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Executive Summary

Purpose

The purpose of this study is to provide a preliminary assessment of the quality of TransLink bus exchanges from the perspective of customer experience. This document takes as a starting point that facility design plays an important role in customers satisfaction, and that poorly designed facilities discourage ridership and therefore revenue.

Specifically, this report is intended to:

- Provide a preliminary assessment of the design quality of TransLink bus exchanges from the perspective of passenger experience
- Recommend guidelines for the design of new or renovated bus exchanges in response to the design issues identified in the study
- Offer a methodology for how bus exchange sites can be prioritized for amenity upgrades.

Policy context

A number of TransLink policies, guidelines and initiatives support high-quality design as a way of improving customer service. These include:

- Transit Facility Infrastructure Design Guidelines (2002; currently under revision))
- Universal Accessibility Guidelines (2007)
- Transport 2040 (2008)
- 2009 10-Year Plan (2008)
- Infrastructure Policy (Anticipated completion: 2009)
- Wayfinding (Anticipated completion: 2009)
- Long-range bicycle plan (Anticipated completion: 2009)
- Wayfinding (Initiated 2008)
- Transit passenger facilities best practices review and design guidelines (Initiated: 2008)
- Public Art (Initiated: 2008)



The case for a customer-experience focus

Safety and efficiency are essential in order to make a transit system work. However, they do not necessarily make the experience of taking public transit enjoyable. In order to increase transit's mode share, existing and potential customers must see it as an attractive choice.

Part of making transit attractive has to do with the bus service itself: frequency of service, trip time, proximity of routes, and the like. However, other aspects of infrastructure, such as the pleasantness and functionality of the waiting environment, also affect users' perception of service quality. A fifteen minute wait can seem longer when standing under an umbrella in an expanse of asphalt than when sitting under cover while watching a vibrant streetscape of shop fronts, passers-by and attractive plantings. If the waiting and transferring environment is unpleasant, transit will lose its appeal to choice riders and reduce the number of trips captive riders choose to take.

A focus on passenger experience is neither novel nor radical. The US Transportation Research Board (TRB), in their Transit Capacity and Quality of Service Manual, define quality of service as "The overall measured or perceived performance of transit service from the passenger's point of view" (emphasis added). They point out that this differs from highways service quality measures which focus on vehicles more than people, or utilization and economic performance measures which tend to reflect the transit operator's point of view.

The TRB identifies "comfort and convenience" as one of the two aspects of service quality. Included in the category are, among other things, the kinds of passenger amenities provided, the

appearance and comfort of transit facilities, and passengers' perceptions of safety and security at transit stops and walking to and from transit stops. This design review of TransLink bus exchanges focuses on these types of customer-oriented measures of service quality.



Methodology

Relevant TransLink policy was reviewed, and a survey of global good practice in bus exchange design was conducted. Throughout the study period, TransLink staff were consulted: planners, engineers, a landscape architect, bus and SkyTrain operations staff, and members of the transit security and transit police forces. Data on passenger volume and number of routes were also gathered.

From these conversations, a checklist was developed, piloted, and iteratively revised for use as a site assessment tool. Of TransLink's 77 bus exchanges, 24 were selected for site analyses. These 24 were chosen to reflect the range of contexts in which TransLink bus passenger facilities are found, including differences in passenger volume, network function, intermodality, geography, density and development context, and separation from general traffic.

Sites were visited during the period of June to August 2008. A qualitative site analysis was performed for each site, highlighting key characteristics and issues. From these site analyses, a set of system-wide issues (such as aesthetics, security, and the provision of shelter) were identified and analyzed qualitatively. Scores from the site visit checklists were used to create ratings for each exchange for each system-wide issue. Finally, overall scores for each exchange were combined with passenger volume to yield overall rankings for need of design upgrading.



Recommendations

This section lists the recommendations given in this document based on the best practices review and site analyses. (For consistency, the numbering corresponds to that used in Chapter II, System-wide Issues, where the recommendations are explained in more detail.)

General Approach to Design

3.1 Siting

- A. Where possible, site bus exchanges in mixed-use areas that are relatively dense compared to the rest of the municipality or area.
- B. Work with communities to plan transit-oriented development around the site.

3.2 General Site Design & Layout

- A. Design for the convenience of the following modes, in descending order of priority:
 - 1. Pedestrians
 - 2. Transit vehicles
 - 3. Bicycles
 - 4. PPUDO & taxis
 - 5. Carpools
 - 6. Private vehicles
- B. Layout should be such that general traffic does not cross through pedestrians’ paths as they transfer from one transit leg of their journey to another transit leg.

- C. Take a holistic approach to designing bus exchanges and multimodal stations, for both functionality and aesthetics.
- D. Where passenger and traffic volumes, and number of routes, are low enough, strongly consider on-street exchanges.
- E. Where passenger and traffic volumes, and number of routes, are high, consider street-side islands without satellite bays, or on-street exchanges with contiguous bays.
- F. Where warranted by passenger volume and neighbourhood context, consider installing a station-style building for customer comfort and community integration.

3.4 Co-location of functions

- A. When designing new bus exchanges, consider separating layover space from the customer waiting and loading/unloading areas.

4 Passenger Amenities

4.1 Furnishings

- A. Use high-quality design and material to increase visual appeal.
- B. Work with municipalities, universities, or other providers of bus exchange furnishings to ensure their needs can be met simultaneously with TransLink’s standards for the provision of amenities.
- C. Provide seating in a quantity commensurate

- with use, reserving areas for expansion if passenger volumes are expected to increase.
- D. Locate seating out of the way of pedestrian paths and desire lines.
- E. Provide some seating choices with back support and arm rests.
- F. Provide continuous coverage of all passenger areas of the exchange, including waiting areas, boarding areas, connecting paths, way-finding and information areas, and furniture such as garbage cans and newspaper boxes.
- G. Consider each site’s microclimate when determining weather protection needs.
- H. Consider using translucent roofing materials in whole or in part to allow daylight while still providing shade on hot days.
- I. If stops are not clustered on an island, ensure that continuous shelter covers the waiting and boarding areas.
- J. Where shelter is provided by an overhanging building, employ creative lighting and aesthetic treatments to achieve a pleasant environment.
- K. Use garbage can designs that do not require the user to touch any part of the receptacle.
- L. If the garbage cans are unsheltered, choose designs that minimize the amount of rain that can enter the receptacle (for example with a built-in rain shield or a side opening).
- M. Develop a recycling program for newsprint, paper, and containers at all off-street TransLink bus exchanges.

- N. If container recycling receptacles are not provided next to each garbage can, choose garbage can designs that include a ledge or rack where users can leave recyclables, so that collectors do not have to forage through the garbage itself.
- O. If newspaper boxes are numerous, use an attractive corral, or install a multi-box unit.
- P. Ensure newspaper vending units are positioned so that pedestrian thoroughways and bus loading and unloading areas are not obstructed.
- Q. Design lighting at a human scale.
- R. Choose attractive luminaires and fixtures.
- S. In underground or very dark exchanges, consider installing public art that incorporates light.
- T. Consider incorporating light into existing structures such as bollards, ID poles, or canopies.
- U. Consider incorporating solar powered lighting.
- V. Install clocks at bus exchanges.
- W. Consider ways of incorporating washroom facilities into bus exchanges, for example as part of station houses or as stand-alone self-cleaning public washrooms.
- X. Provide drinking fountains.

4.2 Landscaping

Note: Please also refer to the Maintenance section (page 46) for further recommendations re-

lating to plantings.

- A. Use plantings to improve passenger experience in waiting areas. When retrofitting existing areas, opportunities may be restricted, but creative solutions should be sought.
- B. Use plantings to define edges and delineate different areas of use, if appropriate.
- C. Find opportunities to combine planting beds with the provision of informal seating.
- D. Engage a registered landscape architect to design plantings and ground planes, and to establish an adequate budget for proper installation.
- E. Use textures, colours, and materials to enhance the visual appeal of the ground plane.
- F. Consider using paving as a cue for intended use of space.
- G. Use permeable paving, bioswales, rain gardens, infiltration trenches for on-site storm-water management.

4.3 Fare media sales

- A. Locate FareDealer at or near bus exchanges.
- B. At off-street exchanges, if the FareDealer is not in the exchange itself, directions to the FareDealer should be included at the central information board.

5 Operations Structures

- A. Consider incorporating operations facilities into a station house building (cf. *Station-style Waiting Areas*, page 20).
- B. Use architectural or artistic features – such as windows, articulation, detailing and public art – on every exposed wall to relieve the visual bulk and create visual interest.
- C. Continue to use colour and peaked roofs for visual appeal.
- D. When window grilles are necessary, choose attractive designs or commission them as public art.
- E. Install windows on crew room or supervisor office walls to allow natural surveillance.
- F. Avoid mirrored glass where possible.

6 Public art and interpretation

- A. Expand TransLink’s public art program to include bus exchanges.
- B. Include cultural, natural and historic interpretation as part of the public art program.
- C. Incorporate a variety of types of art: professional and community based, various scales, temporary/seasonal and permanent, whimsical and educational.
- D. Plan for public art and involve artists early in the site planning process to allow for creative ways to incorporate art into the facility.

- E. Establish a process to ensure high-quality public art - for example proposals assessed by a jury composed of individuals with experience in public art provision.

7 Information and wayfinding

7.1 Exchange naming

- A. Adopt the nomenclature system described below.

The nomenclature system proposed here is based upon four principles:
 - 1. Facilities are consistently named from a restricted set of distinctive facility types.
 - 2. Facility type names suggest a facility’s role in the transit network, as relevant to the customer.
 - 3. Multimodal facilities have a single name, used consistently across modes. A set of additional, more precise names for each modal zone of a multimodal station are used only when the single overarching name would cause confusion.
 - 4. A facility type name is warranted only for any bus hub that has at least one of the following characteristics: it has an off-street component, is part of a multimodal facility, or is a set of contiguous bays.

7.2 Exchange information

- A. As much as possible, locate bus bays within sight of one another, and of the entrance to

any adjacent station.

- B. At each bay, provide a map of the exchange showing where to catch each bus.
- C. Identify information boards with a highly visible ⓘ or ? symbol.
- D. Ensure that information boards (or signs directing to these boards) are highly visible and can be spotted from all passenger areas.
- E. Provide a table or diagram showing which bus to take to reach popular destinations served by routes leaving the exchange.
- F. Use only signs listed in TransLink’s *Transit Infrastructure Design Guidelines*.

7.3 Network and route information

- A. At the information board, provide a single large-type map that shows the entire service area.
- B. At each bay, post a route map for each bus that departs from there.
- C. At a central location, provide a “spider map” that shows the routes of buses serving the exchange.
- D. Consider installing real-time arrival information at exchanges, especially for routes with high passenger volume.

7.4 Temporary information

- A. Use handwritten signs only when the need is urgent and the duration brief.
- B. Develop and use a distinctive sign template

specifically designed to communicate temporary routing or stopping changes to passengers.

7.5 English-language literacy

- A. Where possible, use non-linguistic symbols such as numbers, diagrams and arrows to minimize the degree of English literacy needed to successfully plan and navigate a trip.
- B. Where demand warrants, consider providing information in an additional language, for example Chinese or Punjabi.

8 Intermodal integration

8.1 Rail interchange

- A. Design rail stations and bus exchanges as a single unified design concept, including intermodal transfer, to provide the experience of an efficiently integrated transit network through continuity of appearance and amenity.
- B. For intermodal transfer paths, minimize walking distances, provide adequate weather protection, and supply appropriate wayfinding.
- C. When retrofitting existing station-exchange pairs where the two elements are separated, consider moving the bus exchange to a location adjacent to or underneath the station, so that transfer distance is minimized and passengers are not required to cross



any vehicle lanes.

8.2 Passenger pickup & dropoff (PPUDO)

- A. Ensure that adequate and convenient PPUDO areas and taxi ranks are provided, to prevent stopping patterns that create hazards, disrupt transit operations or interfere with pedestrian movement.
- B. Where the urban environment already provides PPUDO space, ensure that adequate PPUDO space is reserved in anticipation of intensified use in the future.

