
 - Draft pedestrian master plan

- Part 3 – *Plan Refinement* including:
 - Input to Consultation
 - Recommendations for policy changes
 - Revisions to Master Plan
 - Finalization of improvement warrants
 - Project development and implementation plan
 - Funding plan
 - Final report
 - Presentation to Council

1.5 Scope

It is the District of North Vancouver's policy to have sidewalks on both sides of collectors, but this study will focus on the goals of installing sidewalks on:

- Both sides of arterials
- Both sides of collectors within 100 metres either direction of a school, extending to the end of the block face
- One side of all other collectors

No local roads have been considered in this plan, but it is still the District of North Vancouver's policy to have sidewalks on local roads. This should be a priority after arterials and collectors have been completed.

1.6 Format of this Report

This document summarizes the findings of this study and refers to many supporting policies. All appendices have been included in a separate bound report.

2.0 LITERATURE AND PRACTICE REVIEW

This section provides a review of the relevant literature that has provided guidance for the development of the Pedestrian Master Plan. The section is divided into the following parts:

- Review of District Documents;
- Best Practices in Pedestrian Realm Design; and
- Emerging Trends and Innovative Practices.

2.1 Review of District Documents

This section provides a brief summary of District of North Vancouver documents that will impact and/or work in conjunction with the Pedestrian Master Plan. The key documents are listed here and summarized in APPENDIX A.

- Lynn Valley Town Centre Plan (1998);
- North Lonsdale – Delbrook Official Community Plan (1995);
- Lynnmour/Inter-River Local Plan Bylaw (2006);
- Seymour Local Plan (2003);
- Maplewood Local Plan (2002);
- Marine Drive Strategy (2004);
- Lower Capilano Local Plan (2004);
- Upper Capilano Local Plan (2004);
- Development Service Bylaw No. 7388;
- Official Community Plan (1991);
- Street and Traffic Bylaw No. 7125 (2004); and
- Marine Drive Improvement Strategy (2007).

Key points from the above documents include:

- All neighbourhood plans include policies in support of providing pedestrian infrastructure, with accompanying implementation strategies;
- Based on the Development Service Bylaw, sidewalks are required on both sides of arterial and collector roads, and on one side of local streets;
- Curbs, wheelchair ramps, pathways and pedestrians with disabilities are all addressed in the Development Service Bylaw;
- A set of pedestrian policies have been adopted by Council; and
- Local streets can be funded under Local Area Improvement Cost Sharing Bylaw no.3711.

2.2 Emerging Trends and Innovative Practices

As the field of pedestrian planning is relatively new, the practice is still evolving and progressing. This section highlights some of the latest trends in pedestrian planning that the District should consider as it proceeds with implementation of the plan.

Planning for Elderly Pedestrians

It is important to recognize the implications of the aging baby boomers on pedestrian planning as their impending retirement, increased likelihood of physical and visual impairments, and other special needs will have a significant effect on the demand for physical infrastructure. Elderly pedestrians have more specific needs than younger pedestrians, such as a greater need for curb ramps and longer crossing times. In recent years, many studies have addressed these issues. As one study noted, “Plan for the young and you include only the young, but plan for the elderly and you include everyone.”

Road Dieting and Road Space Reallocation

As road authorities have increasingly recognized the importance of non-motorized travel and the disparate amount of funding it has received in the past several decades, these agencies are turning to “road dieting” and road space reallocation as a means to redress poor infrastructure provision for non-automobile modes.

These methods can be much more cost effective than road widening and can also add to the liveability of the surrounding area.

Road dieting, illustrated in FIGURE 2.1 typically involves converting a 4-lane road (2 lanes in each direction) to a three lane road (one lane in each direction, plus a centre left-turn lane) and using the remaining road space for bike lanes and/or wider sidewalks. This typically does not reduce the capacity of the road, but rather uses the existing space more efficiently.

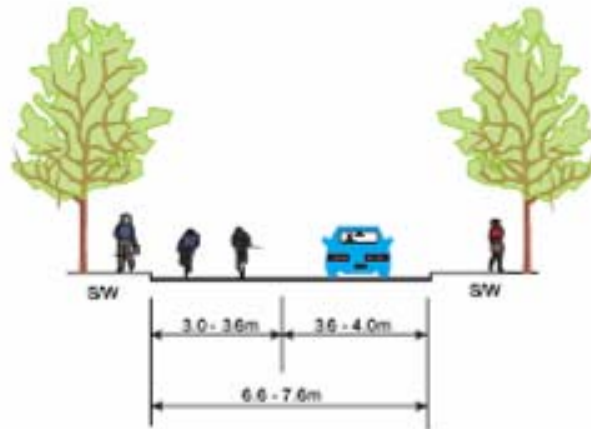


FIGURE 2.1 EXAMPLE OF A ROAD DIET WITH TWO BIKE LANES

Road space reallocation, illustrated in FIGURE 2.2, involves reducing the vehicle capacity on roads that are either under-utilized or which have alternatives within the road network. This would typically involve reducing lane widths and/or the number of overall lanes in order to reallocate road space to other modes. The road space may then be reallocated for bicycle lanes, wider sidewalks, a centre landscaped median, and/or boulevard strips.



BEFORE (above) and AFTER (below)

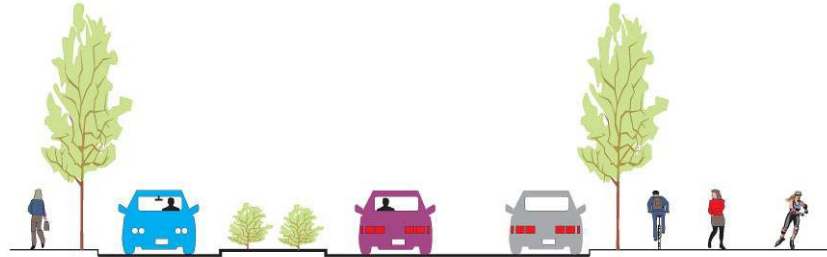


FIGURE 2.2 EXAMPLE OF ROAD SPACE REALLOCATION

Promoting Sustainable Transportation through Site Design

In 2004, the Canadian Institute of Transportation Engineers published a document titled, Promoting Sustainable Transportation through Site Design. The document provides guidelines for promoting pedestrian travel (and other non-automobile modes) on a site-by-site basis. The guide provides an easy to use checklist (http://www.cite7.org/Technical_Projects/Final%20Proposed%20Recommended%20Practice%20RP-035.pdf and in APPENDIX B) that can be employed at the development approval stage for ensuring that new developments consider access by all modes and contribute to an pleasant and aesthetic walking environment.

Designated Pedestrian Priority Areas

Pedestrian Priority Areas create an environment that is safe and comfortable for pedestrians, by prioritizing pedestrian movement over vehicle movement, while still allowing an adequate level of vehicle access. These areas can be a single street or a zone including several blocks within a municipality. Pedestrian priority streets would typically also serve cyclists and transit, and are expected to have low vehicle speed limits.

A typical pedestrian-oriented street would include such features as narrow vehicle travel lanes, wide sidewalks, landscaping, curb extensions, frequent marked

crossings, raised crosswalks, and pedestrian-scale street furniture among other features. A Pedestrian Priority designation is appropriate for streets that have high pedestrian volumes, such as commercial shopping streets. Areas within the District that have commercial shopping streets are shown in FIGURE 2.3.

Planning for Climate Change and Peak Oil

Many cities are recognizing the need to address the interrelated issues of climate change and “peak oil” (the theory that oil production may soon reach a peak followed by a supply shortage). As walking is the least energy-intensive form of transportation, many cities recognize that the more viable walking is, the greater chance the city will have of reducing its greenhouse gases and remaining economically viable as oil prices increase and supplies decline. Furthermore, pedestrian plans may be able to receive funding allocated for addressing climate change.

2.3 Best Practices in Pedestrian Realm Design

A review of the literature and other pedestrian plans for municipalities throughout North America was completed. Based on this review, the following is a list of pedestrian infrastructure features that can support walking.

Some items listed below are considered essential to any pedestrian plan, while others are highly recommended and still others are good to have, but should not take precedence over the essential items. The following table (TABLE 2.1) categorizes each item discussed in this section by importance.

TABLE 2.1 ELEMENTS OF PEDESTRIAN FACILITIES

ESSENTIAL	HIGHLY RECOMMENDED	GOOD TO HAVE
<ul style="list-style-type: none"> • Complete sidewalk network • Appropriate and complete road crossing treatments • Accessibility features 	<ul style="list-style-type: none"> • Curb extensions* • Refuge Islands* • Pedestrian routes within new public and private developments • Pedestrian-scale lighting 	<ul style="list-style-type: none"> • Pedestrian countdown signals* • Parking lot design standards* (only for redevelopment if land is private) • Street furniture

*Should become a higher priority at locations where a traffic engineer has recommended them due to safety concerns

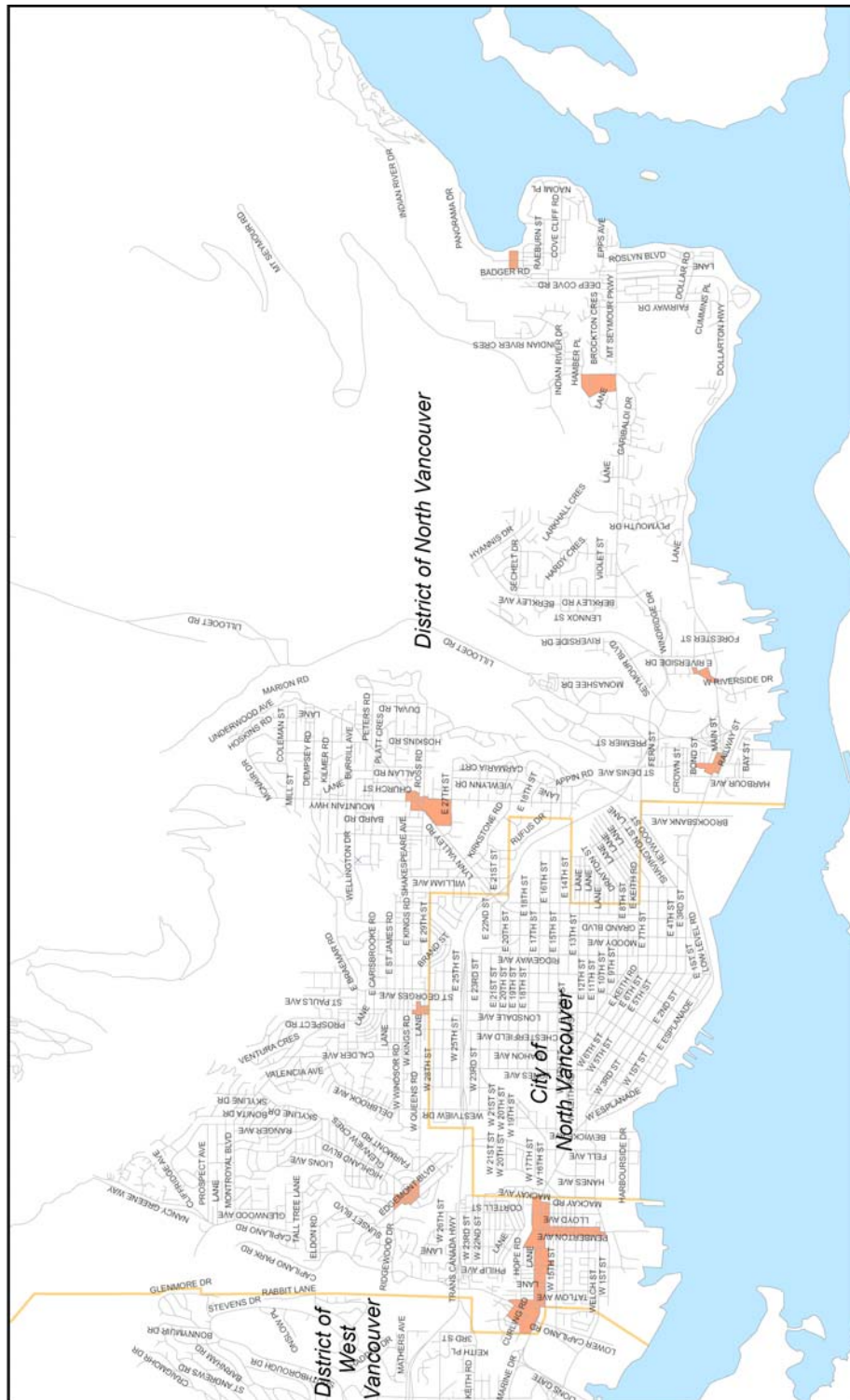


FIGURE 2.3 PEDESTRIAN FRIENDLY COMMERCIAL AREAS

Complete Sidewalk Network

The importance of a complete, convenient and continuous sidewalk network cannot be over-emphasized. Even relatively small gaps in the overall network can discourage walking as pedestrians may feel that the presence of sidewalks is unreliable.

A complete sidewalk network also includes a continuous “clear zone” (path free of any obstacles) of at least 1.5 metres width, with properly-graded ramps at every intersection or any other elevation change. These features are also extremely important for ensuring accessibility for persons with mobility impairments.

Appropriate Crossing Treatments

Crossing treatments may include pavement markings, signage, curb extensions, pedestrian signals, and overhead flashers. Municipalities should adopt warrants for pedestrian crossing treatments based upon pedestrian volumes, road width, vehicle volumes and vehicle speeds. If high-visibility crosswalks are used too frequently or where they are unwarranted, drivers may become de-sensitized to them and they will lose their impact.

Municipalities should also be consistent with placing them in locations where they are warranted. Guidelines that detail the signs, pavement marking or other features, should be formally adopted for each crossing treatment.

Accessibility Features

Accessibility features include curb letdowns at crosswalks (or any location where a grade change is present), appropriate grades on all pedestrian facilities, and a continuous clear zone of at least 1.2 metres (2003 MUTCD). A clear zone is a continuous path that is free of barriers or obstacles.

In the District of North Vancouver, many issues related to accessibility of the current pedestrian facilities have been identified by the North Shore Advisory Committee on Disability Issues (ACDI), as illustrated in FIGURE 2.4.



Mount Seymour Parkway: Concern that high vehicle speeds on the channelized right-turn lane increase the risk to crossing pedestrians. Note: this section of Mount Seymour Parkway is under the jurisdiction of the Ministry of Transportation and Infrastructure.



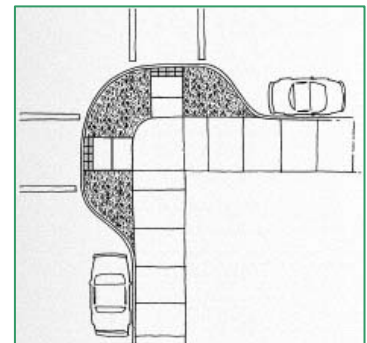
Dollarton Highway: Concern that walkway leading to bus stop is unpaved, limiting access. Lack of lighting also discourages night use and may create security risk.

FIGURE 2.4 EXAMPLES OF ISSUES IDENTIFIED BY ACDI

The District's consultation with stakeholders representing the elderly, disabled and youth, for this Master Plan also identified the need for safe pedestrian infrastructure and is further discussed in Section 3.5 of this report.

Curb Extensions

Curb extensions serve many functions: they shorten crossing distances, create streetscaping opportunities, make waiting pedestrians more visible to drivers, prevent people from parking their vehicles too close to an intersection which decreases pedestrian visibility, and, reduces vehicle speeds by physically narrowing the road.



Refuge Islands

Refuge islands are particularly important on long crossings, where some pedestrians may not be able to cross within the pedestrian signal crossing time and may become

caught in the middle of a road. A refuge island provides pedestrians a safe place to wait until the next crossing signal.

Pedestrian Countdown Signals

Pedestrian countdown signals are becoming increasingly popular, because they allow pedestrians to determine whether or not they have enough time to cross the road based upon their individual walking speed, rather than pre-determined crossing time based upon an average walking speed. An example of a pedestrian countdown signal in use is provided in FIGURE 2.5 below.



FIGURE 2.5 PEDESTRIAN COUNTDOWN SIGNAL, NEW WESTMINSTER

Street Furniture

Street furniture, which includes benches, garbage receptacles, pedestrian-scale lighting, and public art, should not be overlooked in terms of creating an inviting pedestrian realm. The District has some good examples of street furniture use in retail areas for example Edgemont Village, shown in FIGURE 2.6.



FIGURE 2.6 EDMONT VILLAGE, NORTH VANCOUVER

Other features that may be present in a well-designed pedestrian network include:

- Appropriately-placed pedestrian push buttons, in terms of both height and location;
- Foliage trimming to prevent infringement on pedestrian envelope;
- Consideration of driveway placement to minimize pedestrian inconvenience;
- Tree grates to minimize tripping hazards; and
- Sidewalk and crosswalk inspection and maintenance plan.

2.4 Pedestrian Planning References

This section has explored several aspects of pedestrian planning that the District should consider as the Pedestrian Master Plan is developed. Further to this goal, the following is a primary list of references for pedestrian planning activities.

- Portland Pedestrian Design Guide (City of Portland, 1998)

- Geometric Design Guide for Canadian Roads (Transportation Association of Canada , 1999)
- Promoting Sustainable Transportation through Site Design (Canadian Institute of Transportation Engineers, 2004)
- Improving the Pedestrian Environment Through Innovative Transportation Design (Institute of Transportation Engineers, 2005)

2.5 Municipal Practice Review

Overview of Municipalities Interviewed

Municipalities included in the municipal practice review were chosen to represent a cross-section of conditions. Some of the municipalities were selected because they had similar population, demographics (aging population) and climate as the District. Others were chosen because they were considered to be innovators in the field of pedestrian planning. TABLE 2.2 lists the municipalities chosen for interview, and their reason for inclusion.

