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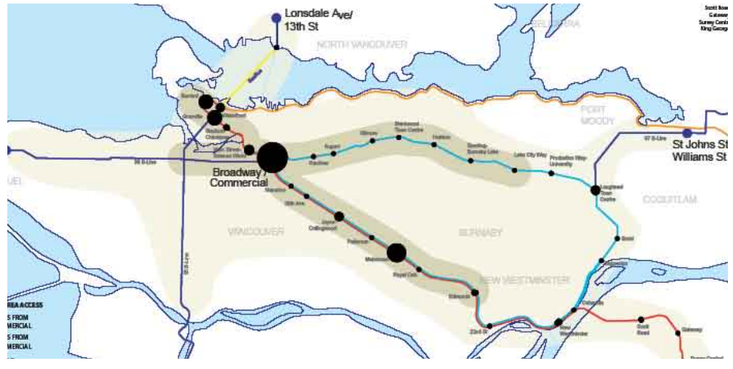
BROADWAY / COMMERCIAL TRANSIT VILLAGE PLAN

DRAFT January 2006



PART A: SITE ASSESSMENT

BROADWAY/COMMERCIAL
TRANSIT VILLAGE PLAN

Part A: Site Assessment

Part B: Recommendations

Part C: Appendices

1.1 Project Objectives

This report provides the initial assessment of issues and conditions at Vancouver's Broadway/Commercial station area with a view to informing development of a Transit Village Plan for this station area.

The Transit Village Plan project is being undertaken by the Greater Vancouver Transit Authority (GVTA or TransLink) and the City of Vancouver with Urban Transportation Showcase Program funding from Transport Canada. The goals of this project are to:

- Improve transit ridership, neighbourhood livability and overall performance of the Broadway/Commercial station area;
- Demonstrate more energy efficient transportation and land use patterns and practices;
- Reduce associated greenhouse gas emissions;
- Contribute to village identity and placemaking

The Transit Village Plan aims to supports the area's already high transit ridership with measures that will better integrate both stations into the neighbourhood while increasing the safety, comfort, legibility, and commercial vitality of the immediate station area.

The Plan will consider (but not be limited to) six primary areas of investigation:

1. Transportation Issues

- Pedestrian and passenger movement, wayfinding and shelter
- Connections and transfers between the two stations, between the stations and the surrounding neighbourhoods and between the stations and the bus stops
- Layover needs for terminating lines (B-Line and local)
- Impacts, if any, of Millennium Line Extension to VCC, and possible ultimate extension to UBC

2. Station Design Issues

- Orientation, entry, accessibility, safety and security
- Retail opportunities within the stations

3. Commercial Streetscape and Streetwall

- Continuity across Grandview Cut
- Improved public realm and pedestrian scale
- Urban design issues related to lane off Commercial Drive

4. Pedestrian and Bikeway Connections

- Connections to Central Valley Greenway and 10th Ave Bikeway
- Bicycle service and short term storage at stations

5. Redevelopment Opportunities

- CIBC and Safeway
- Lane access from Commercial Drive
- Medical/Dental Precinct

6. Integration into Community Context

- Positive contribution to neighbourhood 'Sense of Place'
- Grandview Cut amenity

1.2 Study Area

The Broadway/Commercial transit interchange is the most important single transfer point in the Greater Vancouver region. It is not just a rail-rail transfer point within the SkyTrain system, but also the connection point between SkyTrain and the region's busiest bus corridor, the 99 B-Line service extending west along Broadway to UBC. The interchange is also situated at the geographic centre of the region's transportation system, with a large portion of the region accessible within a 30 minute period. The role as a transfer point also means that many points are accessible with one transfer. For example, this is the only point in the region with direct, frequent, and rapid service to both UBC and Surrey.

As seen in Figure 1-1 on the following page, Broadway/Commercial transit interchange lies at the heart of Vancouver's regional transit system, with the greatest volume of rail passengers and transfers.

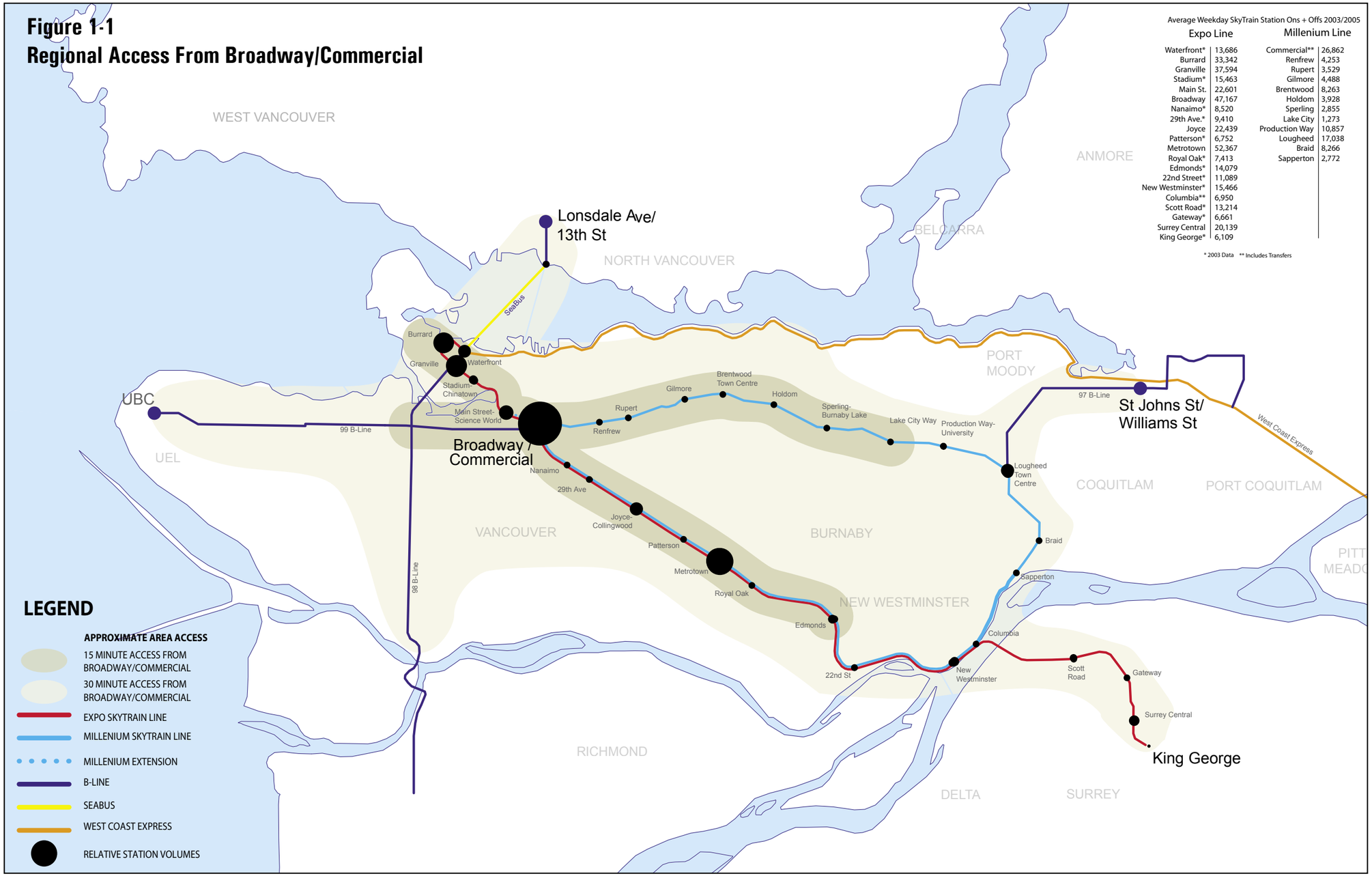
The Transit Village Plan focuses on enhancing the performance of, and interaction between, the transit interchange and the local neighbourhood. Assessment and intervention therefore relates to three different geographic and functional levels: the passenger transfer experience; the immediate station environment; and the station area context.

1.2.1 Passenger Transfer Experience

The passenger transfer experience addresses the environment and use of space by passengers transferring between the two rail stations as well as transferring between rail and other modes.

As well as providing interchange between the two SkyTrain lines, Broadway/Commercial Station is an important transfer point from SkyTrain to bus, and between different bus services. The 99 B-Line service to UBC is of particular importance, given its high ridership. Broadway/Commercial is, and will continue to be, one of the most important intermodal hubs in Vancouver.

Figure 1-1
Regional Access From Broadway/Commercial



As in most major transfer facilities in cities around the world, connecting passengers have to do some walking and changing of levels. While the distances themselves are not insurmountable – less than 1,000 feet at most – the fact that transfers will occur on city streets and around corners presents unusual challenges. At major subway interchanges all over the world, including many stations in New York, Paris and London, the pedestrian walk distances are far greater. Those transfers, however, usually occur in dedicated, "connection-only" space, free from interference from other traffic.

Analysis of the passenger transfer experience therefore focuses on intermodal efficiency, effectiveness and amenity for those making rail-rail or rail-bus transfers at the relevant points around Broadway/Commercial.

1.2.2 Immediate Station Environment

In addition to facilitating the transfer of passengers, the immediate station environment provides for pedestrian, bicycle or motorized vehicular access to major transit facilities as well as providing a hub for community and commercial activity. This can be seen in Figure 1-2.

The analysis of the immediate station environment will therefore examine multi-modal access issues surrounding the station as well as features which affect the success of the area in terms of community livability, economic vitality and urban amenity.

Figure 1-2 Aerial View of the Broadway/Commercial Site

The immediate station environment connects SkyTrain lines, bus services, pedestrians, bicycles and motor vehicles, as well as a providing a hub of community and commercial activity.

1.2.3 Station Area Context

The station area includes the residential neighbourhood and commercial/retail area within a 500-metre radius of Broadway and Commercial Drive stations. This area includes Commercial Drive from 6th to 12th Avenues and Broadway from Clark to Victoria Drive. The epicenter of the site area is the Broadway/Commercial Drive SkyTrain stations, while the focal point of the transit village is the intersection of Commercial Drive and 10th Street. This area is defined as a precinct by the City of Vancouver in its 2001 "Broadway/Commercial Drive SkyTrain Station Precinct Plan".

As seen in Figure 1-3 on the next page, the 500-metre walking radius defines the Broadway/Commercial station area, which encompasses a variety of commercial, multifamily and single family residential land uses.

1.3 Project Process and Timeframe

This is a joint project of TransLink and the City of Vancouver. Two TransLink operating subsidiaries are directly involved: Coast Mountain Bus Company, which operates all TransLink bus service in the area, and BC Rapid Transit Company (BCRTC), which operates SkyTrain. When "SkyTrain" is referred to as an agency, the reference is to BCRTC.

The Transit Village report will be structured into three major phases, concept design, concept development and final report.

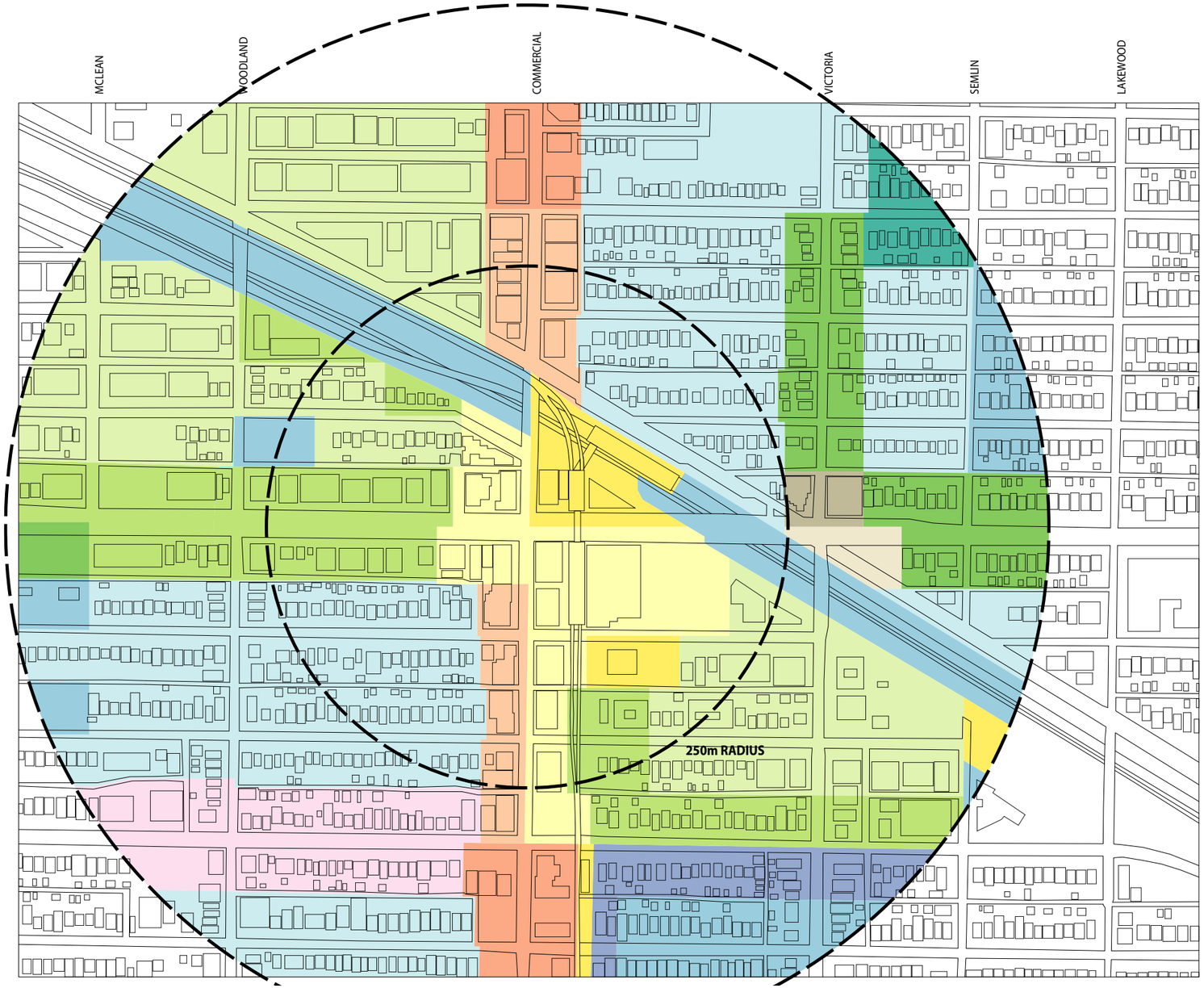
- The concept phase included a full day site assessment and issue synthesis workshop with the stakeholder group (Translink, City of Vancouver, Coast Mountain Bus Company and SkyTrain), in addition to meetings with project managers and technical steering committee. The findings of this phase are summarized in this report.
- Upon completion of the concept design phase, the concept development phase will commence. This phase will include staff reviews and meetings with the technical steering committee.
- The submittal of the final report will include a public open house in early Fall 2005 followed by a report to council scheduled for late Fall 2005.