8.3 Park & Ride

- A. Ensure that directional and identifying signage is clearly visible to drivers on the main commuter route, both for wayfinding and publicity.
- B. Find opportunities and plan space for compatible land uses particular to the travel patterns of commuters.
- C. Incorporate weather-protected, designated pedestrian connections from the lot to the bus exchange, for example walkways in between parking rows.
- D. Provide infrastructure at both the pedestrian and vehicle level, for example light standards with fixtures at two heights.

8.4 Bicycle integration

- A. Design cycle travel paths into the exchange, anticipating entry and exit points, and con-

nections to bike parking and waiting areas.

- B. If cyclists cannot be accommodated, place signs at the bicycle entrance to the exchange instructing where to dismount. Pavement markings throughout the pedestrian and bus areas should also be installed.
- C. Provide sheltered bike parking at exchanges.
- D. Discourage theft and vandalism by locating racks in well-lit areas with high natural surveillance from foot traffic or surrounding businesses, or active surveillance from station attendants if present.
- E. Locate bike parking close to bike entry and exit points, to reduce the risk of conflict with pedestrians.
- F. In exchanges with high existing or latent demand for bike parking, consider providing space for premium parking facility.
- G. Provide cycle network map and policy information at a weather-sheltered location near cycle parking, or a central information board, or both.
- H. Install signs on nearby cycle routes that direct cyclists to the exchange.
- I. Install signs in bus exchanges that direct cyclists to nearby bike routes.
- J. When designing new or renovating old exchanges with high existing or latent demand for cycling trips, consider providing space for cycle services.

9 Safety & Security

9.1 Safety

- A. Use fences, railings, and other barriers as sparingly as possible.
- B. As much as possible, accommodate desire lines (or, in new facilities, anticipate them) rather than blocking them.
- C. When a physical barrier is required, make it a positive contribution to passenger experience by using landscaping (for example, prickly shrubs or raised beds), decorative fencing, or by treating the barrier as an opportunity for public art.

9.2 Security

- A. Site new bus exchanges in relatively dense, mixed-use contexts with many legitimate users and high natural surveillance.
- B. Where opportunities exist, create relatively dense, mixed-use areas around existing bus exchanges.
- C. Ensure windows and entrances of adjacent buildings face the exchange.
- D. Ensure sightlines are unobstructed by pillars and opaque walls.
- E. Use the “3 and 7” rule for plantings: no plants higher than 3 feet, and trees and shrubs should be limbed up to a height of 7 feet.
- F. Where warranted by passenger volumes, security conditions, or community concern,

consider establishing a dedicated or rotating human TransLink presence at bus exchanges, such as a FareDealer kiosk or a station manager.

- G. Budget appropriately for maintenance, and include life-cycle maintenance costs when selecting among different materials, designs, finishes, or plant species (specialists such as engineers and registered landscape architects should be consulted where applicable).
- H. Establish standards for the maintenance of structures, furnishings, ground planes and landscaping.
- I. Establish a protocol for regular monitoring of structures, furnishings, ground planes and landscaping for damage and soiling.
- J. Promptly perform any cleaning or repairs that are below standard, using “patches” only until proper repairs can be carried out.
- K. If structures are no longer to be used, maintain them until they can be removed.
- L. Install at least one pay phone or security phone at every off-street bus exchange not associated with a SkyTrain or WCE station.
- M. Install at least one pay phone or security phone at every off-street bus exchange associated with a SkyTrain or WCE station but not immediately adjacent to that station.
- N. Where an off-street bus exchange is associated with a SkyTrain or WCE station, and that station has a security phone, install signage alerting customers to the location of that phone.

10 Universal Design

- A. Design bus exchanges in accordance with recommendations in the *Universal Accessibility Guidelines for TransLink Fleet and Facilities*.

11 Community Integration

- A. Develop and implement a strategy for early and ongoing meaningful engagement among the design team, operations staff, the municipality, and the community about how best to integrate the facility into the neighbourhood.
- B. Avoid single-use off-street exchanges.
- C. Commit to a program of design and maintenance that ensures that the facility is attractive when seen from the outside.
- D. Incorporate space for goods and services relevant to the community, e.g. a community policing office, local-serving retail, a news-agent/convenience store.
- E. Implement a program for designing, installing and maintaining community bulletin boards.
- F. Clearly post who residents should contact if they have comments or complaints.



Conclusions & Next Steps

TransLink is well positioned to improve the level of customer service by focussing on design that is oriented toward improving customer experience. This is due to the commitment to quality customer service and infrastructure outlined in the 10-year and 30-year plans, combined with the with the exchange construction and upgrade projects currently being considered. This preliminary study of bus exchange design can inform future processes aimed at providing better passenger facilities.

A broader assessment of all passenger facilities, not just those with buses, is needed. The evaluation tool can be refined to make it more precise, and broadened in scope to make it more comprehensive. Support must be garnered outside of the planning division, and this support must consist of both verbal and financial commitment. A formal consultation process that pays close attention to users' experiences, as well as the needs of other agencies and local jurisdictions, can help build the partnerships that are required for this to succeed.

Ultimately, the creation and adoption of design guidelines for passenger facilities will streamline the process of designing new facilities by offering clear standards rather than requiring designers to start from scratch each time. But it is the provision of a high quality transit experience that will attract riders and increase customer satisfaction.

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1 Purpose

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Specifically, this report is intended to:

- Provide a preliminary assessment of the design quality of TransLink bus exchanges.

ges from the perspective of passenger experience

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- Offer a methodology for how bus exchange sites can be prioritized for amenity upgrades.

What this document is not

This document is not intended to be a comprehensive set of design guidelines for bus exchanges.

The recommendations contained herein are only those that respond to aspects of bus exchange design that were identified through site analyses as needing improvement. Recommendations are not given regarding aspects of design which are currently working well, but these would need to be included in a set of comprehensive guidelines.

This document is not an analysis of how well TransLink bus exchanges meet vehicle movement requirements or the needs of transit vehicle operators. This is merely a limitation of scope, and does not suggest that those matters are insignificant.

Nonetheless, it is important to remember that public transit exists for the benefit of passen-

gers, and the needs of vehicles and bus operators are important only to the degree to which they can provide good customer service. For example, it is essential to have adequate turning radii for buses, so that they can move passengers efficiently. Similarly, bus operators must have comfortable working conditions, such as convenient access to amenities such as restrooms and crew rooms, so that TransLink can attract and retain skilled operators to deliver high quality service to customers. Any final set of design guidelines for bus passenger facilities would need to incorporate these types of considerations as well.



2 Background

2.1 The significance of bus passenger facilities

Almost three quarters of a transit journeys in Metro Vancouver begin with a customer boarding a bus. If that trip begins or ends at a major destination, or if it involves a transfer, the customer is likely to pass through a bus exchange. These facilities serve numerous functions. For operators, they may be timing points, and usually feature washrooms or other driver services. For the buses themselves, they are physical spaces for buses to turn around or lay over. From the customer’s point of view, an exchange is a place to wait for or transfer to a bus or another adjacent transit mode.

2.2 TransLink’s current approach to bus exchange design

Metro Vancouver bus exchanges are carefully designed to meet the requirements of transit vehicles, fulfill civil and structural engineering requirements, ensure passenger safety, and increase access for people of different abilities. However, unlike rail transit stations, they are not usually designed with a strong consideration for how people will experience their surroundings.

Transit is in direct competition with the automobile for customers.

Transit facilities should be designed to provide a quality environment for transit riders that is planned with the same attention to detail and user convenience as is currently devoted to the auto driver.

– Calgary Transit, *Transit Friendly Design Guide*

2.3 The need for passenger-experience-centred design

Safety and efficiency are essential in order to make a transit system work. However, they do not necessarily make the experience of taking public transit enjoyable. In order to increase transit’s mode share, existing and potential customers must see it as an attractive choice.

Part of making transit attractive has to do with the bus service itself: frequency of service, trip time, proximity of routes, and the like. However, other aspects of infrastructure, such as the pleasantness and functionality of the waiting environment, also affect users’ perception of service quality. A fifteen minute wait can seem longer when standing under an umbrella in an expanse of asphalt than when sitting under cover while watching a vibrant streetscape of shop fronts, passers-by and attractive plantings. If the waiting and transferring environment is unpleasant, transit will lose its appeal to choice riders and reduce the number of trips captive riders choose to take.

2.4 Passenger experience as quality of service

A focus on passenger experience is neither novel nor radical. The US Transportation Research Board (TRB), in their Transit Capacity and Quality of Service Manual, define quality of service as “The overall measured or perceived performance of transit service from the passenger’s point of view” (emphasis added). They point out that this differs from highways service quality measures which focus on vehicles more than people, or utilization and economic performance measures which tend to reflect the transit operator’s point of view.

The TRB identifies “comfort and convenience” as one of the two aspects of service quality. Included in the category are, among other things, the kinds of passenger amenities provided, the appearance and comfort of transit facilities, and passengers’ perceptions of safety and security at transit stops and walking to and from transit stops. This design review of TransLink bus exchanges focuses on these types of customer-oriented measures of service quality.

2.5 Customer perception vs. TransLink jurisdiction

For most customers, it does not matter whether a shelter is supplied by TransLink or a municipality, or that the lighting comes from a pole installed and maintained by BC Hydro; it will be considered as part of what it feels like to take public transit. Because quality of experience affects the degree to which public transit appeals to current and potential customers, TransLink should

strive to ensure that that experience is as positive as possible.

This report takes the point of view of the customer, and therefore includes in its assessment those aspects of the public transit experience that are provided by other agencies as well as by TransLink. If shortcomings are identified that do not fall under the immediate sole control of TransLink, then TransLink should endeavour to work with the other providers to maximize the benefit to all involved.

3 Policy Context

3.1 Existing policy

Several of TransLink’s existing policies and plans relate directly to bus exchange design. These address a range of concerns, including ecological, social and economic sustainability; customer comfort and convenience, and plans for creating new bus exchanges and upgrading old ones.

Transport 2040

Adopted: 2008

TransLink’s recent 30-year plan was developed in conjunction with Metro Vancouver’s updated Regional Growth Strategy. The population of Metro Vancouver set to increase by over 3 million by 2040, accompanied by half as many new jobs. Most of this growth will take place south of the Fraser or east of Pitt River, where ridership and density are relatively low, so the need for new facilities and improvements of existing facilities is particularly acute.

In addition to this growth, it is predicted that the 23% of the population will be over age 65, almost double the current proportion. Seniors are more likely than younger residents not to drive, and will need convenient, comfortable, safe, and secure public transit.

Goals of the plan include increasing transit, walking and cycling mode share to over half of all

trips; locating the majority of jobs and housing along the Frequent Transit Network; and providing transit that is safe, secure and universally accessible. Some of the strategies adopted to achieve these goals point directly to improvements to the quality of bus exchange design:

- 1.1b Invest in new rail and bus infrastructure and accelerate a phased implementation of the Frequent Transit Network. [See inset box for definition.]
- 1.1c Coordinate transit investment with land use development plans to serve and stimulate high density and mixed use areas and reinforce a compact region.
- 1.2b Improve integration of cycling and transit.
- 2.2a Create and support dense, vibrant communities around the Frequent Transit Network where walking, cycling, and transit are the main modes of travel.
- 2.2b Locate public sector investments on the Frequent Transit Network.
- 2.2c Increase densities at rapid transit stations

The **Frequent Transit Network** concept will provide transit service every 15 minutes or better from morning to evening, every day of the week on corridors with densities and land uses that promote maximum ridership. Areas that do not have transit supportive development can not expect these levels of investment.

– TransLink, *Transport 2040*

and hubs.

- 2.3c Upgrade existing transit stations to ensure optimal usage.
- 3.1 Make transit, walking, and cycling appealing by ensuring they are safe, attractive, easy to use, and provide good value.
- 3.2 Optimize the safety, security, and usability of the transport system through design, enforcement and policing, technology, and information.