TABLE 2.2 OVERVIEW OF MUNICIPALITIES INTERVIEWED

MUNICIPALITY	POPULATION	REASON FOR INCLUSION
Coquitlam, BC	120,000	Similar population and climate
Halifax, NS	372,000	Similar demographics
Kelowna, BC	105,000	Progressive pedestrian policies, Similar population, and demographics.
North Vancouver (City of), BC	40,000	Adjacent to District and practices often compared.
North Vancouver (District of), BC	84,000	
Portland, OR, USA	565,000	Progressive pedestrian policies.
Prince George, BC	77,000	Progressive pedestrian policies, similar population
Saanich, BC	110,000	Similar population, demographics and climate
Vancouver, BC	600,000	Progressive pedestrian policies.
Victoria, BC	345,000	Similar demographics and climate

Coquitlam, the City of North Vancouver, and Vancouver are all within the recently renamed Metro Vancouver, which is formally known as the Greater Vancouver Regional District (GVRD) and, along with Saanich and Victoria, were chosen due to their similar climate and demographics, such as an aging population. Being a neighbouring municipality, the City of North Vancouver has similar topography issues, and many roads are continuous between the City and the District. Additionally, the City and the District frequently co-operate on initiatives relating to pedestrians – they share the same school board, operate a single recreation commission, and produced a joint Bicycle Master Plan in 2006. Prince George was selected for comparison due partly to the similar population sizes, but principally because of the lead taken in pedestrian planning with their Pedestrian Network Study (2005) and their Pedestrian Priority Policies (2006).

Kelowna established British Columbia's first Pedestrian Master Plan in 2000. Vancouver was included in the survey because it has mature infrastructure, and has taken a leadership role in supporting walking, whilst Portland has the reputation of being very progressive in sustainable transportation and alternative modes.

The climate of an area can influence whether or not residents choose to walk on a regular basis. It can also influence a municipality's policies relating to pedestrians, particularly when it comes to maintenance. For example, previous studies have shown that in areas where snowfall is high, the municipality often takes the responsibility for clearing snow from sidewalks. In municipalities where snowfall is low, it is more frequently the responsibility of the adjacent property owner to clear snow from sidewalks. Of the municipalities interviewed, the average January records show that Prince George, Halifax and then Kelowna have the coldest January temperatures, and the most snowfall and cover. The areas of British Columbia around the Lower Mainland and Vancouver Island are similar in their average climates for January, as is Portland in Oregon with the main noticeable difference being less snowfall.

Interview Content

The interviews and discussions with each municipal representative(s) were structured to provide an overview of the policies, activities undertaken, and guidelines followed by each municipality to provide pedestrian facilities. The interview was generally structured to cover the following topics:

- General information about pedestrian travel;
- Provision of new pedestrian facilities;
- Repair and upgrade of existing facilities, including funding;
- Signalised pedestrian crossings;
- Maintenance; and
- Public complaints and reporting procedures including the reporting of trips and falls.

The full results of the interviews with municipalities can be found in APPENDIX C. The main highlights of the municipalities' policies, practices and general comments for planning, constructing and maintaining their pedestrian network are:

- Although the majority of municipalities did not have specific **Pedestrian Plans**, all incorporated pedestrian planning into other plans such as Transportation Plans and Official Community Plans. The District is therefore innovative in completing a Pedestrian Plan;
- All had general **goals to increase pedestrian travel**, but the majority did not have explicit goals or targets;
- Most received **complaints and requests about specific issues**, but no general pressure to improve the overall pedestrian network;
- **Pedestrian home-to-work travel mode** information is not readily available in most cities, but the information available shows a range of 1 percent in rural areas to 33 percent in downtown cores. The mode split in the District of North Vancouver for the walking and cycling trip to work is 5% (2006 Census, Statistics Canada);
- Most are moving towards providing sidewalks on both sides of both **collectors and arterial streets**. The District currently requires sidewalks on both sides of arterials collectors;
- Sidewalk policies for local streets vary between municipalities, ranging from none required to sidewalks required on both sides of the street. The District currently requires sidewalks on one side of local roads;
- Kelowna's separate **sidewalk budget** came as a result of recommendations by Opus Hamilton in Kelowna's Pedestrian Master Plan, and Prince George's budget for new pedestrian facilities came after the Prince George Pedestrian

Network Study in 2005, also done by Opus Hamilton. The District of North Vancouver currently has a sidewalk budget that varies annually;

- All municipalities have addressed issues and policies regarding **accessibility design guidelines** and several have produced their own guidelines as they do not feel that the national guidelines are robust or progressive enough. Others are considering doing so as well;
- Planning for the increasing number of **electronic scooters** has been recognized as an area that needs addressing by several municipalities, but none have done so yet;
- Policies for **sidewalk cafés and patios** are generally in place through permit requirements;
- Some municipalities have policies on the placement of street furniture but only one had a system to zone the differing segments of sidewalks, as well as guidelines on where street furniture, such as hydrants and parking meters, can be placed;
- Nearly all those municipalities that do not currently have **GIS** (Geographic Information Systems) are interested in introducing a system. The District of North Vancouver is currently testing handheld computers with GIS maps for sidewalk inspections;
- All have by-laws requiring property owners to **remove snow from sidewalks** except the District of North Vancouver that relies on 'good neighbour' initiatives (Street and Traffic Bylaw No. 7125, part 7, section 629). Prince George does remove snow from sidewalks in commercial areas; and
- All have a **complaints recording and action process** for trips and falls that varies from manual to electronic, although the majority still rely on telephone complaints by the public and case-by-case prioritization.

3.0 PUBLIC CONSULTATION

In the spring of 2007, District of North Vancouver staff engaged in a public consultation process in order to identify pedestrian use of the existing pedestrian network, and to consider priorities for improvement among those District residents that currently walk, and those that would like to walk more. In other words, the goals of the public consultation were to assess how often and for what purposes residents currently walk, and what prevents them from walking more.

Public outreach was conducted via a physical survey to be filled out by interested residents in the population at large, and through several “open-house” discussions with the District’s elderly, disabled and youth populations; groups who, in general, walk more than and have different needs from the population at large.

3.1 Survey Process

District of North Vancouver staff developed and administered a survey regarding pedestrian issues in the District. The survey was administered both online and via hard copy. In addition to the English-language version, surveys were also made available at the North Shore Multicultural Society in Chinese, Farsi, and French.

A total of 324 surveys were returned for analysis. It should be noted, however, that the survey results may not be representative of the opinions of all District residents, but should instead be used as a gauge of the safety and effectiveness of the pedestrian network to help determine future priorities for improvement.

Survey Respondents

Age – The majority of respondents were between 35 and 54 years old (69 percent), followed by those over 55 (19 percent), and those under 35 (13 percent). A comparison of the age distribution of survey respondents versus the District population indicates that respondents are over-represented in the 35 to 54 age range and under-represented in the younger (under 24) and older (over 65) age ranges. However, residents in these younger and older age ranges were directly consulted via the focus group discussions. A more detailed breakdown of respondents by age category and compared to the population at large is shown in FIGURE 3.1.

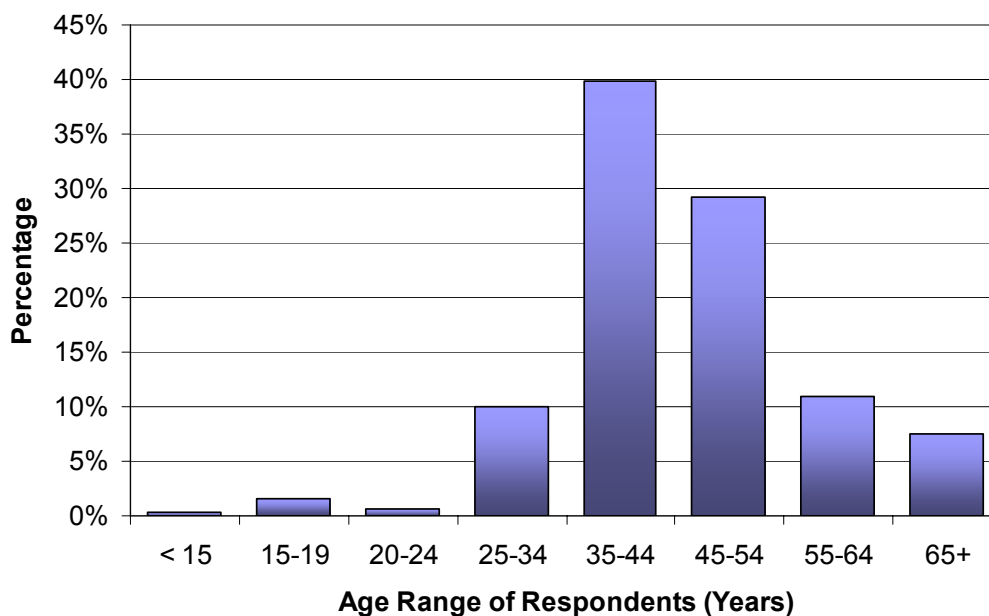


FIGURE 3.1 AGE DISTRIBUTION OF SURVEY RESPONDERS

Location - Although respondents are generally dispersed throughout the District, the majority of respondents live in Seymour (26 percent) followed by Lynn Valley (25 percent) and Upper Capilano (21 percent). Neighbourhood residency is shown in FIGURE 3.2. It should be noted that although respondents identified which neighbourhood they were from, precise community boundaries may not be clear to all respondents and, thus, exact geographic distribution may not be entirely accurate. However, a comparison of actual geographic distribution of the District' population based on Census data to the approximate distribution of the survey respondents indicates that the surveys do represent the actual geographic distribution of the District.

3.2 Where and Why Residents Walk

Residents were asked various questions to determine where it is they walk and why they choose this method of transport. Multiple responses were accepted for this question and, thus, response totals are greater than 100 percent.

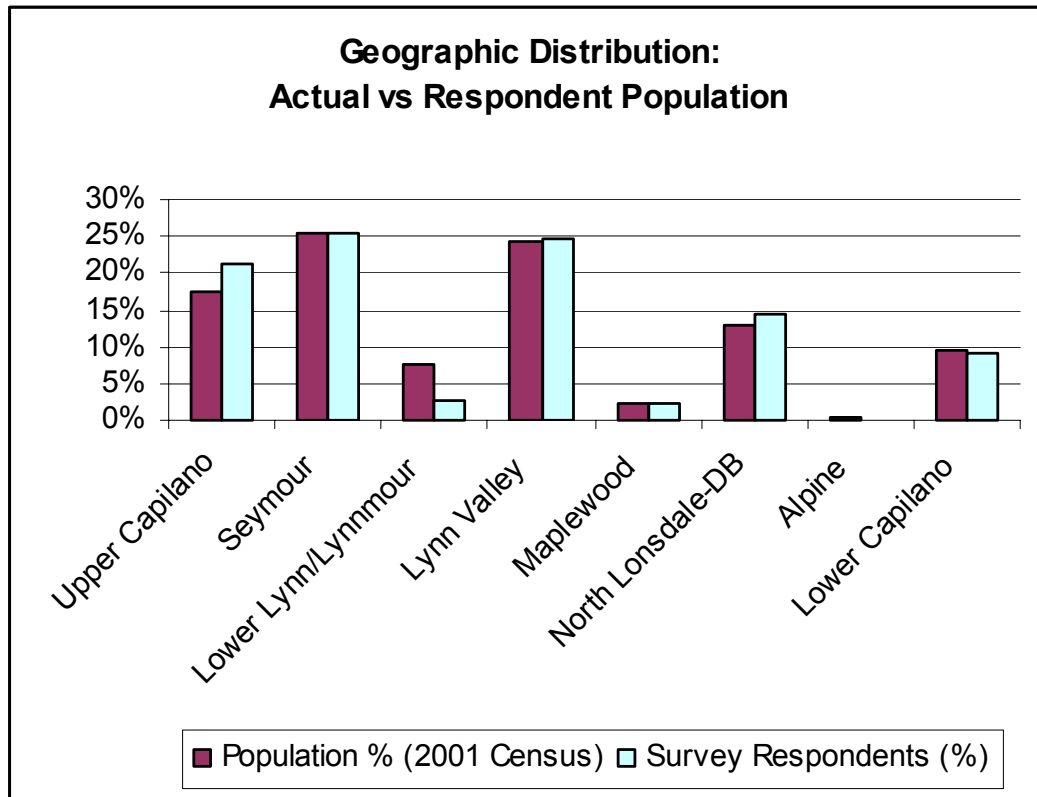


FIGURE 3.2 NEIGHBOURHOOD OF RESPONDENTS

The most frequent reason for walking is for exercise and fitness (81 percent). Survey results indicate that District residents do this frequently; a total of 79 percent respond that they walk for exercise and fitness two to three days per week or more. While 44 percent claim to walk every day for this purpose, only 3 percent rarely or never walk for exercise. Results are shown below in FIGURE 3.3.

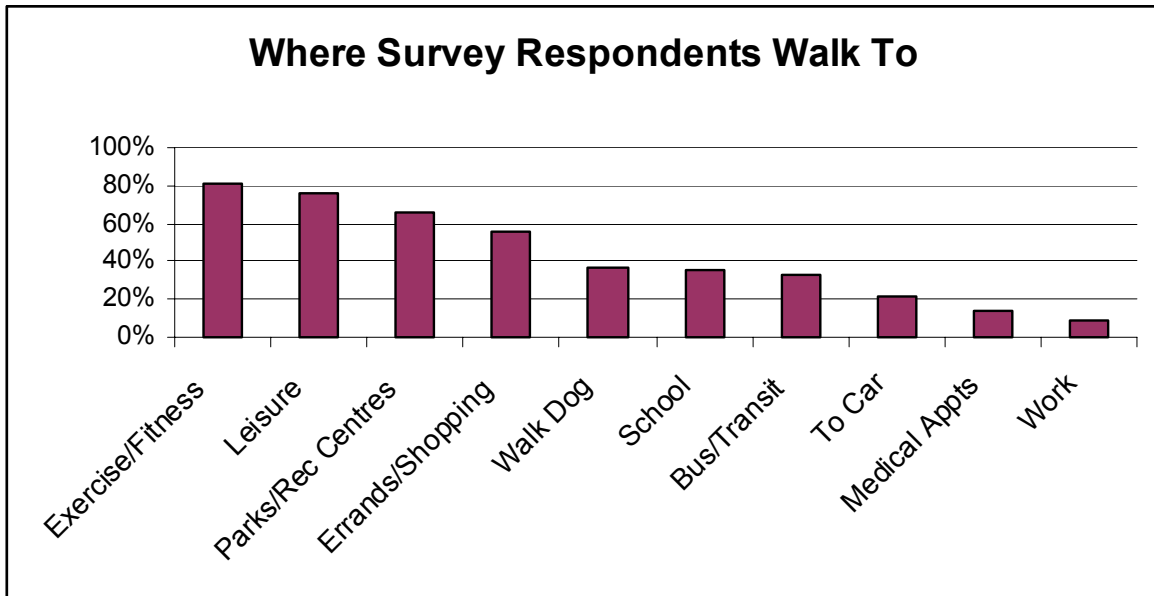


FIGURE 3.3 WHERE PEOPLE ARE WALKING

Walking for “leisure” is also popular among respondents (76 percent) as well as travel to parks/recreation centres (65 percent), and errands/shopping/entertainment (56 percent). The errands category includes trips to stores and shops, entertainment, library, dining, etc. While 44 percent of respondents walk for their errands two to three days per week or greater, only 24 percent claim to rarely or never walk for this purpose.

Walking to work, school, medical appointments or to public transit are the least popular destinations on foot in the District. While 49 percent claim to walk two to three days or more per week for this purpose, a nearly equal sized group (41 percent) rarely or never walks for this reason. Complete results are shown below in FIGURE 3.4.