1.4 Related Projects and Previous Initiatives

1.4.1 City of Vancouver Precinct Plan

The Transit Village Plan addresses the area defined by the City of Vancouver in its 2001 "Broadway/Commercial Drive SkyTrain Station Precinct Plan". The purpose of the Precinct Plan is to provide the framework for coordination of SkyTrain related transportation, greenway, bikeway and street improvements. The encompassing vision for the precinct is "that it should be a high priority to enhance public and pedestrian safety and comfort, support its role as a transit hub, and strengthen the shopping vitality of Commercial Drive.

Figure 1-3 Broadway-Commercial Station Area and Zoning



KEY:

C1	Provide for small-scale convenience commercial establishments, catering typically to the needs of a local neighbourhood and consisting primarily of retail sales and certain limited service functions, and to provide for dwelling uses designed compatibly with commercial uses.
C2	Provide for a wide range of goods and services, to maintain commercial activities and personal services that require central locations to serve large neighbourhoods, and to provide for dwelling uses designed compatibly with commercial uses.
C-2C	As in C2 and to encourage creation of a pedestrian oriented district shopping area by increasing the residential component and limiting the amount of office use.
C-2C-1	As in C2 and to encourage creation of a district shopping area by increasing the residential compo-nent and limiting the amount of office use.
C-3A	Provide for a wide range of goods and services, to maintain commercial activities, specialized services and some light manufacturing enterprises while preserving the character and general amenity of the area and its immediate surroundings, and to provide for dwelling uses designed compatibly with commercial uses.
CD-1	A separate CD-1 bylaw exists for each area or site zoned CD-1, tailor-made to the intended form of development.
RM-3	Permit medium density residential development, including high-rise apartment buildings, and to secure a higher quality of parking, open space and daylight access through floor area bonus incen-tives.
RM-4	Permit medium density residential development, including a variety of multiple dwelling types, to encourage the retention of existing buildings and good design, and to achieve a number of commu-nity and social objectives through permitted increases in floor area.
RM-4N	As RM-4 and the RM-4N District requires evidence of noise mitigation for residential development.
RS-1	The intent is to maintain the single-family residen-tial character of the RS-1 District and, in the RS1S District, to conditionally permit two-family dwell-ings and encourage new development that is simi-lar in character to development in the RS-1 District.
RT-4 RT-5 RT-5A RT5AN RT-5N	The intent is to encourage the retention of existing residential structures and to encourage and main-tain a family emphasis in the RT-4, RT-4N, RT-5 and RT-5N Districts emphasis is placed on the external design of all new buildings and additions being compatible with the historical character of the area, and on being neighbourly in scale and placement. In the RT-4A, RT-4AN, RT-5 and RT-5AN District this emphasis is limited to certain uses or, in RT-5A and RT-5AN Districts, to development seeking density relaxations. The RT-4N, RT-4AN, RT-5N and RT-5AN Districts require evidence of noise mitigation for residential development.

Area planning is composed of five initiatives:

- The community vision set out by the Kensington/Cedar Cottage Vision;
- The now operational Commercial SkyTrain Station and Millennium Line;
- Transportation policies as approved in plans such as the 1997 Transportation Plan – identifying the road network and priorities for pedestrians, cyclists and transit;
- Precinct planning as set out by the public consultation process; and
- The planning and implementation of the Central Valley Greenway which links Vancouver, Burnaby, and New Westminster.

1.4.2 Project Charrette

In June 1999, the City of Vancouver's Rapid Transit Office, in collaboration with Rapid Transit Project 2000, sponsored an urban design charrette for the Broadway/Commercial Station Precinct. The main objective was to respond positively to the proposed SkyTrain extension providing ideas for fitting the station and its associated development into the fabric of the community.

A Working Group composed of residents, merchants, property owners and community group representatives was struck to provide a discussion forum and also to provide advice to the City and Rapid Transit Project 2000 through the charrette process. A summary of objectives and conclusions developed at this charrette is included in Appendix A.

1.4.3 Walkthrough and Workshop

On March 23 2005 the consultant team met with representatives of the stakeholder group (Translink, City of Vancouver, Coast Mountain Bus Company and SkyTrain) for a site walk-through followed by a workshop at city hall. The goal of the walk-through was to familiarize all parties with the site and to identify the issues that need to be addressed in the scope of the Transit Village Plan.

The workshop that followed gave each stakeholder and consultant the opportunity to express her/his specific concerns. City of Vancouver staff with relevant expertise joined the team and provided background to the site as well as invaluable insight into the City's view of the site and surrounding precinct. Results of this walkthrough and workshop are presented in Appendix B.

1.4.4 Accessible Transit Strategic Plan

An additional parallel study which complements the Transit Village Plan is the Accessible Transit Strategic Plan (ATSP) being undertaken by TransLink. The ATSP includes the development of improved and more consistent wayfinding tools across the various transit modes operating in the Greater Vancouver region. This work will be coordinated with the Broadway/Commercial Transit Village Plan with a view to improving the design, accessibility and amenity of Broadway Station and enhancing the pedestrian, cycling and transit user environment immediately around both stations.

1.5 Report Structure

The Transit Village Plan includes a number of components.

In Part A the Plan provides background information and analysis of best practice with respect to multimodal interchanges, transfer facilities and transit villages. This information will help to frame later efforts to understand the site and define projects to improve its performance both in terms of transit ridership, interchange efficiency, community livability and greenhouse gas emissions.

The principles identified in the best practice analysis are then applied to the particular conditions existing and projected for Broadway/Commercial in order to understand related issues, constraints and opportunities at the site. These issues, opportunities and constraints will be described through quantitative analysis of conditions as well as a series of photo essays focused on the three-tiered study area.

In Part B the Plan investigates design options and recommendations for Broadway and Commercial Station stations and immediate areas, including potential redevelopment in the vicinity of Broadway/Commercial. The redevelopment opportunities associated with the parcels of land adjacent to the station area is key in the future viability and vitality of the area. There are a number of significant sites that will require detailed study of development options, in addition to working directly with the land owners to encourage their redevelopment over time. These options will not be included in the initial site assessment but will be developed in later stages of the Transit Village Plan.

2.1 Introduction

By transfer or interchange "area," we imply a looser organization, where the paths among various modes or lines are not dedicated solely to transit passengers. Due to the wide dispersal of connecting transit services and the lack of dedicated pathways among them, Broadway/Commercial is, at best, an interchange area.

Finally, although we use the term "transfer" because it is an industry standard, this common word may generate some negative associations, because it is based on metaphor of freight. In the future, the verb "to connect" and the noun "connection" should be tried as alternatives to "transfer."

2.2 Continuity of Physical Transfer

The two root barriers inherent in transferring are time and effort (physical and emotional, real and perceived). Almost all other issues are parts of these two – for example, designing for good wayfinding, security, and providing retail and stop amenities all mitigate a passenger's emotional stress of getting the connection on time, or enduring waiting time for the next mode. Indeed, a Gothenburg, Sweden, study (1991) found that the main factors in interchange decisions for passengers were time and distance related – specifically, the distance between different services and the length of wait.

The Wardman, et al, study (Scotland, 2001) showed that passengers are very sensitive to the distance required to change modes. Their study asked transit riders to state their opinions about various types of interchange between modes, ranking them from 'Don't Mind at All' to 'Dislike Very Much'. The survey found that the proximity of interchange modes or services to one another is significant for transferring passengers – transferring across a platform was acceptable to 98% of those surveyed, while transfers involving walks (through bridge or subway, 50-75% acceptance) or interaction with physical space outside the transit zone to an adjacent or cross-town station (7-31% acceptance) were far less tolerated.

This is not surprising when considering the time penalty of long on-foot journeys between modes. Several studies have assigned time values to various aspects of the interchange experience. From the Wardman study (2001):

- An interchange involving a change of platform via subway or bridge relative to a cross-platform transfer was valued at 9 minutes of connection time.
- A change of station – exiting one station, walking some distance and entering another – was valued at 27 minutes
- Good information relative to poor information was equivalent to 7 minutes.
- Good facilities, such as quality food, dry cleaning, information and other vendors, at a station compared to poor and medium facilities were 18 and 9 minutes of interchange time, respectively.
- Interchange penalties were lower for underground-to-underground transfers (cross platform or other), following by surface rail-to-rail, bus-to-rail, and bus-to-bus transfers

London Transport (1988) found an average penalty of 5.4 minutes travel time for routes with an interchange, versus those without. A further analysis using 1990 data estimated a 3.7 minute penalty for peak period interchange, with both studies weighting walk and wait time as twice in-vehicle time. That is, passengers value a 5-minute walk time or a 5-minute wait time for a vehicle the same as they value 10 minutes sitting in a transit vehicle. When considering the comparative attractiveness of trips, a modeler would consider a transit trip that includes 20 minutes of in-vehicle time plus 5 minutes of waiting and 5 minutes of walking between modes as a 40 minute trip total.

In the Wardman study, survey respondents wrote down the time spent walking between stops at an interchange, and commented on whether the time was "too long" or "not too long." Using these perceptions, the study assigned values to acceptable lengths of trips – walking trips between stops of 0-2 minutes were considered short, 2-4 minutes medium, while walks over 5 minutes were long.

For interchanges between stations -- that is, when passengers must exit one station, walk some distance and enter another station -- not only are passengers penalized with the time of the journey between modes or services, but the possibility of getting timed transfers or making a quick connection to the next mode is far less likely.

2.2.1 Interchange Access, Egress and Proximity to Different Modes

The physical siting of an interchange location is critical in minimizing the time and distance it takes passengers to get between modes. According to a Federal DOT paper (Horowitz, 1994), "An intermodal facility will ultimately be judged by its ability to serve passengers, and its location is critical to the quality of that service. Inappropriate site selection can doom the success of the facility."

Poor siting of the facility is also directly related to the need for wayfinding infrastructure. If the relationship between modes is intuitive (i.e. modes are across platforms from each other, buses proximate to entrances to stations, or in view of each other) the need for wayfinding media such as signs and design elements recedes. If there are long journeys or visual barriers such as walls, variation in topography, or turns in the path, the transfer becomes more physically and mentally arduous for the passenger.

The GLA Best Practices outlines two key suggestions for physical space requirements and ideal proximity of various modes to each other:

- Reliability is central to the quality of both bus and rail services, and adequate layover is subsequently necessary. Provision of optimum bus service requires that layover space is at, or very close to, terminal points.
- On-street bus stops should be located to minimize walk distances to other services and

modes, to optimize the ability of pedestrians to walk safely along natural desire lines and where possible to minimize conflicts with other pedestrians. However, it may not be desirable for bus services to make long detours to achieve this – some balance of route efficiency and transfer efficiency must be struck.

According to the preliminary results of the transfer analysis, transfer between SkyTrain and the various bus lines in the Broadway/Commercial area will be very important, particularly the 99 B-Line service to UBC. In fact, there are more boardings and alightings on bus services in the area than at Commercial Station.

2.3 Wayfinding

The ability of a passenger to easily find their way from one mode to another is the most critical part of designing good interchanges, and one of the best ways to minimize time and stress. While wayfinding is often thought of as the job of signage, the best wayfinding is the kind that doesn't need signs, because the passenger can see where she's going and the environment encourages here to go the right way. Architectural elements which assist wayfinding might include prominent corner expression and detailing all entries to more prominently announce the station. Wayfinding is therefore, first of all, a design consideration. In the design of interchanges, shopping malls, airports and other complex environments, the need for signage is seen as an admission of design failure.

There are two primary ways that design promotes easy wayfinding: physically siting the interchange location where different modes are in close enough proximity to build an interchange facility, or second, to use signing, design elements, and siting mode stations along direct lines-of-sight to create coherent connections along public streets or space.

In the case of Broadway/Commercial, where modes are spread out along streets, the latter option is most likely the most realistic one. The GLA Best Practices and TCRP manual articulate several guidelines for effective design of pedestrian paths, type and use of signage, and information provision that facilitates easy and clear interchange.

2.3.1 Pedestrian Path

Effective pedestrian path design encompasses the following elements:

- Clear sightlines should be provided along pedestrian desire lines. The use of transparent materials can enable passengers to see the place to which they wish to walk and promote feelings of personal security.
- Pedestrian routes should be kept clear of structural elements and other obstructions that can lead to delays and congestion. Pillars, alcoves, and 'hidden' spaces, for example, should all be avoided.
- Ticket offices and ticket halls should be designed and oriented to provide convenient walk links to key passenger objectives within and beyond the zone, particularly other public transportation facilities.
- Pedestrians should be segregated from road vehicles (including trucks, cars, taxis, buses, and bicycles) as much as possible. Guard rails and glazed panels, pedestrian crossings should all be implemented.
- Signal controlled pedestrian crossings should be considered with large numbers of pedestrians.

2.3.2 Signage and Indication

The TCRP and GLA Best Practices manuals' design suggestions for station layout and wayfinding emphasize transparency, clear signage, and intuitive layout:

- Whenever a passenger has to make a decision about which direction they should choose, options should be clearly signed to provide guidance and reassurance.
- Signs should be legible in terms of their typeface and size, and should not be obscured by other signs, pieces of equipment, or other objects.
- Signs should follow a consistent hierarchy, providing more information about the upcoming mode or service as the passenger moves closer to it.
- Signs should incorporate service "branding" and internationally recognized symbols and pictograms, and can be made easier to read with the use of other visual aids like lighting, arrows on the floor, and the use of color in architectural finished such as floor finishes and wall tiling. In the case of Broadway/Commercial, branding for the bus lines (or at least the 99-B) is just as important as branding for the SkyTrain stations.
- Design and location of signs should take full account of the needs of partially sighted passengers, signposting any physical barriers such as stairs.
- Main routes between the interchange facility and key passenger destinations– including not only other transportation lines but also final destinations such as "University of British Columbia" or "Downtown Vancouver" -- should be clearly signed. The entrance to the interchange facility or individual mode stations should be highly visible to people arriving on foot and by other modes, and should inform people which modes serve the interchange facility before they enter it.
- Open ceiling and glass walls can provide visual connections to other levels and between points inside and outside the station
- Alternate materials and colors can distinguish between alternate routes or services; these should be used consistently system-wide
- Tactile signage and audible information offers direction and information to persons with visual impairments

2.4 Information

Access to readily available and clear information is consistently one of the most important aspects of positive interchange that come up for passengers. According to the GLA Best Practices, all interchange facilities should have at least one information point displaying information about all the services that depart from and arrive at the interchange area. Co-locating ticketing and information facilities is also preferred by most riders. Since Broadway/Commercial is comprised of four scattered "stations," at least a subset of the system and precinct information should be made available in all four locations, with indication as to where additional information can be found.

Real-time information is also a common request by passengers, and provides many secondary benefits with up-to-the-minute arrival and departure information. The signs for real-time information are often large and centrally placed, providing passengers with a consistent and visually accessible source of information for their mode, eliminating the need to find a posted timetable or dig in pockets for a printed schedule. More importantly, it allows passengers to make the best use of their time in the event of a long wait or delay, and provides peace-of-mind that they know exactly when the transit is departing and won't miss the connection. Since SkyTrain runs so frequently, real-time information on train arrivals is less important than for bus arrivals.

2.5 Safety and Security

Real and perceived feelings of safety and security are extremely important in interchange design. Moving between modes or services can leave passengers feeling vulnerable, particularly if the interchange is at night or times when few people are around, if the distance is long, poorly lit, or lacking appropriate surveillance.