2009 10-Year Plan

Adopted: 2008

The 2009 10-Year Plan identifies projects underway that will help TransLink move towards achieving its Transport 2040 goals. Some of these include:

- A commitment to comfort and convenience as a way to make transit more attractive
- Upgrades to Expo Line SkyTrain stations, in some cases in concert with major redevelopment plans: Broadway/Commercial, Main, Waterfront, Metrotown, Surrey Central
- Bus service expansion, particularly in the area south of the Fraser River
- Initiatives to build, upgrade, or expand bus passenger facilities, including Newton, Guildford and Semiahmoo Exchanges in Surrey; Steveston Exchange in Richmond; and SFU, UBC and Capilano University.

The quality of transit facilities – including physical infrastructure, safety, accessibility and amenities – affects the comfort and convenience and, thus, the attractiveness of transit.

– TransLink, *2009 10-Year Transportation & Financial Plan*

Universal Accessibility Guidelines

Adopted: 2007

Part of the Access Transit initiative, the Universal Accessibility Guidelines meticulously outlines design considerations for accommodating a wide range of customer abilities. These include paving, furnishings, signage and facility layout, among other topics. A detailed audit checklist is provided, which could be used in the assessment of existing facilities or plans for new ones.

Transit Facility Infrastructure Design Guidelines

Adopted: 2002

The Transit Facility Infrastructure Design Guidelines – currently under revision – are a compendium of detailed technical specifications, focussing on engineering considerations for efficient, safe bus operation. The development of any future customer-experience-centred design guidelines would function as a complement to this guide to operational geometric design requirements and “rules of thumb”.

3.2 Current policy initiatives

TransLink currently has a number of policy initiatives underway that support the improvement of bus exchange design.



Transit passenger facilities best practices review and design guidelines

Initiated: 2009

TransLink’s *Transit Passenger Facilities Best Practices Review and Design Guidelines* will focus on the physical design of all passenger facilities, from bus stops to major multimodal interchanges. The current document addresses a subset of the facilities and issues to be addressed in the larger review and guidelines, and is intended to serve as an initial foray into the assessment of TransLink passenger facilities.

Infrastructure Policy

Anticipated completion: 2009

TransLink’s infrastructure policy will address how TransLink can achieve its commitment to reduce negative ecological impacts while remaining socially and economically sustainable. It notably covers energy and water use, materials and resources, and the protection of natural ecosystems. Implications for bus exchanges include the sourcing of materials for pavement, structures, and furnishings; as well as landscaping, stormwater management, energy use, and biodiversity. The policy will identify best management practices that cover the lifecycle of transportation infrastructure projects, from planning through design, construction, operation, maintenance, upgrading and finally decommission.



Wayfinding

Anticipated completion: 2009

The wayfinding programme seeks to improve customers’ experience as they plan and execute their public transit journey. In 2009, two stations will pilot the unified, system-wide developed in the first phase of this project, with eventual deployment to all modes and passenger facilities. For bus exchanges, this will entail improvements in not only in directional signage, but also route and schedule information.



Long-range bicycle plan

Anticipated completion: 2009

Effective bicycle integration at bus exchanges is difficult to retrofit into existing facilities. The long range bicycle plan currently under development includes in its goals the improvement of bike parking at transit facilities, and better bicycle-transit integration. Both of these require bus exchanges to be thoughtfully designed to incorporate bicycle traffic and cyclists’ needs.



Public Art

Anticipated completion: 2009

Public art is a part of all Millennium Line SkyTrain stations, but few other TransLink passenger facilities. TransLink’s public art policy will establish guidelines for where and how to include artistic elements in transit vehicles and facilities – not only for customers’ enjoyment, but also to help create a sense of place at transit facilities, and to make a positive contribution to communities where those facilities are located.



4 Other Agencies’ Design Guidelines

4.1 Introduction

At their most sparing, design guidelines for passenger facilities must include technical specifications that ensure transit vehicles can move effectively and that safety standards are met. Standard for Universal Design are also common, and these are often influenced by or developed in concert with national-level guidelines for accommodating people with disabilities.

Many agencies have begun to use design guidelines as a way to ensure quality facilities that will attract more customers. They focus on passenger comfort and convenience, aesthetic appeal, community fit, and physical design to deter crime. This section reviews guidelines from agencies that have taken this broader approach to design control, illustrating options for TransLink to consider including in its own design guidelines should it choose to progress in this direction.

4.2 Calgary

City of Calgary: *Transit Friendly Design Guide* (1995/2006) and *Transit-Oriented Development Policy Guidelines* (2004)

These two companion documents focus on LRT/BRT station area planning, a task that in Calgary co-ordinates more easily with the physical

design of the facility as transit planning occurs at the municipal level. The *Policy Guidelines* set out policy objectives, accompanied by guidelines for achieving those objectives (see inset box).

The *Design Guide* gives more specific guidance on physical design, and identifies existing city policies that, when invoked, would support TOD. Of particular relevance to TransLink is Principle 8: 8. Build Quality, User Friendly Transit Facilities.

4.3 Seattle

Sound Transit: *Design Standards and Guidelines for Sound Transit Projects: Sounder & ST Express Passenger Facilities* (2007)

Sound Transit operates regional transit services in the Seattle area, including commuter rail, light rail and regional express bus services. The *Design Standards and Guidelines for Sound Transit Projects: Sounder & ST Express Passenger Facilities*

TABLE I-1. Transit-Oriented Development Policy Objectives Linked to Guidelines (Calgary Transit: <i>Transit Oriented Development Policy Guidelines</i>)		
Policy objective	Example of a guideline to achieve the policy objective	Quote
Ensure transit-supportive land uses	Mix land uses	
Increase density around Transit Stations	Optimize density around each station	“Locate the highest density uses and building forms (e.g. apartments, office towers) as close as possible to the station building.”
Create pedestrian-oriented design	Locate pedestrian-oriented uses at the ground level	“As TOD is focused on pedestrian comfort, the ground floor should contain uses that are appealing to pedestrians, such as retail, personal service, restaurants, outdoor cafes, and residences.”
Make each station area a “place”	Create a focus for the local community	“Each station area should be developed as a unique environment, transforming a utilitarian transit node into a community gateway and a vibrant mixed-use hub of activity.”
Manage parking, bus, and vehicular traffic.	Long term redevelopment	“Surface parking should be designed to allow redevelopment with parking structures and/or other development.”
Plan in context with the local communities	Provide needed community services and amenities	“These could include new housing forms to support community demographics, employment options, [...] day-care, public gathering spaces, etc.”



Artistic elements, Olympia, WA Transit Centre

guide the design of both their rail and bus facilities in a single manual.

This document is structured so that certain matters, such as engineering and safety requirements, are detailed in the manual itself, whereas topics less related to specific physical pieces of an facility, for example transit-oriented development, public art, signage and sustainability have been developed as separate policy documents. An overview of each of these broader “integrated programs and initiatives” is given, and compliance with them is specified as a requirement or recommendation. This distribution of guidelines over

multiple cross-referenced documents allows for more manageable development and revision of individual aspects of facility design.

4.4 Florida

Florida Department of Transportation: *Accessing Transit: Design Handbook for Florida Bus Passenger Facilities* (2008)

This handbook stands out in both scope and presentation. It is designed to be informative enough to be used by engineers, but is presented in plain language and illustrated with clear graphics and photographs so as to be understandable by others. It takes the opposite approach to that of Sound Transit described above: all matters relating to facility design are included in a single manual.

The handbook covers four broad topics: curb-

FIGURE I-1. Facility Prototypes Covered In Florida's *Accessing Transit Design Handbook*

- On-line bus stop
- Primary stop
- Transit mall
- Transfer centre
- Park & Ride facilities
- Air-bus intermodal transfer centres
- Rail-bus intermodal transit stations
- Bus Rapid Transit
- University transfer centres

TABLE I-2. New South Wales - Bus Exchange Design Elements, By Development Context															
Situation	Bus zone type				Zone delineation		Shelter	Seating	Information						Telephone
	Curb-side	Bay	Bulge	Off-street	Signs	Road markings			Route map & schedule	Destination guide	Network map	Local map	Chrono list	Real-time Info	
CBD/ Town Centre	x	x		x	x	x	x	x	x	x	x	x		x	x
Regional Shopping Centre	x	x		x	x	x	x	x	x		x			x	x
Neighbourhood shopping centre	x	x		x	x		x	x	x		x				x
Residential area	x	x		x	x		x	x	x		x				x

side and street-side elements, facility prototypes, land use guidelines, and safety. The issues covered in each of these sections is briefly outlines below.

Curb-side and street-side elements. These infrastructure requirements include such diverse topics as vehicle turning radii, benches, landscaping and wayfinding.

Facility prototypes. A kit-of-parts approach is taken to minimize costs and provide consistency. Prototypes are shown for virtually every context, including stops, BRT, intermodal facilities, and university hubs.

Land use guidelines. The handbook moves beyond the technical requirements for bus and passenger movement and safety, and goes on to outline key land use principles that support transit. It gives useful, well annotated examples of both transit-oriented design, and transit-discouraging design for comparison, covering residential, office, retail and mixed uses.

Safety. This section covers both safety and se-

curity, with special attention paid to principles of Crime Prevention Through Environmental Design (CPTED)

An extensive list of appendices give examples of documents from various municipalities addressing practical topics such as a bus stop evaluation program, bus passenger facility development thresholds, and recommends transit-supportive language and policies for local government planning documents.

4.5 New South Wales, Australia

State Transit Authority of New South Wales (Australia): *Bus Stop Style Guide* (1999)

This guide from the State Transit Authority of New South Wales includes a hierarchy of bus passenger facilities that extends from standard stops to major intermodal interchanges. Notably, it takes the position that bus-bus and intermodal exchan-



Real-time arrival information signs at bus stops. Bristol, UK (top), Singapore (bottom)



Notable design features. Clockwise from top left: Artistic shelter in Renton, WA; architectural detail in San Rafael, CA; bus pole route map in Philadelphia, PA; architectural design at Charlottesville Transit Center, VA; covered boarding areas in King County, WA; stairside bike gutters at Hollywood Transit Center, CA; urban pedestrian-oriented street presence in Brisbane, Australia.

TABLE I-3. AASHTO Guidelines for the Provision of Amenities

Amenity	How many people must be present to warrant installing one unit	Minimum per facility
Food & beverage vending	50	2
Newspaper Vending Machines (8-unit array)	50	1
Kiosks/Information Display	100	-
Convenience shop	200	-
Public telephone	50	2
Patron phone	50	2

ges have virtually identical needs in terms of passenger amenities. The stop hierarchy and level of amenity is shown in the accompanying table. Of note is that for it warrants real-time information at bus passenger facilities in the CBD and in regional shopping centres, and recommends both a local map and destination guide for those in the CBD.

4.6 AASHTO

American Association of State Highway and Transportation Officials: *Design Guide for Transit Facilities* (2002)

Although not a transportation planning agency itself, the American Association of State Highway and Transportation Officials (AASHTO) produces many guidelines recommending good practice. Beyond the usual technical specifications,

the AASHTO *Design Guide for Transit Facilities* also describes the importance of designing transit facilities as places that are not just functional but desirable, and that design plays an important role in raising the public perception of transit as an attractive transportation option.

Public art and the provision of amenities are two aspects of facility design mentioned in the guide. It finds that art is valuable not only for the pleasure of viewers but also as a way of increasing community acceptance, discouraging crime and vandalism. It also points out that art creates a sense of permanence to the facility, and so encourages development and businesses.

The guide also provides a useful set of guidelines for when various amenities are warranted (see inset)

5 System Overview of Exchanges

5.1 Introduction

The TransLink bus network extends from Lions Bay to Maple Ridge in the north, to the US border in the south. Several dozen bus hubs or facilities allow customers to transfer from one service or mode to another, and provide buses with places to lay over and turn around. TransLink does not consistently use a single name to refer to these facilities, so this document will use the term exchange as an umbrella term. This section explains what is included as an exchange in this document, and describes the kinds and functions of exchanges in the TransLink system.

5.2 What qualifies as an exchange?

TransLink does not currently use the term “exchange” in a consistent or exclusive fashion, an issue which is described in more detail in *Information & Wayfinding*, page 34. For the purpose of this study, a bus passenger facility is considered an exchange if it is presented to the public explicitly as an exchange, implicitly as a network hub on maps, or is located at an intermodal transfer facility. Specifically, it is considered an exchange if any of the following criteria are met.