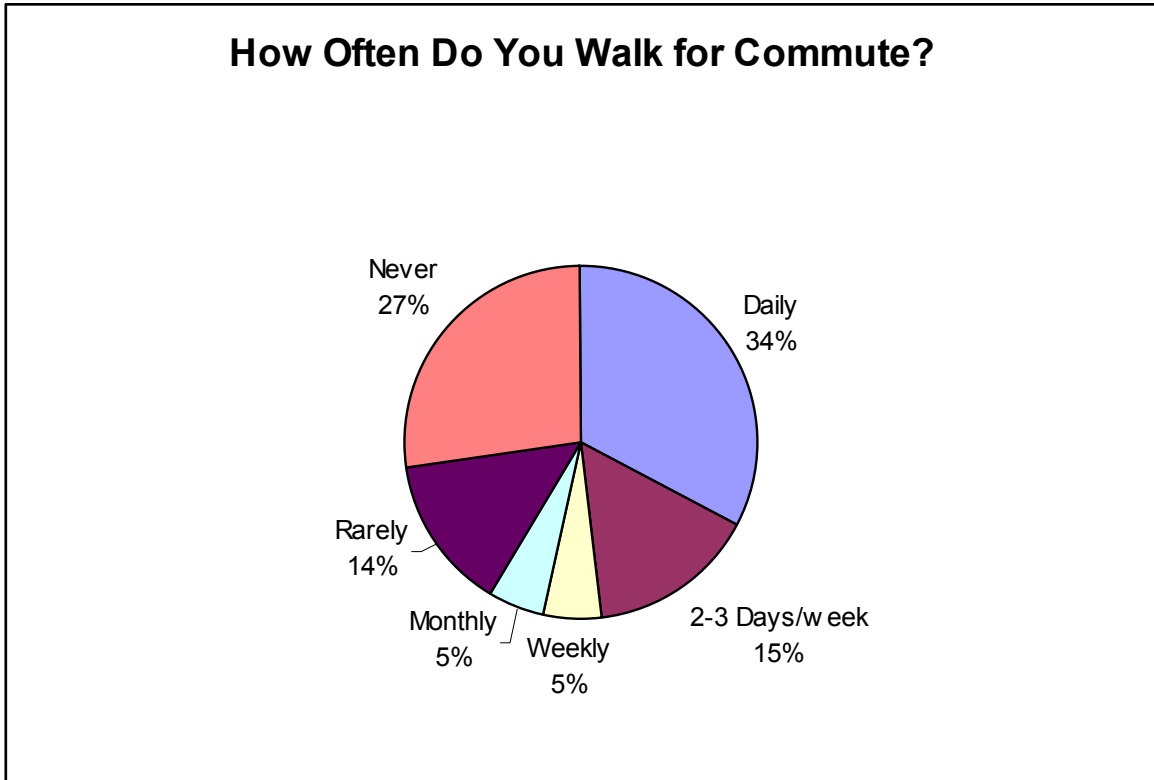


FIGURE 3.4 WALK FOR COMMUTE DISTRIBUTION

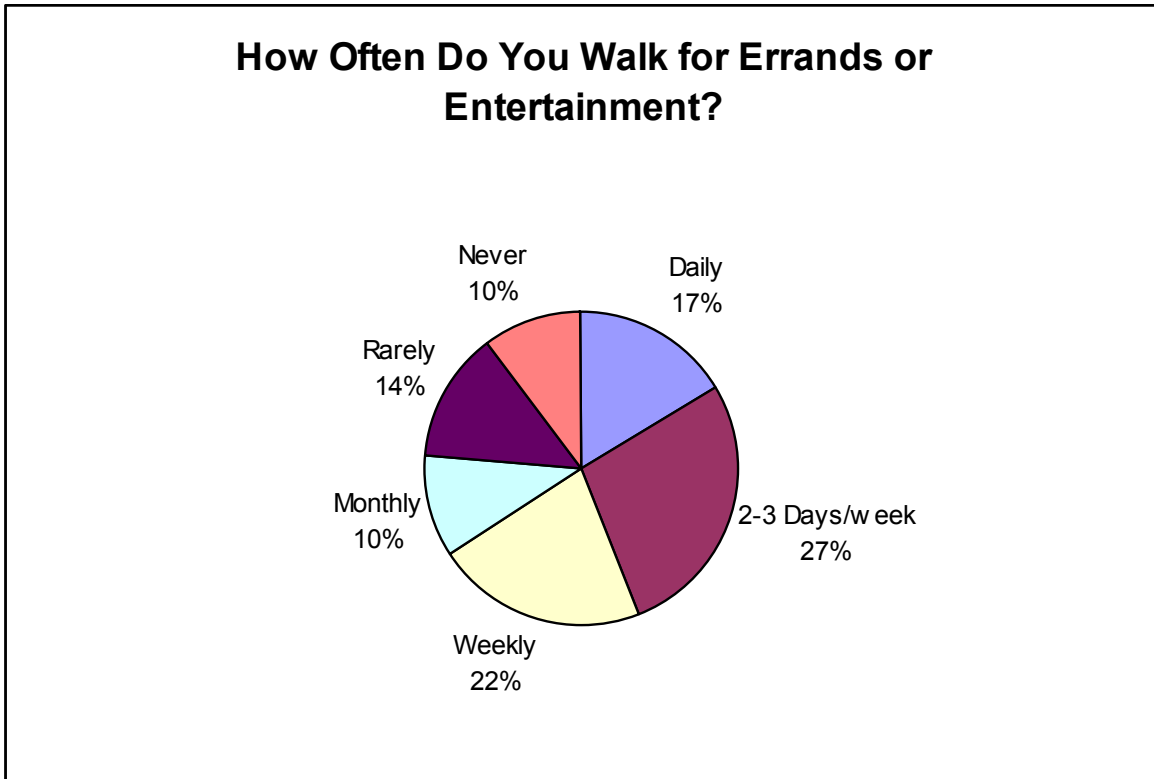


FIGURE 3.5 WALK FOR ERRANDS DISTRIBUTION



FIGURE 3.6 WALK FOR FUN OR EXERCISE DISTRIBUTION

3.3 Impediments to Walking

Respondents were also asked to indicate what personal/environmental as well as transportation system factors discourage them from walking more. For each factor listed, respondents indicated the relative importance of that factor in their decision to walk (a ranking of 1 indicated “not a factor” while a ranking of 5 indicated “most important”).

Personal and Environmental Factors

Examples of personal and environmental factors that would discourage walking include weather, personal health/fitness levels, terrain, and concerns about safety and crime. In general, these factors are less significant in discouraging District residents from walking.

Every one of the factors received more votes in categories 1 and 2 (“not a factor” and “less important”) than in categories 4 and 5 (“very important” and “most important”).

The two personal and environmental factors receiving the highest relative importance were inattentive or aggressive drivers (safety) with an average score of 2.87, and too dark (average score of 2.78).

Particularly noteworthy is that concerns about inattentive and aggressive drivers received a higher score than any factor, both in the personal/environmental and transportation system categories indicating that a focus on pedestrian safety and traffic calming will be an important component in the development of a complete pedestrian network.

Weather, out of the scope of this report, received an average score of 2.64.

Particularly encouraging is the low average score of “don’t enjoy,” which received an average score of 1.24, indicating that most respondents enjoy using their feet as a mode of transportation.

The table below provides a comparison of the relative respondent rankings on the factors.

TABLE 3.1 PERSONAL AND ENVIRONMENTAL FACTORS LIMITING WALKING

What Personal and Environmental Factors Limit You From Walking More Often?				
			# of Responses by Priority Rating	
	# of Responses	Average Ranking Score*	STRONG (4&5)	LOW (1&2)
Physical	319	1.38	17	280
Don't Enjoy	317	1.24	8	296
Personal Appearance	318	1.20	7	301
Aggressive Drivers (Safety)	320	2.87	120	122
Crime	318	2.30	57	182
Too Dark	320	2.78	94	125
Weather	321	2.64	71	145
Terrain	316	2.02	26	214

* Ratings scale from 1 (Not a Factor) to 5 (Most Important)

Transportation System Factors

Examples of the transportation factors that potentially influence whether one might choose to walk include lack of sidewalks, crossing barriers (highway, streams), unsafe street crossings, incomplete sidewalk networks (stopping and starting), sidewalk too close to moving traffic, and poor maintenance of sidewalks. The most important factors, with average score listed, include:

- Inadequate lighting (2.86)
- No sidewalks (2.75)
- Not enough separation between sidewalk and vehicle lanes (2.71)
- Sidewalk connectivity issues (2.62)

The least important factors include (with average score):

- Lack of useable wheelchair ramps (1.40)
- Sidewalks/pathways too difficult for wheelchairs (1.42)

These low scores are particularly surprising given the fact that some mothers who regularly push their children in strollers indicated that wheelchair ramps are important to them for this reason.

TABLE 3.2 below provides a comparison of the relative respondent rankings on the factors.

TABLE 3.2 TRANSPORTATION FACTORS LIMITING WALKING

What Transportation System Factors Limit You From Walking More Often?				
	# of Responses	Average Ranking Score*	# of Responses by Priority Rating	
			STRONG (4&5)	LOW (1&2)
No Sidewalks	318	2.75	109	136
Crossing Barriers	318	2.50	87	166
Width of Streets	317	1.88	34	236
Not Enough Crossing Time	317	1.83	39	239
Paths Start and Stop	315	2.62	96	156
Not Enough Trails	316	2.66	89	140
Not Enough Separation	316	2.71	102	141
No Wheelchair Ramps	309	1.40	26	275
Sidewalks too Difficult for Wheelchairs	313	1.42	26	277
Distance/Time	316	2.56	91	150
Poor Maintenance	311	2.26	51	191
Poor Transit Stops	314	1.97	42	216
Inadequate Lighting	319	2.86	99	117
* Ratings scale from 1 (Not a Factor) to 5 (Most Important)				

3.4 Potential Improvements

Respondents were asked to rank the relative importance of potential improvements to the District’s pedestrian network for encouraging more walking. Each potential improvement was ranked from 1 (not a priority) to 5 (highest priority).

The potential improvements receiving the highest priority ranking include:

- School zone pedestrian plans
- Make crosswalks more visible
- Install sidewalks on major streets/transit corridors
- Install overhead lights or signals at pedestrian crossings
- Make sidewalks more continuous by filling in missing gaps

Those improvements that received the lowest scores and, thus, would be the least likely to encourage walking include:

- Install more wheelchair ramps
- Increase pedestrian crossing times at signals

- Reduce street crossing distances
- Plant more street trees
- Widen sidewalks and install benches in major commercial centres

3.5 Locations of Improvements

Respondents were offered several locations throughout the District as areas that require the greatest focus. Each respondent was permitted to choose up to two locations. The three locations receiving the most votes include:

- Near schools (48.1%)
- On neighbourhood streets (37.3%)
- Near parks/recreation areas (36.4%)

3.6 Focus Groups

In addition to the physical surveys, several face-to-face meetings were conducted with:

- Senior Citizen Centres (3 meetings)
- Youth Centres (2 meetings)
- Disabled Groups (3 meetings)

As these groups are considered heavy but “vulnerable” users of the pedestrian network, the focus group setting provided an opportunity for members of these groups to provide input to the Pedestrian Master Plan in an open and relaxed forum. Participants were encouraged to voice their opinions on the destinations of their walking trips, successful elements of the pedestrian infrastructure, and what requires greater attention.

Senior Citizens

Safety is a primary concern for senior citizens for as many feel especially vulnerable when walking on our streets. Frequently mentioned concerns include conflicts with cyclists and skateboarders, inadequate street lighting, complicated traffic signal instructions, and uneven sidewalk surfaces.

Many seniors feel that their safety is compromised when walking because of:

- Poor visibility for drivers when trees and hedges aren't trimmed
- A lack of pedestrian crossings (especially in the Seymour area and along Lynn Valley Road)
- Confusion about when it is safe for pedestrians to cross the street – for example, questions were raised by some as to the meaning of the blinking “red hand”. (The “countdown” signals such as at 29th/Lonsdale are well-received)
- Fears that the traffic signal cycles are not long enough for the seniors to cross. (Pedestrian refuge areas, such as the frequently mentioned area on 13th Street east of Lonsdale in the City, are universally popular with the seniors.)
- Vehicles that drive too fast and don't stop for pedestrians (especially in the commercial areas such as Lonsdale)
- Potential conflicts between pedestrians and vehicles when sharing the road (primarily in the residential neighbourhoods)
- Inadequate snow removal during the winter months

It was agreed that pedestrian improvements should be prioritized to those areas where there is already a concentration of seniors – such as the Lynn Valley Centre.

Suggested improvements include:

- Increase lighting
- Ensure sidewalks are smooth and wide enough for safe passage
- Increase the time allotted for pedestrians to cross the intersection at signals
- Be mindful of driveway encroachments – drivers come out of driveways too fast and without concern for pedestrians
- Benches and other resting places that aren't at bus stops (some people use bus benches but are nervous about making the bus stop for them when they are only resting)

Youth

The majority of youth are active walkers in the District. Most of the participants walk to school and indicate that they also walk to friends' houses, youth centres, public transit, and work. The youth expressed the freedom from their parents that walking provides them, though the enthusiasm for walking definitely diminishes as the youth approach driving age.

Some of the reasons why students expressed concern about pedestrian safety include:

- Not enough crosswalks (Mt. Seymour Parkway was frequently mentioned)
- Busy areas that need safer crossings, such as near Superstore
- Certain streets where sidewalks are located too close to the roadway are problematic because:
 - Vehicles tend to travel too fast, making walking feel dangerous
 - Pedestrians get splashed by rain water pooling in the roadway
- Areas that are not amply lit at night (examples include the Phibbs Exchange and many of the off-street trails)

It is also worth mentioning that the students are also heavy transit users, although there were not too many complaints about pedestrian conditions around bus stops.

Mobility Challenged Population

Members of the physically challenged groups that participated in the focus groups mentioned the obvious problem of the lack of accessibility around the North Shore related to the pedestrian infrastructure. The groups remained positive about the state of the pedestrian network in the District, but had a few problem areas, including:

- Many sidewalks are not wheelchair friendly:
 - Surfaces are too bumpy (especially surface made from granite and exposed aggregate)
 - On streets that are naturally sloped, some sidewalks are also steeply sloped toward the road
 - Obstructions in the sidewalks, including garbage bins, power poles, and construction trucks that block the sidewalks when unloading equipment

- Snow removal was a particular problem with many walkways made inaccessible by unshoveled snow
- Pedestrian push buttons placed too high or not adjacent to the crosswalk
- Crosswalks with flashing yellow lights are sometimes inadequate because many drivers do not slow down and people in wheelchairs are often less visible to drivers

Some specific problematic locations throughout the District include:

- Marine Drive
 - Too many driveways to cross
 - Sidewalks are too narrow for two people in wheelchairs to pass
 - Sidewalks too close to bus lane
 - Poor lighting
- Capilano Road
 - Sidewalks are so narrow that wheelchairs often have to travel in the roadway
 - Power poles in sidewalk make travel difficult
- Intersection of Mountain Highway/Lynn Valley Road – vehicles turning southbound onto Mountain from eastbound Lynn Valley do not slow down enough

The groups emphasized the importance of the District adhering to universal design, including the *Pedestrian Access Guidelines (Photo Study of Good/Bad Design)*, published by ACDI. Universal Design refers to transportation systems that accommodate all users, including people with mobility challenges and other needs.

3.7 Summary

Extensive public consultation during the early stages of the Pedestrian Master Plan planning process in the form of surveys and focus group conversations resulted in a better understanding of why people walk, where they walk, and what improvements they would like to see to the District's pedestrian network. The surveys and group conversations demographically mirrored the District's population. As the sampling of survey respondents was not random, they may represent those residents who are more interested in walking.

Overall, a significant proportion of District residents indicate that they walk. Walking for exercise/fitness, leisure, and to parks and recreation centres are the most popular reasons. As such, respondents indicated a need to prioritize improvements for pedestrian facilities near schools and recreation centres and on neighbourhood streets.

Respondents were uncomfortable walking in some situations primarily due to safety concerns around motor vehicles, lack of sidewalks, inadequate lighting, and an incomplete sidewalk network. This can be addressed by:

- Focusing on completing missing sidewalk networks in high pedestrian demand areas (around schools, recreation centres and shopping districts, for example).
- Reviewing current District policies and practices to ensure that proper safety measures are built into District designs for pedestrian infrastructure.
- Installing pedestrian-scale lighting, where possible.

4.0 SIDEWALK PRIORITY INDEX

4.1 Methodology

This study uses the Sidewalk Priority Index developed by the City of Portland, which has also been adapted and refined for use in the cities of Kelowna, Prince George and Victoria, British Columbia. The index provides a method for assigning a score to each potential location for a new or extended sidewalk. The method combines two indices to form the final Sidewalk Priority Index:

- Pedestrian Potential Index; and
- Deficiency Index.

The Pedestrian Potential Index measures the strength of environmental factors that favour walking. In other words, it rates the need for a sidewalk based upon the likelihood that people will be walking there, based on specific characteristics, such as having a school or business nearby.

The Deficiency Index measures how critically pedestrian improvements are needed. Factors for the Deficiency Index were chosen to measure how difficult or dangerous the street is for walking. In other words, it rates the street segment based upon how unsafe it would be for people to walk there based on specific characteristics, such as the speed limit for vehicles.

Scores are calculated based on land use and transportation characteristics and the combined score is used to establish priorities. The index has been tested and proven by a variety of municipalities as being able to identify the sidewalk link improvements that are most likely to increase walking trips.

The Sidewalk Priority Index was applied to block faces within the District that do not currently have a sidewalk.

This plan focuses on providing sidewalks on the highest classification roads, specifically on:

- ✓ Both sides of all minor and major arterial roads; and
- ✓ One side of all collector roads, and both sides within 100m in either direction of a school, extending to the end of the block face.

It is recognized that sidewalks are desirable in other locations. For example, sidewalks are required both sides of collector roads and on at least one side of local roads for new developments. This requirement is specified in District of North Vancouver's Development Servicing Bylaw (No. 7388), Schedule D. However, as a first priority, this plan will focus on the higher-ranking road classifications. Once this network is complete, the District may wish to consider application of the index to the other road types.

The index provides a strategy for the District to complete the sidewalk network in an efficient way - that is, to build those sidewalks which are most critically needed first, and then systematically complete the entire sidewalk network in order of priority.

4.2 Index Scoring

TABLE 4.1 provides a description of the fields used to define the locations where a sidewalk is missing. These fields locate the block face along with general information for future analysis.

TABLE 4.1 LOCATION IDENTIFICATION FIELDS

These fields do not form part of the index, but are used for data organization only.

DATA FIELD	DESCRIPTION
Record Number	For reference only
Street Name	Street along which a sidewalk is under consideration
Street From and Street To	End points of the block face
Class	Road classification (arterial, collector, local)
Aspect	North, south, east or west side.
Length of Segment	In metres
Unit Cost of Construction	\$ per linear metre

A score is assigned as shown in TABLES 4.2 and 4.3. The scores reflect the expected impact that each feature has on the likelihood of walking and on the probability of improving safety.

TABLE 4.2 PEDESTRIAN POTENTIAL INDEX FIELDS

DATA FIELD	CONTENTS		
	Feature	Points Given (otherwise 0)	Maximum Points
Commercial Land Use	Pedestrian-Oriented Commercial	7	7
	Local Commercial Area	6	
	Single Commercial Property	5	
Transit	Transit Route	2	2
Existing Walkway	Existing Walkway (Can be footpath)	2	2
Elementary School Proximity	< 0.5 km	4	4
	0.5 km to 0.9 km	3	
	1.0 km to 1.4 km	2	
	1.5 km to 2.0 km	1	
Middle or Secondary School Proximity	< 0.5 km	4	4
	0.5 km to 0.9 km	3	
	1.0 km to 1.4 km	2	
	1.5 km to 2.0 km	1	
Other Destinations within 0.5 km	Pedestrian-Friendly Commercial (not on block face itself)	2	8
	Transit Stop on Block	2	
	Park	2	
	Community Centre or Library	2	
Employment within walking distance	< 0.5 km	2	2
	0.5 km to 1.0 km	1	
Local Interest	High Interest/ Scenic	2	2
	Medium Interest/ Pleasant	1	
Average Parcel (Lot) Size	< 600 square metres	2	2
	< 10,000 square metres	1	
Grade	< 2 percent	2	2
	Between 2 and 8 percent	1	
Pedestrian Potential Index	Total Maximum Points		35

Note: Data fields refer to information for that block face only, unless distance to nearby feature specified otherwise.

TABLE 4.3 DEFICIENCY INDEX FIELDS

DATA FIELD	CONTENTS		
	Feature	Points Given (otherwise 0)	Maximum Points
Sidewalk Continuity Factor (% of sidewalk in block, one side of street for collector roads, both sides of street for arterial roads)	0%	5	5
	1 to 24%	4	
	25 to 49%	3	
	50 to 74%	2	
	75 to 99%	1	
	100%	0	
Pedestrian Crashes (within 250 m radius in 3-year period)	1 to 2 crashes	4	10
	3 to 4 crashes	6	
	> 4 crashes	10	
Posted Traffic Speed	>= 80 kph	5	5
	70 to 79 kph	4	
	60 to 69 kph	3	
	50 to 59 kph	2	
	40 to 49 kph	1	
Traffic Volume (daily, two-way)	>= 20,000	5	5
	15,000 to 19,999	4	
	10,000 to 14,999	3	
	5,000 to 9,999	2	
	2,000 to 4,999	1	
Road Width (number of through lanes, both directions, including parking)	Number of Lanes (if > 6, use 6)	One point per lane (1-6)	6
Street Segment Length	>= 300 m	5	5
	240 to 299 m	4	
	180 to 239 m	3	
	120 to 179 m	2	
	60 to 119 m	1	
Public Concerns (Formal Requests Received)	5 + request	5	5
	4 requests	4	
	3 requests	3	
	2 requests	2	
	1 request	1	
Vulnerable road users	High proportion of vulnerable road users	5	5
Deficiency Index	Total Maximum Points		46

Note: Data fields refer to information for that block face only, unless distance to nearby feature specified otherwise.