In many cases the same design elements that contribute to wayfinding can also contribute to real and perceived safety within the station, and hence greater passenger comfort. Specific measures articulated by GLA Best Practices manual include:

- Locate staff facilities so that staff can see and be seen by passengers
- Locate waiting facilities so that passengers can see and be seen by other passengers and staff
- Provide help points, mirrors and CCTV
- Design out blind corners, recesses and other places where people can hide
- Use transparent materials
- Ensure that all areas used by passengers and staff are well lit
- Provide areas where passengers can gather and wait until they are informed via real time information displays that their service is about to arrive
- When elevators are needed for change in vertical height, locate waiting areas in busy places and use transparent materials

In 2004, TransLink commissioned a study entitled Qualitative Research on SkyTrain Strategic Development. This study sought input from SkyTrain users regarding the planning and implementation of new strategic directions that focus on positioning the SkyTrain system as community-oriented and making stations more user-friendly without increasing staffing levels. The study highlighted perceived safety and security issues at and around SkyTrain stations as well as potential solutions including:

- Conducting a communications campaign to "get the real story out" and overcome misconceptions regarding the levels of fare evasion, criminal activity and security staff in the SkyTrain network
- Improving the clarity of signposting in stations, particularly from the point of view of a first time user, about security arrangements including designated waiting areas and how to communicate with SkyTrain staff
- Clearly identifying staff of all job descriptions to help create feelings of contact and reduce the isolation component of potential passenger anxiety, discomfort and insecurity
- Creating community-based station conditions where there are more people at stations, even in off-peak times

Since SkyTrain does not have permanent station agents, retailers and kiosk vendors can supplement SkyTrain Attendants and other SkyTrain employees in providing informal surveillance and passenger assistance. The provision of night-time transit services, such as the N9 and N20 which operate until 3:30 AM, also bolsters the number of people and helps to create a more dynamic atmosphere at and around the stations during off peak times.

2.6 Design Quality and Amenities

There are several aspects of design quality that affect the experience of the transferring passenger: the design of the physical infrastructure that connects various modes (i.e. width and style of walkways, grade change mechanisms), ancillary infrastructure (trash cans, benches, newspaper stands), and any retail shops.

2.6.1 Transiting Infrastructure: Queuing, Waiting, and Traveling Space

The same design guidance and performance measurement applies for both off-street transit centers as well as more complex transfer areas that include on-street bus stops. On city streets, however, various unpredictable elements are introduced. At Broadway/Commercial, pedestrian levels of service (LOS) are compounded by external, non-transit related factors such as non-transit pedestrians, and navigating road crossings and interactions with other modes. Many of the aspects of designing transiting infrastructure were described above – the importance of fluidity of movement, ease of wayfinding, and minimizing time and distance from one mode to another. For example,

at a traditional interchange, designers would plan for a limited number of clear pedestrian lines-of-sight and ensure minimum conflicts and interruptions among them. At Broadway/Commercial, however, pedestrian cross traffic, auto traffic, unrelated retail traffic and other movements ensure that fluid pedestrian channelization is not possible.

Designing for specific widths and types for optimum pedestrian LOS (such as the ability to by-pass slower-moving pedestrians and select one's own desired speed) is explained in formula in the TCRP Transit Capacity and Quality of Service Manual. LOS is affected by three factors -- the speed of passengers, density of passengers, and the effective walkway width. The speed of passengers fluctuates based on the time of day, weather and temperature, pedestrian traffic composition (including wheelchair users), trip purpose, and reaction to surrounding environment. Passenger density is translated as the available space for each passenger to move – increase in density reduces the available space for walking and increases conflicts between pedestrians, and therefore, reduces walking speeds. Pedestrian speeds are free-flow up to an average pedestrian space of 2.3 square metres (25 square feet) per person. That is, a sidewalk with a 3 metre (10 foot) clear walking area can have 4 pedestrians for every 3 metres (10 feet) of length and still be at free-flow conditions. More pedestrians or a narrower sidewalk increase pedestrian density and would decrease maximum pedestrian speeds, with slower pedestrians limiting the speed of faster pedestrians. Studies have shown that pedestrians keep as much as an 18-inch buffer between themselves and adjacent walls, street curbs, platform edges, and other obstructions. This buffer can vary based on the overall width of the walkway, the level of pedestrian congestion, and the type of adjacent wall or obstruction.

Maximum average peak flow rates occur at an average occupancy of 0.46 square metres (5 square feet) per person. For one-directional pedestrian flow such as along the divided passarelle, the maximum average peak flow is 86.0 persons per metre per minute (26.2 persons/ft/min) on either side of the divider. For bi-directional pedestrian flow such as along a standard sidewalk, the maximum average flow is 81.0 persons per metre per minute (24.7 persons/ft/min). For multi-directional flow such at the confluence of the sidewalk and the SkyTrain entrance, the maximum average flow is 76.4 persons per metre per minute (23.3 persons/ft/min). This means that, on a crowded sidewalk such as the Commercial Drive bridge with pedestrians literally rubbing shoulders, it is possible to move 81 pedestrians per metre of bi-directional sidewalk width per minute.

For the design process, the TCRP manual outlines formulas and methodology for determining space necessary for multi-activity passenger circulation areas, access for persons with disabilities, emergency evacuation, security, clarity of station layout and wayfinding, and comprehensive analysis of passenger circulation.

2.6.2 Ancillary (Retail) Activities and Infrastructure

Interchanges are not just transport spaces, they are also public spaces, and this is especially true of the area in and surrounding Broadway/Commercial Station. Providing non-transportation related facilities such as shops, places to buy food and drink, and cash machines is beneficial for both passengers and merchants. It makes passengers' waiting time more enjoyable, and allows them to incorporate other aspects of their life into their transit trip. Shopping or retail areas can also can make passengers feel more secure, particularly during less busy periods of the day or during the evening, and revenues from leasing space or other sources can also help to fund improved interchanges.

Using public art and planting can also make transfer areas more attractive public spaces and improve the waiting or transferring experience (thus making the transit trip more attractive). In placing the public art or planting, however, it is important to ensure that the features do not obstruct pedestrian routes or provide screens for anti-social activities.

2.6.3 Waiting Area Comfort

Providing comfortable waiting areas at the major stops or stations is also important. GLA's Best Practices manual suggests providing the following for waiting passengers:

- Weather protection and heating (depending on weather)
- Seats
- Public address and real time information
- Help points
- Telephones
- Toilets and baby changing facilities
- Clocks
- Appropriately located waiting facilities

According to the GLA Best Practices manual, where shared waiting facilities are provided they should be located as close as possible to those services where the volume of waiting passengers and the time that they are likely to spend waiting is greatest.

The SkyTrain 2004 Qualitative Research study emphasizes the need to improve station décor and ambience in order to increase feelings of physical and emotional warmth. Solutions to consider in relation to this improvement include:

- Improving Expo (Broadway) station design to fit into its surroundings and create an warmer, friendlier, more attractive and cleaner environment
- Ensuring that bus and train waiting areas have adequate protection from the elements through the use of wind breaks, heaters or both
- Employing some surfaces, such as pillars and columns, for advertising in order to make the station more interesting and provide commercial benefits for SkyTrain
- Providing more seating both on platforms and in bus waiting areas

2.6.4 Bicycle Amenities

Around transit interchanges, it is important to provide convenient and secure bicycle facilities to enhance station access by non-motorised modes. At a minimum, the GLA manual suggests that bicycle facilities should be:

- Easy to use
- Located for convenient access to the station
- Secure (in public view, or monitored by CCTV)
- Protected from the weather
- Well lit
- Clearly signed

For example, BART seeks to place bicycle racks within view of the station agent, oftentimes on the mezzanine level of a subway station or immediately outside the faregates of an elevated station.

A portion of the bicycle facilities at Broadway/Commercial may be provided in the form of a bike station. The bicycle station would offer a secure, staffed bicycle parking for members and visitors in a covered area such as the presently under utilized space beneath Broadway station. Bicycle station facilities generally include a combination of the following:

- Secure, covered and affordable bicycle parking spots
- Convenient operating hours and friendly, helpful staff
- Convenient access to public transportation
- Trip planning information
- Shared-use bicycle rentals for local and tourist needs
- Bicycle repair facilities and services
- Bicycle and commute sales and accessories
- Restrooms and changing rooms
- Access to environmentally-clean vehicle-sharing

2.7 System-wide Integration and Other Transit Elements

The guidelines above articulate some of the design techniques that can be implemented to create seamless interchange areas. There are other strategies that have been used in existing hubs in the US and abroad that provide more technical approaches to connecting modes at Broadway/Commercial.

2.7.1 Queuing Strategies

Interchange between several high-capacity or high-frequency modes can create pedestrian crowds both at the waiting area, transfer paths, and adjacent city streets. This can be a particular issue when queuing and transferring takes place on city streets and interfaces with non-transiting pedestrians and automobiles. For areas where boardings and alightings are high and ambient pedestrian LOS is congested, there are alternative queuing strategies that can minimize the further impact of transit on pedestrian LOS, such as real-time zoned boarding and corral strategies for waiting passengers.

In Melbourne, the light rail network utilizes “Superstops” to maximize platform space and minimize dwell time at stations. Instead of having a dedicated bay for each vehicle, the Superstops split platforms into three zones and use real-time information to alert passengers to which train will arrive at which boarding area. For example, the overhead might say “Line 2 to St. Kilda will be arriving at Zone A in 2 minutes”, allowing enough time for waiting passengers to move to the appropriate loading place and those waiting for other trains to step away.

Some bus terminals – the El Monte Station near Los Angeles, for example – use the same approach, alerting passengers to the route that will arrive at each bay several minutes before the bus arrives. This strategy maximizes the use of limited space, eliminating the need to hold assigned bays open for late vehicles that could otherwise be used for other buses in the interim. For buses that share stops along street curbs, real-time information helps passengers know when their bus is arriving, which helps keep the boarding and alighting areas clear of passengers not wishing to take the arriving route.

2.7.2 Self-Service Fare Collection (SSFC) Strategies

Transit operators are increasingly implementing self-service fare collection (SSFC) systems – also known as barrier-free or proof-of-payment (POP) systems – in order to reduce “dwell time” for transit vehicles to stop and board passengers.

Conventional fare collection (CFC) systems for bus transit require all passengers to board through the front-door and to pay their fare once on board the bus either by paying a single-ride cash fare or by showing the driver a transfer, multi-ride or monthly pass. SSFC systems reduce dwell time by allowing transit riders to pre-purchase fare instruments and to board through multiple doors. Riders are then expected to carry a valid single-ride ticket or pass, and are subject to random inspection by roving inspectors and enforcement agents.

SSFC systems may be accompanied by a variety of other operational and design features as listed below:

Figure 2-1 SSFC Operational and Design Features

Objective	Feature	Location of Feature
Reduce queuing at front-door or farebox reduce bunching at backdoor during exiting	Ticket vending/validating machines to pre-purchase fare instruments	At stops/stations
	Universal transit pass programs e.g. U-Pass at UBC	Major trip generators
	Allow passengers to board through all doors	Vehicles
	Multiple doors e.g. articulated buses	Vehicles
	Wider doors to allow simultaneous boarding & alighting	Vehicles
Reduce climbing, especially for younger, older, and mobility-impaired riders	Low-floor vehicles	Vehicles
	Platforms or raised curbs which are level with vehicle floor	All major stops/stations
Reduce passenger uncertainty & questions to drivers, especially by occasional riders	System maps and wayfinding signage	At stops/stations and on vehicles
	Verbal announcement and/or visual indication of all stops/stations and major destinations in the vicinity	At stops/stations and on vehicles)
	Real-time arrival information of multiple routes/vehicles to allow passengers to know how much time they have before the next vehicle arrives	At stops/stations
Reduce fare evasion	Roving inspectors	Across system
	Semi-regular and highly visible increase in enforcement	Across system

SSFC systems are usually implemented for rail. Commuter rail systems, such as Caltrain in Northern California and GO Transit in Toronto, are generally barrier-free, allow the advance purchase of tickets, and involve either conductor-validated or self-service fare collection systems. Some heavy rail systems, such as the Los Angeles Red Line and Vancouver SkyTrain, also provide barrier free SSFC. An increasing number of light rail transit (LRT) services, such as the NJ Transit Newark City Subway and San Francisco Muni, have also adopted or converted to SSFC. In the case of Muni, SSFC operation is only partial with some stations not equipped for ticket sales and riders paying on board by boarding the first car.

More recently, SSFC systems have been applied to a growing number of bus services, particularly newer bus rapid transit (BRT) systems and routes, transfer points or zones where passenger volumes are relatively high and travel delays pose a significant or recurring problem. In Ottawa and Toronto, the OC Transpo Transitway and Queen Street Streetcar employ SSFC to minimizing boarding times on multiple-unit streetcars or articulated buses. On these systems, passholders can board through any door while riders without passes need to pay on board at the farebox and collect a POP receipt from the operator.

In Vancouver, TransLink permits all-door boarding on articulated buses at four locations including three locations where university students (holding U-Passes) represent over 90% of ridership. In addition, Vancouver's 99 B-Line uses SSFC at Broadway-Commercial where buses board all doors and staff are sometimes assigned to check passes as people board through the back. At this location TransLink has achieved a 66% reduction in boarding times from 4.5 minutes to 1.5 minutes.

Revenue lost from fare evasion with SSFC systems is generally small and is often more than compensated by citation revenue and operational savings. In a survey of the San Diego Trolley, only 0.5% passengers who were checked could not show proof of payment. Despite evidence of some chronic fare evaders, low collection rates for citations and an 85/15 revenue share for citations collected, annual citation revenue of $21,000 exceeded estimated fare evasion losses by $1,700 a year. Total annualized savings of SSFC to the San Diego Trolley were estimated to amount $195,000 per year, including operating and capital costs associated with fare collection and inspection.

Not all SSFC systems are successful. In Portland, Tri-Met introduced SSFC on buses as part of a federal demonstration project in 1982. The system was deemed impractical for Tri-Met bus fare collection, which subsequently reverted to a conventional system of pay on boarding. Evidence suggests that the Tri-Met's SSFC failed for a number of reasons: Firstly, there was no credible threat of enforcement since citations could only issued by sworn police officers whereas Tri-Met staff could only issue premium fare notices. Secondly, the short distance between stops on local routes (as opposed to BRT or LRT) made it easy for people to get off crowded services if they saw a fare inspector coming. Thirdly, by extending the program across the entire system, Tri-Met spread their resources over many low-demand routes and low-demand times when there was no travel time benefit to all-door boarding but where problems with ticket dispensing machines imposed significant maintenance demands. And finally, a general recession during the demonstration period also damaged ridership and revenue. Tri-Met continues to use SSFC for LRT services.

In general, SSFC has been found to be effective for rail and BRT services at high volume locations and times. It promises substantial savings in both travel time and costs where it is implemented for, or extended to, services with sufficient passenger volumes, stop spacing, and inspection and citation rates.