- It is called an exchange by TransLink.
- It is presented to the public as a salient network element on the TransLink transit system map.

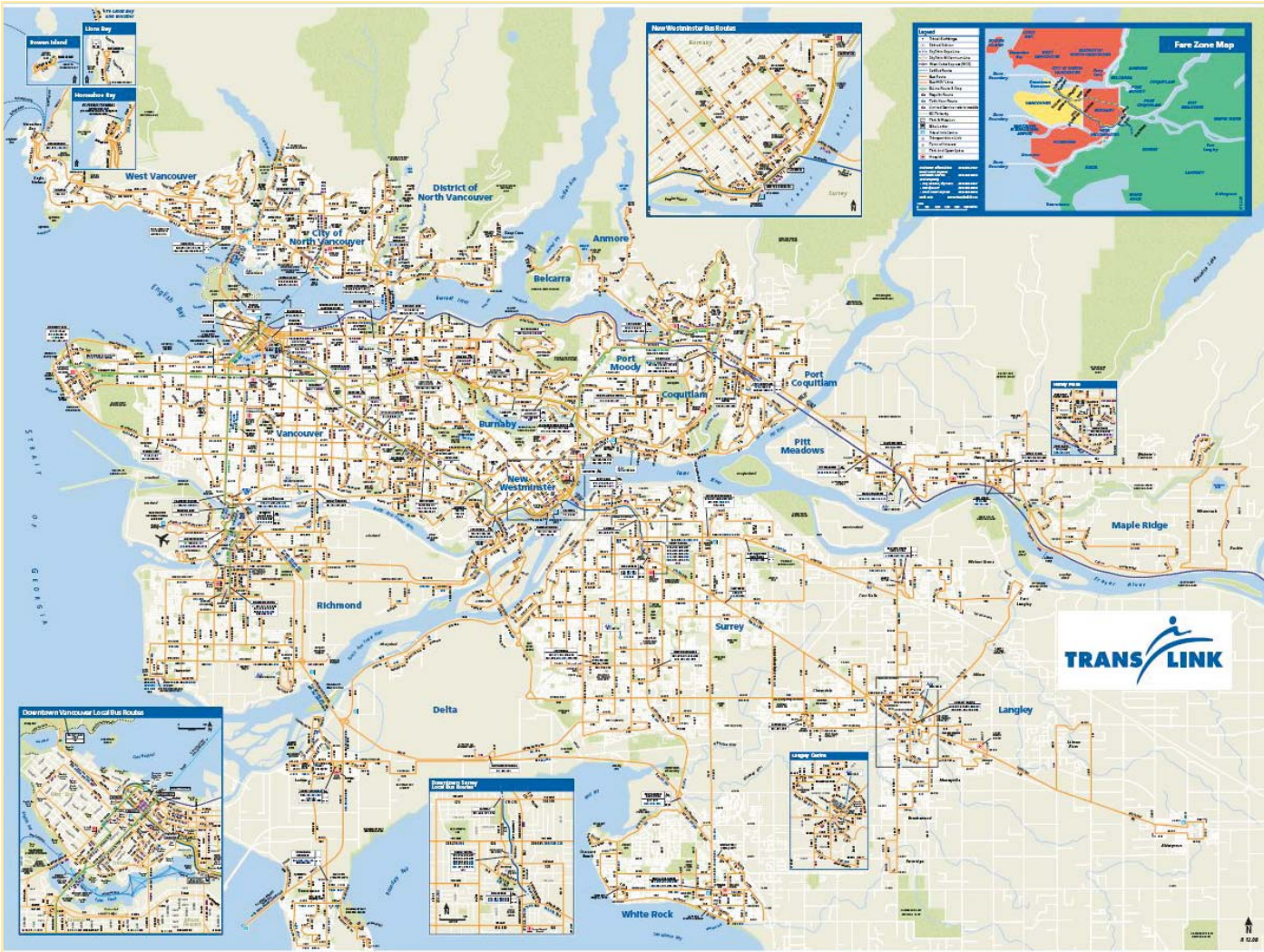


FIGURE I-2. TransLink Network Map Showing the Geographic Extent of Transit Service

- It is located at any rail station or ferry terminal forming part of the public transit system, thus clearly performing a passenger transfer function.

The application of these criteria results in 87 facilities being included as exchanges. The adoption of a single unified name for such facilities is discussed in Chapter II.



From top: Metrotown Station Exchange, Capilano University Exchange, UBC Loop.

5.3 Functions and characteristics

The 87 exchanges identified here perform a variety of functions, both from the point of view of bus operation and passenger usage. They may be points at which buses primarily terminate, or are

merely a mid-route stop. For passengers, they may be primarily destinations, unimodal or intermodal transfer points, or a mixture (see Table I-4, Bus and Customer Functions of Bus Exchanges).

Although the prototypical bus exchange is usually thought of as off-street, only half (39) of

the exchanges have an off-street element. SkyTrain or West Coast Express connections are available at 39 of the 87 exchanges (45%). A total of 16 exchanges have Park & Ride lots, seven of these are also associated with rail stations.

5.5 Who designs exchanges?

Exchanges are currently designed in-house by TransLink staff, primarily by engineers with input from planners and others. This is the case even when they are part of a multimodal interchange at which the stations have been designed by architects (such as Millennium Line and Canada Line stations).

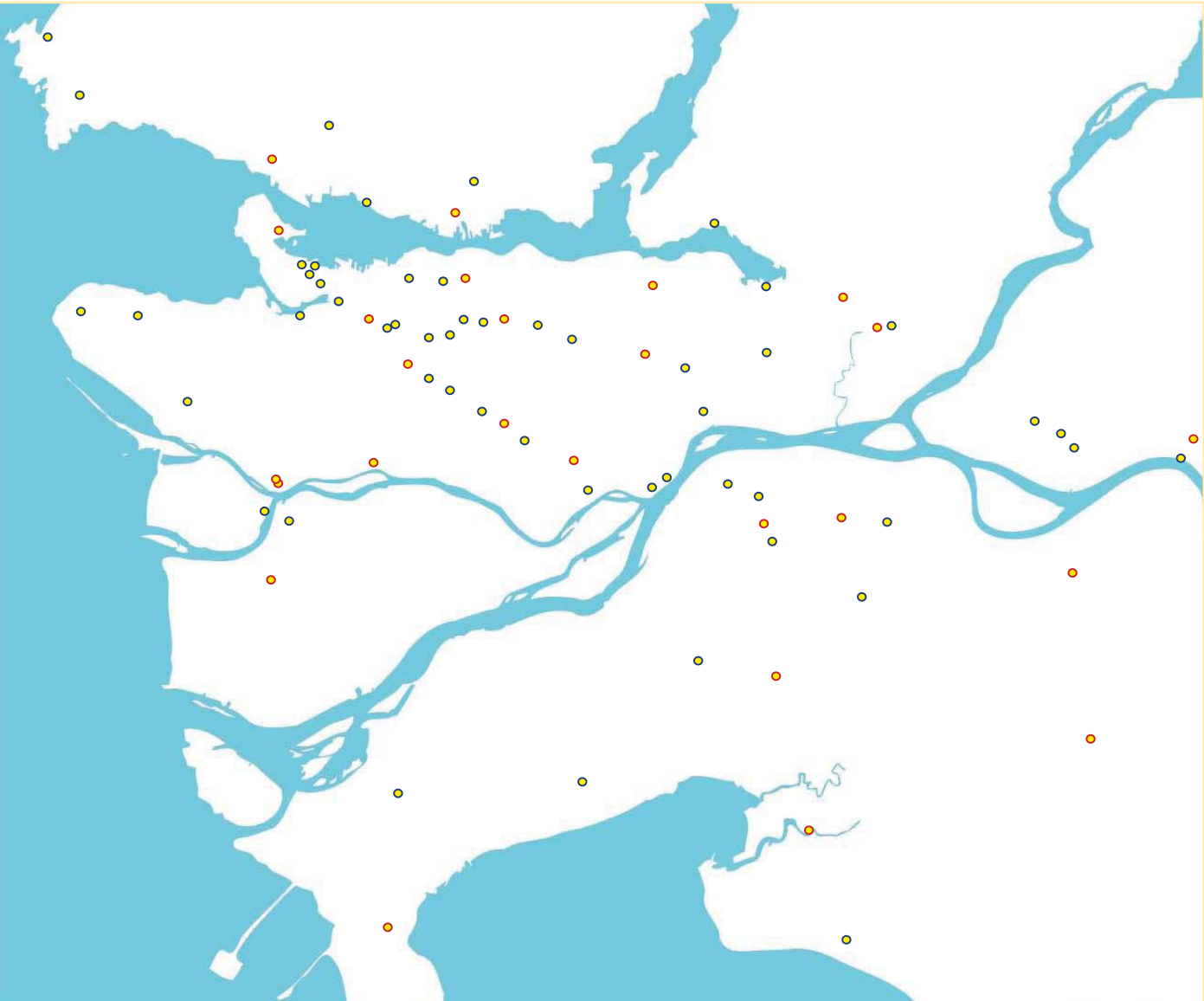


FIGURE I-3. TransLink bus exchanges. Red dots indicate the exchanges that were included in the site visit sample.

TABLE I-4. Bus- and Customer-Oriented Functions of Exchanges

Point of view	Function	Examples: Single function	Examples: Multiple functions
Bus	Terminus/layover	SFU Exchange	Park Royal
	Mid-route timing point	Gilmore Station	
Customer	Destination	Capilano University	Metrotown
	Bus transfer point	Ladner Exchange	
	Intermodal transfer point	Royal Oak Station South Surrey Park & Ride	

6 Methodology

The methodology consisted of three parts: literature review, site visits, and data analysis.

6.1 Information gathering

Relevant TransLink policy documents were reviewed in order to understand the policy context. Staff in planning, service planning, engineering, transit security, and transit police departments, as well as Access Transit, were consulted where necessary to clarify policy or inform of upcoming policy initiatives.

Academic literature was sought through electronic searches of the Urban Studies and Planning database, Urban Studies Abstracts, and Transportation Research Information Services (TRIS) Online. Keywords used were combinations of *design, bus, transit, exchange, interchange, transit centre, station, terminus, loop, architecture, guidelines, standards, manual, handbook, and policy*.

Web searches were performed with the same keywords to access English-language bus facility design guidelines and policy documents that had been made publicly available on the internet. These documents were examined for content that went beyond engineering or safety considerations. In some cases, the transit agency or government in question was contacted for clarification or further information.

Web searches were also performed through

Google Image and Flickr searches for illustrative or inspirational photographs of transit facilities. Where these photos have been used in the current document, their originators have been credited in the endnotes. Copyrighted or restricted-use photos were not used.

6.2 Site analyses

In order to ensure that all relevant issues would be examined, sites were selected for maximum variability in geographic distribution, passenger volume, intermodal interchange, and land use context. In all, 24 exchanges, almost one third of the total, were selected for individual detailed site analyses.

Site visits themselves were conducted typically during the peak boarding hour so that issues arising from site design would be more likely to be observed. The observation method included photo documentation (30-80 photos per site) and a checklist. The checklist was developed based on standard urban design features and specific issues that arose from the literature review and from consultations with TransLink staff described above.

As it was not yet known what issues would become relevant at TransLink bus exchanges, the checklist included a wide scope of topics. Not all of the data collected ended up meriting specific mention in this report, but the attention to breadth and detail informed the researcher’s deeper understanding of the success of each passenger facility. They also were the basis for developing the ranking system ultimately used in Chapter IV. The final

checklist is included as Appendix A.

6.3 Data analysis

Data for each site was qualitatively analyzed for specific issues arising from the observations and staff interviews. Key issues arising at each exchange were selected for presentation in individual at-a-glance site analyses. This information is presented in Chapter 3, *Individual Site Analyses*.

Through the site analysis process, certain recurring themes were identified that were widespread across the system, or were otherwise prominent. Although this stage of analysis occurred after the individual site analyses, in order to give the reader a broad overview they are presented first, in Chapter 2, *System-wide Issues*.