4.3 Details of Input Fields

This section describes briefly the rationale for each input field to the index. The relative weighting of the scores is based on work done by the City of Portland. For the purposes of the analysis a pedestrian was considered to be “*A person: on foot, operating a pushcart, riding on or pulling a coaster wagon, sled, scooter, tricycle, bicycle with wheels less than 14 inches in diameter, on roller skates, skateboard, wheelchair or baby in a carriage.*”

Pedestrian Potential Index Fields

TERM	DEFINITION
• Commercial Land Use	
Pedestrian-Oriented Commercial	Those areas with policies that identify desired pedestrian improvements (eg. Lynn Valley Town Centre and Marine Drive)
Local Commercial Area	Local shopping districts such as Edgemont, Parkgate, and Upper Lonsdale that don't have specific improvement policies in place for pedestrian improvements, but that warrant good pedestrian environments.
Single Commercial Property	Property on which only one commercial building is located (eg. Some corner stores along Mt. Seymour Parkway)
• Transit	<i>Buses travel along this route</i>
• Existing Walkway	<i>A pedestrian facility, whether in the public right-of-way or on private property, which is provided for the benefit and use of the public. Such facilities can range from a worn path to a gravel walkway to a paved shoulder.</i>
• School Proximity	
Elementary School Proximity	<i>Straight line distance from any point along block face to an elementary school.</i>
Middle or Secondary School Proximity	<i>Straight line distance from any point along block face to a middle or secondary school.</i>
• Other Destinations within 0.5 km	<i>Any of the following facilities within a 500m straight line distance of any point on the block face</i>
Pedestrian Friendly Commercial (not on block face)	<i>Shopping areas where there are likely to be 'strolling' shoppers (eg. In Edgemont Village Street)</i> <ul style="list-style-type: none"> ○ <i>For example:</i> ○ <i>Residential nearby, especially for typical daily uses such as grocery, drug store, coffee shop</i> ○ <i>Business adjacent to a street versus adjacent parking lot (eg. Downtown shop)</i>
Transit Stop on Block	<i>A signed pick up and drop off stop for transit</i>
Park	<i>An open green space maintained by the District or an area zoned as a park.</i>

Community Centre or Library	
• Employment within walking distance	<i>A location likely to employ a minimum of 20 staff who do not reside at that property. Distances are straight line distances from any point on the block face. Examples of employment locations include any office / industrial complex; large mall, an office building or a waterfront / port / harbour / cruise ship terminal area</i>
• Local Interest	
High Interest / Scenic	<i>Fountain, lake, public art, view point, place of natural beauty, waterfront identified by District staff</i>
Medium Interest / Pleasant	<i>Historic place, or pleasant scenery identified by District staff</i>
• Average Parcel (Lot) Size	<i>Average area of lots on the block face</i>
• Grade	<i>Maximum slope of sidewalk surface, in the direction parallel to the adjacent roadway.</i>

Deficiency Index Fields

INDEX FIELD	DEFINITION
• Sidewalk Continuity Factor	<i>% of sidewalk in block, one side of street for collector roads, both sides of street for arterial roads</i>
• Pedestrian Crashes	<i>Number of collisions involving pedestrians within a 250m straight line radius of any point on the block face in the most recent 3 year period.</i>
• Posted Traffic Speed	<i>Official posted speed limit along the block face. If speed is not posted, assume 50km/h.</i>
• Traffic Volume	<i>Average total daily two-way volume</i>
• Road Width	<i>Number of through lanes in both directions, including parking lanes.</i>
• Public Concerns	<i>Number of Formal Requests Received.</i>
• Vulnerable Road Users	<i>Significant proportion of the pedestrian traffic comprised of physically challenged pedestrians , for example:</i> <ul style="list-style-type: none"> ○ <i>Seniors' homes</i> ○ <i>Special needs housing</i> ○ <i>Institutions for the blind, deaf, challenged, etc.</i> ○ <i>Day care</i> ○ <i>Hospitals</i>

The geographic information for each input field was summarized in a Geographic Information System (GIS), on a base map provided by the District. The map shown in FIGURE 2.3 illustrates the locations of:

- 'Pedestrian-Friendly Commercial' areas (shopping areas that were designed to be pedestrian-oriented) and

- Locations of 'Public Concerns' (sidewalk, requests received from residents of the District).

4.4 Example Block

The results of the application of the Index are shown for a sample block in the District of North Vancouver: a section of Mt. Seymour Road between Indian River Road and Banff Court. This section of road is currently under the jurisdiction of the province of British Columbia, but has been included as an example as a sidewalk was frequently requested here during the public survey.

The example block is illustrated in FIGURE 4.1.



Looking South



Looking North

FIGURE 4.1 MOUNT SEYMOUR ROAD EXAMPLE

The score selected for each field is shown in TABLE 4.4.

In this example, the block received a total score of 52, placing it in the top 20 percent of all the blocks scored, making it a high priority for improvement.

TABLE 4.4 EXAMPLE SIDEWALK PRIORITY INDEX CALCULATION

DATA FIELD		MAXIMUM SCORE	SCORE ASSIGNED	DETAILS
Location ID	Street Name	Mt. Seymour Road		
	Street From	Indian River Drive		
	Street To	Banff Court		
	Class	Major Arterial Road		
	Aspect	West side		
	Length of Segment (metres)	267		
Pedestrian Potential Index Calculation	Commercial Land Use	7	6	Parkgate Village
	Transit	2	2	Route C15
	Existing Walkway	2	2	Walkway present
	Elementary School Proximity	4	4	Less than 0.5 km
	Secondary School Proximity	4	2	Between 1 and 1.5 km
	Pedestrian-Friendly Commercial	2	2	Parkgate Village
	Transit Stop	2	2	Transit stop on block
	Park	2	2	Park within 0.4 km
	Community Centre or Library	2	2	Parkgate Village
	Employment within walking distance	2	2	Parkgate Village
	Local Interest	2	0	None
	Average Parcel (Lot) Size	2	0	Greater than 10,000m ²
	Grade	2	2	Less than 2% grade
	SUBTOTAL (Pedestrian Potential)	35	28	
Deficiency Index Calculation	Sidewalk Continuity Factor	5	5	No existing sidewalk
	Pedestrian Crashes	10	4	1 collision in the past 3 years
	Posted Traffic Speed	5	1	Posted Speed is 50 km/h
	Traffic Volume	5	3	Approximately 11,000 per day
	Road Width	6	2	2 lanes wide
	Street Segment Length	5	4	Approximately 270m long
	Public Concerns	5	5	19 requests received
	SUBTOTAL (Deficiency)	46	24	
TOTAL INDEX SCORE		81	52	

4.5 Application of the Sidewalk Priority Index

Once all of the blocks without sidewalks were scored, the highest Sidewalk Priority Index score was 56 out of a possible 81 points.

An Excel spreadsheet with the Sidewalk Priority Index scoring for each missing sidewalk link was created and is provided in APPENDIX D. A colour-coded map of the results is shown in FIGURE 4.2.

The Sidewalk Priority Index has been sorted based on the total index score for each missing sidewalk. Based upon the scoring results and number of links, the prioritization was grouped into quintiles as shown in TABLE 4.5.

TABLE 4.5 PRIORITY GROUPINGS USED

PRIORITY	INDEX SCORE RANGE	COLOUR USED
Priority 1 (Highest)	>35	red
Priority 2	31-34	blue
Priority 3	28-30	brown
Priority 4	25-27	pink
Priority 5 (Lowest)	0-24	green

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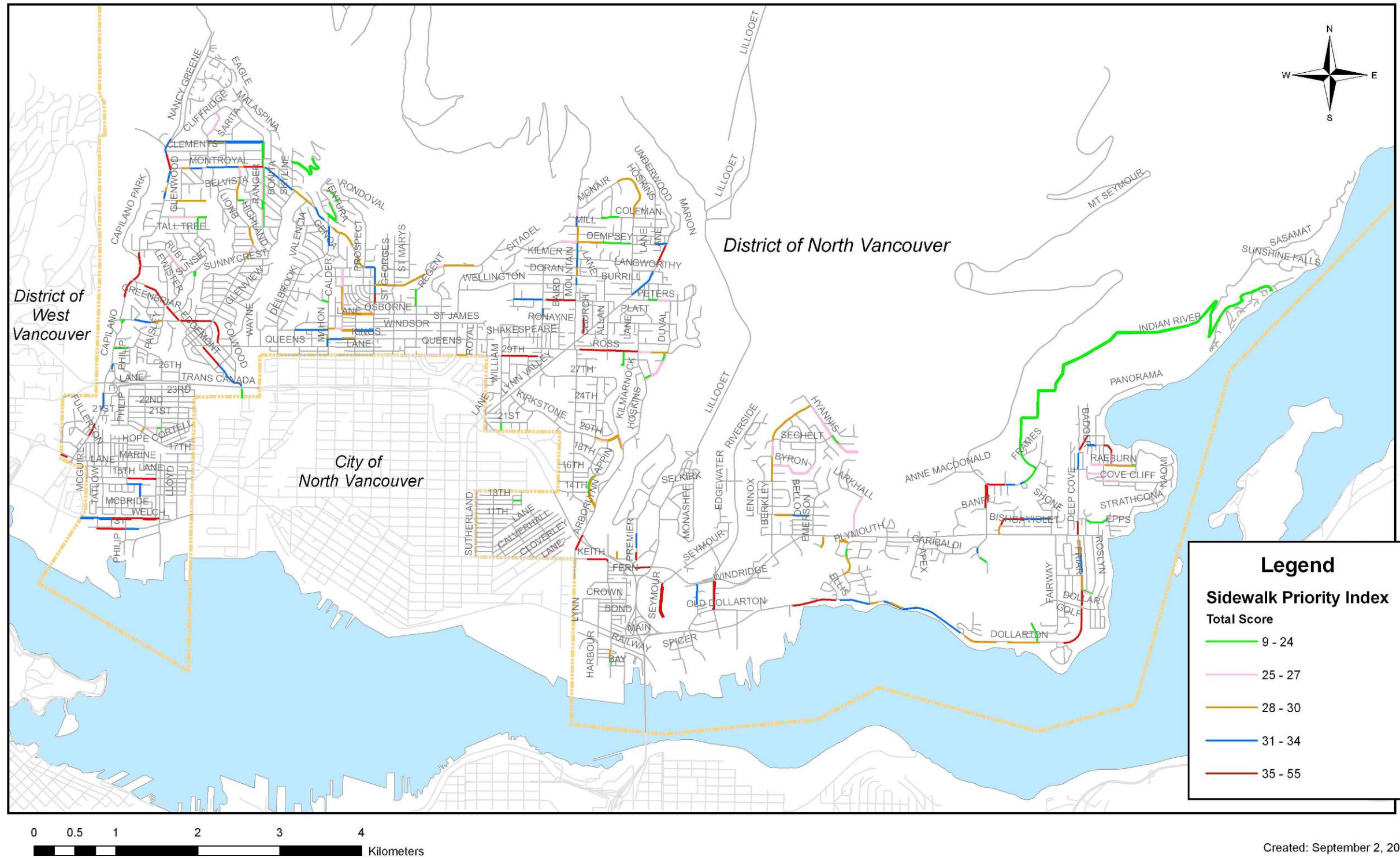


FIGURE 4.2 SIDEWALK PRIORITY INDEX MAP

5.0 POLICY AND PRACTICE REVIEW

Policies for standardizing pedestrian improvements through the regular activities of government are important to the success of any pedestrian plan. For example, some communities have made it standard policy to include pedestrian concerns in all transportation improvement studies and to provide sidewalks whenever streets are constructed or maintained.

Although many transportation plans will state a policy to 'promote walking' or 'prioritize non-automobile modes', these policies will have little impact if, for instance, budgets do not allow for significant improvement and maintenance of pedestrian infrastructure.

Some local governments find that in addition to the need for physical improvements to their pedestrian infrastructure, many of their policies affecting pedestrian transportation have become outdated or do not support non-motorized transportation.

The District currently has some good practices in place, which should be continued and emulated as the District implements the Pedestrian Master Plan. Examples of good practices currently in place are provided in TABLE 5.1. Following that, policy and practice areas are discussed and recommendations for improvements provided.

The following three policy and practice areas are discussed in this section:


- Planning;
- Engineering and Design; and
- Maintenance and Operations.

The three areas are discussed in Sections 5.1 through 5.3.

Each policy and practice area is discussed within the following framework:

- Current Practice: what the District is currently doing or what the policy currently says;
- Discussion: a discussion of the District’s practices compared with current best practices and best planning and engineering judgement; and
- Recommendations: the consultant’s recommendations for how the policy or practice could be improved to promote pedestrian travel and/or decrease safety risks.

TABLE 5.1. GOOD PRACTICES CURRENTLY IN PLACE

GOOD PRACTICE	ILLUSTRATION
<ul style="list-style-type: none"> • The District requires a minimum 2.0 metre width on all new sidewalks built on Arterials, 1.8 metre minimum width on Collectors (Development Servicing Bylaw No. 7388). Design standards for new sidewalk on Marine Drive are even wider. Wide sidewalks allow for higher pedestrian volumes and are more accessible for strollers and wheelchairs. 	 <p><i>Sidewalk in front of new Avalon Development on Marine Drive (Marine Drive Design Guidelines)</i></p>

- The District of North Vancouver has a relatively unique network of pathways connecting cul-de-sacs and neighbourhoods, reducing trip lengths that would otherwise be circuitous.



Winton Ave. (Google Earth)

- The District of North Vancouver requires a minimum 1.5 metre sidewalk width and a minimum 0.6 metre clear zone between the sidewalk and any above ground utilities (shown in design drawings in Development Servicing Bylaw No. 7388). This is a good practice as some jurisdictions do not have a stated clear zone beyond the sidewalk resulting in obstacles such as utility poles impeding the flow of pedestrians.

- The District of North Vancouver uses a lower walking speed for signal timings near senior centres and homes of 1.0 metres/second compared to the 1.2 metres/second walking speed used elsewhere

- District Council Policy 3-9 states that upon written request, sidewalks shall be considered for construction at District expense in any of the following circumstances:

“On any curbed street where there are a minimum of 60 pedestrians and 75 vehicles on any day between 8:00 am and 9:00 am or between 3:00 pm and 4:00 pm.” *“On any street not ditch eliminated where there is sufficient safe walking space on the side of the street on which the majority of home front and where there are a minimum of 240 vehicles in one direction on any day between 8:00 am and 9:00 am or 3:00 pm and 4:00 pm.”*

This policy is exemplary as many municipalities require that residents pay for any improvements to local streets, regardless of pedestrian and vehicle volumes.

5.1 Planning

Planning includes those activities which promote a long-term vision for the District and set targets and goals that will inform day-to-day decision making. The following are discussed in this section:

- Target Mode Split;
- Pedestrian Collision Reduction;
- Funding; and
- Explicitly Prioritizing Pedestrians.

5.1.1 Target Mode Split

<i>Current Practice</i>
<p>The current mode split for walking and cycling to work in the District of North Vancouver is 5.0%. (2006 Census, Statistics Canada). The Walking and Cycling mode share is 11.4% for all trips for the North Shore region as a whole, according to the <u>Greater Vancouver Trip Diary Survey 2004</u> (Translink and the B.C. Ministry of Transportation).</p>
<i>Discussion</i>
<p>It is essential to establish measurable goals for increasing pedestrian travel in order to confirm that improvements to pedestrian facilities are successful in encouraging more people to walk. Many plans have incorporated the goal of increasing the percentage of walking trips by a specified amount, as outlined in the <u>National Bicycling and Walking Study</u> (United States Department of Transportation, 1999).</p>
<i>Recommendations</i>
<ul style="list-style-type: none">▪ Increase the District's mode split for walking and cycling to 10% of all trips by 2031.

5.1.2 Pedestrian Collision Reduction

Current Practice

The 2004 to 2006 three year average of reported collisions to ICBC involving pedestrians in the District of North Vancouver was 27 per year.

Discussion

ICBC collision data was obtained for the years 2004 through 2006 for pedestrian-related crashes as a result of a collision with a motor vehicle. The results are shown below:

TABLE 5.2 PEDESTRIAN RELATED CRASHES IN THE DISTRICT

YEAR	PEDESTRIAN-RELATED CRASHES
2004	30
2005	22
2006	29
Average	27

A list of locations with more than one pedestrian collision in the period January 1, 2004 to December 31, 2006 is provided in TABLE 5.3.

Improving crossing safety is important because nearly 80% of pedestrian collisions occurred at crosswalks at signalized intersections. . Some methods to improve safety are discussed in Section 2.7: Pedestrian Crossing Treatments. Also, nearly 80% of the pedestrian collisions were along Marine Drive.

TABLE 5.3 PEDESTRIAN COLLISION LOCATIONS

STREET ON	STREET AT	COUNT	SIGNALIZED?
Marine Dr.	Capilano Rd.	3	Yes
Marine Dr.	Pemberton Ave.	3	Yes
Marine Dr.	Philip Ave.	3	Yes
E. 29th St.	Lonsdale Ave.	2	Yes
Edgemont Blvd.	Highland Blvd.	2	No
Marine Dr.	Bridgman Ave.	2	Yes
Marine Dr.	Garden Ave.	2	Yes
Marine Dr.	MacGowan Ave.	2	No

Recommendations

- Reduce the number of pedestrian-related on-road crashes by half
- Implement the recommendations provided in Section 2.7 for pedestrian crossing treatments
- Conduct a safety review of Marine Drive as nearly 80% of pedestrian collisions occurred along Marine Drive.
- Consider education as a component of reducing collisions.
- Review the need for special signal timings, (such as leading pedestrian intervals, protected left turn phases or longer walk phases).
- Review higher collision locations. These locations should be a priority for the signal improvements such as countdown timers outlined in Section 2.8: Pedestrian Signal Timings. Special signage for both pedestrians and vehicles may also be needed such as painted Look signs or Yield to Pedestrian signs as shown in the images below. Increasing lighting and decreasing radius of right turns should also be considered.