2.7.3 Consistent Branding: Coordination between Transit Systems

Visually unifying all transit modes in an interchange through "interchange branding"– the use of consistent colors, image, and style for presenting information and wayfinding tools (signs, arrows, colors, paving, etc) – is clearly important. The Transport for London Interchange Plan states that, "Poor co-ordination and differing priorities between [transit] organizations can often result in barriers to interchange, and the creation of physical and organizational 'tidemarks' where passengers perceive a change in quality as they pass between areas controlled by different organizations. This can make the journey feel difficult, complex, and disjointed. In these circumstances, the interchange experience will fall short of the aspiration of providing the 'seamless journey'."

London has many of the same interchange constraints as Broadway/Commercial. The transporta-

tion network is a mix of old and newly constructed systems, all of which are entrenched within a mature and densely developed city. Interchange locations are often physically constrained, requiring piecemeal linkages between modes. To clarify the routes between modes, all interchanges in London's transportation network use standard signs with the same font, layout, and symbols for various modes (Thameslink and National rail, buses, tube, DLR). Some stations use color to indicate the interchange path from one line to another; for examples gray tiles gradually turn to blue tiles along the walkway between the gray Jubilee Line and blue Piccadilly Line at Green Park, and all services and lines are color coded. Some stations also include a 'one stop shop' information center that provides information about all modes service the station, and most have real-time information on when tube and rail trains will arrive and depart. The combination of this coordinated wayfinding approach makes using transit in a complicated network and dense city, even with inevitable interchanges, clear and efficient.

At the Broadway/Commercial interchange, consistent branding of both SkyTrain stations and bus stops is needed to achieve an overarching, integrated form for the transit hub, as well announcing the interchange as a neighbourhood heart.

2.8 Transit Village Characteristics

In addition to station design and transit system elements, a number of elements characterize successful transit village areas in proximity to interchanges similar to Broadway/Commercial. Various qualitative and quantitative studies have identified common elements that distinguish true transit villages and transit-oriented development (TOD) from land use and development that is merely "transit-adjacent". Robert Cervero, a professor of city planning at the University of California, Berkeley, talks about the "4Ds" or four dimensions needed for a TOD to work. These dimensions include:

- Density;
- Diversity;
- Design; and
- Access to Destinations.

Each of these elements is briefly discussed in the following excerpts from a NelsonlNygaard article in the May 2003 Special Transportation Issue of the Planning, the magazine of the American Planning Association. Demand management is also discussed as a specific design element of transit villages.

2.8.1 Access to Destinations

As the names suggest, transit villages or transit-oriented development should be located in good proximity to transit services that provide access to a range of local and regional destinations. The transit-oriented development should lie within a five-minute walk of the transit stop, or about 500 metres from stop to edge. For major stations offering access to frequent high-speed service or major interchange (such as Vancouver's Broadway/Commercial interchange) this catchment area may be extended to a 10-minute walk or almost 1 kilometre.

Transportation services should also be of sufficient quality to encourage walking, cycling and transit ridership relative to single-occupant vehicles:

- Transit service should be fast, frequent, reliable, and comfortable, with a headway of 15 minutes or less;
- Roadway space should be allocated and traffic signals timed primarily for the convenience of walkers and cyclists; and
- Automobile level-of-service standards are met through congestion pricing measures, or disregarded entirely.

2.8.2 Density

The role of density in successful transit villages is partly a matter of geometry. All else being equal, the more housing and jobs within a short walk of a transit station, the greater the ridership. According to a 1996 report published by the Transit Cooperative Research Program, a 10 percent increase in population density has been shown to correspond to a 5 percent increase in boardings, while doubling density can reduce vehicle travel by 20 percent.

As a general guide, transit-oriented development (TOD) should provide at least 60 to 75 units per hectare (25 to 30 units per acre) of housing in order to be transit supportive.

Density has even more far reaching implications than pure proximity to transit. Residents of denser communities are more likely to be able to walk to shops and services and thus to be able to live with just one car—or with none. According to research conducted for Fannie Mae's Location Efficient Mortgage program, vehicle ownership falls rapidly as density increases, reaching an average of just one car per household when density climbs to 50 to 75 housing units per hectare (20 to 30 units per acre).

At Broadway-Commercial, the 2001 Census indicates that there are approximately 1,470 units (1,600 residents) within a 300-meter radius of the interchange and 5,720 units (6,460 residents) within a 500-meter radius. This translates to a gross residential density of 52 units per hectare within the 300-meter radius and 73 units per hectare within the 500-meter radius. Existing densities in the vicinity of Broadway-Commercial therefore compare favorably with the desirable density for TODs, although densities within the 300-meter radius are at the low end of the scale (or slightly below) for development near intensive transit service.

Many of the best-performing TODs focus high density immediately around the station. Building height drops rapidly and housing forms change from attached to detached as they approach the existing single-family neighborhoods that surround many of these stations.

At Broadway-Commercial, some increase in building height and density could be implemented if the area were built out to the full density allowed under current zoning. According to current

zoning, the full build-out capacity within a 300-meter radius of the interchange is approximately 1,870 units (2,120 residents) or a gross residential density of 66 units per hectare. Within a 500-meter radius, the full build-out capacity is approximately 7,100 units (7,705 residents) or 90 units per hectare. These figures compare favorably with the desirable density of 60 to 75 units per hectare for transit-oriented development.

2.8.3 Diversity

Not all land uses are equal when it comes to generating transit ridership. Office or retail development tends to employ more workers and thus to produce more riders than industrial uses, for instance.

A less obvious example is affordable housing. Since low-income households tend to own fewer cars and are more likely to use transit, a subsidized housing component of a transit-oriented development can add more riders, as well as furthering other public policy objectives, so long as the development as a whole remains mixed-income and not predominantly subsidized.

It is mixed use however, that has demonstrated some of the highest ridership gains. A balanced mix of uses generates 24-hour ridership. There are places to work, to live, to learn, to relax and to shop for daily needs.

2.8.4 Demand Management

Even the densest mixed-use developments will have only a limited impact if financial incentives discourage residents and employees from taking transit. To achieve the greatest success in reducing vehicle trips, projects need to encompass TOD + TDM, that is, both transit-oriented development and transportation demand management.

Perhaps the most critical element of a TDM package is parking management. After all, unlimited free (to the user, but not the transit agency) parking is one of the biggest incentives to drive, and also encourages people to own a vehicle in the first place. Conversely, research by UCLA urban planning professor Donald Shoup has shown that ending parking subsidies is an effective way to get people out of their cars, reducing vehicle trips by an average of 25 percent. Transit villages should therefore ensure that parking costs are "unbundled," and full market rates are charged for all parking spaces (with a possible exception for time-limited and/or validated parking for shoppers).

Another demand management strategy, used to great effect in Portland, Oregon; Boulder, Colorado; and Santa Clara County, California, is to provide free or discounted transit passes for residents and employees. Unlike the U-Pass program, this program would be primarily subsidized by developers or owners within a residential community.

2.8.5 Urban Design

All else being equal, walkability is maximized when streets are designed to accommodate lower traffic volumes. One key to successful transit villages is therefore to factor the reduced tripmaking benefits of TOD back into the street design, by ensuring that auto capacity is adequate but not excessive given the expected transit mode share.

Many agencies grant trip generation credits for transit-oriented development. The Los Angeles Metropolitan Transportation Authority, for example, offers a 15 percent credit for residentially oriented, mixed-use projects that have at least 24 units per acre and that are within a quarter-mile of a light rail station. The same principle may apply to parking generation within transit villages since reduced parking allows a finer grain of development and smaller block sizes, which create variety and interest.

An important tool for creating walkable streets and transit villages the street hierarchy and design standards written by the Congress for the New Urbanism, together with the Institute for Transportation Engineers and the U.S. Environmental Protection Agency. These standards envisage a new hierarchy of streets – from mews and lanes up to main streets and boulevards, rather than local, collector and arterial.

Common design elements of transit villages and transit-oriented developments are listed below:

- Architecture and/or a place-based zoning code generate buildings that shape and define memorable streets, squares, and plazas, while allowing uses to change easily over time.
- All activities and building entrances front primary pedestrian routes and "main street" corridors. Furthermore, main street corridors have continuous (100%) street frontage with no setback.
- Average block perimeter limited to no more than approx. 400 meters (1,350 feet). This generates a fine-grained network of streets, dispersing traffic and allowing for the creation of quiet and intimate thoroughfares.
- Minimum parking requirements are abolished and maximum parking requirements are instituted: for example, for every 1,000 workers, no more than 500 spaces and as few as 10 spaces are provided.
- Major stops provide BikeStations, offering free attended bicycle parking, repairs, and rentals. At minor stops, secure and fully enclosed bicycle parking is provided.
- Traffic calmed streets with on-street parking, easy access to transit, and roads designed to limit speed to 50 kph on major streets and 30 kph on minor streets.

Broadway Station is now almost 20 years old and is beginning to 'show its age.' Increased ridership and development of the adjacent Commercial Station have changed the passenger circulation patterns of the station in ways that were unpredictable during the initial design. The potential development of the Safeway and CIBC/McDonald's sites bookending the station may have significant impacts on its character and ability to function adequately. This study is an exciting opportunity to address the shortcomings of the Broadway/Commercial Station and its surrounding context as they exist today.

3.1 Passenger Transfer Experience

3.1.1 Transit Service Conditions

It is hard to overstate the importance of Broadway/Commercial station area to the Vancouver region's transit network: Broadway/Commercial is the region's largest rail-rail transfer point, in terms of passengers and frequencies. All passengers from the north side of the Millennium Line transfer here to reach downtown. (The extension of the Millennium Line to VCC will not affect this volume, but it may add new transferring movements in the opposite direction as passengers begin transferring here for travel between VCC and Expo Line destinations.)

Additionally, the station area provides transfers to the 99 B-Line which has the highest bus productivity (ridership per unit of service) of any line in the region, and one of the highest in western North America. The 99 B-Line and the local 9 are also the most frequent bus lines in the region, with both running every 4 minutes during peak hours and every 5-6 minutes midday. Even at these headways, overloads frequently occur.

Transit service conditions for base conditions (throughout the course of the day) and peak hour conditions are displayed on the following two pages, in Figure 3-2 and Figure 3-3 respectively. Base headways of 15 minutes or less for all five SkyTrain and bus routes at the site, provide good to excellent transit quality of service in relation to this important parameter. Other important transit performance indicators include overall travel speed, span of service (hours of operation), reliability and loading/comfort. As shown in Figure 3-1, the Expo and Millennium SkyTrain services perform very well in terns of the first three parameters. The 99 B-Line, 9 and 20 also display acceptable to very good headway and span of service, with less favourable average travel speeds relative to the posted speed limit.

In addition to the routes displayed below, there are two NightBus routes that serve the station, the N9 and the N20. Although minor in comparison to other routes, these service boost overall transit quality of service since they operate until 3:30AM.

Figure 3-1 Weekday Transit Quality of Service*

Route	Location	Avg. Speed (km/h)			Headway (min)			Span (hours)			
		Speed	%PSL**	QOS	Peak	Base	QOS	From	To	Span	QOS
SkyTrain	Expo	52.3	131%	A	3	6	A	05:30	25:30	20.0	A
SkyTrain	Millennium	47.7	119%	A	5	6	A	05:00	25:30	20.5	A
99 B-Line	Broadway	27.2	68%	D	5	10	B	06:30	23:30	17.0	C
9	Broadway	21.9	55%	D	5	5	A	05:00	26:00	21.0	A
20	Commercial	21.8	54%	D	5	7	B	05:00	25:00	20.0	A

* Table based on website schedule information from 7/7/2005 and Quality of Service measures outlined in the TCRP Transit Capacity and Quality of Service Manual, 1999

** %PSL = Average travel speed as a percentage of the posted speed limit

To facilitate access to the above services, non-motorised facilities in the vicinity of the transit interchange include wider pedestrian pathways along Commercial Boulevard within two blocks of the station, as well as designated bicycle routes and greenways in the surrounding area. These non-motorised transportation facilities are shown in Figure 3-4.

3.1.2 Transfer Analysis

Transit connections at Broadway/Commercial account for 116,000 daily boardings and alightings from both rail and bus services. This includes 47,000 boardings and alightings to and from the Broadway SkyTrain station, 27,000 to and from the Commercial Drive station, and 42,000 to and from TransLink bus services including the 99 B-Line service, the #9 bus line, and the #20 bus service. A breakdown of boardings and alightings around Broadway Commercial is illustrated in Figure 3-7 with the quantity of boardings and alightings outlined in Figure 3-5.

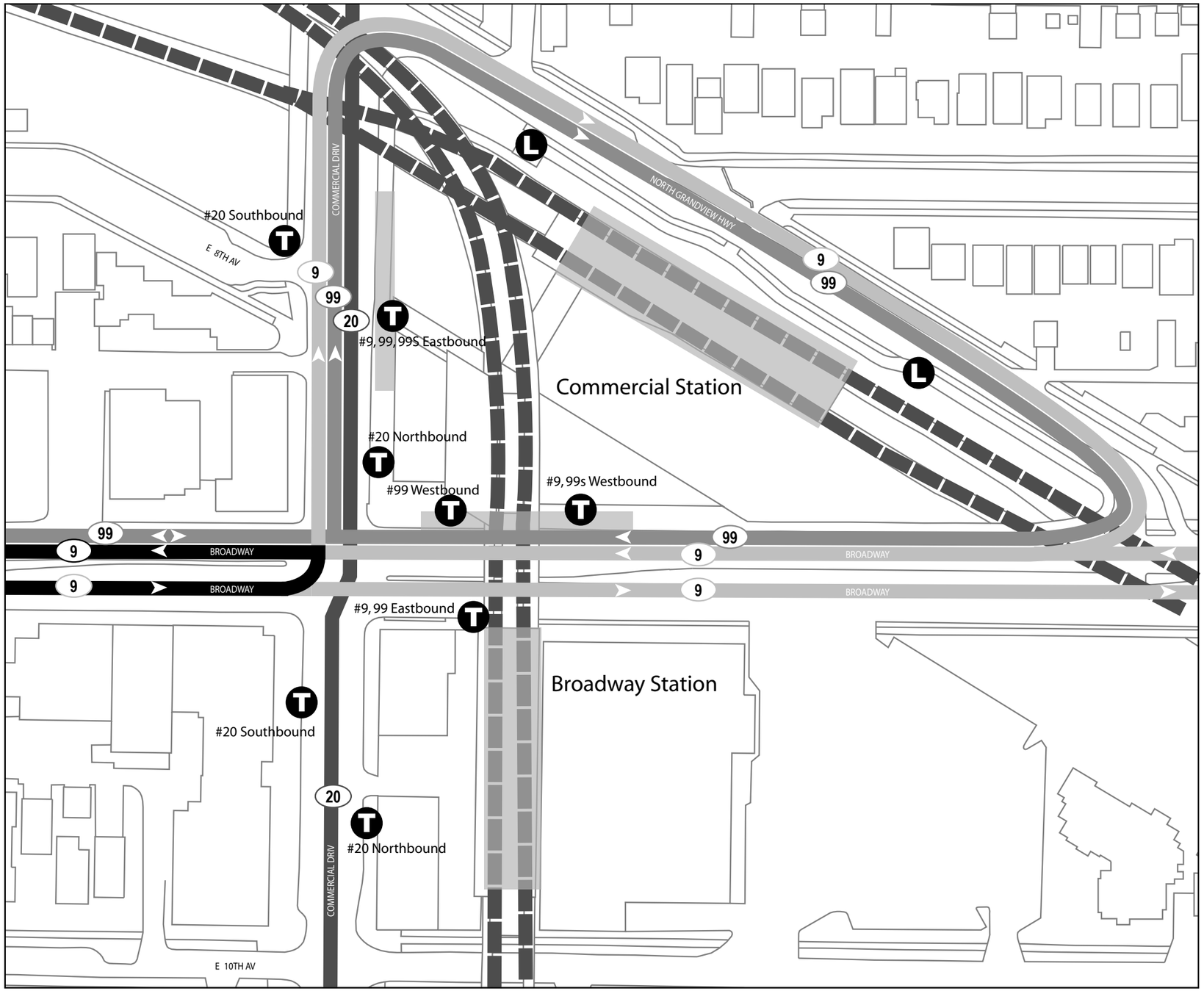


Figure 3-2
Existing Base Transit Service at Broadway/Commercial

Bus Routes (Base Headways)