The sites were ranked according to their checklist scores for each issue category (for example, seating, or intermodal integration), and compiled in tables for comparison. These rankings will help identify which issues are least well met system-wide. It will also provide a rough guide to which of the sites sampled are most lacking in customer-centred design, and are therefore most in need of design repair. Chapter 4, *Typologies and Rankings*, sets out these comparisons. Other, non-design factors that will influence priority (such as passenger volume or projected changes in service needs) are also discussed, although not applied as they are outside the scope of this project.

Transit facilities cannot be “second best” or “good enough” [...] bus terminals must overcome traditional negative images and become places where transit riders feel welcome and valued.

– Calgary Transit, *Transit Friendly Design Guide*

7 References & Image Credits

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Image credits

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Page 5: SkyTrain wayfinding map. <<http://www.flickr.com/photos/roland/9291441>>. Accessed 15 January 2009.

Page 6: Olympia transit centre. Spillar, Robert and Parsons Brinckerhoff Inc. 1997. *A Comprehensive Planning and Design Manual for Park-and-Ride Facilities*, p. 167. Available online: <<http://www.pbworld.com/library/fellowship/spillar>>. Accessed 17 November 2008.

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Page 8: Renton shelter. <<http://flickr.com/photos/waderockett/243690264>>. Accessed 14 January 2009.

Page 8: Philadelphia bus pole route map. <<http://flickr.com/photos/29923994@N03/2854144645>>. Accessed 14 January 2009.

Page 8: Charlottesville Transit Center. <<http://flickr.com/photos/waldoj/2769037420>>. Accessed 14 January 2009.

Page 8: King County covered boarding areas. <<http://flickr.com/photos/viriyin-cy/2975598427>>. Accessed 14 January 2009.

Page 8: Hollywood Transit Center. <<http://flickr.com/photos/bikeportland/474887923>>. Accessed 14 January 2009.

Page 8: Brisbane Transit Centre. <<http://flickr.com/photos/floongle/2428804811>>. Accessed 14 January 2009.

II System-wide Issues

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1 Introduction

Site analyses of the 24 sample exchanges revealed a number of issues that were widespread if not universal. These include high-level considerations, such as site location and layout; others are at a finer scale, such as the quality and type of furnishings. Some of the issues relate to the network beyond the exchange itself, for example wayfinding and intermodal integration.

This section identifies common issues that go beyond the need for design repair at specific sites, and are best addressed through systematic policy review.



2 Responsibilities to Stakeholders

In Chapter one, the viewpoints of three stakeholders were identified as the focus of this study: customers, the community, and the local ecosystem. All of the system-wide issues presented in this chapter are evidence of some degree of failure to include or balance responsibilities to these stakeholders.

Poor orientation to customers, community,

and the local ecosystem results in facilities that detract from passenger experience and negatively affect quality of life for the communities that transit is intended to serve.

Figure II-1, *System-wide Issues and Responsibilities to Stakeholders*, shows how these issues relate to the three responsibilities. In order to fulfill TransLink’s responsibilities to these stakeholders, a moral and financial commitment must be evidenced through official TransLink policy and proactive program initiatives.

TABLE II-1. Responsibilities to Stakeholders

Stakeholder	Responsibility	Examples of responsibilities met inadequately
Customers	Provide an efficient, comfortable, and pleasant trip	Poor aesthetics (as viewed from on site)
		Low range of amenities
		Poor multimodal integration
		Inadequate provision of information
		No on-site customer service
Community	Provide a community asset	Poor aesthetics (as viewed from off site)
		No community function outside of transit itself
		Poor physical integration into the community
		Little sense of permanence, discouraging commercial and residential investment
Ecosystem	Do not create a net negative impact on the ecosystem	Stormwater mostly diverted to storm drains
		Little biodiversity or wildlife habitat
		No recycling facilities in exchanges



Most of the system-wide issues addressed in this chapter focus on the customer, mainly because transit facilities are constructed primarily for their benefit. Many of the customer-oriented issues, such as security, or landscaping, also benefit the community if done well, and these links are made in Section 11, *Community Integration* (page 50). Because the local ecosystem is the context in which all aspects of the built environment occur, its relevance is addressed in every topic as required, rather than being presented as a separate,

GOAL 2: Most trips are by transit, walking, and cycling.

– TransLink, *Transport 2040*

Density, local retail and the absence of major arterials have been found to be three of the most important factors influencing walk trips to BART, together with individual characteristics such as gender and availability of a car.

- David Loutzenheiser, *A Model of Walk Trips and Their Design and Urban Form Determinants Around BART Stations*.

stand-alone consideration.

3 General Approach to Design

The initial approach to designing a bus exchange has a significant effect on the design decisions that follow. From choosing the location of the exchange, to deciding what components will be included and how they are to be arranged, the designer will shape the look and feel of the facility for transit users. In this section, the siting, layout, and functionality of bus exchanges is examined, followed by a discussion of the limitations of site design in achieving a positive customer experience.

3.1 Siting

Site selection and transit-oriented development

A number of factors influence the selection of a bus exchange site, relating to physical, budgetary, network and customer needs and constraints (see Table II-2: *Some Considerations For Siting Bus Exchanges*).

As a result, bus exchanges are often sited where land is relatively inexpensive, near major roads or highways, at a distance from other transit hubs. They are often near major destinations (an example from the TransLink service area is Haney Place), but sometimes function primarily as an interchange point (for example, Phibbs Exchange) or a end-of-route turnaround (Knight & Marine), with little relevance for the surrounding neighbourhood.

In the past decade, however, an increased awareness of the symbiotic relationship between transportation and land use planning has resulted in more transit hubs being built near, or in conjunction with, dense mixed-use development. When accompanied with a high-quality pedestrian environment, this is what is meant by *transit-oriented development*. Transit-oriented development puts more people and more destinations within easy walking distance, but also makes transit a more convenient option for those trips which are not made locally, thereby creating a concentrated market for transit.

Some neighbourhoods, especially those built before the rise of the automobile, already exhibit many of the features of transit-oriented develop-

Transit Friendly Design Principles

- 1. Provide appropriate community densities
- 2. Minimize walking distance
- 3. Provide mixed land uses
- 4. Organize density, land use and buildings to benefit from transit
- 5. Create a pedestrian friendly environment
- 6. Route transit into the community
- 7. Reduce transit travel time
- 8. Build quality, user friendly transit facilities

FIGURE II-2. Transit Friendly Design Principles from Calgary’s Transit Friendly Design Guide

ment. Because they are already developed, siting a bus hub (as opposed to merely providing bus service) in such communities is constrained primarily by the cost and availability of land, and the suitability of the roads for heavy bus traffic.

Existing bus exchanges in low-density single-use areas could be relocated to a more transit-supportive location, or transit agencies could work with municipalities to develop the area around the facility in a transit-oriented fashion. This may not, however, fit in with a municipality’s official community plan, and typically requires a long timeline to come to fruition.

Where possible, it is best to site bus exchanges, like other transit hubs, in communities that already have an appropriate urban form, and then continue to develop in a way that supports transit.

Land constraints	Transit network fit	Rider attraction
Land rehabilitation costs	Appropriate distribution of transit hubs across service areas	Proximity to major trip generators (shopping areas, major parks, recreational and civic centres)
Land purchase costs	Proximity to roads appropriate for heavy bus volumes	Proximity to major commuter routes (for exchanges with Park & Ride lots)
Land availability (especially for exchanges with Park & Ride lots)	Connection with other transit modes	

TABLE II-2. Some Considerations For Siting Bus Exchanges

Given the anticipated population growth [get figures for this] for the Metro Vancouver area, and the number of new exchanges and renovations being explored in Area Transit Plans that are currently in progress, this should be an excellent time to take advantage of existing suitable development and shape future land use and transportation patterns.

Selecting sites for Park & Ride

Park & Ride facilities are a special case in which the facility requirements seem difficult to reconcile with transit-oriented development patterns. Park & Ride lots are created for precisely those customers who do not live in areas with transit-supportive urban form, and are designed to integrate closely with their existing commuting patterns. For example, if the Park & Ride lot is not prominent from major commuter roads, or requires drivers to detour from their usual com-



Completed in 2002, the Village at Overlake Station in Redmond, Washington is an example of purpose-built transit-oriented development that includes a Park & Ride lot. The transit centre development also incorporates moderate-income rental housing and a day care facility; retail and employment areas are within walking distance.^a

muting route, it is less likely to attract riders. In contrast, compact, mixed-use, pedestrian-oriented development is less likely to develop along the highways and major roads that can accommodate high volumes of car commuters. In fact, transit-oriented development is designed to *reduce* the need to drive to transit. However, there are examples where new transit-oriented development has been successfully designed to meet the needs of Park & Ride customers as well (*see inset*).

Siting of TransLink bus exchanges

Almost all of the bus exchanges in the sample were near some kind of major employment, civic, or recreational destination. However, few of the exchanges could be said to be part of true transit-oriented development. At Metrotown, for example, the exchange is beside the region’s largest shopping mall, and is within walking distance of low- and high-rise residential towers. However, the exchange itself has the feel of a loading bay or service area, providing an uninspiring welcome for arriving customers, and there is very little street-

oriented, pedestrian-scale development in the vicinity. Port Coquitlam Centre comes closest to true transit-oriented development, with narrow close shop fronts abutting the sidewalk, and some residential above and behind.

Table II-3, *Siting of Sampled TransLink bus Exchanges*, shows the distribution of the sample exchanges in relation to the two siting-related elements of transit-oriented development: density and urban form.

Unsurprisingly, the chart shows exchanges clustering around a central diagonal axis from low-density pedestrian-unfriendly forms to high-density pedestrian-friendly ones. High-density car-oriented development is difficult to achieve because surface parking and roads take up much of the land area. Similarly, few pedestrian-oriented businesses or residential developments can be successful where there is low density because there is so little to walk to, and there are so few pedestrians that the cost per new walk trip is relatively high. Stanley Park stands out as an exceptional case of low-density pedestrian-oriented form – the nearly undeveloped park is itself the focal attraction.

TABLE II-3. Siting of Sampled TransLink Bus Exchanges ^b				
Urban form	Density of development (relative to municipality or area)			TOTAL
	Low	Medium	High	
Agricultural				1
Mostly car-oriented				14
Both car- and pedestrian-oriented				6
Mostly pedestrian-oriented				3
TOTAL	11	7	6	24

The table also shows that the majority of exchanges are situated towards the low-density, car-oriented end of the spectrum. This could reflect a siting decision process that did not consider urban form, but more likely it is at least partially due to limited choices in a metropolitan region that developed mostly after the widespread adoption of the personal automobile as the transportation option of choice.

Bus exchanges and development

Bus exchanges may not be as appealing to developers as rail stations for sites of new transit-oriented development, partly because of a perception of impermanence and low prestige of buses as a mode of transit. Transit agencies and municipalities can begin to overcome these negative perceptions by creating high-quality exchanges that are community assets, with strong placemaking features, high quality of design, and features such as stationhouses that demonstrate their permanence. The remaining sections of this chapter address ways in which this can be achieved.

Recommendations: Siting

- A. Where possible, site bus exchanges in mixed-use areas that are relatively dense compared to the rest of the municipality or area.
- B. Work with communities to plan transit-oriented development around the site.

FIGURE II-3. Design Elements Relevant to Exchange Layout			
Pedestrians	Cyclists	Buses & HandyDART	Employees
Entry points			Washroom
Exit points			Break room
Pathways			Office/work space
Information area		Loading bays	Work vehicle parking
Waiting area	Parking	Layover spaces	
Queuing area			
Boarding area			
Amenities			

3.2 Site Design & Layout

This section examines the basic design elements of bus exchanges: what elements have been included, and how they are placed in relation to each other. The main design elements relating to the layout of a standard bus exchange are shown in Figure II-3, *Design Elements Relevant to Exchange Layout*.

General

How design elements are ultimately manifested depends on the physical aspects of the site (for example size, or an on- or off-street configuration), decisions of what to include as part of the exchange (layover space, plantings), and how to include them (stationhouses or bus-stop-style shelters as waiting areas). This section explores TransLink bus exchanges in terms of general approaches to design, physical configurations, and

ranges of function.