5.1.3 Funding

Current Practice

Currently, the District of North Vancouver's total transportation budget including maintenance is \$3,575,000. The District spends approximately \$100,000 annually on sidewalks, varying from year to year with additional capital funding. The majority of the budget is spent on sustainment (i.e. maintenance). A large proportion of sidewalk maintenance funding is spent on maintaining plantings in boulevards.

Discussion

Recent annual budgets are reflected in the tables below and represent approximate figures:

TABLE 5.4 TRANSPORTATION BUDGET INCLUDING SUSTAINMENT CAPITAL

MODE	2008 BUDGET	% of TOTAL	% MODE SHARE (2006 Census)
Private vehicles, goods movement (roads)	\$3,000,000	84	84
Pedestrians (sidewalks, crosswalks, pedestrian signals)	\$400,000	15	5
Bicycle (cycling lanes)	\$125,500		
Transit (bus shelters, etc.)	\$50,000	1	10
Other	\$0	0	1
TOTAL	\$3,575,000	100	100

Most of the funds are "sustainment" capital (88%) - in order to upgrade existing infrastructure. The majority of capital (58% of total transportation funding) is spent on the rehabilitation of roadways.

The following assumptions were made in the determining the budget per user group above:

- These figures include only District funding and no external funding (i.e. only funds from the tax levy, new capital funds, DCC reserves, and surplus funding)
- Spirit Trail funding was allocated at 50% pedestrian, 50% bicycle
- TRRIP projects (primarily sidewalk improvements around existing bus stops) was allocated at 100% transit
- Traffic calming projects - allocated at 100% pedestrian
- Street lighting projects - allocated at 80% vehicle, 10% pedestrian, 10% bicycle

Recommendations

- Budget allocations should reflect the mode split goal. Available budget has to be divided over all modes, including numerous competing demands from both pedestrians and cyclists. The District has indicated that ideally at least \$300,000 per year should be spent on pedestrian infrastructure and safety improvements. The Pedestrian Master Plan recommends \$37.0 million to be spent to complete the sidewalk network. All Priority 1 sidewalks, as defined by the Sidewalk Priority Index, could be completed within 20 years with an annual budget of \$330,000. However, Priority 1 sidewalks only account for 20% of sidewalks. Previous studies have revealed that municipalities spend on average \$3.90 per capita on new sidewalks and \$3.10 per capita on repairs. According to the 2006 Census for the District of North Vancouver has a population of 81,910. For a per capita spending comparable to other municipalities, the District of North Vancouver would spend \$320,000 on new sidewalk and \$254,000 on repairs.
- Lower the amounts spent on landscaping in boulevards by switching to lower maintenance plantings, and divert this to new sidewalk construction.

5.1.4 Explicitly Prioritizing Pedestrians

Current Practice

There is currently no official hierarchy of transportation modes in the District of North Vancouver and no policies to directly increase pedestrian travel, however the District prioritizes sidewalks.

Discussion

Some cities, such as the City of Vancouver, have made an official policy that pedestrians are prioritized over all other modes. In the City of Vancouver, mode priorities are stated in the 1997 Transportation Plan as (in descending order of importance):

1. Walking
2. Bicycling
3. Transit
4. Goods Movement
5. Private Vehicles

Explicitly stating this policy, plus setting targets and monitoring them has been extremely successful for the City of Vancouver: their 2021 mode share targets for walking that were set in 1996 have already been met and surpassed. Adopting a similar policy in the District of North Vancouver will help the District to justify increasing budgets for this mode of travel in order to make this goal a reality. Such a policy ranking pedestrians at higher priority than vehicles could allow the District to adjust bylaws such that sidewalks continue across driveways.

Alternatively, a policy could be adopted similar to the one considered by Prince George to include consideration of pedestrians as a requirement in decision-making: *“The mobility and safety needs of pedestrians of all abilities should be an important consideration in the City’s budget, planning, engineering, maintenance and development decisions.”* (City of Prince George Pedestrian Priority Policy Draft Report).

Recommendations

Adopt a policy to prioritize pedestrians over all other modes of travel and/or to consider pedestrian needs in decision-making

5.1.5 Creating a Pedestrian Priority Area

Current Practice

The District does not currently have specific plans or policies in place regarding establishing specific pedestrian priority areas. However, the Upper Capilano Local Plan includes the objectives:

“To provide safe and convenient pedestrian linkages throughout the community inter-connecting all neighbourhoods and Edgemont Village”, and

“Edgemont Village: To foster an interesting pedestrian environment and maintain a human scale in the relationship of buildings on the street”.

The Marine Drive Design Guidelines are

“intended to visually create the impression of a lively and diverse shopping district, minimize vehicle/pedestrian conflicts and improve pedestrian conditions within the Marine Drive Corridor.”

Discussion

Pedestrian Priority Areas create an environment that is safe and comfortable for pedestrians, while still allowing an adequate level of vehicle access. These areas can be a single street or a zone including several blocks within a municipality. Pedestrian priority streets would typically also serve cyclists and transit, and are expected to have low vehicle speed limits. Pedestrian Priority Areas could coincide with other planning definitions such as “village centres” and “Pedestrian-Friendly Commercial Areas” shown in FIGURE 2.3 (shopping areas that were designed to be pedestrian oriented).

A typical pedestrian-oriented street would include such features as narrow vehicle travel lanes, wide sidewalks, landscaping, curb extensions, frequent marked crossings, raised crosswalks, and pedestrian-scale street furniture, among other features.

A Pedestrian Priority designation is appropriate for streets that have high pedestrian volumes, such as commercial shopping streets.

The District's Marine Drive Design Guidelines are a good example of pedestrian friendly design and these principles could be applied to other areas.

Recommendations

- Edgemont Village is recommended as a pedestrian priority area. There are many restaurants, cafes, shops and services. It also attracts tourism due to its proximity to the Capilano Suspension Bridge and Grouse Mountain. Festivals are also held in the village. A pedestrian priority area would be highly successful as the area already enjoys such high pedestrian activity.



Edgemont Village (www.edgemontvillage.ca)

- Marine Drive should also be defined as a Pedestrian Priority Area and rezoned for higher density and mixed use. Other areas to consider include: Lynn Valley Town Centre, Parkgate and Maplewood.
- Apply Marine Drive Design Guidelines to other areas.

5.2 Engineering and Design

Engineering and design includes those activities which immediately precede construction of District infrastructure. These practices will have the greatest impact on how the District looks and how friendly it is for pedestrians. It is very important that pedestrian infrastructure be considered at this stage, because it tends to only add marginal costs at the design stage, whereas retrofitting can be very costly. The following are discussed in this section:

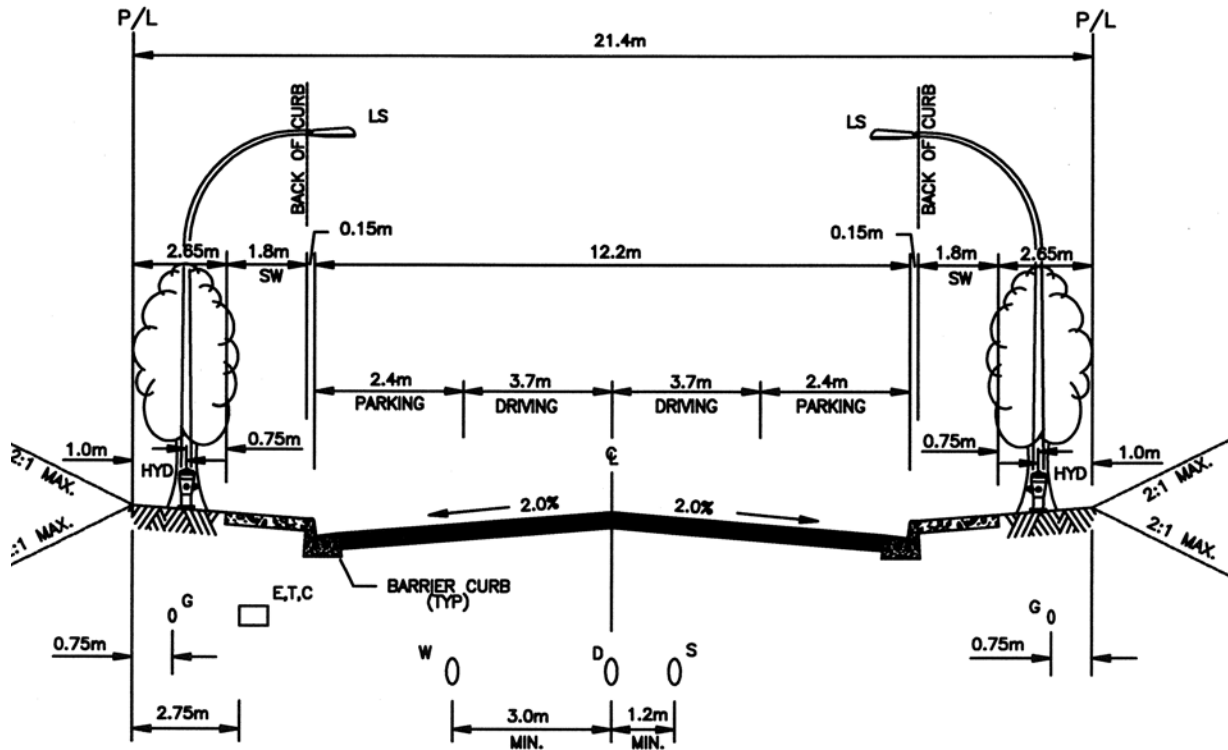
- Street Design Standards;
- Sidewalks;
- Accessibility Standards;
- Curb Extensions;
- Refuge Medians;
- Site Design of New Developments or Re-developments;
- Pedestrian Crossing Treatments;
- Pedestrian Signal Timings;
- Safe Routes to School; and
- Trail and Transportation Network

5.2.1 Street Design Standards

Current Practice

The District of North Vancouver has standard drawings for Arterial Streets, Collector Streets, and Local Streets (District of North Vancouver Development Servicing Bylaw No. 7388 Standard Drawings SSD-R.1 through SSD-R.12, 2006) which apply to new developments only. In addition to the development guidelines established in the standard drawings, the District uses TAC and Master Municipal Control Document guidelines.

Discussion



Typical Local Road Section (District of North Vancouver Development Servicing Bylaw)

Recommendations

- The Bylaw is used for development only, and not for retrofit. The Bylaw could be considered for adoption for all of the District's work.
- More flexible options could be added to the Bylaw.
- Sidewalks to continue across driveways to reflect prioritization of pedestrians over vehicles

5.2.2 Program Implementation

Current Practice

The District's standards regarding Sidewalks for new development are laid out in the Development Servicing Bylaw. The District currently requires sidewalks on both sides of arterial roads, and on one side of collectors and local roads. The Local Improvement Cost Sharing Bylaw allows the District to have homeowners pay for up to 100% of the cost of sidewalks abutting their property.

Discussion

The importance of a complete, convenient and continuous sidewalk network cannot be overemphasized. Even a relatively small number of gaps in the overall network can discourage walking as pedestrians may feel that the presence of sidewalks is unreliable.



Best practices for sidewalk design recommend a clear zone (adjacent area clear of obstructions) and properly-graded ramps at every intersection or other elevation change. These features are extremely important for ensuring accessibility for persons with mobility impairments. Other considerations, such as the placement of street furniture and proper sidewalk widths based upon expected pedestrian volumes also need to be considered for promoting pedestrian travel. A good example of sidewalk corridor design standards are those produced by the City of Portland (<http://www.portlandonline.com/shared/cfm/image.cfm?id=61748>) provided in APPENDIX E.

Recommendations

- Use the Sidewalk Priority Index developed for the District of North Vancouver in the September 2007 Draft of the Pedestrian Master Plan.
- The District should plan to update the Sidewalk Priority Index every five years, as changing conditions may cause some sidewalk links to go up or down in priority relative to other missing links.
- Allocate adequate resources to complete the sidewalk network. This is estimated in the Pedestrian Master Plan to be \$37.0 million. This amount would provide sidewalks on both sides of all arterial roads and on one side of collector roads. An annual budget of \$330,000 over 20 years (a total of \$6.6 million) would allow for completion of all Priority 1 sidewalks.
- Implement the Sidewalk Priority Index presented in Section 4 of this report
- Require collectors to have sidewalks on both sides within 100 m of a school in either direction, extending to the end of the block face.
- Make residents aware of Local Improvement Cost Sharing option. See the City of Burnaby's website at http://www.burnaby.ca/cityhall/departments/engnrrn/engnrrn_faq/engnrrn_faq_lclars.html for an example.

5.2.3 Accessibility Standards

Current Practice

The District of North Vancouver generally follows TAC and MMCD guidelines and incorporates suggestions from their Advisory Committee on Disability Issues (ACDI) when feasible.

The District's consultation with stakeholders representing the elderly, disabled and youth for this Master Plan identified the need for safe pedestrian infrastructure that includes:

- Paved and illuminated bus stop landing areas, with accessible routes to and from the stop, with a tactile method of locating bus stops;
- Curb ramps aligned with crosswalk markings to guide the visually impaired;
- Removal of high speed right turn slip lanes where pedestrians are crossing;
- Increased visibility for mid-block crossings;
- Alternate routes provided when construction activity results in removal of a pedestrian route;
- Clearance of overgrown shrubbery around traffic signs, at intersections, along walking routes, and at bus stops;
- Separation of cyclists from pedestrians;
- Provision of pedestrian routes through parking lots, for example at shopping malls;
- Way-finding signage for pedestrians;
- Removal of snow from sidewalks, particularly from in front of private residences, intersections and arterial roads;
- Consideration of centre refuge medians for crossing wide busy streets;
- Consideration for local streets to have sidewalks, particularly if they are part of a continuous route;
- Trails to be frequently maintained;
- Benches at strategic locations to provide rest areas;
- Appropriate traffic signal walking times for slower pedestrians;

- Sidewalks to be level and smooth (quick repairs to heaving and cracking);
- Measures to ensure drivers at driveways slow down and look for pedestrians; and
- Plantings kept low at intersections and roundabouts to ensure pedestrian visibility.

Discussion

Accessibility is an essential element of pedestrian infrastructure. People with mobility impairments (e.g. using a wheelchair, walker or cane), and visual and hearing impairments all need to be considered when designing the pedestrian realm.

Most municipalities follow TAC or MMCD guidelines and standards for accessible features such as curb ramps and gradients, but some have gone beyond these guidelines as they are not thought to be robust enough. The City of Kelowna has their own Guidelines for Accessibility in Outdoor Spaces, which can be found at <http://www.kelowna.ca/citypage/docs/pdfs/community%20planning/guidelines%20for%20accessibility%20in%20outdoor%20areas.pdf> and are provided in APPENDIX F, and the City of Coquitlam is considering developing their own as well.

The City of Portland, Oregon uses the Americans with Disabilities Act (ADA) standards, but again does not feel that they are robust enough so has augmented them with higher standards, such as two curb ramps perpendicular to the crosswalk versus a single one for both. Halifax is currently reviewing their accessibility policy, particularly around the issues of electric scooters. Saanich uses wider sidewalks than standard to accommodate wheelchairs and increasing numbers of electric scooters. Oak Bay was the only municipality interviewed that did not have any guidelines or policies for issues concerning accessibility.

A good reference for developing Accessibility Standards is the U.S. Federal Highway Administration Publication, Designing Sidewalks and Trails for Access, specifically, Part 2, Chapter 4, which has also been provided in APPENDIX G and at:

http://safety.fhwa.dot.gov/ped_bike/docs/ada.pdf

The Transportation Association of Canada has just come out with *Guidelines for Understanding, Use and Implementation of Accessible Pedestrian Signals (2008)*.

In general, accessibility standards should include the following:

- Width of sidewalk (minimum 1.2 metre clear zone in restricted corridors, preferred 1.5 metre clear zone);
- Pedestrian crossing push button easily located and understood;
- Appropriate gradients;
- Curb ramps properly aligned with crosswalks, and tactile paving on curb to assist those with vision impairments into the proper path;
- Properly designed tree gratings (level with sidewalk); and
- Street furniture not blocking or restricting width of sidewalk or curb ramp landing area.

Comparisons of poor and good accessible design are provided in TABLE 5.4.

Emerging Issue:

An emerging issue in the realm of accessibility is how to safely accommodate motorized mobility devices, such as scooters, electric wheelchairs, and also possibly zero emissions vehicles. Concerns have been raised regarding this travel mode, due to the following:



- They are becoming increasingly popular and are expected to continue to rise in use as the population of BC ages;
- Some have speeds of up to 25 kph, which can pose a hazard to other sidewalk users; and
- They take up more space and are less manoeuvrable than walking pedestrians.




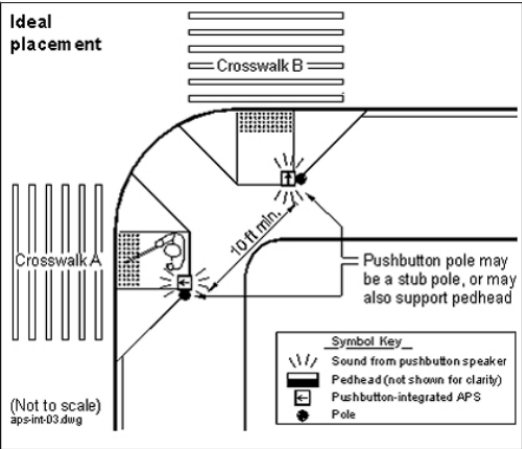


Despite these concerns, there are many reasons to promote their use, particularly because they can increase independence and mobility for disabled and elderly people who are not able to drive. Also, their emissions are much lower than personal vehicles.


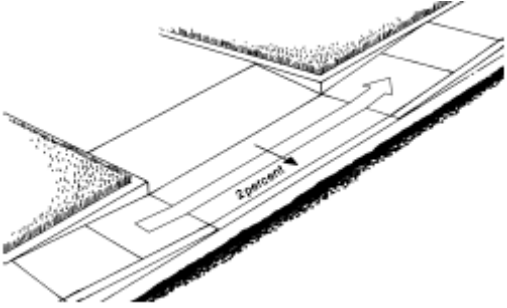
Recommendations

- Develop and formally adopt official Accessibility Standards for public right-of-ways, with specifics for each road classification as requested by senior levels of government.
- Allocate an annual budget for retro-fitting existing facilities to meet Accessibility Standards.
- Post on the District’s website guidelines about proper scooter use on sidewalks. An example is provided in APPENDIX H and at http://www.richmond.ca/__shared/assets/scooter_brochure6893.pdf.
- Work with the Province and/or Federal Government to develop Provincial or National Accessibility Standards
- Include curb let down recommendations in the Development Services Bylaw.