- 5 Minutes or Less
- 7 Minutes
- 10 Minutes
- 12 Minutes

SkyTrain

- 5 Minutes or Less

- T Bus Stops
- L Bus Layover Area

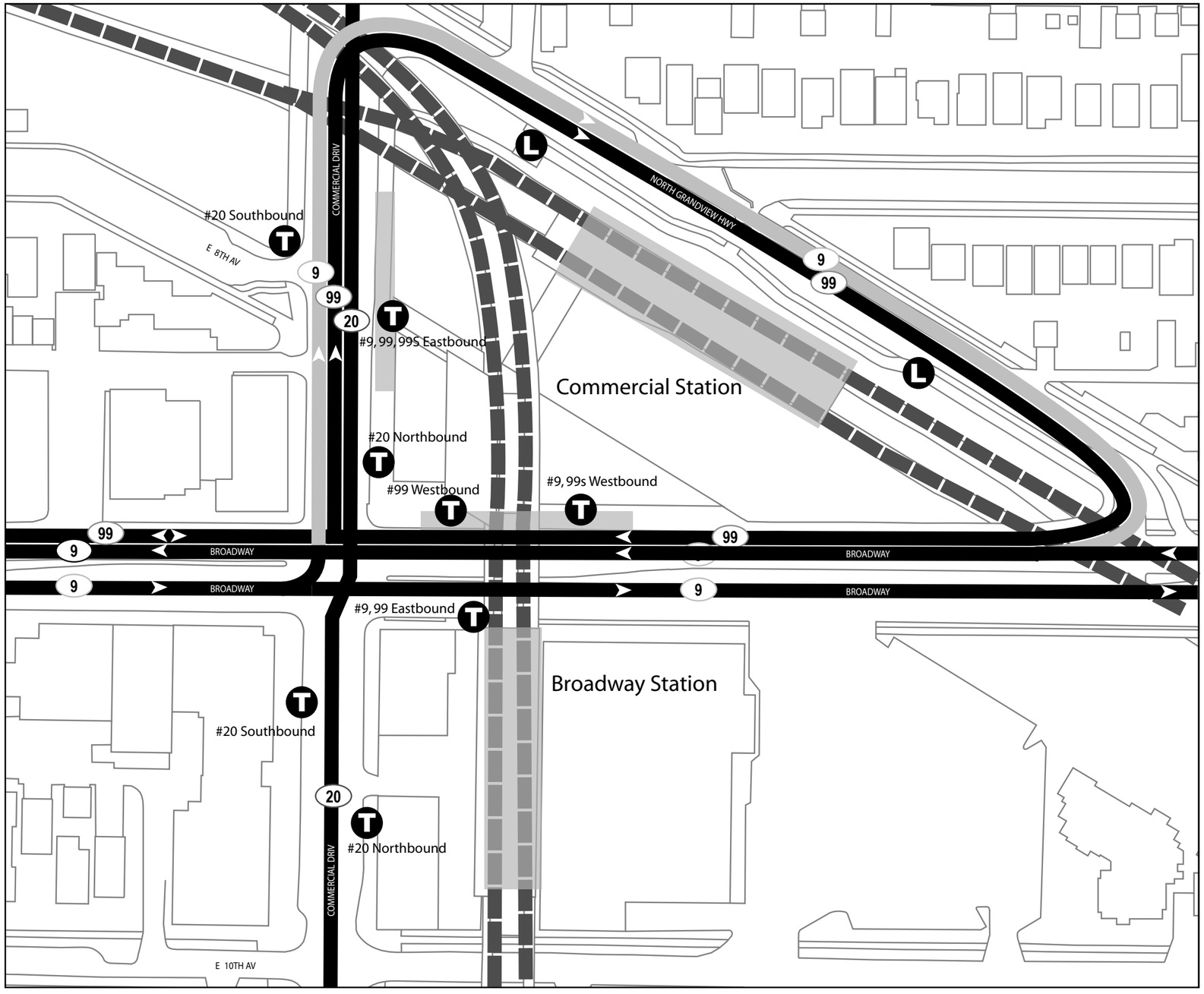


Figure 3-3
Existing Peak Transit Service at Broadway/Commercial

Bus Routes (Peak Headway)

5 Minutes or Less

15 Minutes

SkyTrain

5 Minutes or Less

Bus Stops

Bus Layover Area

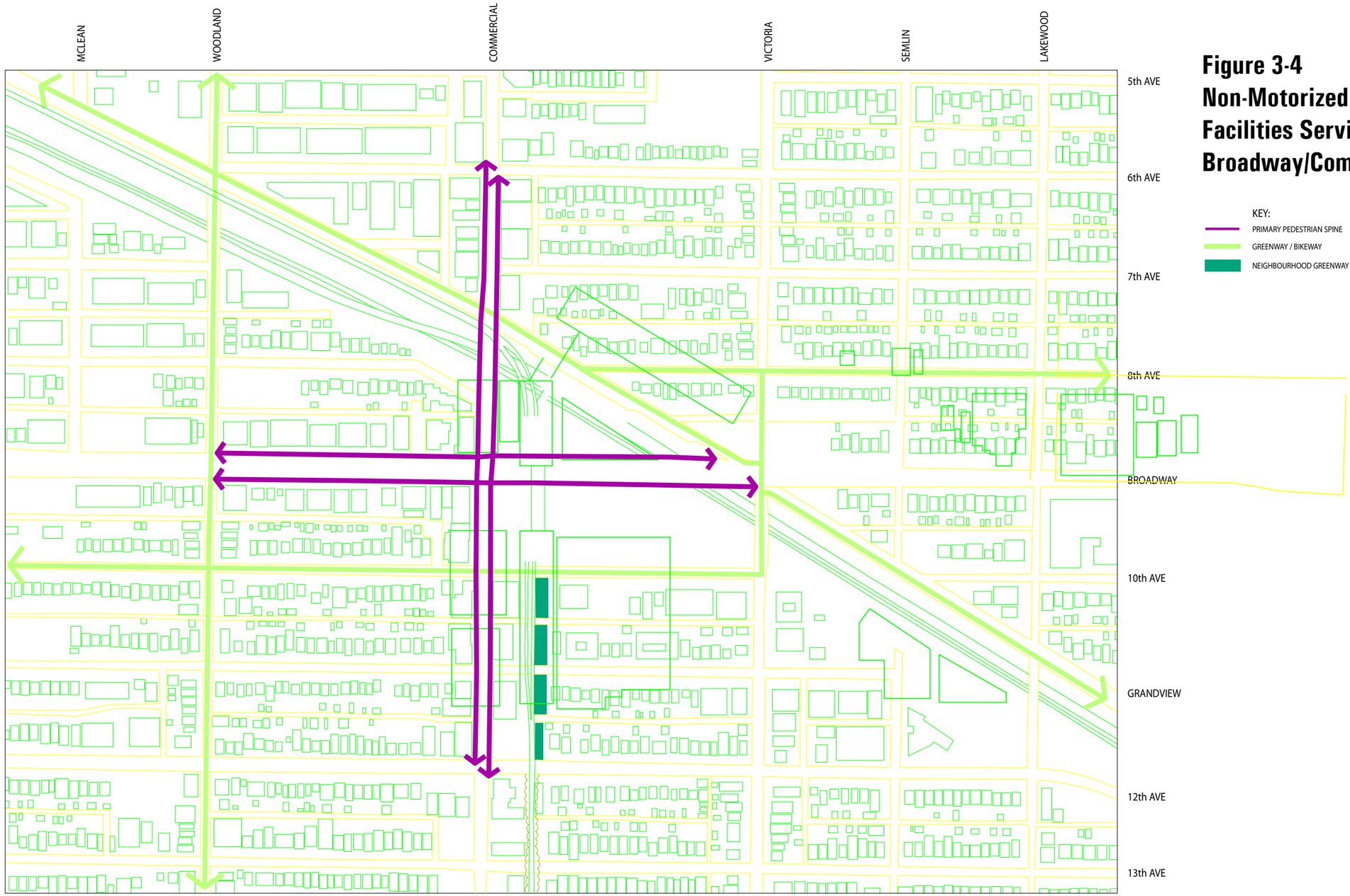


Figure 3-4
Non-Motorized Transportation Facilities Serving Broadway/Commercial

Figure 3-5 Total Daily Boardings and Alightings by Stop Location

Service Type	Location	Route	Board-ings	Alightings	Total*
SkyTrain (2005)	Broadway Station	Expo line	23,500	23,700	47,200
	Commercial Station	Millennium line	12,200	14,600	26,900
	Total	74,100			
Bus (2004)	#20 SB Commercial Dr @ E 8th Ave	20 SB	1,200	600	1,800
	#20 SB Commercial Dr @ Broadway	20 SB	1,900	900	2,800
	#9,99,99S NB Commercial Dr @ Bridge	9 NB	30	3,200	3,200
		99 EB	300	7,000	7,400
	#20 NB Commercial Dr @ Alley	20 NB	900	1,900	2,800
	#20 NB Commercial Dr @ Broadway	20 NB	2,500	400	2,900
	#99 WB Broadway @ Commercial Dr	99 WB	7,200	300	7,400
	#9 EB Broadway @ Passerelle	9 EB	1,700	3,700	5,400
		99 EB	500	2,700	3,200
	#9,99S WB Broadway @ Passerelle	9 WB	3,200	1,400	4,500
		99 WB	200	100	300
				Total	**41,600**

* Numbers may not add up exactly due to rounding

These boardings and alightings translate into an enormous number of pedestrian movements in and around the Broadway/Commercial interchange. These connecting movements are listed in Figure 3-6 and described below.

Inside the SkyTrain system, connecting pedestrian movements include 28,300 movements between the platforms and the Commercial Street exit, 17,900 movements between the stations and the Broadway exit, and 29,300 movements across the passarelle over Broadway.

With 46,200 people passing through the two SkyTrain entrances, roughly 80 percent (or 37,000) of these riders are assumed to connect with bus line services, creating heavy pedestrian flows and dense transfer patterns around the immediate station area and across the Broadway/Commercial Drive intersection. These rail-bus and bus-rail connections include 9,400 passengers moving from the #9,99,99S NB drop-off point on Commercial Dr at the bridge to the SkyTrain stations, 7,600 passengers moving between the #9,99 EB stop on Broadway underneath the passerelle and the SkyTrain stations, and 6,600 passengers moving from the SkyTrain stations to the #99 WB pick-up point on Broadway at Commercial Drive.

Figure 3-6 Connections at Broadway/Commercial*

Transfer Type	Transfer Locations	Broadway entrance (south)	Commercial Driveentrance	Between Stations	Total to/from Stop or Station**
Rail-to-Rail or Rail-to-Exit	Broadway Station	17,900	14,900	13,400	47,200
	Passerelle	-			29,300
	Commercial Dr Station	-	13,400	13,400	26,900
	Total Through Exit	17,900	28,300		74,100
Bus-Rail *(assuming 80% rail-bus transfer)*	#20 SB Commercial Dr @ E 8th Ave	600	1,000		1,600
	#20 SB Commercial Dr @ Broadway	900	1,500		2,500
	#9,99,99S NB Commercial Dr @ Bridge	3,700	5,700		9,400
	#20 NB Commercial Dr @ Broadway	1,000	1,500		2,500
	#20 NB Commercial Dr @ Alley	1,000	1,600		2,500
	#99 WB Broadway @ Commercial Dr	2,500	4,100		6,600
	#9,99 EB Broadway @ Passerelle	3,000	4,600		7,600
	#9,99S WB Broadway @ Passerelle	1,700	2,600		4,300
	Total	14,300	22,600		37,000

* Based on 2005 SkyTrain ridership data and 2004 CMBC bus data on the distribution of boardings and alightings in the Broadway/Commercial station area

** Numbers may not add up exactly due to rounding

These connecting movements between transit stops are displayed in Figure 3-8.

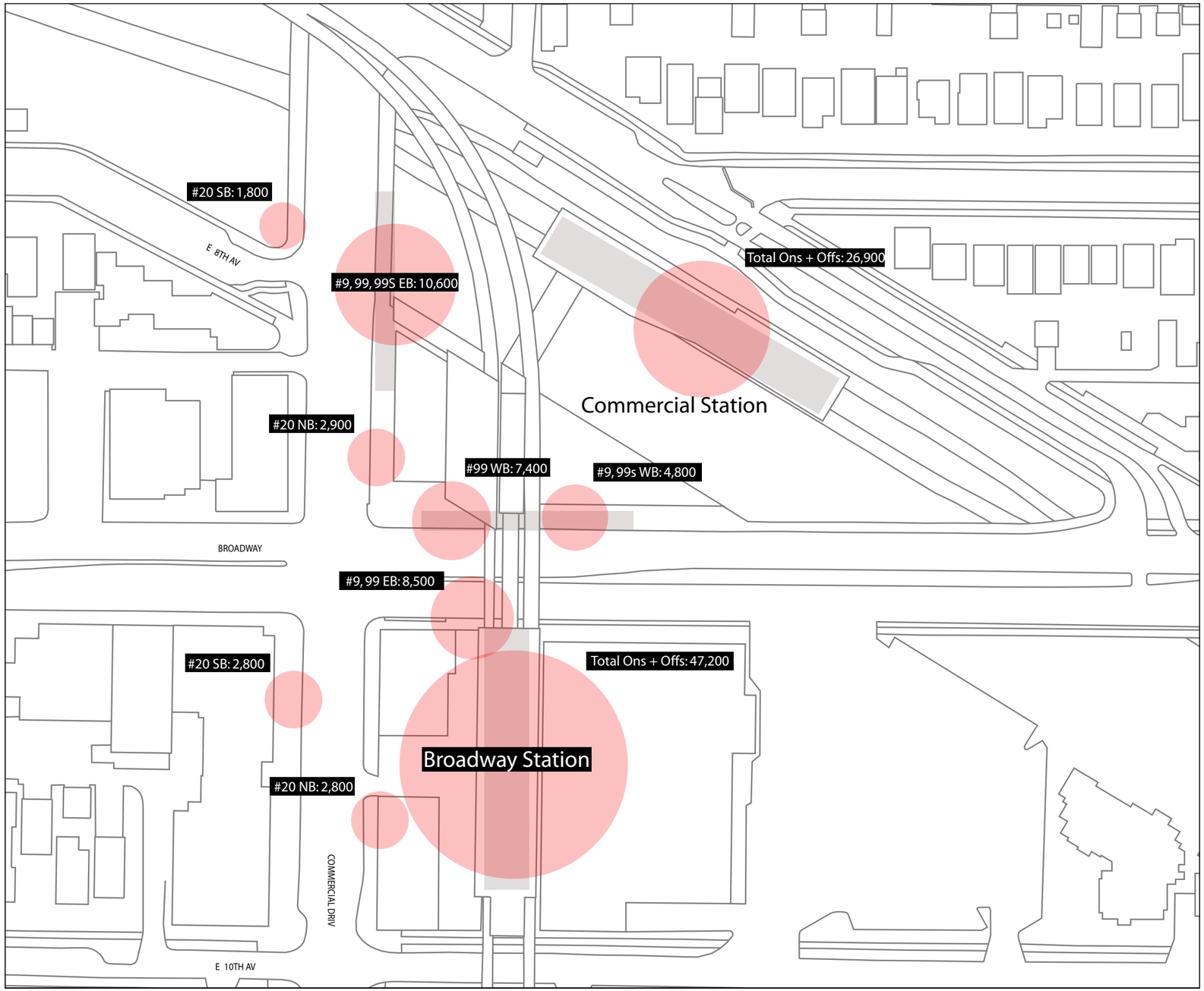


Figure 3-7
Average Weekday Boardings and Alightings for all Rail and Bus at Broadway/Commercial