Designs that promote transit use are those which are most appealing to customers, that is, pedestrians. By prioritizing pedestrians, designers create bus exchanges that are convenient, comfortable, and attractive. The way in which bus exchanges accommodate transit vehicles should serve to make customers' journey as appealing as possible, rather than merely maximizing the efficiency of bus movement.

Recommendations: General Site Design & Layout

- A. Design for the convenience of the following modes, in descending order of priority:
1. Pedestrians
 2. Transit vehicles
 3. Bicycles
 4. PPUDO & taxis
 5. Carpools
 6. Private vehicles

- A. Layout should be such that general traffic does not cross through pedestrians' paths as they transfer from one transit leg of their journey to another transit leg.

Holistic and modular approaches

One way to distinguish the conceptual approach to designing bus exchanges is to place them on a continuum from modular to holistic designs. *Modular* design involves discrete units that can be placed anywhere, such as stand-alone shelters,

or individual bike lockers. Modular approaches to design are more flexible in that elements can be easily moved around if necessary. They can also be less expensive because identical small units can be purchased or produced in quantity and then installed when needed. For the same reasons, modular designs can give a sense of impermanence and cheapness to a facility, and may not fit or function as well together as the elements were designed in isolation.

Holistic design involves designing all elements as a single concept, for example as part of a stationhouse, or a large central island covered by a canopy, with central waiting areas. Holistic approaches are site-specific designs, so the parts function together seamlessly. They also tend to cost more, because of the need to design each one individually, and because their structures and grounds may require the expertise of architects and landscape architects, in addition to engineers. A well-executed holistic approach benefits customers from its seamless and tailored design, and benefits the community by creating a stronger sense of place than can typically be achieved by a collection of modules. Holistic designs need to anticipate future use or demand more than modular designs, with spaces and structures that are adaptable to evolving needs.

A user-centred evaluation of bus exchange design favours the holistic approach. It better meets customers needs, provides a higher-quality experience, and has greater potential to be a integrate well with the community.

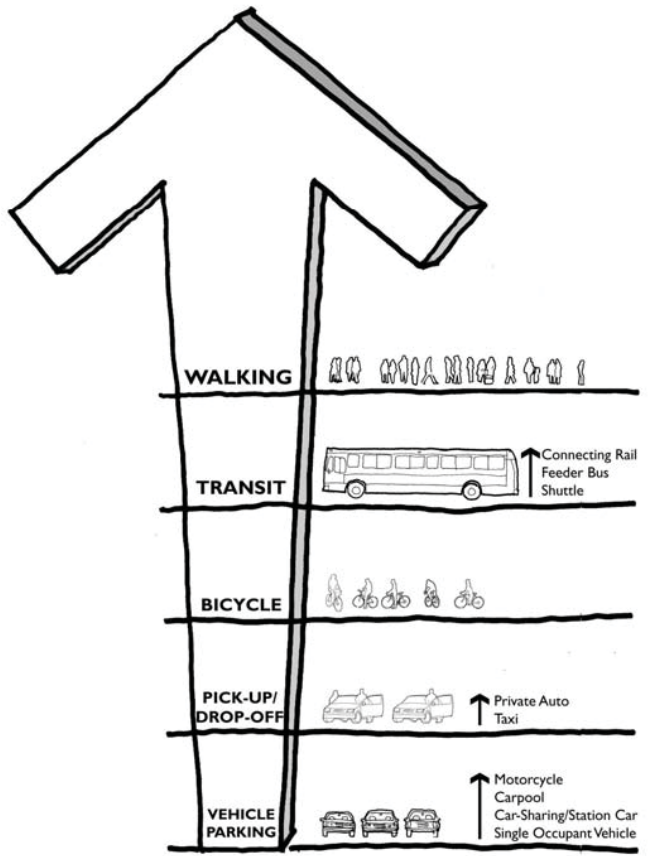


FIGURE II-4. Access Hierarchy (from San Francisco Bay Area Regional Transit design guidelines)

Holistic vs. Modular Design at TransLink bus exchanges

Among the sample sites, modular design tends to predominate. Manifestations of this design approach include:

Shelter: Where shelter is not provided by an overhead buildings or bridge structure, customers at TransLink bus exchanges must move to shelter modules rather than the shelter being designed to accommodate natural passenger movements. Shelters fail to cover movement paths, boarding or queuing areas, or information kiosks.

Bus-rail facility integration: Bus exchanges often integrate poorly with SkyTrain and WCE stations, failing to provide the customer with a seamless transit experience. Connections between the two may be unsheltered and indirect (diagram: Brentwood and Coquitlam stations/exchanges). The facilities themselves are frequently inconsistent in quality of design, with high-quality architecture and design features at rail stations, and purely functional bus exchanges with little architectural merit.

Bicycle integration: Bicycle parking is provided, but without clear bike routes to the parking from the edge of the exchange. Parking modules (racks, lockers) are positioned independently of weather protection structures.

HandyDART integration: HandyDART bays have specific needs, and those needs are sometimes poorly met, sometimes not at all, because they do not appear to have been included in the original design concept and standard bus bay designs do not consider HandyDART features (for example, that they are rear-loading).

The exchange at Surrey Central station stands

out among the 24 sample sites as an exception to the modular approach. Its more holistic design features a central area that combines shelter, seating, and operator facilities. The on-street bays are located in such a way that takes advantage of the shelter provided by the elevated SkyTrain station-house, alongside food outlets and a convenience store. Distinctive interlocking pavers unify the bus exchange, on-street bays, and the connections to the SkyTrain station, while distinguishing the multimodal transit hub from the surrounding neighbourhood. The device is further extended to indicate traffic conflict areas with contrasting-coloured blocks, showing a well conceived design approach to serve multiple aesthetic and functional purposes.

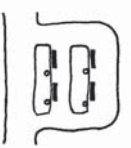
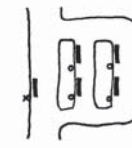
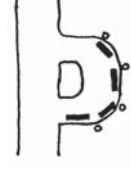
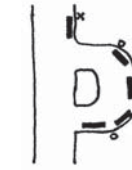
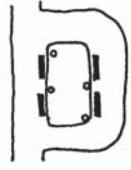
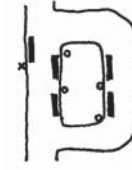
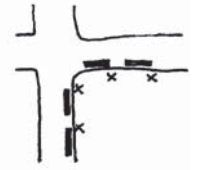
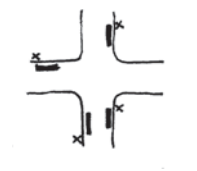
Recommendations: Holistic vs. Modular Design

- C. Take a holistic approach to designing bus exchanges and multimodal stations, for both functionality and aesthetics.

On-street and off-street configurations

The physical design of bus exchanges can be most basically classified by the location of the bays and waiting areas relative to the street. Bus bays at on-street exchanges are like those at other bus stops: buses pull up to the sidewalk and rejoin traffic without fully separating from the street. At off-street bays, buses travel on service roads or plazas where only transit vehicles are permitted, and passengers board from a central island, plaza periphery, or side of the service road. On- and off-street facilities each have advantages and drawbacks, and exchanges often have a combination of

TABLE II-4. Basic Layout Configurations

Basic type	Subtype	Layout	With on-street satellite bays	Comment
Off-street	Off-street island			<i>Customer comfort:</i> Customers are most likely to be removed from the noise, fumes, and danger of general traffic. (On-street satellite bays: See “Dispersed bays” below)
	Drive-through islands			<i>Mode conflict:</i> Requires transferring passengers to cross bus lanes. (On-street satellite bays: See “Dispersed bays” below)
	Periphery boarding			<i>Mode conflict (possible):</i> Transferring passengers’ desire lines may cross bus lanes. (On-street satellite bays: See “Dispersed bays” below)
Mixed	Streetside island			(On-street satellite bays: See “Dispersed bays” below)
On-street	Contiguous bays			<i>Neighbourliness:</i> Can create a “wall” of buses, displeasing adjacent property owners.
	Dispersed bays			<i>Transfer distance:</i> Potentially long transfer distances between bays. <i>Mode conflict:</i> Requires transferring passengers to cross general traffic lanes. <i>Transfer time:</i> Possible delays while customers wait for traffic signals. <i>Wayfinding:</i> Transferring passengers may not be able to see or identify their departure bay from their arrival bay.

both types.

One of the primary functions of bus exchanges is to bring routes together so that passengers can transfer conveniently. Exchanges with a single island, either off-street or streetside, offer the most efficiency for transferring passengers: short distances, and no need to cross bus or traffic paths. On-street exchanges with dispersed bays are least efficient, necessitating longer distances, traffic crossings, and potential waits for pedestrian signals. However, on-street bays tend to be more conveniently located to a variety of goods and services the customer might wish to purchase while waiting, and are likely to be more visually interesting in terms of building variety, street activity, and so on. Efficiency of transfer, although clearly of high importance, is not the sole determiner of customer service.

On-Street and Off-Street Design at TransLink bus exchanges

The 24 sample sites were evenly balanced among on-street, off-street, and mixed configurations. There is no clearly superior configuration. The most appropriate type site size, surrounding development, , number of routes, volume of passengers, and level of street traffic.

If transit-oriented development is desired, a good pedestrian realm is key and on-street bays are preferable to maintain a consistent street wall. Although dispersed on-street bays make for more complicated transfers, it is worth noting that Langley Centre Exchange accommodates six contiguous bays, arranged along two sides of the same block, and arguably has the capacity for additional bays without detriment to functionality or urban design.

Streetside islands such as Newton Exchange strike a good balance between on-and off-street advantages, without requiring customers to cross lanes of traffic. However, attention must be paid to creating an appropriate sense of place. At Brentwood Station, the same configuration yields a sterile and unpleasant ambience because it lacks Newton Exchange’s thoughtful (though poorly maintained) landscaping and the streetside bays are not set back from the traffic lanes, leaving no buffer between waiting customers and passing traffic.

Recommendations: On-Street and Off-Street Design

- D. Where passenger and traffic volumes, and number of routes, are low enough, strongly consider on-street exchanges.
- E. Where passenger and traffic volumes, and number of routes, are high, consider street-side islands without satellite bays, or on-street exchanges with contiguous bays.

Station-style waiting areas

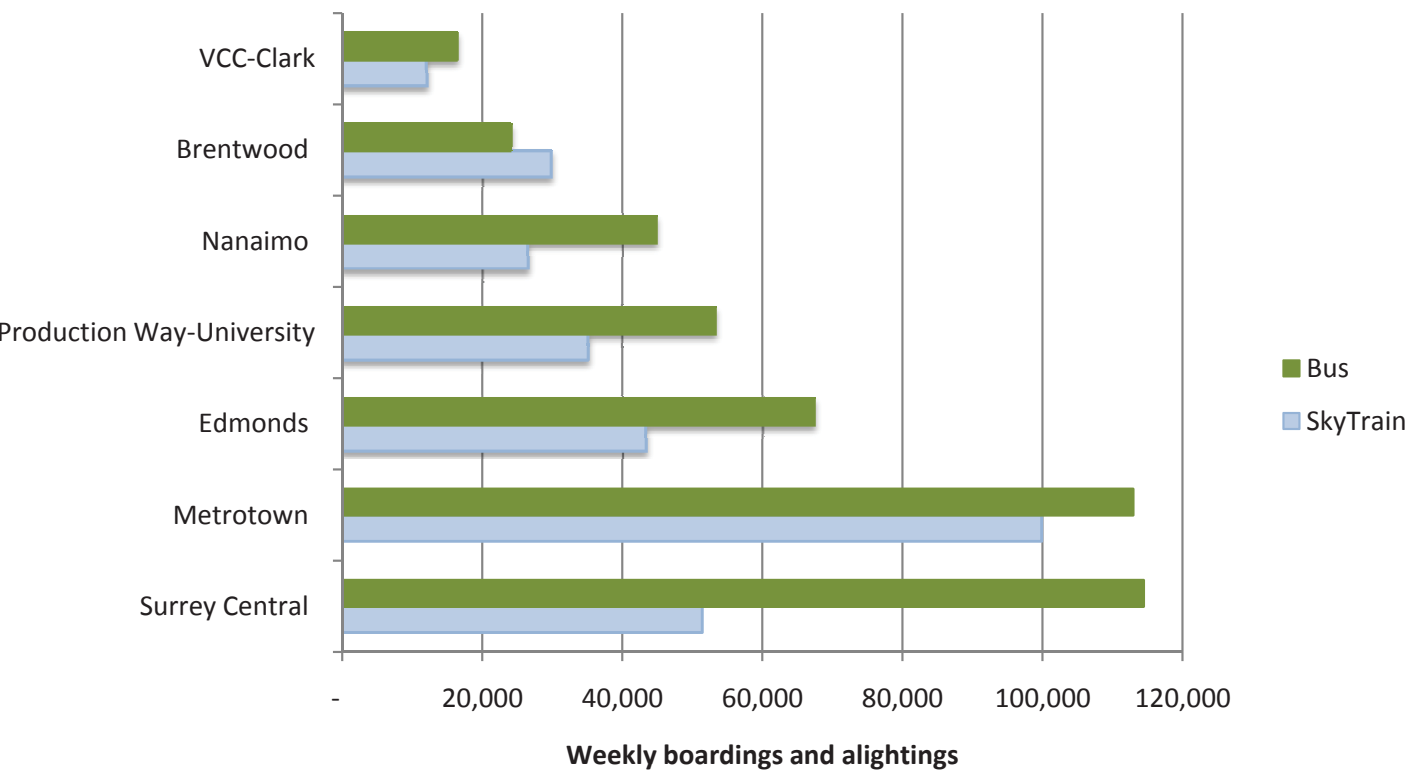
Station-style buildings are typically either fully enclosed, climate-controlled waiting areas that open onto bus bays (as in airport waiting lounges or some long-distance coach stations), or partially enclosed buildings where passengers wait for and board transit vehicles that enter the station itself (like most of Vancouver’s SkyTrain stations). In addition to providing comfortable waiting space for passengers, they may also feature trip planning information, fare media sales, food vending or out-