TABLE 5.5 ACCESSIBLE DESIGN EXAMPLE LOCATIONS

	POOR ACCESSIBILITY	GOOD ACCESSIBILITY
CLEAR ZONE	 <p>Utility pole and foliage obstruct sidewalk. Foliage also obstructs sightlines from the driveway (behind the utility pole) to the sidewalk.</p>	 <p>Continuous clear zone: potential obstructions (bus shelter, trees) have been placed at the edge of the sidewalk.</p>

	POOR ACCESSIBILITY	GOOD ACCESSIBILITY
CURB RAMP DESIGN	 <p>Curb ramp appears to be too narrow to accommodate wheelchairs, electric scooters and strollers, and is not level with the street.</p>	 <p>Curb ramp is wide and level with street and aligned to guide users directly into the path of the crosswalk.</p>
PUSH BUTTON LOCATION	 <p>Push button is difficult to locate and reach and the pole is surrounded by grass, making it difficult for wheelchairs to approach.</p>	 <p>Ideal placement of push buttons</p>
REFUGE MEDIAN DESIGN	 <p>Island curb ramps are steep and do not meet the pavement smoothly; the island has an insufficient landing area for waiting</p>	 <p>Excellent island design for accessibility and pedestrian refuge</p>

	POOR ACCESSIBILITY	GOOD ACCESSIBILITY
GRADE AND CROSSFALL	 <p>Driveway cuts can be difficult for persons in wheelchairs to manoeuvre over, as they must travel on a cross-slope.</p>	 <p>If a grade change between the road and the property will result in more than a 2% cross-slope grade, then a modified design should be used.</p>

5.2.4 Curb Extensions

Current Practice

No policy on curb extensions is stated in the Design Standards; instead they are reviewed on a project-by-project basis. The District of North Vancouver [Traffic Calming Policy](#) states that curb extensions are an appropriate traffic calming measure for Local Streets, Collector Streets, and Transit Routes.

Discussion

Curb extensions serve many functions: they reduce crossing distances, create opportunities for low height streetscaping, make both approaching and waiting pedestrians more visible to drivers, prevent people from parking their vehicles too close to an intersection and decreasing pedestrian visibility and can prevent passing and reduce vehicle speeds by physically narrowing the road. Curb extensions should:



- Be free of any landscaping or other street furniture that would obstruct the view of waiting pedestrians; and
- Accommodate cyclists on cycling routes.

Typically, curb extensions are provided on local and collector streets, although they may be appropriate on arterial streets where parallel parking is allowed.

Recommendations

- Consider curb extensions at the time of development approvals, particularly for new developments that may generate a greater number of street crossings, such as a high-turnover business for which the nearest parking lot (or other pedestrian generator such as a school or bus stop on a “Good Transit Route”) is located across the street.
- Develop standard layout drawings and/or work with TAC and MMCD to develop standard layout drawings.

5.2.5 Refuge Medians

Current Practice

The District of North Vancouver's Traffic Calming Policy lists raised median islands as an appropriate traffic calming measure for local streets, collector streets, and transit routes, and raised medians through Intersections as an appropriate traffic calming device for local streets, collector streets of 1500 to 5000 vehicles per day (two way) and transit routes.

Discussion

Refuge islands are particularly important on long crossings or multi-lane locations with high traffic volumes. For example at some signalized crossings, some pedestrians may not be able to cross within the pedestrian signal clearance time and may become caught in the middle of a road. A refuge island gives these pedestrians a designated place to wait until part of a multi-lane road is clear to cross, or the next crossing signal. If radius is a concern, the crosswalk may be able to be moved back from the intersection a small amount to accommodate trucks.

Using refuge medians that are designed to be driven over contradict their purpose of creating a refuge area for slower pedestrians that are unable to cross the street within the designated crossing time at a signalized crossing.

It should be noted that incorporating low landscaping and appropriate signage are desirable design features for both aesthetics and safety. Refuge islands can also be an alternative or precursor to a marked crosswalk.

Based on the Manual of Uniform Traffic Control Devices (MUTCD) and American Association of State Highway and Transportation Officials (AASHTO) guidelines, a median must be 1.2 metres wide and 1.8 metres long to adequately serve as a refuge area to pedestrians. For crosswalks marked across the raised median, the following should also be provided:

- The relevant pedestrian crosswalk and pedestrian crosswalk warning signs as

documented in the TAC Pedestrian Crossing Control Manual; and

- Curb ramps on both the sidewalks and the raised median or
- A gap at grade to the road to allow wheelchairs or strollers to use the median.



Raised Median (<http://www.tfhrc.gov/safety/pedbike/pubs/05085/images/fig101.jpg>)

Recommendations

- Continue using refuge medians for pedestrians on high-volume, multi-lane facilities, such as the one being installed on Capilano Road in the vicinity of the Mount Crown Road and Capilano Park Road intersections.

5.2.6 Site Design of New Developments or Re-development

Current Practice

Three departments review development applications:

- Transportation Section: considers the surrounding transportation network to ensure connectivity to existing sidewalks, bus stops, parking lots, etc.
- Parks Section: looks for trail and walkway options.
- Building Section: looks within building area.

Discussion

Development applications should be required to undergo an on-site specific review for pedestrian issues before a development permit is issued. Different types of developments will require different types of audits or reviews.

For instance, developments with large parking lots inevitably have many people walking through them, yet often do not include pedestrian infrastructure, resulting in vehicle priority. All parking lots should include clearly-marked, direct pedestrian paths from the surrounding sidewalks to the front entrance of the building, especially where transit stops are present, as well as clearly defined areas for motorists to walk from their vehicles to the front entrance. High-density residential developments should also provide pedestrian-related amenities such as on-site passenger pick-up and drop-off space.

Promoting Sustainable Transportation through Site Design (Canadian Institute of Transportation Engineers, 2004) provides guidance regarding the types of issues that should be addressed at the design stage to ensure new developments will enhance the pedestrian realm and contribute to a complete pedestrian network. The “Site Design Prompt List” is included in APPENDIX B and at: [http://www.cite7.org/Technical Projects/Final%20Proposed%20Recommended%20Practice%20RP-035.pdf](http://www.cite7.org/Technical_Protocols/Final%20Proposed%20Recommended%20Practice%20RP-035.pdf).

Recommendations

- Formally adopt a pedestrian audit checklist that must be completed by developers as part of their Transportation Impact Study (TIS) requirements.

5.2.7 Pedestrian Crossing Treatments

Current Practice

The District of North Vancouver generally follows Pedestrian Crossing Control Manual (TAC, 1998) guidelines and incorporates suggestions from their Disability Advisory Committee whenever possible.

Discussion

It should be noted that the TAC warrants do have some limitations in urban conditions. The report Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations, (Federal Highway Administration, 2002) indicates that on multi-lane roads with traffic volumes above 12,000 vehicles per day, the presence of a marked crosswalk alone (without other substantial improvements) was associated with a higher pedestrian crash rate compared to an unmarked crosswalk. The report advocates providing substantial improvements such as signals, lighting or a median when installing marked crosswalks on high-volume, multi-lane facilities. Depending on cross-section, traffic volume and posted speed, the report classifies locations as either candidates for marked crosswalks, probable candidates for marked crosswalks, or marked crosswalks alone insufficient, as summarized in the table below.

TABLE 5.5 FINDINGS OF FHWA REPORT*

Roadway Type	Vehicle ADT ≤ 9000			Vehicle ADT >9000 to 12,000			Vehicle ADT >12,000 to 15,000			Vehicle ADT >15,000		
	Speed Limit: miles/hour (approx. conversion to km/hour)											
	≤30 (45)	35 (55)	40 (65)	≤30 (45)	35 (55)	40 (65)	≤30 (45)	35 (55)	40 (65)	≤30 (45)	35 (55)	40 (65)
2 lanes	C	C	P	C	C	P	C	C	N	C	P	N
3 lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multi-lane (4+) w/ raised median	C	C	P	C	P	N	P	P	N	N	N	N
Multi-lane (4+), no raised median	C	P	N	P	P	N	N	N	N	N	N	N

C = Candidate sites for marked crosswalk.

P = Probable candidate - Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements.

N = Marked crosswalks alone insufficient: pedestrian crash risk may be increased due to providing marked crosswalks alone. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvements.

AADT = Annual Average Daily Traffic

***NOTE:** Refer to the FHWA Report for complete information and footnotes. These guidelines do not apply for all scenarios and **do not apply to school zones.**

Recommendations

- A crosswalk review is recommended.
- Supplement the TAC crosswalk warrant with the FHWA guidelines to compensate for the limitations of the TAC guidelines in urban areas.
- Mount Seymour Parkway should also be reviewed as it is known to be difficult for pedestrians.

5.2.8 Pedestrian Signals

Current Practice

The District of North Vancouver uses 1.2 metres/second normal walking speed for signal timings, except near senior centres and homes where a 1.0 metres/second walking speed is used. The Disability Advisory Committee advises the signals department regarding Audible Pedestrian Signals (APS) policies and implementation and countdown signals on a case-by-case basis, but is hindered by budget constraints.

Discussion

One study, Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians (Federal Highway Administration, 2001), recommends a walking speed as low as 0.85 metres/second for elderly pedestrians. As the District's elderly population grows, the District may wish to review whether 1.0 metres/second is still an appropriate speed for locations where a higher proportion of elderly pedestrians is expected. The Transportation Research Board's Webinar of May 8, 2008 "Accommodating Pedestrians At Signalized Intersections" discussed pedestrian walking speeds. A walking speed of 4fps (1.2 metres/second) is standard and is recommended in the Manual of Uniform Traffic Control Devices (MUTCD) for pedestrian clearance at Flashing Don't Walk signalized intersections. It is felt by the National Committee on Uniform Traffic Control Devices that the time this speed allows is not sufficient, and pedestrian clearance times should be based on a 3.5 fps (1.1 metres/second) walking speed for pedestrian clearance and extending the Walk interval by the amount of time to clear 6' (1.8m) beyond the curb at a walking speed of 3.0 fps (0.9 metres/second). The increased crossing time would accommodate a larger range of pedestrians.

Pedestrian countdown signals are becoming increasingly popular, because they allow pedestrians to estimate whether or not they have enough time to cross the road based upon their individual walking speed, rather than pre-determined crossing time based upon an average walking speed. In the United States, all new signals are required to have countdowns. The District could make use of these devices along Marine Drive and in Pedestrian Priority Areas.

Audible Pedestrian Signals (APS) are an enhanced form of the standard traffic control signal, equipped with an audible cue that is activated concurrently with the Walk phase as a prompt for pedestrians to start crossing. Different audio signals are emitted for the east-west and north-south intersection crosswalks. APS are primarily useful for people with visual disabilities to determine when it is safe to cross. However, they can also be useful for children (limited perception and field of vision), the elderly without impaired sight (limited neck/back movement) and any distracted pedestrians. The Transportation Association of Canada presents guidelines for APS in the *Guidelines for understanding, use and implementation of accessible pedestrian signals (2008)*.

Some concerns have been expressed about the noise of these signals, but these generally occur when APS volumes have been set too loud.

Recommendations

- Amend the *Practices Review* (2002) to incorporate specific guidelines for locations where slower walking speeds should be used.
- Install APS at all new intersections, and upgrade signals which are within 200m of an existing or planned major pedestrian generator (including bus stops on “Good Transit Routes”) or in a pedestrian priority area. Introduce a feature on the District’s website allowing the public to request APS upgrades to existing signals. In residential areas, set the tones low enough so as not to disturb residents (loud enough to hear the signal within 4 metres is sufficient to allow pedestrians to correctly align themselves).
- All Pedestrian Priority Areas and Marine Drive should have Pedestrian Countdown Timers, which can be installed when development occurs, possibly at cost to the developer.
- Follow the guidelines for APS in TAC’s *Guidelines for understanding, use and implementation of accessible pedestrian signals (2008)*.

5.2.9 Safe Routes to School

Current Practice

The District of North Vancouver works with schools regarding traffic safety issues around schools on an as-needed basis. Issues are generally identified through requests from schools, by residents or through redevelopment applications.

Discussion

Safe Routes to Schools covers programs, education, infrastructure and engineering improvements to reduce traffic around schools and increase safety, and encourage pupils and parents to walk to school. Several organizations operate programs and schemes based around the concept of Safe Routes to Schools. Programs can include identifying Best Routes to Schools, special days and incentives to encourage children to walk, and establishing programs such as walking school buses.



Students walking on Capilano Road, North Vancouver.

Once Best Routes to School have been established, the District can work with schools to identify any engineering or maintenance measures to further enhance the students' walking experience. Examples of engineering measures that can be implemented include crosswalks, curb extensions or extending school speed zones. Maintenance improvements can include trimming trees to improve or to improve the visibility of school speed zone signs, or ensuring that sidewalks on designated Best Routes to School are well-maintained.

Best Walking or Cycling Routes can be identified and mapped from different quadrants of a school catchment area to allow parents and students to feel more comfortable about walking to school. Planning for Best Routes is a useful way to involve your community and key stakeholders (municipal staff, police, traffic safety experts) in improving the safety of neighbourhoods for all residents.

ICBC's **Way To Go!** School Program www.waytogo.icbc.bc.ca is an active and safe routes to school initiative for communities in British Columbia. This school traffic reduction program provides parents, teachers and students with a variety of specific tools for traffic safety education, best routes planning, and promoting active transportation choices. The goals are to reduce vehicle trips and create safer traffic environments around schools. As of July 2008, it is a web-based resource. The website provides information and tools to help schools develop safer, healthier transportation alternatives as well as incorporate fitness, environmental awareness and a sense of community at schools.

iWalk started with just a few schools in 1994, and as of 2008 now organizes International Walk to School month during October with children, parents and school of 42 countries taking part. www.iwalktoschool.org. During Walk to School Week 2008, TransLink allowed both elementary and high school students to travel for free on transit during the week of October 6 to 10, 2008. The aim was to give young people an opportunity to commute to and from school by means other than a private automobile, however the free rides can also be a valuable "teacher's aid" when planning field trips. The class can take their trips, learn about the importance of public transit and get an idea of how to "navigate" around Metro Vancouver on buses, SkyTrain, SeaBus, Albion Ferry and West Coast Express. TransLink's website also provided suggestions for teachers on how to organize a field trip using transit, and also of popular field trip destinations that are served and accessible by transit.

HASTE (www.hastebc.org) is a new project that supports schools and their communities taking action on reducing transportation emissions in British Columbia. It is an online resource and networking centre, designed to help students, teachers and schools improve the health of individuals, communities and the environment. It provides tips on setting up your own walking school bus, as well as an on-line emissions calculator, MyTravel which is an engaging, kid-friendly tool that allows students to calculate the environmental impacts of their current to-and-from school transportation.

Recommendations

- Take a proactive approach to traffic safety around schools in the District by aiming to work with one or two schools (both public and private) per year to introduce or enhance programs and make engineering and route improvements.
- Work with School District #44 to prioritize schools (both public and private) to determine funding sources and resources to establish programs for encouraging children to walk to school such as ICBC's **Way to Go!** program. This may include grants such as the ecoMobility grants, projects for co-op students, and opportunities through the ICBC Road Improvement Program to fund improvements that will reduce collisions.
- Provide mode-split targets for schools to achieve, with measurable goals and monitoring programs in place.
- Actively promote Walk to School Week each year, and encourage schools to use public transit for field trips.

5.2.10 Trail and Transportation Network

Current Practice

Sidewalks are currently looked after by the Transportation section and trails by the Parks section. During the review of planning applications the Parks section looks for trail and walkway options, whilst the Transportation section focus often off-site ensuring connections to existing sidewalks, bus stops, parking lots etc. (See section 5.2.6)

Discussion

Having a complete and integrated network that allows pedestrians to walk and navigate the shortest route from their origin to their destination with the perception of safety is going to encourage and supporting walking in the community as a viable form of transportation.

Pedestrians want a connected network to walk regardless of whether it is a sidewalk under the jurisdiction of the Transportation section or a trail under the Parks section. There should be good integration between these with easy to navigate WayFinding through adequate signposting. A trail that is mostly used for transportation may physical differ from other trails in providing more lighting, a harder surface and meet TAC standards. During the public consultation process youth who attended the Focus Groups included lack of lighting at night as a reason for not feeling comfortable as a pedestrian. (Section 3.5)



Trails in North Vancouver without WayFinding signage or lighting

Recommendations

- Work with the District's Parks section to explore opportunities for coordination and integration of trail and transportation networks, including: WayFinding and signage, lighting and other pedestrian amenities. This may mean defining a new trail type: a transportation orientated trail, defined as a trail which provides a similar or shorter walking distance than the sidewalk network; enhanced connectivity; significantly improves safety conditions over an on-road pedestrian facility; or fills missing links that cannot be accommodated with an on-road route. Ensure that such trails are built to TAC standards and have appropriate lighting.
- Ensure that trails that are suitable for inclusion as part of the transportation network are included in recommendations for accessibility (Section 5.2.3) and in areas of maintenance and operations such as snowploughs not piling snow on trail entrances (5.3.2).

5.3 Maintenance and Operations

Maintenance is an important aspect of any pedestrian plan, because even the best-designed facilities can become hazardous if they are allowed to fall into a state of disrepair. The following are discussed in this section:

- Trip and Fall Hazard Prioritization;
- Snow Clearing;
- Foliage Trimming; and
- Utility Pole Placement.

5.3.1 Trip and Fall Hazard Prioritization

Current Practice

The Streets Department at the District of North Vancouver methodically surveys the sidewalks, with their own database for logging repairs that are needed. These inspections identify and prioritize sidewalk repairs and replacements. All sidewalks are inspected every two years. The focus is on horizontal and vertical pavement separations of 20mm or greater. Typically, all hazards are fixed within one year.