#20 NB: 2,900

Average Daily Ons + Offs at Stops and Stations

Ridership Summary *

Service	Total Daily Ons + Offs
Broadway Station:	47,200
Commercial Station:	26,900#99 and #99S: 18,300
#9	13,100
#20:	10,200
Total Bus Riders:	41,600
Total Transit Riders:	115,700

*** Numbers many not add up exactly due to rounding**

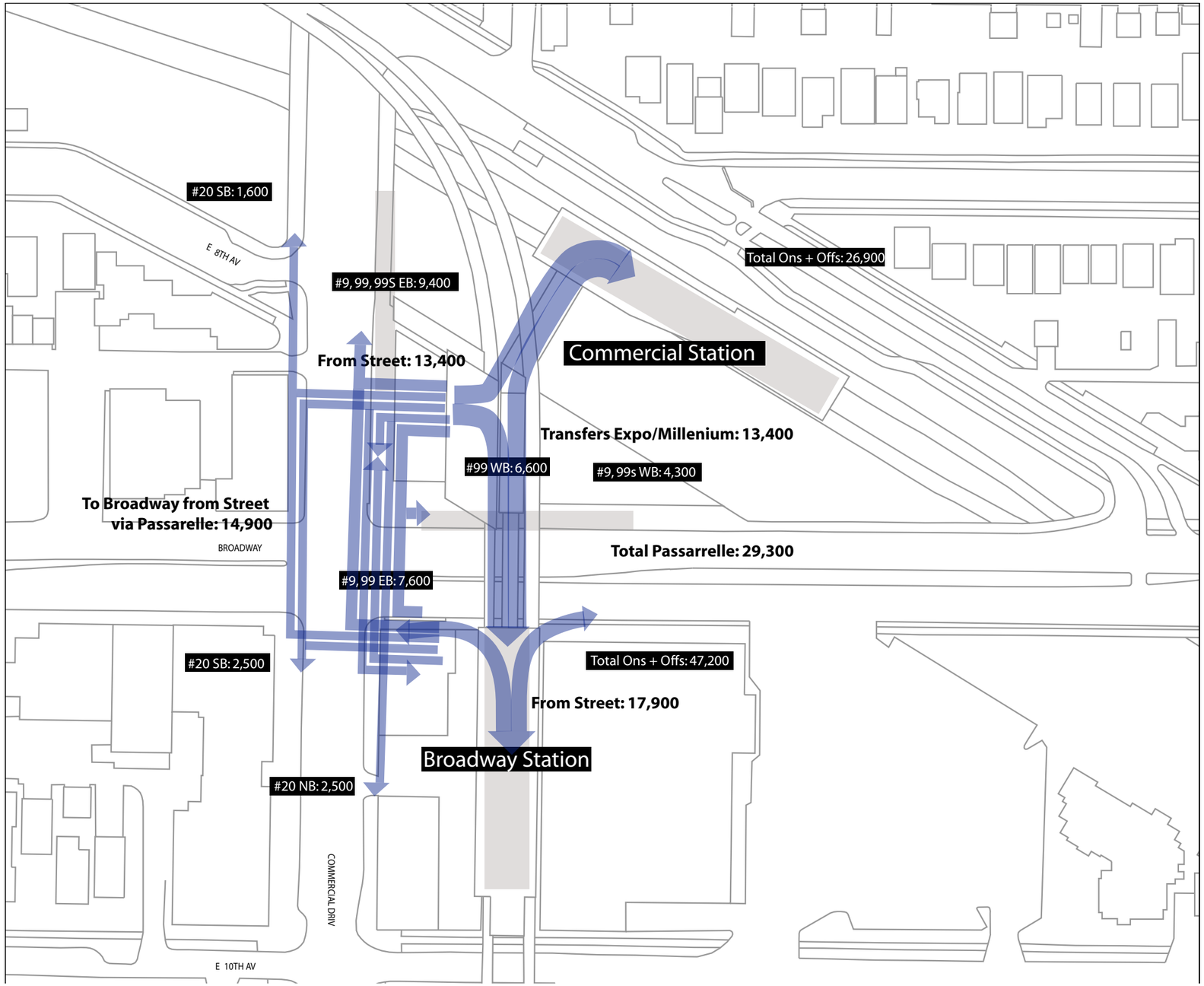


Figure 3-8
Total Passenger Bus and Rail Transfers at Broadway/Commercial

Total Daily Station Access Volume

Given the passenger volumes on the transfer analysis map, it becomes clear that there are four, not two, "stations" at Broadway/Commercial. These include:

- Broadway Station
- Commercial Drive Station
- The 99-B pick-up stop on Broadway
- The 99-B drop-off stop on Commercial

Throughout the following analysis, we will be considering these four locations and the transfers among them as the most important functional elements of the study.

The transfer analysis for Broadway/Commercial highlights the heavy pedestrian flows throughout the Broadway/Commercial interchange as well as the issue of pedestrian congestion around both SkyTrain entrances. This is especially true considering the peaking of pedestrian flows during commuter peak hours and immediately following the arrival of SkyTrains and buses.

These issues emphasize the need for streamlining pedestrian movements within the transit village area including:

- implementing missing or inadequate wayfinding cues and signage;
- upgrading poorly developed bus stops;
- relocating the Broadway elevator to increase pedestrian flow at the platform and ground levels;
- implementing detailed pedestrian flow modeling for the Expo line extension to upgrade facilities across the passerelle and Commercial Street bridge;
- improving pedestrian capacity between the 99 B-Line drop-off on Commercial Drive and the SkyTrain entrance to Commercial Drive station; and
- increasing capacity of Commercial Drive station access.

In addition to streamlining passenger transfer manoeuvres there is a need to ensure that traffic conditions enhance transit efficiency around Broadway/Commercial. One traffic issue affecting transit efficiency in the study area is vehicles making right turn movements in the westbound curb lane at the 99 B-Line pick up on Broadway. This problem may be addressed by exploring the options for making the curb lane a bus-only lane along this segment.

3.1.3 Pedestrian Capacity and Crowding

1. Broadway Station South/West Access

Large passenger volumes crowd Broadway Station Platform and Paserrelle.

A single north entry to Broadway Station provides access to an elevator, escalator and stair system. At street level the elevator is a significant visual barrier to the station entrance.

Broadway station can be entered only from the north, either at ground level or via the passarelle. While this serves the original purpose of access to Broadway's transit connections, the lack of south and west entrances does cut the station off from the surrounding neighbourhood.

The lack of a south entrance is also a problem for bicycles, since 10th Avenue, immediately south of the station platform, is a primary bike corridor through the area.

There is currently no access to Broadway station from 10th Avenue, which detracts from the 10th Avenue streetscape and results in unnecessary circuitous station access from the south.

2. Broadway Station Crowding

During morning hours, large volumes of bus passengers make connections and large volumes of passengers come off the arriving Millenium Line trains at the Commercial Drive station, and most transfer to Broadway station to board the Expo Line into downtown. Many bus passengers also transfer to the Expo line and try to board trains at Broadway Station. The result is that large waves of passengers arrive on the Broadway platform (all via the constrained passarelle, see below) and produce crowding conditions on the platforms. At these hours, passengers frequently cannot board the first inbound train, since the trains often have large loads when they arrive.

Over time, SkyTrain will acquire additional cars so that it can run longer trains, thereby draining the platform more rapidly. However, this will always be the primary transfer point for riders from the northern Millennium Line destined to downtown, and the demand for this trip can be expected to grow as further development occurs in northern Burnaby and Coquitlam station areas.

This issue, then, should be a factor in support of any solution that expands platform capacity.

Crowding of SkyTrain cars can be partially alleviated by acquisition of additional cars.

3. Connection between Broadway and Commercial Drive Stations

The pasarrelle connecting the Broadway Station to the Commercial Station is the choke point for riders transferring to and from Broadway Station. The choke point is exacerbated by large elevator column at north end of platform. This elevator column narrows the access to the passerelle connecting to the Commercial Station, resulting in problematic passenger crowding and congestion as passengers enter and leave the passerelle. The elevator column, moreover, is nearly fully opaque, unnecessarily cutting sightlines to the Commercial Station passerelle.

There is limited space for moving and passing in each direction on the Commercial Drive Walkway.

4. Commercial Drive Bridge

The sidewalk on the Commercial Bridge is also the alighting zone for Line 99 and 9 buses arriving from the west. For this purpose, it is much too narrow, to the point that sidewalk congestion can slow the process of alighting. The sidewalk design should also recognize the heavy volumes of customers walking south from the alighting points to enter the station.

High passenger volumes on the #9 and #20 make both routes likely candidates for using new articulated trolley vehicles in the medium to long term. The use of these vehicles would affect the amount of space needed for stops and loading/alighting areas, and should therefore be factored into future sidewalk design.

Pedestrian congestion occurs on Commercial Drive Bridge following the arrival of 99 B-Line and #9 buses.

3.1.4 Continuity of Transfer Movements

Multiple changes of direction and elevation are required to connect between stations. For example, to walk from Broadway station to Commercial Drive station, you must go:

- Around the elevator (change of direction) and across the passerelle
- Down an escalator (or elevator) to street level on the north side of Broadway (change of direction on either end and change of elevation)
- Across the bridge to Commercial Drive station
- Down an escalator (or elevator) to the Commercial Drive station platform (change of direction and change of elevation).

The multiple changes of elevation are especially problematic for customers who must use the elevators, since two separate elevator riders are required.

Temporary partitions are needed to guide passengers to and from Commercial Drive Station since there are confusing changes in direction and elevation. Also, deviations from the shortest path are needed avoid crowding, and directional crowding causes operational concerns.

Figure 3-9 Circuitous Passenger Access Routes from/to Broadway Station (The Expo Line)

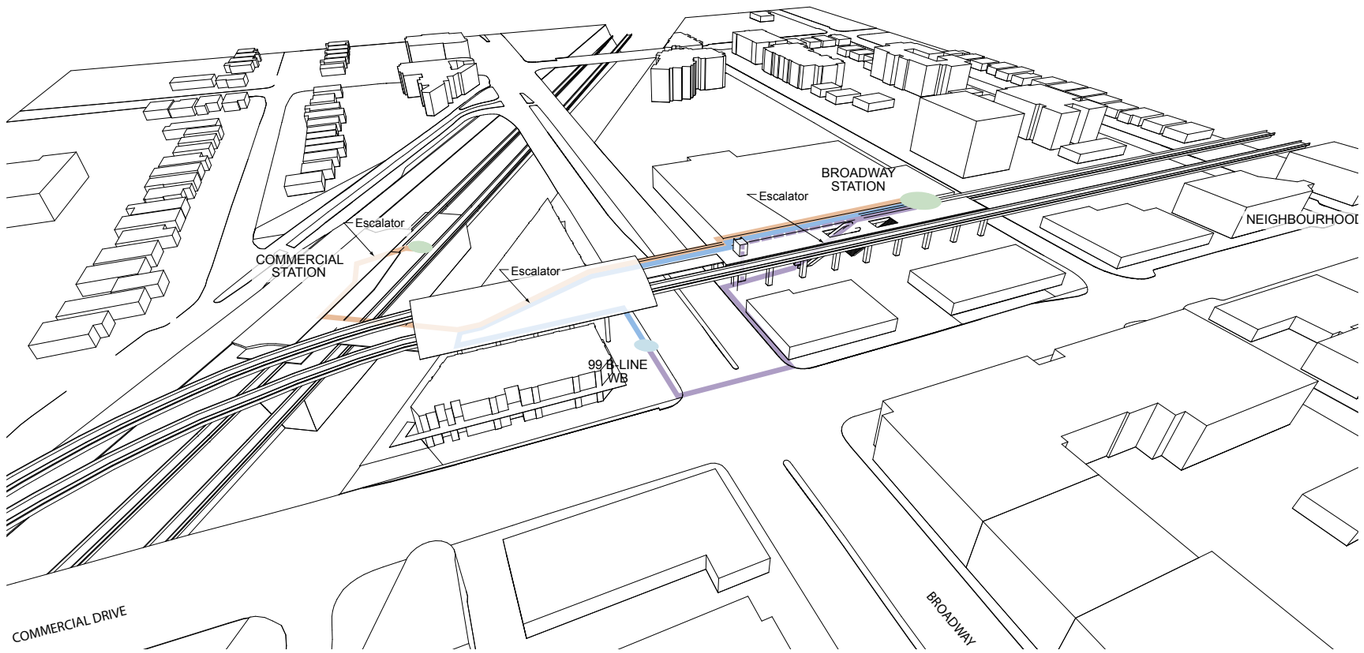
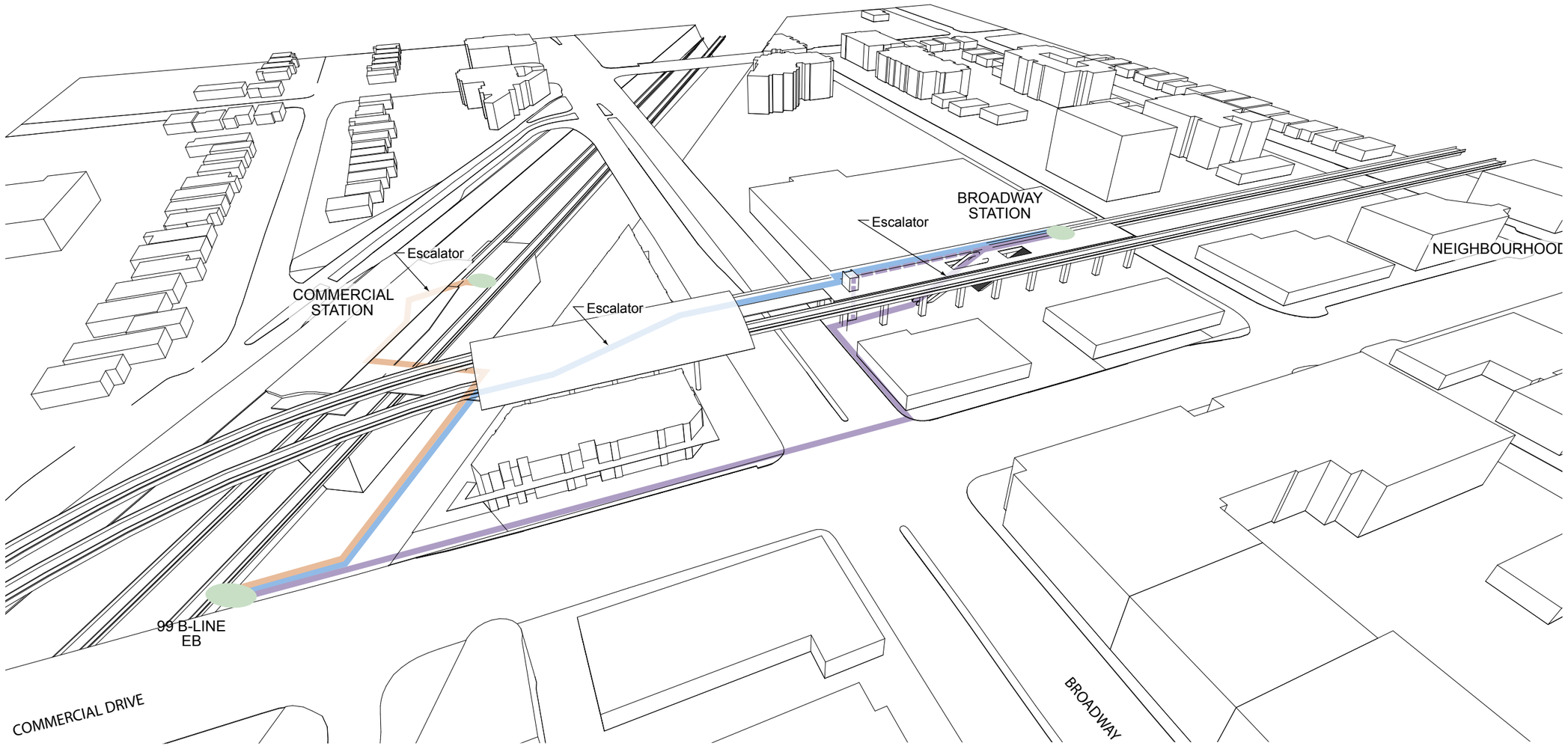