Table II-5. Enclosed Waiting Areas at Bus Exchanges: Two Examples

Feature	Arnhem, Netherlands	Christchurch, New Zealand
Urban context	Central city	Central city
Number of routes	29	42
Number of bays	20	15
Total boardings & alightings per day	24,000-26,000	[no data]
Total boardings & alightings at peak hour	4,000-5,000	4,800
Shelter	Fully enclosed and climate-controlled	Fully enclosed and climate-controlled
Size of waiting area	1,500 m ²	200 seats
Relationship to street	Off-street bays	Off-street and on-street bays
Grade	Waiting area: at grade, enclosed Local buses: open-air & street level Regional buses: at grade, with building above	Street level
Dynamic bay assignments	Yes	Yes
Bus layover	Separate; off-street	Not a layover point (not a terminal)
Intermodality	Rail (a separate but connected facility)	Bus only
Bicycle garage	Yes	[no data]
Commercial	Office and retail	None in the exchange, but it is connected to a food court and a department store



FIGURE II-5. Passenger Volume, By Mode, At Multimodal Exchanges



lets, retail, and general services. Such services may be automated, or provided by transit agency staff or the private sector. Fully-enclosed waiting areas are sometimes combined with dynamic bay assignment and real-time arrival information which can benefit small sites through the more efficient use of space.

Station houses can be designed to different scales. At SkyTrain stations, for example, the station houses may be little more than a covered foyer and platform (Edmonds Station), or may be more developed and offer food outlets and convenience retail (Surrey Central Station). Some are fully integrated into other retail or mixed-use developments (Columbia Station). Whether a station-style building is warranted at a bus exchange depends partly on passenger volume. Station houses are universal at SkyTrain stops, but in comparison some bus exchanges experience far higher passenger volumes than many SkyTrain stations (see Figure II-5, *Passenger Volume, By Mode, At Multimodal Exchanges*).

Although not a feature of Metro Vancouver bus exchanges, these type of station buildings

have the potential to offer more comfort and convenience to bus passengers, and create a stronger neighbourhood presence than a collection of shelters and stops on a paved island. If exchanges are sited in relatively dense, mixed-use neighbourhoods, station-style facilities can offer amenities useful to the community as well as customers, potentially providing additional income, and increased pedestrian activity that adds to neighbourhood vibrancy and improves security by increasing natural surveillance.

Recommendations: Station-Style Waiting Areas

- F. Where warranted by passenger volume and neighbourhood context, consider installing a station-style building for customer comfort and community integration.



SkyTrain stations are typically offer a far more pleasant customer experience than their adjoining bus exchanges. L to R: Brentwood Town Centre SkyTrain station and bus exchange, VCC-Clark SkyTrain station and bus exchange.

3.4 Co-location of functions

Bus exchanges need not always include all non-passenger activities or amenities in their design. For example, at mid-route exchanges, where no buses are terminating, no layover spaces are required, and operator facilities may be optional (depending on how operators' shifts are scheduled). Even at some terminal exchanges, buses drop off all passengers at unloading-only bays, then carry on to layover spots, either on- or off-street. An advantage of this is that less land area is required at the exchange proper, which in order to be most convenient for customers is likely to be sited on relatively more expensive property. Layover facilities can then be located in less expensive and less pedestrian-convenient areas. This arrangement also allows layover space to be more dispersed, preventing crowding or manoeuvrability problems if the vehicle numbers increase in the future. Finally, separate layover space also provides bus operators with an opportunity to be out of the public eye while they pause between runs.

There are also drawbacks to separate layover facilities. Where layover is above ground and off-street, the result is essentially a parking lot devoid of even passenger activity, creating a potential eyesore. On the other hand, on-street layover may create a wall of buses in the area, and neighbouring business owners and residents may object to the unsightliness and to any loss of on-street parking. Underground layover facilities do not create any of these problems, but are financially and logistically difficult, and may only be feasible when they can be designed in as an integral part of a new and otherwise highly profitable major development.

Co-location of functions at TransLink bus exchanges

None of the sampled off-street exchanges provide off-site layover space. However, the planned renovation of the White Rock Centre exchange at Semiahmoo will include underground layover as part of a major new mixed-used development.

Recommendations: Co-location of functions

- A. When designing new bus exchanges, consider separating layover space from the customer waiting and loading/unloading areas.

3.5 Limitations of site design

Newton Exchange illustrates how good bus exchange design cannot overcome the problems caused by social problems and insensitive urban form. The streetside-island type exchange has setbacks to remove waiting customers from the busy traffic on 72nd Avenue, creating small square that has the potential to be a lively community gathering space. Benches line a leafy central corridor which attracts non-transit users as well as customers waiting for buses. Attractive interlocking pavers help define the space, but at the same time the exchange is tied into its neighbourhood by using the character light standards that form part of the neighbourhood's placemaking elements.

Nonetheless, the exchange has many unpleasant aspects. First, the buildings surrounding the exchange either have large setbacks, or turn their back or side to the exchange, creating an oppressive blank outlook and robbing the exchange

of pedestrian vitality. Social problems such as poverty and drug addiction mean that the site attracts undesirable activity and users that may make customers uncomfortable or cause them not to take transit, especially after dark. The unpleasant atmosphere is rounded off by poor maintenance of paving, furnishings, and landscaping, making the space feel derelict.

Transit agencies must work with stakeholders – including municipalities, police, social welfare agencies, and the community – to ensure that the bus exchange is part of a broader strategy to bring about positive change to depressed neighbourhoods, and that the surroundings in turn are developed in a way that supports transit use and the vitality of the exchange.

4 Passenger Amenities

Passenger amenities include anything not directly related to the mechanics of travel. Customers benefit from appropriate and high-quality amenities because their journey is more comfortable, more convenient, and more aesthetically pleasing.

Furnishings and landscaping are examined in this section, as are fare media sales outlets. Goods and services that are attractive to community members as well as transit customers are addressed separately in Section 11, *Community Integration* (page 50).

4.1 Furnishings

Although not central to the actual movement of passengers as part of their journey, attractive, functional and ergonomically designed site furnishings contribute considerably to customers’ positive experience of their trip. A lack of adequate shelter and seating can make a wait feel long and uncomfortable. Newspapers from vending boxes offer customers a way to occupy their waiting time; so do pay phones, which also allow passengers the opportunity to obtain information or confirm travel arrangements.

Furnishings should be carefully chosen and arranged to be attractive as well as functional, improving the passenger experience and enhancing the public realm. The quality and kind of furnishings contribute to the character of a place, making it vibrant or dull, human-oriented or industrial, an investment in the public realm or an erosion of it.

This section examines the furnishings customers encounter at TransLink bus exchanges, regardless of whether they are provided by TransLink. Because they are part of passengers’ transit experience, they are connected with the level of customer satisfaction and affect TransLink’s image in the eyes of the general public.

Certain specialized furnishings are addressed elsewhere in this document: bike parking (*Bicycle Integration*, page 40), wayfinding elements (*Information & Wayfinding*, page 34) and pay phones (*Security: Communication*, page 47).

Recommendations: Furnishings (general)

- A. Use high-quality design and material to increase visual appeal.
- B. Work with municipalities, universities, or other providers of bus exchange furnishings to ensure their needs can be met simultaneously with TransLink’s standards for the provision of amenities.

4.1.1 Seating

Comfortable seating, in sufficient quantity, is a basic and expected comfort at bus exchanges. Certain demographic groups, including children, the elderly, and mobility-impaired individuals, are more likely to tire easily and need places to rest. These groups are also disproportionately represented among transit ridership, making seating particularly important for bus passenger waiting environments.

At the very least, seating must be supplied in quantity that meets demand, and positioned

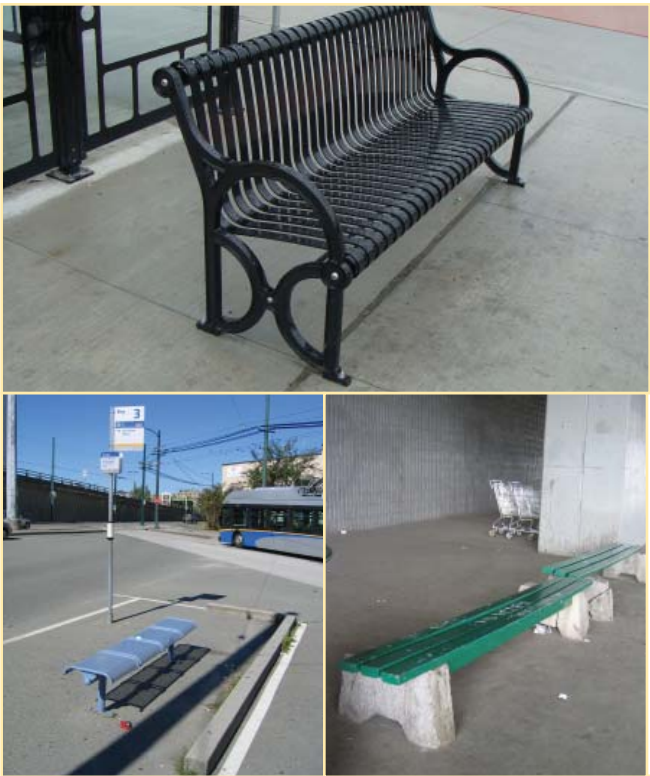
where customers can watch for their bus. Good seating is positioned in a way that does not interfere with other functional aspects of the facility, for example queuing areas or pedestrian throughways.

The ergonomic design of benches directly relates to their usability and to passenger experience. Backless benches allow people to sit facing either way, but are not suitable for longer waits because they do not provide lumbar support. Armrests deter people from lying down on benches, and also offer support to customers who may have difficulty moving between seated and standing positions. Customers in the latter category may also benefit from leaning rails, but these should be installed in addition to full seating, not in place of it.

No exchange is without a case for high-quality seating. Installing high-quality seating at facilities with high passenger volumes will benefit the greatest number of customer, but at low-volume exchanges service is likely to be less frequent and so wait times are typically longer and customers are more likely to tire during their wait.