Discussion

According to the Veterans Affairs Canada website, falls are the leading cause of fatal injuries among senior Canadians and account for more than half of all injuries among seniors. Tree roots are the greatest trip hazard in the District of North Vancouver. Common sidewalk conditions that cause people to trip and fall are summarized below:

TABLE 5.6 COMMON SIDEWALK HAZARDS

CONDITION OR HAZARD	ILLUSTRATION
<p>Concrete Spalling is a loss of the aggregate (stone) in concrete. Spalled uneven surfaces increase the difficulty of walking or maneuvering. Spalled surfaces may also contribute to the risk of slipping and/or unintentional wheelchair rolling.</p>	
<p>Cracking Concrete sidewalks can crack because of erosion, frost heave, damage by heavy vehicles, and simply time. Cracked sidewalks do not provide firmness and stability and do not resist deformation. Large cracks are hazardous to pedestrians and can easily catch wheelchair casters, inline skating wheels, and bicycle tires. If a wheel gets caught suddenly, the user will be pitched forward.</p>	
<p>Undeveloped This term refers to missing sidewalk sections. Continuous sidewalks should be provided along streets. People in wheelchairs or with vision impairments may find it infeasible to walk where the sidewalk is missing. A hazard may also be created at the joint.</p>	
<p>Differential Heights A trip hazard can be created with a height difference, typically considered to be over 25 mm. Causes include tree roots, heaving and settling due to frost, brick surfaces buckling, and uneven transitions between gutters and curb ramps. People with low vision may have difficulty detecting changes in level, which puts them at a higher risk of tripping. People using wheeled devices can catch the wheels, lose their balance, and propel forward. Wheelchair users may also have a difficult time rolling over larger changes in level because of the work required.</p>	
<p>Crossfall Crossfall is intended to improve drainage, but can make it difficult for pedestrians to maintain their lateral balance. People using crutches or canes may be forced to turn sideways to keep their base of support. Cross slopes can also cause wheelchairs to veer to the side which increases their risk of rolling into the street.</p>	
<p>Obstacles Obstacles such as utility poles can make walking difficult and sometimes impossible or dangerous, especially when a pedestrian has to walk into the street to get around the obstacle. Overhung signage, telephone kiosks and low tree branches encroaching upon the pedestrian route may make walking difficult or hazardous.</p>	
<p>Drainage Poor drainage can create hazardous spots if melted snow remains then freezes. Frost heaving and settling may cause changes of level in sidewalks. During summer, algae may grow due to improper drainage and increase the risk of falling.</p>	

Recommendations

- Continue to test and implement the use of handheld computers with GIS maps to upload inspection findings.
- Improve work and reporting service levels as part of an asset management approach. This could include introducing a policy to redistribute sidewalk inspection funds to allow for greater inspection frequency of sidewalks in pedestrian-friendly commercial areas and inspecting other sidewalks on a complaints only basis. The District could also consider introducing requirements on maximum length of time before a hazard is required to be repaired.
- To continue to record complaints and concerns about specific areas reported by the public.
- The District can add all new pedestrian facilities to the inventory so that the annual maintenance budget may be updated to reflect the amount required to achieve an appropriate level of service. Although the District would ideally set budgets using inventories and service levels, this is typically not how funds are currently allocated.

5.3.2 Snow Removal

Current Practice

The District of North Vancouver requires property owners of multi-family housing and commercial property to remove snow and ice from the surrounding sidewalks and footpaths within 24 hours after snow has stopped falling or before a 10cm snow depth is exceeded (Streets and Traffic Bylaw 7125, Section 629). There is no bylaw for single-family housing, where instead an informal ‘good neighbour’ policy is counted on due to the aging population of the District and has generally worked well in the District. These ‘good neighbour’ initiatives are relied upon and the District does not remove snow from sidewalks.

Discussion

Snow-cleared and ice-free sidewalks are essential to promoting walking in the winter as slippery and unsafe conditions discourage people from using the sidewalks.



Snowy North Vancouver Street (digitaldoodles.com)

Recommendations

- Review the wording of existing newspaper, television, and web ads in order to have them ready to run in the event of a snowfall, so that information can be disseminated quickly and also so that residents may be reminded of their responsibility.
- Continue to educate snowplough operators to minimize the piling of snow at street corners, particularly on streets near schools, hospitals, seniors' centers or homes, and generally with high pedestrian activity. Suitable locations for snow to be piled in the interim period before it melts should be provided for snowplough operators.

5.3.3 Foliage Trimming

Current Practice

The District issues property owners of untrimmed foliage infringing on the sidewalks with a notice to trim the foliage by a certain date. If the owner does not heed this notice, the District trims the foliage at cost to the property owner. The District removes, cuts down, or trims trees, shrubs, hedges or bushes which are considered dangerous to public safety or convenience, or harmful to the road bed or sidewalk, at the expense of the owner or occupier of the land. (Bylaw 5679) District design criteria require a minimum distance of 0.6 metres between the sidewalk and obstructions be maintained.


Discussion

The District's current policy on foliage trimming to remove all dangerous trees and trim foliage that owners neglect after a date specified in a notice.

Recommendations

- If more resources become available, the District could advertise on the District's website the process for making a complaint regarding unkempt landscaping and foliage on private property infringing on public right-of-ways. This could allow residents to submit complaints online, and check the status of their complaint online as well.
- Consider adopting a pro-active approach for monitoring untrimmed foliage in pedestrian priority areas.
- State a minimum distance landscaping must be planted from the sidewalk from 60cm, up to 1 metre to allow for foliage to grow without infringing on sidewalks, where boulevard is sufficient.
- Foliage at corner properties should have a 6 metre by 6 metre setback at the corner, with a maximum height of 1 metre.

5.3.4 Utility Pole Placement

<i>Current Practice</i>	
<p>The District of North Vancouver’s standard design drawings specify a minimum clear distance of 0.6m between above ground utilities and the sidewalk. There is also a required minimum separation between utilities and trees.</p>	
<i>Discussion</i>	
<p>The placement of utility poles is specified in the Development Servicing Bylaw. The poles therefore do not interrupt the movement of pedestrians on the sidewalk.</p>	
	<p><i>Example of poor utility pole placement: utility pole and foliage obstruct sidewalk. Foliage also obstructs sightlines from the driveway (behind the utility pole) to the sidewalk.</i></p>
<i>Recommendations</i>	
<ul style="list-style-type: none"> ▪ Continue to require utility poles obstructing sidewalks in high pedestrian areas to be relocated or have the utilities moved underground whenever a redevelopment of the area occurs. ▪ Assist utilities engineers to understand pedestrian requirements when reviewing utility projects. 	

5.4 Summary of Policy And Practice Recommendations

The following is a summary of all policy and practice changes that are recommended in order to implement and support the Pedestrian Master Plan. The goal of these policy and practice changes is to make the District of North Vancouver a safe, convenient and pleasant environment for pedestrians, and thus make walking a preferred mode of transportation.

TABLE 5.7 SUMMARY OF RECOMMENDATIONS

POLICY / PRACTICE AREA	RECOMMENDATIONS
PLANNING	
Target Mode Split	10% of all trips by 2031.
Pedestrian Collision Reduction	Reduce the annual number of pedestrian-related collisions by half by 2018 (over the next 10 years).
Funding	Allocate \$330,000 annual budget for completion of all Priority 1 sidewalks within 20 years and divert the money spent on landscaping in boulevards to construction of new sidewalks.
Explicitly Prioritizing Pedestrians	Adopt a policy to prioritize pedestrians over all other modes of travel or to consider pedestrian needs in decision-making.
Creating a Pedestrian Priority Area	Marine Drive, Edgemont Village, Lynn Valley Town Centre, Maplewood and Parkgate are recommended as Pedestrian Priority Areas.
ENGINEERING AND DESIGN	
Street Design Standards	Add more flexible options to Bylaw 7388 and apply it to all work in the District and have sidewalks continue over driveways.

POLICY / PRACTICE AREA	RECOMMENDATIONS
<i>Implementation Plan</i>	Implement the Sidewalk Priority Index to construct Priority 1 sidewalks within 20 years and encourage residents to apply for sidewalks through the Local Improvement Cost Sharing Bylaw.
<i>Accessibility Standards</i>	Implement the recommendations of TAC APS document.
<i>Curb Extensions</i>	Work with TAC and MMCD to develop standard layout drawings for curb extensions. Consider curb extensions at the time of development approvals.
<i>Refuge Medians</i>	Consider using refuge medians for pedestrians on high-volume, multi-lane facilities, as is being installed on Capilano Road in the vicinity of the Mount Crown Road and Capilano Park Road intersections.
<i>Site Design of New Developments or Re-developments</i>	Formally adopt a pedestrian audit checklist that must be completed by developers as part of their Transportation Impact Study (TIS) requirements.
<i>Pedestrian Crossing Treatments</i>	Conduct a crosswalk review and supplement the TAC crosswalk warrant with the FHWA guidelines.
<i>Pedestrian Signal Timings</i>	Equip all Pedestrian Priority Areas and Marine Drive with Pedestrian Countdown Timers when development occurs, possibly at cost to the developer, install AP at all new intersections and upgrade signals which are within 200m of an existing or planned major pedestrian generator, and introduce specific guidelines for locations where slower walking speeds should be used.
<i>Safe Routes to Schools</i>	Work with one or two schools (both public and private) per year to make engineering and route improvements.
<i>Trail & Transportation Network</i>	Work with the District's Parks section to co-ordinate and integrate trail and transportation network.

POLICY / PRACTICE AREA	RECOMMENDATIONS
MAINTENANCE AND OPERATIONS	
<i>Trip and Fall Hazard Prioritization</i>	Continue to test and implement the use of handheld computers with GIS maps. Continue to have operations crews to report new sidewalk deficiencies and to monitor sidewalk hazard reports on the District’s website.
<i>Snow Clearing</i>	Continue to educate snowplough operators to minimize the piling of snow at street corners, particularly on streets near schools, hospitals, seniors’ centers or homes, and generally with high pedestrian activity.
<i>Foliage Trimming</i>	State a minimum distance landscaping must be planted from the sidewalk and maximum height for foliage at corner properties. Allow residents to submit complaints online.
<i>Utility Pole Placement</i>	Require utility poles obstructing sidewalks in high pedestrian areas to be relocated or have the utilities moved underground whenever a redevelopment of the area occurs.

6.0 PLAN IMPLEMENTATION

6.1 Overview

For any plan to be successful, forethought must be given to how the plan will become a built reality. Plans should have:

- Responsibility for implementation assigned to specific departments or staff;
- An annual budget allocated over a term of approximately 20 years;
- Regular monitoring of targets (approximately once per year); and
- Regular updates set for the plan (approximately every 5 years).

The need for successful plans to have an implementation and monitoring strategy was well-described in a recent paper Opportunity, Challenge and Action: Applying Strategies for Sustainable Transportation Planning (Noxon and Hollingworth, CITE 2007.) The authors reviewed transportation plans across Canada and their conclusions are directly quoted below.

- Many transportation plans include goals and principles related to sustainability that are not reflected in the recommended policies, programs and projects.
- Most transportation plans do not effectively identify objectives and steps required to monitor progress toward sustainable transportation.
- Some transportation plans describe future system characteristics that are consistent with more sustainable transportation, but provide inadequate guidance on the steps required to achieve them.
- Even those transportation plans that do give sound support and direction to improved sustainability are simply not succeeding in that regard. This situation may be related to the general absence of mechanisms to hold decision-makers accountable for the implementation of key policies and programs.

This section outlines a framework to help the District make the plan a reality.

6.2 High Priority Corridors and Areas

The Sidewalk Priority Index is the foundation of this Pedestrian Master Plan. Its purpose is to help the District systematically plan and budget construction of new sidewalks. Based on the Sidewalk Priority Index, an implementation plan for new sidewalk projects within the District was developed. The implementation plan addresses segments that are ranked as Priority 1 and is divided between Early Winners and Corridors.

6.2.1 Early Winners

The District may wish to identify some Early Winners by addressing gaps in existing pedestrian routes. These would be relatively short, isolated segments of arterial or collector roads (less than 200 metres, with no adjacent new sidewalk projects identified). A scoring system was developed to rank the Early Winners and is summarized in TABLE 6.1. This system considers the results of the Sidewalk Priority Ranking, as well as anticipated ease of construction. The cost estimate discussed in Section 6.3 was used as a surrogate for the ease of construction. All possible Early Winners are summarized in TABLE 6.2.

TABLE 6.1 SCORING SYSTEM FOR EARLY WINNERS

SIDEWALK PRIORITY INDEX		EASE OF CONSTRUCTION	
Index	Score	Cost Rating	Score
44 and above	3	Low	3
37-43	2	Medium	2
31-36	1	High	1

Based on the Sidewalk Priority Index, 23 Early Winners were identified. These segments were then ranked using the scoring system. A summary of results (ranked results is provided in TABLE 6.2).

TABLE 6.2 “EARLY WINNER” RANKING

STREET NAME	FROM	TO	LENGTH (m)	SIDE	SCORE			RANK
					SPI	COST	TOTAL	
Institute Rd	Frederick Rd	Lynn Valley Rd	171	E	3	3	6	1
W 15th St	Philip Ave	Lane	336	S	3	3	6	1
Riverside Dr	Mr Seymour Pky	Windridge Dr	57	E	2	3	5	2
Premier St	Access	959 Premier St	84	W	2	3	5	2
Riverside Dr	Windridge Dr	Old Dollarton Rd	249	E	2	3	5	2
Riverside Dr	Mt Seymour Pky	Old Dollarton Rd	341	W	2	3	5	2
Marine Dr	End	Capilano Rd	70	S	3	2	5	2
E 29th St	William Ave	St Christophers Rd	306	N	3	2	5	2
Premier St	Access	Old Lillooet Rd	164	W	1	3	4	3
Fromme Rd	Argyle Secondary Lane	Wendel Pl	83	E	1	3	4	3
Roche Point Dr	Garibaldi Dr	Osprey Crt	52	W	1	3	4	3
Mt Seymour Pkwy	E Keith Rd	Fern St	177	S	1	3	4	3
E 29th St	St Christophers Rd	Fromme Rd	110	N	2	2	4	3
Ridgewood Dr	Edgemont Blvd	Highland Blvd	336	N	2	2	4	3
E Keith Rd	Lane	Mountain Hwy	259	S	3	1	4	3
Mountain Hwy	E 29th St	E 27th St	122	E	3	1	4	3
Mahon Ave	W Kings Rd	W Queens Rd	84	W	1	3	4	3
Redwood St	Sowden St	Alderwood Pl	131	W	1	2	3	4
Sowden St	Philip Ave	Redwood St	173	N	1	2	3	4
Ridgewood Dr	Aintree Dr	Bluebonnet Rd	185	N	1	2	3	4
Mountain Hwy	E 8th St	Off-ramp	183	E	2	1	3	4
Dempsey Rd	Underwood Ave	Lynn Valley Rd	132	N	1	1	2	5

As indicated in TABLE 6.2, most of the segments are less than 200 meters in length. However, some longer segments were also selected as Early Winners as they are isolated segments in which the remainder of the corridor already has sidewalks.

6.2.2 Corridor Segments

All other Priority 1 and Priority 2 segments that are not considered “early winners” are identified as Corridor Segments, as shown in FIGURE 6.1. For instance, many blocks of Dollarton Highway east of Forester Street are missing sidewalks. Although the individual block faces received different scores based on more localized characteristics, an opportunity exists to create a continuous sidewalk along the corridor, or large segments of the corridor as a single project.

To identify Corridor Segments, individual segments were grouped and ranked using a similar scoring system. However, as the Corridor Segments are comprised of individual segments, the scoring system is based on the weighted averages of the segments. The scoring system is summarized in TABLE 6.3.

TABLE 6.3 CORRIDOR SCORING SYSTEM

SIDEWALK PRIORITY INDEX		WEIGHTED CONSTRUCTION COST		ALTERNATE ROUTES	
Weighted Index	Score	Cost Rating	Score		Score
40 and above	3	Low	3	No	3
36-39	2	Medium	2	Partial	2
32-35	1	High	1	Yes	1

To calculate the weighted sidewalk priority index, the following formula was used:

Weighted Sidewalk Priority Index = Σ (Sidewalk Priority Index X Length of Segment to which it applies)

(Total Length of Sidewalks Assessed in the string)

For example, on West 1st Avenue, the two segments from Garden Ave to Philip Avenue and from Philip Avenue to Pemberton Avenue have SPI’s of 37 and 32 respectively, and segment lengths of 338 metres and 149 metres respectively. For this Corridor Segment, the calculation is as follows:

$$\text{Weighted Sidewalk Priority Index} = \frac{\Sigma (37 \times 338) + (32 \times 149)}{(338 + 149)} = 35.47$$

Construction cost (Section 6.3) was used as a surrogate for ease of construction. Lower-cost, easier to implement corridors were ranked at 3, whereas higher cost corridors were ranked at 1. To calculate the weighted construction cost score, the following formula was used:

$$\text{Construction Cost Score} = \frac{\sum (\text{Cost Rating Score} \times \text{Length of Segment to which it applies})}{(\text{Total Length of Sidewalks Assessed in the string})}$$

For West 1st Avenue, this calculation becomes

$$\text{Construction Cost Score} = \frac{\sum (338 \times 3) + (149 \times 3)}{(338 + 149)} = 3$$

Corridors were also ranked as a higher priority for implementation if no alternate routes existed. For example, on arterials, if sidewalks were provided on one side, but not the other, it was considered that an alternate route was provided for this location. An alternate route was considered to be provided if there was a nearby parallel roadway with sidewalks, a nearby parallel roadway with low traffic volumes and/or a nearby parallel off-route path (existing or planned).

So, for example, the segment on Riverside Drive is ranked highly because the construction costs are expected to be low relative to other projects, the segments ranked highly under the pedestrian priority index system, and no alternate routes exist.

Based on the scoring system, segments were organized into corridor projects, ranked and are presented in TABLE 6.4.

Finally, the District may choose to allocate construction of a sidewalk on a specific block in a time frame different than may be indicated by the Index. The timing could be advanced or delayed as a result of:

- ✓ Development expected on that block, which could include provision of the new sidewalk; or
- ✓ Road re-construction plans, such as major utilities work, when construction of the new sidewalk, could be better incorporated at that time.