Figure 3-10 Circuitous Passenger Access Routes from the 99 B-Line EB



3.1.5 Wayfinding for Rail-Rail and Rail-Bus Connections

1. Poor sightlines and circulation

The inherent confusion produced by transferees' required changes of direction and elevation is exacerbated by the fact that passengers alighting at any one of the four "stations" in the area cannot see the platforms of the other three stations, nor can they see key geographic markers such as the downtown skyline or surrounding mountains. Sightlines are unnecessarily obscured by the screens and walls on the Broadway platform, a utility room alongside the passarelle escalator, and the overgrown edge at the 99-B drop off on Commercial Drive.

To make wayfinding easier, the following design opportunities should be explored:

- Remove the block wall from the Broadway platform that obscures views of the surrounding mountains. This may be done earlier or in conjunction with redevelopment of the Safeway site.
- Replace the rusted steel mesh from the Broadway platform that obscures views of the downtown skyline. Besides being pleasant, these views are important orientation cues for passengers.
- Remove a portion of the utility room wall alongside the passarelle escalator. This would open up views from the passarelle directly to the Commercial Station platform, assisting passengers transferring between Commercial and Broadway stations. If major, costly utility relocations are required, this may be a low priority.
- Create a strong architectural statement for the 99-B stops, allowing passengers to identify them from both SkyTrain stations with ease. These are currently marked by small, illegible bus stop signs.
- Improve the edge conditions along the path from the 99-B drop off on Commercial Drive into Commercial Station. This is currently overgrown, trash-ridden and lined with rusted fences, unnecessarily obscuring views and introducing a sense of unease among passengers.
- Explore the removal or reshaping of the retail spaces at Commercial Station, opening up the area to increase visibility of the station from the surrounding streets and bus stops.

Sightlines between Commercial Drive and Broadway Stations are blocked by the Commercial Drive Station utility room and Shoppers Drug Mart building thereby inhibiting wayfinding between the two stations.

2. Wayfinding system ignores the importance of the B-Line as a Rapid Transit Connection

While there are many wayfinding issues relating to signage, the most dramatic is the lack of clear wayfinding related to the B-Line. Since the B-Line is considered a regional rapid transit service, it should be advertised on in-station signage just as the SkyTrain lines are, i.e. with signs such as "99 B Line, to UBC"

A system-wide review of wayfinding should also look at providing more detailed information in-station about:

- Locations of specific bus connections (as opposed to just "Buses") where these are in various places around the station.
- Specific directions on where each station exit will lead you to on the surface (common in underground stations, but helpful also in labyrinthine stations such as this one).
- Branding and iconography for major bus lines on par with the SkyTrain lines.

Wayfinding systems at other B-Line locations, such as this 98 B-Line stop at Burrard, are missing from Broadway/Commercial Stations.

3.1.6 Information and Amenity of Bus Stops

1. Broadway 99 B-Line Pickup

The pick-up space for the 99 B-Line on Broadway provides insufficient passenger queuing space, little shelter and no information or wayfinding amenities. There is no real time information, information panels or maps, such as those provided at less important stops along the 98 B-Line. The only shelter is provided by the passarelle, the underside of which is deteriorated and home to roosting pigeons that produce droppings upon the waiting passengers below.\

2. Commercial 99 B-Line Drop-off

The Broadway/Commercial 99 B-Line pick-up lacks adequate shelter, wayfinding information and real time arrival information.

Wayfinding and real time arrival information exists at many other bus stops in Vancouver such as this 98 B-Line stop at Burrard.

The drop-off stop for the 99 B-Line is located too far north of station on Commercial, with preferable sites assigned to commercial access. There is very constrained sidewalk space at the drop-off point, and between this site and the rail interchange. The fencing and land along the route from the bus stop to the station is not maintained and collects garbage. Vendors should not be permitted in this constrained area

High volumes of drop-off passengers access Broadway/ Commercial stations from the Commercial Drive bridge.

3.2 Station Area Context

Many of the themes found in the stations themselves are found again in the opportunities and constraints in the area surrounding the stations. The following section examines the larger context around the stations themselves, starting from the station entrances and working outward into the surrounding neighbourhoods.

3.2.1 Beneath Broadway Station

The space at grade below Broadway Station is an under utilized, 'dead space' that has the potential to be occupied with retail or as a pedestrian circulation space serving the station.

Dead space underneath Broadway station could be used to create a vibrant retail and pedestrian circulation space.

3.2.2 The Lane

Passengers approaching Broadway station from the neighbourhoods to the south or from the northbound line 20 stop generally use the nameless service alleys between and behind the McDonald's and CIBC. These lanes are dominated by blank walls, garbage and parked cars, offering a very poor urban environment.

Many pedestrians access Broadway Station via the parking surfaces and service lane immediately west of the station.

Areas further south of the station are devoid of storefronts, entrances or visual amenity.

3.2.3 Beneath the Guideway

South of the Broadway station, the area beneath the SkyTrain guideway offers the opportunity to create additional greenway connections to the neighbourhoods to the south.

3.2.4 Grandview Highway North Layover Space

Currently, bus layover space on Grandview Highway North is fully utilized with no room for expansion. Additionally, Coast Mountain Bus Company (CMBC) juggles bus schedules to move recovery time that would normally occur at Broadway/Commercial to UBC. As demand for frequency on the 99 corridor continues to grow, layover facilities will become even more of a concern at Broadway/Commercial.

3.2.5 Commercial Drive

Commercial Drive at 10th Avenue is the heart of the surrounding community, yet it is weakest as pedestrians approach the station. On the south side, the McDonald's and CIBC offer little indication that the intersections of Broadway and Commercial or 10th and Commercial are important nodes. On the north side, the bridge over the Grandview Cut is especially weak, with poorly defined and poorly maintained edges. Farther from the station, Commercial Drive offers a fairly high pedestrian quality of service.

The urban design plan should allow for a strong urban edge along Commercial Drive to bridge the two halves of the linear commercial district. Quality materials and design details will be especially important nearest the station, particularly for street furniture and building frontages. Lighting should be pedestrian scale and detailed to a similar quality as in Vancouver's other important centres.

Under utilized space below the Expo line guiedway should provide community amenity and neighbourhood access to and from stations.

Layover space along Grandview Highway North is at capacity with little room for additional growth.

Commercial Drive is currently under-developed south of Broadway with fast food retail, walk-in clinics and and banking facilities in single storey structures the dominating land uses.

Generous sidewalks and interesting shop frontages, as seen further north along Commercial Drive, can help enliven pedestrian areas.

Poor landscape quality and lack of development at the intersection of Commercial Drive and Grandview Highway North create derelict spaces that detract from the public realm.

A large parking lot and blank Safeway wall define the Broadway streetcape adjacent to Broadway Station.

Near the intersection of Broadway, additional setbacks are recommended to address the pedestrian crowding that occurs here.

At the Grandview Cut bridge, significant additional pedestrian space is needed at the 99-B drop off. Significant attention to quality and ongoing maintenance is also necessary along this structure. Continuous shelter from the 99-B drop off into Commercial Station may be provided in the form of a covered pergola, assisting not only with weather protection but also wayfinding.

3.2.6 Broadway

With higher traffic volumes and a wider right of way, Broadway is currently a significant barrier and a boundary marking distinct neighbourhoods. Broadway currently offers a poor quality of service for pedestrians throughout the study area, degrading even further near the stations. The sidewalks are narrow, with little buffer against adjacent auto traffic. The Safeway presents a large parking lot followed by a blank wall as passengers approach Broadway station from the east, offering little positive contribution to the urban environment.

The sidewalks narrow further on the bridge over the Grandview cut, making it challenging even for single pedestrians to pass one another. Due to the large waves of transit passengers utilising the bridge, there are times when pedestrian crowding occurs.

The #9, #20 and 99 B-Line stops offer little in the way of shelter and nothing in the way of information, despite these being among the most important transit stops in the region. Pigeon droppings litter the area where transit passengers wait. Street furniture and amenities are limited to an undersized shelter, a garbage container, bus stop sign and other minor features.

Broadway offers a landscaped median along portions of its length, but it is not well maintained.

The passarelle is the dominant feature of the street, and it is also not well maintained. Pedestrians' views of the structure are dominated by unsightly utilities, pigeons and an overall sense of deterioration.

Very large numbers of pedestrians cross Broadway on the east side of Commercial, resulting in queuing and congestion at the corners at peak. Additional pedestrians cross Broadway mid-block at both the Safeway entrance and Broadway Station entrance. Even greater pedestrian crowding and queuing occurs at the 99-B pickup stop on the north side.

Future changes to Broadway should enhance the pedestrian quality of service by ensuring that adjacent development addresses and embraces the street. Sidewalk area materials should be of a high quality and pedestrian scale. Additional pedestrian right of way must be provided at the 99-B stop and along the Grandview Cut bridge. Cleaning up the underside of the passerelle is also a high priority.

3.2.7 Station Pedestrian Access

1. Broadway Station

Access to Broadway Station is limited on the south, west and east.

The lane adjacent to Broadway Station, in its current form, is a serious CPTED issue, as it is perceived by many passengers as a haven for crime and drugs.

It is especially important to open Broadway Station to the south to engage the 10th Avenue Greenway, as well as improve the urban design of the alley to the west. If the Safeway site redevelops, there is also the opportunity to open the station up to the east.

Lack of space and shelter limit pedestrian and passenger comfort at the #9 loading / drop off at Broadway Station entrance.

Shopper's Drug Mart service area immediately adjacent to Commercial Drive Station detracts from the streetscape.

Parking surfaces and lanes adjacent to Broadway Station are considered a haven for crime and drug dealing.

Lack of signage, blind corners, and poor urban design at the intersection of Commercial Drive and Grandview Highway North fails to orient pedestrians, cyclists and passengers to the station precinct from the north.

Pedestrian amenity is generally high in the residential neighbourhoods surrounding the station precinct.

2. Commercial Station

Upgrading the pedestrian environment of the North/South axis of Commercial is a priority to keep retail along Commercial vibrant. Pedestrian traffic should be accommodated on Broadway and Commercial which will require increased building setbacks in some areas.

Access to Commercial Station is limited on the north and east, despite existing features that would allow for direct connections to both Grandview and the Broadway bridge. Instead, passengers must enter and exit the platform area to the south regardless of origin/destination. This is an issue primarily for Commercial Drive to the north, where the main neighbourhood core begins just north of the station. Access to the northeast across Grandview is less of an issue, because this leads only into a fairly low-density residential area.

The intersection of Grandview and Commercial is a weak pedestrian corner with insignificant signage marking the greenway. The future Central Valley Greenway should orient users to both SkyTrain stations.

3. Pedestrian Quality of Service and Obstacles

Pedestrian quality of service in the surrounding neighbourhoods is generally high, with generous sidewalks and continuous tree canopies. On some streets, trees are missing, but these are easily replaced in the existing green strip between the sidewalks and street.

Closer to the station, however, pedestrian quality of service could be enhanced to provide a similar experience to that of the surrounding neighbourhood. Besides the issues already identified on Broadway and Commercial, the following issues and opportunities are noted for each of the station approaches:

Pedestrians from Grandview – Woodlands approach the station area primarily via Commercial Drive and the bridge over the Cut and, secondarily, across the Victoria Drive bridge. The lack of an entry to the station from the north necessitates a less than direct route for some of these local transit users. Grandview –Woodlands benefited from significant public realm improvements during the implementation of the Millennium SkyTrain project and the adjacent Central Valley Greenway including closure of the truck route on Grandview, traffic calming, and substantial landscaping. The parkette being implemented at the intersection of East 8th Avenue and Grandview further addresses public realm amenities and the function of the Greenway. The south side of the intersection of Grandview and Commercial Drive, under the SkyTrain, is currently being used as a fenced construction staging area. This area and the public realm space on the west side of this intersection both have potential to be more valuable amenities in the future.

Pedestrians from the neighbourhood west of Commercial Drive and north of Broadway converge on East 8th Avenue en route to the station area. This street benefits from frontage on W. C. Shelley Park but otherwise has had its streetscape eroded from its historical condition including loss of sections of both grass boulevard and street trees. The potential is strong to create a much improved streetscape through rehabilitation.

South of Broadway and west of Commercial Drive, the 10th Avenue Bikeway is also an attractive pedestrian route to the station area with mature street trees and traffic calming. The proposed station changes that would permit access to the station from the corner of 10th Avenue and Commercial Drive will significantly increase the pedestrian access along 10th Avenue for the Cedar Cottage neighbourhood. The bike route along Woodlands intersects at 10th Avenue, providing a high amenity cycling route from the south. There is potential to add to the amenities of the public realm in this catchment through streetscape and laneway improvements that would offer pedestrians a choice of routes to filter to the station area from this neighbourhood; 11th Avenue and the lanes to the north and south of 11th could be readily improved through streetscape repair and landscaping.

The catchment area to the southeast of the stations currently has the lowest level of public realm amenity. Redevelopment of the Safeway block offers the opportunity to improve the 10th Avenue frontage leading to the station access at 10th and Commercial with both streetscape amenity and a more vibrant and interesting built edge. The area under the Expo SkyTrain between 12th and 10th Avenues has significant potential for improved pedestrian and community amenities and is currently being designed through a collaboration between a community group, MOBY (My Own Back Yard), and the City. The streetscapes and lanes in this catchment area have potential to be much more attractive pedestrian routes through the implementation of some basic repair and improvements including completion of street trees and grass boulevards where missing, curb bulges to shorten pedestrian crossing distances, and landscaping.

Pedestrian amenity and safety could be improved at the intersection of 10th Avenue and Commercial Drive.

Lack of design detailing and blank building faces detract from the pedestrian environment at 10th Avenue and Commercial Drive.

There is a shortage of bike racks at both stations; bikes are often locked to parking metres and trees.

Bike commuters can transport their bikes on B-Line buses, two per bus.

3.2.8 Bicycle Access

Despite Broadway/Commercial's proximity to both the 10th Avenue Bikeway and Central Valley Greenway, the station does not reach out to these corridors. A connection to 10th Avenue is easily solved with a new station entrance at 10th, as well as the possibility of a staffed Bike Station beneath the platform in the existing under utilized space where there is currently some auto parking.

Connecting the Central Valley Greenway is more challenging, given the high traffic volumes on Commercial Drive and very narrow sidewalks along both the Commercial and Broadway bridges over the Grandview Cut.

3.3 Summary of Urban Challenges

Broadway/Commercial Station and its surrounding neighbourhoods are among the most important places in the Vancouver region and represent one of the region's best potential investments for improvements to the public realm. With over 115,000 transit passenger boardings and alightings a day, this is one of the most intensely used nodes in all of western North America.

While Broadway/Commercial suffers from many issues identified throughout this report, four key themes emerge from the analysis that deserve priority attention:

- **Address existing and projected passenger crowding.** This is especially important on the Broadway Station platform, along the passarelle, on the bridge to Commercial Station, in the passenger waiting area for the 99-B pickup, and along the path from the 99-B drop off into Commercial Station.
- **Improve passenger wayfinding.** This is especially important for connections to key surrounding bus stops, and passenger information at those stops.
- **Improve pedestrian quality of service and overall urban environment.** Broadway and Commercial, the two most important streets in the area, should receive the highest level of treatment and be prioritized over other potential improvements.
- **Upgrade overall design, materials and attention to detail.** Broadway station itself is due for a major makeover, along with the underside of the passarelle. The 99-B bus stops need major attention in keeping with their high passenger volumes.

A summary of station area planning and design issues can be seen in Figure 3-11.

In order to address these issues a number of potential strategies are suggested in Figures 3-12 and 3-13.

The following are the specific opportunities that were discussed in the text, along with their relative priority for meeting the project goals. Priority rankings and time frame estimates are based on stakeholder input from a project information session held on 28 June, 2005. These opportunities will be examined in more detail in the next stage of the project, along with a more thorough prioritization analysis.

Figure 3-11 Station Area Planning and Design Issues

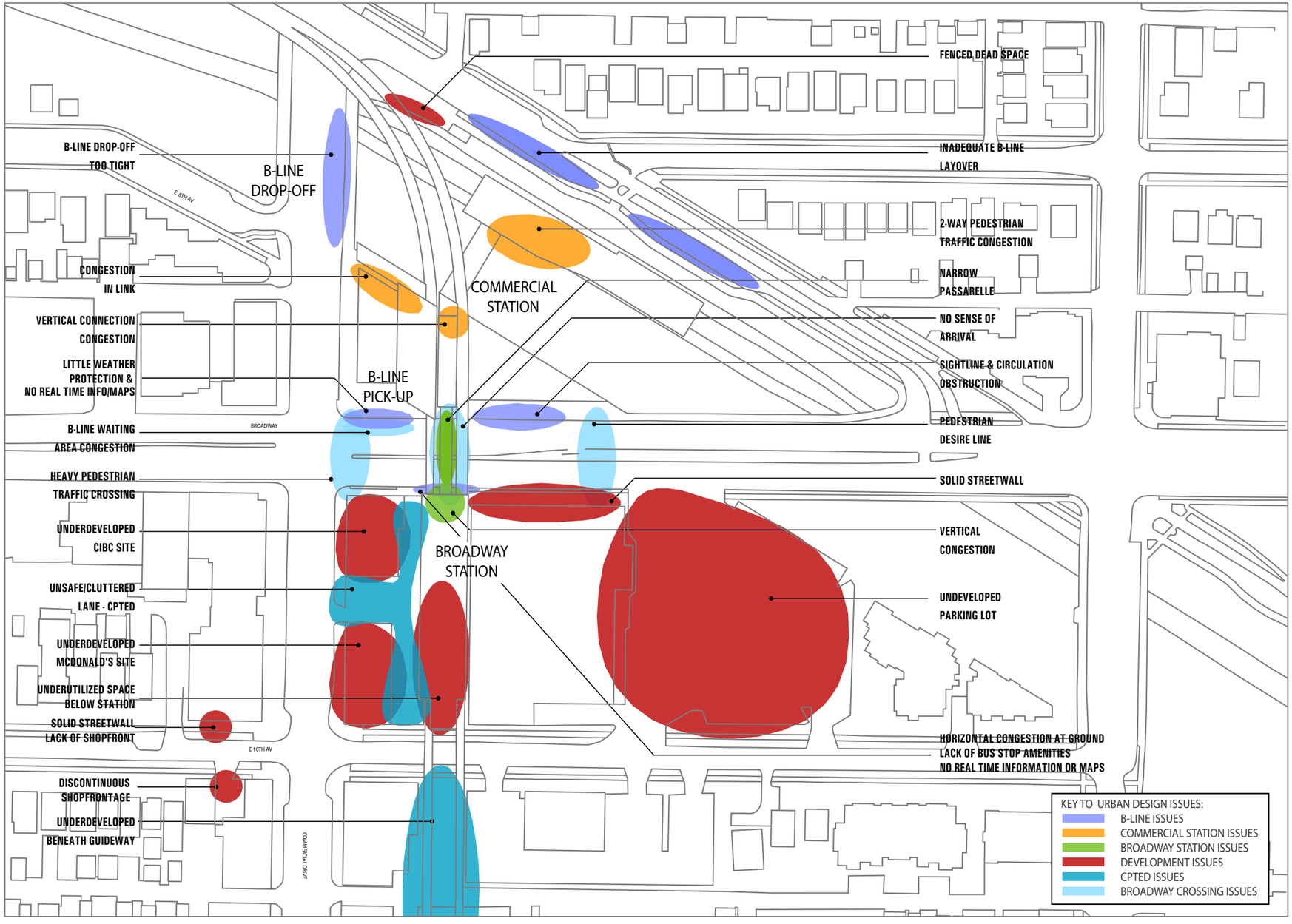


Figure 3-12 Neighbourhood Catchment Planning and Design Issues

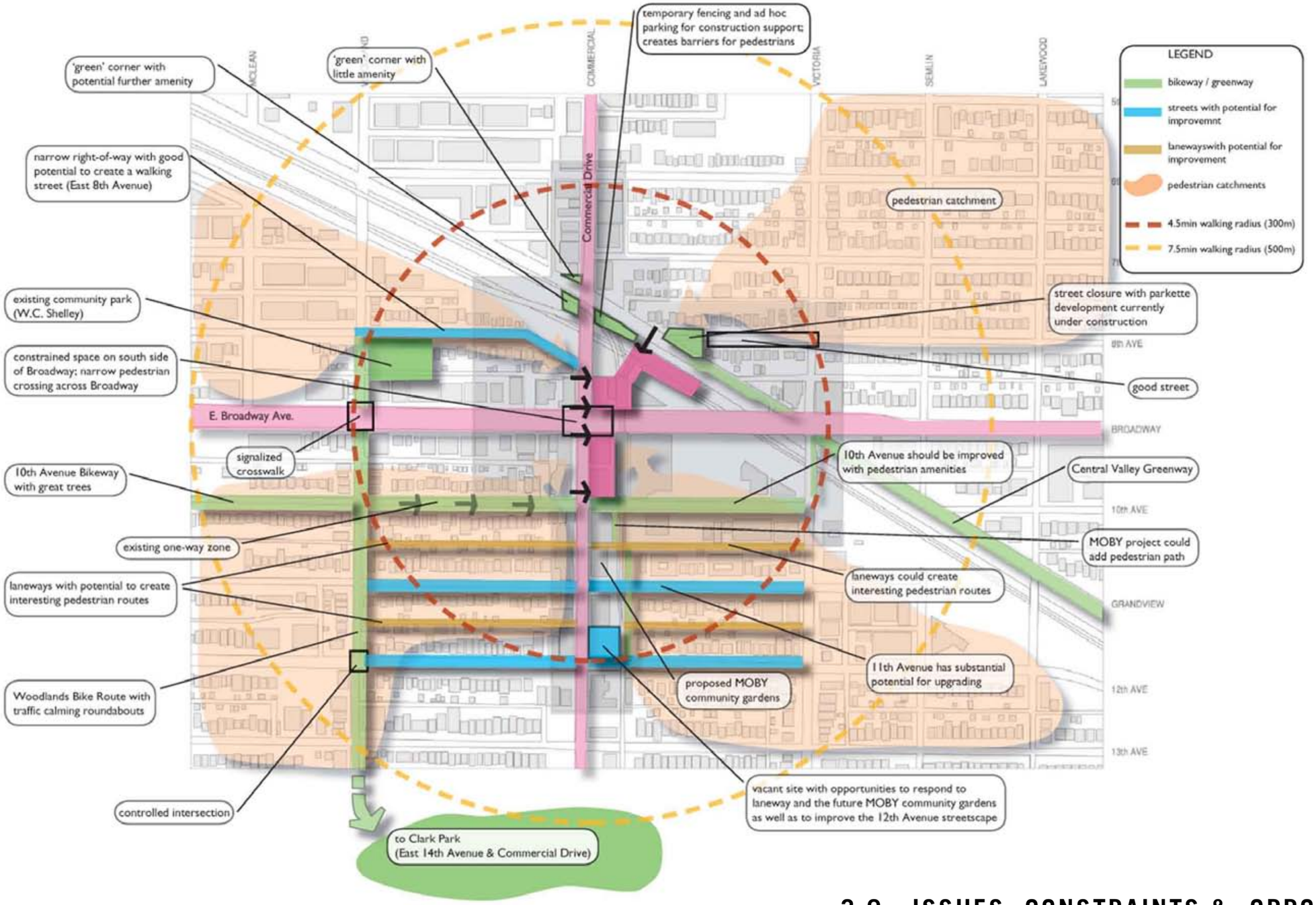


Figure 3-13 Potential Improvement Options for Broadway/Commercial Station Area

	High/Med/ Low Priority	Near/Med/ Long Term
1.0 Safeway Site Redevelopment		
1.1 Completely redevelop Safeway site to open station up to the east and improve pedestrian orientation of Broadway & 10th Avenue	High	Med
2.0 McDonald's/CIBC Site Redevelopment		
2.1 Completely redevelop site to open station to the west and improve environment of Commercial Drive and alleys	Very High	Near - Med
3.0 Broadway Station Upgrades		
3.1 Replace metal screens	Med - High	Near
3.2 Relocate elevator to South end of station	Very High	Very Near
3.3 Open a new South, 10th Avenue entrance	High	Near
3.4 Install bicycle storage / Bike Station	High	Med
3.5 Lower Safeway wall to east of platform	Med	Med
3.6 Cover the underside of the passarelle	Med	Med
3.7 Construct side platforms with additional passarelles on either side of the tracks	Med - High	Near - Med
3.8 Replace roof structure to encourage daylighting	Med - High	Near - Med
3.9 Improve wayfinding signage and lighting	Med - High	Near - Med
4.0 Commercial Station Upgrades		
4.1 Explore potential new connection to Commercial Drive bridge	Med	Med
4.2 Widen Commercial bridge to accommodate 99 B-Line pedestrian flows	Med	Near
4.3 Explore potential new connection to Grandview	Low	Long
4.4 Expand existing station platform bridge width to address crowding	High	Near
4.5 Explore shrinking or relocating utility room to create clear sightlines between stations	Med	Near
4.6 Improve pedestrian connection to 99 B-Line drop-off	Med	Near
4.7 Widen Broadway passarelle to accommodate pedestrian flow	Med	Near
5.0 99 B-Line Bus Stop Upgrades		
Drop-Off		
5.1 Move the drop-off closer to station entrance as part of redevelopment of Commercial Station retail area	Low	Med
5.2 Provide covered pergola for weather protection and wayfinding to Commercial Station	Low - Med	Med
Pick-Up		
5.3 Provide additional plaza area to accommodate queuing	High	Near
5.4 Provide covered waiting area to accommodate peak queues	Med	Med
5.5 Provide wayfinding and information	Very High	Near
5.6 Provide consistent design treatment as if this were a rail station	High	Near
5.7 Explore possibility of making WB curb lane a bus-only lane	High	
6.0 9, 20 Bus Stop Upgrades		
6.1 Provide sufficient shelter to accommodate most of peak queuing, integrated into adjacent building architecture	Med	Med
6.2 Provide wayfinding details, including system maps and schedules	Very High	Very Near
6.3 Shift #20 bus stop to the south side of 10th Avenue to address potential new entrance to Broadway Station	Med - High	Med
7.0 Surrounding Neighbourhood		
7.1 Make attractive and direct pedestrian routes available to serve residents of all adjacent catchment areas for the stations	High	Near
7.2 Redevelop the block bounded by Broadway, Commercial, 10th Avenue and Victoria Drive to result in an improved pedestrian environment on all frontages and minimize the impact of vehicular movements on pedestrians	Very High	Near
7.3 Design the pedestrian crossing of Broadway on the east side of Commercial Drive to accommodate heavy pedestrian volumes and to address desire lines to station entrances and bus stops	Very High	Very Near
8.0 Additional Interventions / Comments		
8.1 Provide a community safety office	High	Near - Med
8.2 Accomodate more bikes on transit	High	Near
8.3 Improve Commercial Station plaza	Med	Near - Med
8.4 Install a public notice board	Med	Med

4.1 Next Steps

Following site assessment, the issues and opportunities described above will be discussed, developed and prioritized. These projects include strategies focusing on transit options, station design and the wider public realm surrounding Broadway/Commercial stations. Specific areas of improvement include:

- Safeway Site Redevelopment;
- McDonalds/CIBC Site Redevelopment;
- Broadway Station Upgrades;
- Commercial Station Upgrades;
- 99 B-Line Bus Stop Upgrades; and
- 9, 20, 99 Bus Stop Upgrades.

Prioritization of projects will be assisted through a three pronged process including:

- Development of Prioritization Criteria: a series of principles or performance objectives to inform decision making / prioritization of options;
- Compilation of a Project Matrix assessing the performance of different projects according to prioritization criteria; and
- Scoring Analysis to rank projects according to aggregated principles and performance criteria.