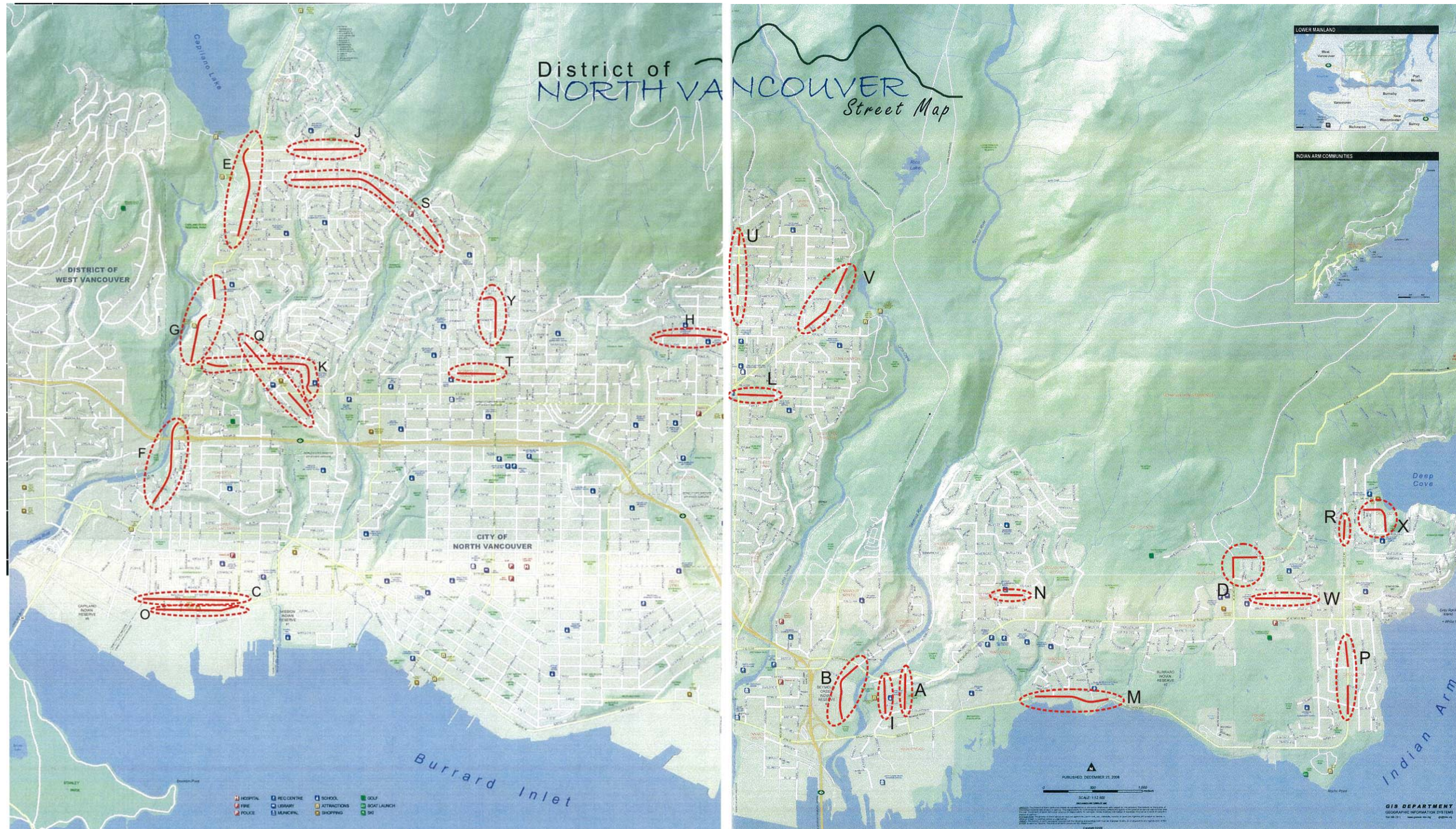


FIGURE 6.1 POTENTIAL SIDEWALK CORRIDOR PROJECTS
(LABELS CORRESPOND TO TABLE 6.4)

TABLE 6.4 RANKING OF CORRIDOR PROJECTS

	STREET	FROM	TO	LENGTH (m)	TOTAL LENGTH (m)	SIDE	WEIGHTED SPI	SPI	CONST.	ALT. ROUTE	TOTAL	RANK
A	Riverside Dr	Mt Seymour Pky	Old Dollarton Rd	42	121	W	42	3.0	3.0	3.0	9.0	1
	Riverside Dr	Mt Seymour Pky	Windridge Rd	37		E						
	Riverside Dr	Windridge Rd	Old Dollarton Rd	42		E						
B	Seymour Blvd	E Keith Rd	South End	34	70	W	37	2.0	3.0	3.0	8.0	2
	Seymour Blvd	E Keith Rd	End	36		E						
C	Welch St	Bowser Ave	Lane	44	294	N	38	2.0	2.3	3.0	7.3	3
	Welch St	Lane	Pemberton Ave	39		N						
	Welch St	Whonoak Rd	Garden Ave	31		S						
	Welch St	Garden Ave	Bowser Ave	33		S						
	Welch St	Bowser Ave	Philip Ave	39		S						
	Welch St	Philip Ave	Existing Sidewalk	38								
	Welch St	Whonoak Rd	Bowser Ave	32		N						
	Welch St	Existing Sidewalk	Pemberton Ave	38								
D	Mt Seymour Rd	Hamber Pl	Indian River Rd	36	194	E	42	3.0	1.9	2.0	6.9	4
	Mt Seymour Rd	Indian River Rd	Banff Crt	50		W						
	Indian River Dr	Mt Seymour Rd	Cascade Crt	41		N						
	Indian River Dr	Cascade Crt	Access	34		N						
	Indian River Dr	Inlet Cres	Inlet Cres	33		N						
E	Capilano Rd	Nancy Greene Way	Access	31	163	W	33	1.0	2.8	3.0	6.8	5
	Capilano Rd	Access	Bus Stop	33		W						
	Capilano Rd	Montroyal Blvd	Teviot Pl	33		W						
	Capilano Rd	Capilano Rd	Langdale Dr	31		W						
	Capilano Rd	Bus Stop	Montroyal Blvd	35		W						
F	Capilano Rd	Woods Dr	Hwy 1.	31	108	E	38	2.0	1.6	3.0	6.6	6
	Capilano Rd	Capilano Offramp	Graveley St	34		W						
	Capilano Rd	Graveley St	Fullerton Ave	43		W						
G	Capilano Rd	Eldon Rd	Capilano Park Rd	35	113	W	37	2.0	1.6	3.0	6.6	6
	Capilano Rd	Capilano Park Rd	Edgemont Blvd	41		W						
	Capilano Rd	Edgemont Blvd	Ridgewood Dr	37		W						

TABLE 6.4 RANKING OF CORRIDOR PROJECTS (Continued)

	STREET	FROM	TO	LENGTH (m)	TOTAL LENGTH (m)	SIDE	WEIGHTED SPI	SPI	CONST R	ALT ROUTE	TOTAL	RANK
H	Frederick Rd	Sykes Rd	Hendecourt Rd	31	143	S	35	2.0	2.1	2.0	6.1	8
	Frederick Rd	Lane	Baird Rd	37		N						
	Frederick Rd	Hadencourt Rd	Fromme Rd	34		S						
	Frederick Rd	Baird Rd	Mountain Hwy	41		N						
I	Seymour River Pl	Mt Seymour Pky	Seymour River Pl	34	34	W	34	1.0	3.0	2.0	6.0	9
J	Prospect Ave	Cliffridge Ave	Sarita Ave	33	101	N	34	1.0	3.0	2.0	6.0	9
	Prospect Ave	Sarita Ave	Ranger Ave	34		N						
	Prospect Ave	Shirley Ave	Highland Blvd	34		S						
K	Ridgewood Dr	Aintree Dr	Buebonnet Rd	34	111	N	38	2.0	2.0	2.0	6.0	11
	Ridgewood Dr	Edgemont Blvd	Highland Blvd	42		N						
	Colwood Dr	Highland Blvd	W Queens Rd	35		W						
L	Ross Rd	Allan Rd	Hoskins Rd	39	87	N	43	3.0	1.5	1.0	5.5	12
	Ross Rd	Mountain Hwy	Allan Rd	48		N						
M	Dollarton Hwy	Bus Stop	Raven Woods Dr	32	104	S	34	1.0	1.2	3.0	5.2	13
	Dollarton Hwy	Ellis St	Steil-Waututuh Rd	31		S						
	Dollarton Hwy	Bus Stop	Ellis St	41		S						
N	Carnation St	Lytton St	Emerson Way	33	33	S	33	1.0	3.0	1.0	5.0	14
O	W 1 st Ave	Garden Ave	Philip Ave	37	69	S	35	1.0	1.0	3.0	5.0	14
	W 1 st Ave	Philip Ave	Pemberton Ave	32		S						
P	N Dollarton Hwy	Dollar Rd	Baker View St	36	147	E	38	2.0	1.7	1.0	4.7	16
	N Dollarton Hwy	Caddy Rd	Friar Cres	31		E						
	N Dollarton Hwy	Access	Dollar RD	41		E						
	Deep Cove Rd	Mt Seymour Pkway	Deep Cove Pl	39		W						
Q	Edgemont Blvd	Edgemont Blvd	Sunset Blvd	36	186	S	38	2.0	1.6	1.0	4.6	17
	Edgemont Blvd	Sunset Blvd	Ridgewood Dr	40		W						
	Edgemont Blvd	W Queens Rd	Throncliffe Dr	45		W						
	Edgemont Blvd	Thorncliffe Dr	Newmarket Dr	31		W						
	Edgemont Blvd	Newmarket Dr	Hwy 1	34		W						




TABLE 6.4 RANKING OF CORRIDOR PROJECTS (Continued)

	STREET	FROM	TO	LENGTH (m)	TOTAL LENGTH (m)	SIDE	WEIGHTED SPI	SPI	COST	ALT ROUTE	TOTAL	RANK
R	Deep Cove Rd	Badger Rd	Caledonia Rd	46	77	W	38	2.0	1.5	1.0	4.5	18
	Deep Cove Rd	Cliffmont Rd	Badger Rd	31		W						
S	Montroyal Blvd	Montroyal Pl	Delbrook Ave	31	255	N	32	1.0	1.3	2.0	4.3	19
	Montroyal Blvd	Bonita Dr	Skyline Dr	33		S						
	Montroyal Blvd	Ranger Ave	Bonita Dr	31		S						
	Montroyal Blvd	Belvedere Dr	Pheasant Pl	32		S						
	Montroyal Blvd	Cliffridge Ave	Shirley Ave	31		N						
	Montroyal Blvd	Shirley Ave	Highland Blvd	31		N						
	Montroyal Blvd	Cedarcrest Ave	Ranger Ave	35		N						
	Delbrook Ave	Montroyal Blvd	Delbrook Ave	31		E						
T	W Windsor Rd	Chesterfield Ave	Lonsdale Ave	32	95	S	32	1.0	2.2	1.0	4.2	20
	W Windsor Rd	Chesterfield Ave	Lonsdale Ave	32		N						
	W Windsor Rd	W St James Rd	Mahon Ave	31		N						
U	Mountain Hwy	Coleman St	Mill St	34	165	W	33	1.0	1.0	2.0	4.0	21
	Mountain Hwy	Dempsey Rd	Dyck Rd	32		E						
	Mountain Hwy	Dyck Rd	Kilmer Rd	33		E						
	Mountain Hwy	Kilmer Rd	Chamberlain Dr	33		E						
	Mountain Hwy	Doran Rd	Wellington Dr	33		E						
V	Lynn Valley Rd	Dempsey Rd	Kilmer Rd	37	68	W	33	1.0	1.0	2.0	4.0	21
	Lynn Valley Rd	Langworthy St	Hoskins Rd	31		W						
W	Brockton Cres	Beaufort Rd	Brockton Pl	34	69	S		1.0	2.0	1.0	4.0	21
	Brockton Cres	Brockton Pl	Bishop Pl	35		S						
X	Naughton Ave	Deep Cove Cres	Panorama Dr	32	131	N	34	1.0	2.0	1.0	4.0	21
	Naughton Ave	Deep Cove Cres	Panorama Dr	32		S						
	Naughton Ave	Panorama Dr	Burns Ave	32		S						
	Rockcliff Rd	Banbury Rd	Raeburn St	35		S						
Y	Lonsdale Ave	E Rockland Road	E Braemar Rd	33	133	E	33	1.0	1.0	1.0	3.0	25
	Lonsdale Ave	E Braemar Rd	Kensington Rd	31		E						
	Lonsdale Ave	Kensington Rd	Carisbrooke Cr.	37		E						
	W Rockland Road	Lonsdale Ave	Prospect Rd	32		N						

6.3 Funding

Estimates were made of the costs expected to provide the sidewalks identified in this plan. Unit costs were applied to each block face by assessing whether construction of a 1.5-metre wide sidewalk in that location would be a low, medium or high cost. The guidelines used to define the three cost categories and the unit prices used are shown in TABLE 6.5. The unit prices are intended to reflect typical average costs to the District for the year 2007 for the conditions listed.

TABLE 6.5 BASIS FOR UNIT PRICES

COST CATEGORY	DEFINING FEATURES	EXAMPLE	UNIT COST
Low	<ul style="list-style-type: none"> - 1.5 m level width available - if obstructions, there is room to go around - gravel, sand or other suitable ground - no retaining walls required 		\$300 /metre
Medium	<ul style="list-style-type: none"> - less than 1.5 m level width - may have obstruction (pole, tree) to be moved - cut or fill required, up to 1 m - retaining wall, up to 1 m needed - landscaping, hedge or fence to be moved or replaced (as in example photo) - build sidewalk into the roadway 		\$500 /metre
High	<ul style="list-style-type: none"> - virtually no level area now - need to relocate utility (as in example photo) - severe cut and/or fill required, such that retaining wall over 1 m - multiple obstructions - difficult to access during construction - extensive traffic control required 		\$1,000 /metre

This estimating method is intended to establish an overall annual budget for sidewalk construction. A more detailed examination would be required to determine the precise construction costs for a specific block. Estimates do not include property acquisition.

To complete the sidewalk network proposed in this plan, the total estimated cost is \$37.0 million (in 2007 million). This amount would provide sidewalks on both sides of all arterial roads and on one side of collector roads. A more detailed breakdown of the expected costs for each of the five priority levels is provided as TABLE 6.6.

TABLE 6.6 COST ESTIMATES BY FUNDING LEVEL

PRIORITY	FUNDING ESTIMATE (in 2007 dollars)	COLOUR USED (Sidewalk Priority Index Map)
Priority 1 (Highest)	\$6,608,000	Red
Priority 2	\$7,477,000	Blue
Priority 3	\$7,756,000	Brown
Priority 4	\$5,920,000	Pink
Priority 5 (Lowest)	\$9,206,000	Green
Total	\$36,966,000	

Annual Costs

It is recommended that that if the District wishes to support walking, that annual funding should be made available to construct the highest priority sidewalks. This should include at least the Priority 1 (red) projects, and if possible the Priority 2 (blue) projects. It would be preferable to schedule the sidewalk projects over a 10-year time frame, but it is recognized that a 20-year time frame may be required due to funding limitations. The options for annual funding levels are summarized in TABLE 6.7.

TABLE 6.7 OPTIONS FOR ANNUAL FUNDING

TARGET SIDEWALK COMPLETION	PROPORTION OF ALL SIDEWALKS	TOTAL COST (in 2007 dollars)	ANNUAL FUNDING LEVEL BY TIME FRAME (in 2007 dollars)	
			10 YEARS	20 YEARS
Priority 1 only	20%	\$6,608,000	\$661,000	\$330,000
Priorities 1 and 2	40%	\$14,085,000	\$1,409,000	\$704,000

For Priority 1 projects only, which constitute approximately 20 percent of the new sidewalks identified, an annual budget of \$330,000 (in 2007 dollars) would be required to complete the program in 20 years.

In addition to capital costs, allowance should be made for the appropriate increase in sidewalk inspection and maintenance costs.

Cost Increases

The costs listed above do not account for construction cost inflation. In the past few years, costs have escalated significantly after over a decade of minimal increases. The Construction Price Index published by Statistics Canada indicates some of the recent changes for the Vancouver metropolitan area.

The index is shown in TABLE 6.8. A relatively high 11.7 percentage annual cost increase occurred in the year 2006, but the average increase over five years was approximately 6 percent.

TABLE 6.8 CONSTRUCTION PRICE INDEX

COMPARISON VALUE	YEAR				
	2002	2003	2004	2005	2006
Index compared to 1997 (100)	108.4	109.8	119.7	128.1	143.1
Annual Percentage Change	1.5	1.3	9.0	7.0	11.7

Note: Index for apartment building construction best available information.

Although a high rate of cost inflation may continue, predicting the increase is unlikely to produce accurate results. Nonetheless for the purpose of this estimate, it was assumed that the average annual cost increase of 6 percent per annum could continue in the near term.

The results of this inflation increase are shown in TABLE 6.9 for the next five years for the Priority 1 projects.

TABLE 6.9 PROJECTED INCREASES IN ANNUAL FUNDING REQUIREMENTS

YEAR	ANNUAL FUNDING LEVEL Assuming 6% annual increase in cost.	
	10-YEAR TIME FRAME	20-YEAR TIME FRAME
2008	\$661,000	\$330,000
2009	\$701,000	\$350,000
2010	\$743,000	\$371,000
2011	\$788,000	\$393,000
2012	\$835,000	\$417,000

At this rate, an annual sidewalk construction budget of \$417,000 in the year 2012 would be the equivalent of \$330,000 in the year 2008.

Next Steps

The District should plan to update the Sidewalk Priority Index every five years, as changing conditions may cause some sidewalk links to go up or down in priority relative to other missing links. The District will also need to update the index to remove from it those sidewalks which have been built. The updates to the plan will help the District to gauge success and set or maintain budgets appropriately. The District should celebrate its success on an annual basis by publishing a list of completed sidewalks and pedestrian improvements, and continuing to build upon the list over the next 20 years.

7.0 CONCLUSION

The District has stated its goals in improving conditions for pedestrians. As a result of a literature review and public consultation, areas for improvement, as well as good practices currently in place in the District were identified. The Sidewalk Priority Index provides a means for the District to prioritize the order in which sidewalks are to be completed such that the greatest benefit to pedestrians is attained. The policy recommendations developed are methods through which the District can adjust its current policies such that maximum pedestrian improvements can be achieved. The implementation plan describes how best to achieve these goals.



- Traffic Operations
- Transportation Planning
- Road Safety Engineering
- Transit and Sustainability
- Asset Management
- Project Management