Seating at TransLink bus exchanges

Some seating is provided at almost all exchanges, at almost all bays. On of the newest bus exchanges, Production Way–University, offers no seating at all – despite a service frequency of 30 minutes for one of the routes. At exchanges where seating is present, a wide variety of styles exist, and design quality ranges from austere to elaborate. The seating with the consistently highest design quality tends to be those installed by the City of Vancouver at on-street bays. Seating provided by other municipalities or by TransLink are



Seating type and quality varies widely across bus exchanges. Haney Place (top), Marpole Loop (bottom L), Guildford Exchange (bottom R)

less consistent, some being quite unattractive and uncomfortable.

Seating at TransLink exchanges is usually situated in such a way that they do not block major pedestrian paths. However, at on-street bays, shelters and benches may constrict the through-path.

Recommendations: Seating

- C. Provide seating in a quantity commensurate with use, reserving areas for expansion if passenger volumes are expected to increase.

- D. Locate seating out of the way of pedestrian paths and desire lines.
- E. Provide some seating choices with back support and arm rests.

4.1.2 Shelter

Keeping customers dry should be a fundamental goal of transit waiting facilities in Metro Vancouver.

Shelter is of particular importance in Vancouver’s rainy climate, and its presence and quality can significantly impact users’ perception of their travel experience. Good shelter also protects customers from sun and wind (including blowing rain).

The horizontal coverage of a shelter can be as small and inexpensive as an canopy over a bench, or it can provide comprehensive coverage of all passenger areas as by a large roof, bridge deck, or building overhang. Maximum vertical coverage can be achieved through an entirely enclosed room; the minimum, a single wall panel facing the prevailing wind, with gaps at the top and bottom to permit some air circulation and to facilitate cleaning.

Different conditions require different kinds of weather protection, and site planners can choose from a range of materials with various properties. Clear Plexiglas allows maximum visibility and daylight, whereas tinted or translucent material achieves this to a lesser degree in favour of pro-



Exchanges under buildings or bridges have good rain protection but poor ambience. *Guildford Exchange (L), Production Way–University Station (R)*

Shelter at TransLink bus exchanges

Like seating types at TransLink bus exchanges, shelter types are also varied, providing distinctive character to exchanges but not necessarily comparable practicality. Occasionally shelter is provided by buildings or bridges under which the exchange is located, but more often shelter is in the form of purpose-built stand-alone structures.

Shelter provided by buildings or bridges above the exchange afford excellent weather protection, but tend to be unattractive and gloomy. Stand-alone shelters are of two types:

- Individual stand-alone shelters at each bay, similar to those at bus stops
- One or more centrally located stand-alone shelters, servicing more than one bay

Half of the 24 sample sites have more than one type of shelter. Most have at least some individual shelters at least at some bays; centrally located shelters are less common. One third of the sample sites have at least one bay without any shelter.

Regardless of design, TransLink stand-alone shelters rarely cover more than the waiting area. Large setbacks can mean that the areas for queuing, boarding, and alighting are completely exposed, and the shelter’s usefulness to the passenger is reduced. Absence of this kind of cover has a functional impact as well: longer dwell times are needed because passengers must pause to open or close umbrellas. Although this may take only a few seconds per person, at peak times the cumulative effect may be significant on total trip time.

Keeping customers dry should be a fundamental goal of transit waiting facilities in Metro Vancouver. More extensive rain, wind, or sun pro-

tection may be required, depending on the site – for example, windy areas need walls or longer overhangs to protect from blowing rain. Shelter should not, however, shut out daylight.

Amenities such as information boards, schedules, garbage cans, and pay phones are also typically unsheltered which makes them less convenient for passengers who may already be cold and wet from the weather.

Recommendations: Shelter

- F. Provide continuous coverage of all passenger areas of the exchange, including waiting



FIGURE II-6. Large-Coverage Shelter
This transit centre’s shelter covers the information post, transfer paths, and boarding area. *Bellevue, Washington*

- areas, boarding areas, connecting paths, way-finding and information areas, and furniture such as garbage cans and newspaper boxes.
- G. Consider each site’s microclimate when determining weather protection needs.
 - H. Consider using translucent roofing materials in whole or in part to allow daylight while still providing shade on hot days.



- I. If stops are not clustered on an island, ensure that continuous shelter covers the waiting and boarding areas.
- J. Where shelter is provided by an overhanging building, employ creative lighting and aesthetic treatments to achieve a pleasant environment.

4.1.3 Waste receptacles

Waste receptacles are not only a convenience for customers but also help keep a transit facility tidy, making it a more pleasant place to wait. Waste receptacles in public places are usually for garbage, but separate bins for recycling are increasingly common.

The design of a trash can affects its usability, hygiene, and visual appeal. Some feature an open hole and are therefore touchless and more hygienic for the user, although if the hole faces upwards it also allows rain into the bin, making the task of emptying potentially messier. Garbage cans with

racks or ledges for cans and bottles allow foragers to collect these recyclables without having to dig into the can itself – more dignified for the collector, and less potential for mess.

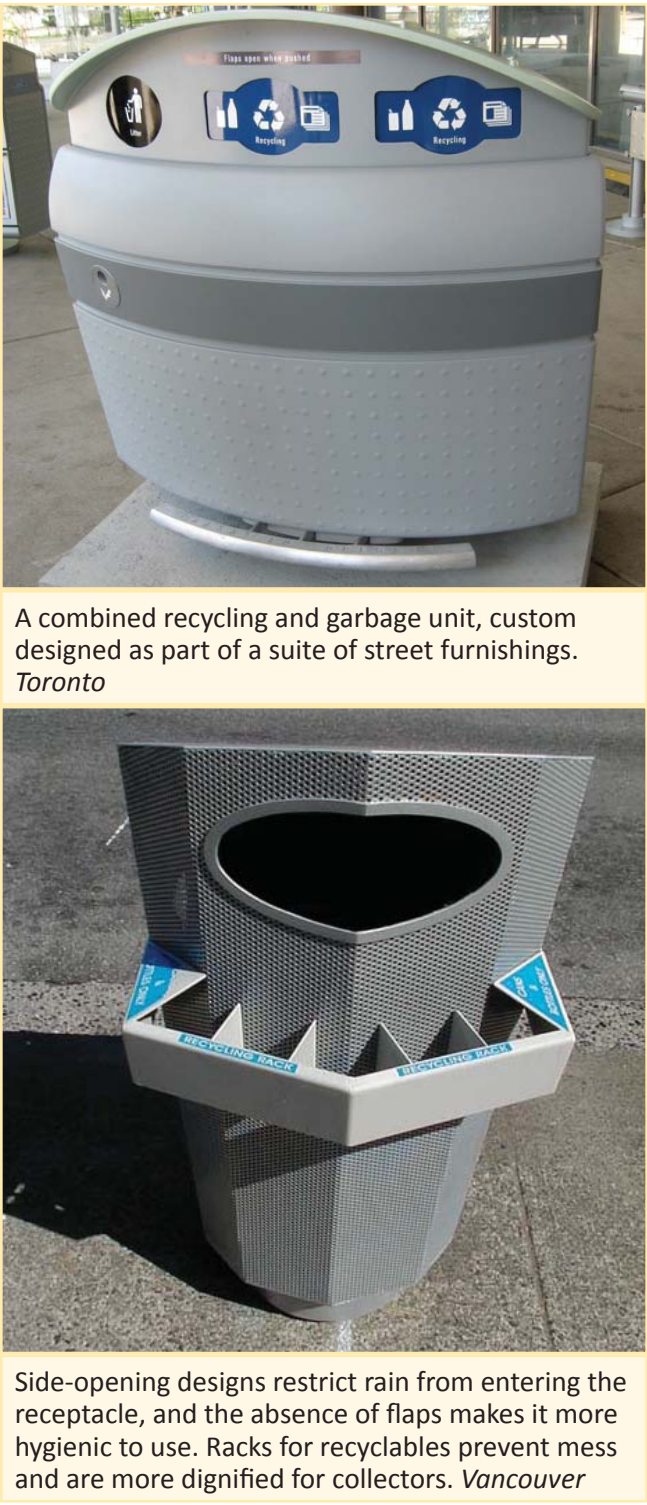
Waste Receptacles at TransLink bus exchanges

Garbage cans are the only waste receptacle found at the sample sites. Many different kinds of garbage cans were observed, and it was common for multiple types to be installed at the same facility. Quality ranges from lidless oil-drum style receptacles to solar-powered trash compactors (see inset, next page).

Many of the receptacles in use at the exchanges require the user to push a flap, which was usually very dirty and therefore is a deterrent to would-be users. Lids of these flap-style cans were often askew or on the ground, removed perhaps by vandals or by collectors of recyclables. This is unsightly, although it has the ironic effect of making the receptacle touchless to use and therefore more hygienic.

Solar-powered trash compactors are installed at the streetside bays of Surrey Central bus exchange. These are far more expensive than regular garbage cans, but require less frequent emptying than conventional cans of the same volume, and their design prevents scavenging and the mess that sometimes results.

Recycling facilities are almost absent from TransLink bus exchanges. SkyTrain stations next to bus exchanges may have newspaper recycling, but they are not visible from the bus exchange and may be some distance from it.





TransLink customers are provided with a range of garbage can types and quality. *Guildford Exchange (top), Surrey Central Station (bottom L), South Surrey Park & Ride (bottom R).*

Recommendations: Waste Receptacles

- K. Use garbage can designs that do not require the user to touch any part of the receptacle.
- L. If the garbage cans are unsheltered, choose designs that minimize the amount of rain that can enter the receptacle (for example with a built-in rain shield or a side opening).
- M. Develop a recycling program for news-

print, paper, and containers at all off-street TransLink bus exchanges.

- N. If container recycling receptacles are not provided next to each garbage can, choose garbage can designs that include a ledge or rack where users can leave recyclables, so that collectors do not have to forage through the garbage itself.

4.1.4 Newspaper boxes

Where no newsagent or convenience store is nearby, boxes that dispense free or paid newspapers are an amenity that many customers value to help pass the time as they wait for their bus. The boxes can be numerous, and have the potential to create a sense of clutter and disorder, as well as being physical obstacles. Steps should be taken to place boxes tidily and out of the way.

Newspaper Boxes at TransLink bus exchanges

Most exchanges have boxes dispensing free and paid newspapers, an amenity. At most exchanges, however they have been thoughtfully placed out of main pedestrian paths, and arranged neatly in lines, facing the same direction. At the Richmond Centre 98 B-Line stop, a metal corral ties the boxes in a designated space, and also serves as an anchor to lock the boxes to (*see inset*).

Recommendations: Newspaper Boxes

- O. If numerous, use an attractive corral OR install a multi-box unit for newspaper boxes.
- P. Ensure newspaper vending units are pos-

itioned so that pedestrian throughways and bus loading and unloading areas are not obstructed.



Units designed to hold multiple newspapers (top, *Toronto*) or to corral individual boxes (bottom, *Richmond Centre*) keep clutter to a minimum and allow for design control and consistency. However, they are not as flexible when accommodating fluctuating numbers of newspapers.

4.1.5 Lighting

Lighting contributes to both safety and security, as well as general functionality of the exchange – people must be able to see where to go, to read signs and schedules, and so on. Well-lit facilities are bright but not glaring, evenly lit, and allow gradual transition to darker areas (such as the outdoors at night) to reduce temporary blindness when leaving the facility.

Lighting also has a role in place-making, and particularly with reference to its scale and visual interest. Human-scale luminaires and fixtures are not only attractively designed, but placed at appropriate heights: high enough to discourage vandalism, but low enough to be part of the pedestrian sphere. This style of lighting may be in conflict with engineering standards for the surrounding roadways. The brighter, higher lighting of which is important for safety at higher speeds, but are bright and distant, dwarfing pedestrians. In some places, poles are fitted with lights at two levels in order to meet both needs.

Lighting at TransLink bus exchanges

The sample sites were not visited at night, so no conclusions can be made about the adequacy of current lighting levels. The point is moot, however, as TransLink will shortly raise its standard for bus exchange lighting to 50 lux, about the level of light in a home living room.

Luminaires at TransLink bus exchanges currently vary widely in scale as well as level of aesthetic consideration. In some places, such as Newton Exchange and Haney Place, the design of the luminaires is an extension of the character lighting scheme of the neighbourhood. Where ex-



Lighting styles at TransLink bus exchanges range from skylights and decorative luminaires (Surrey Central Station, L) to high mast lighting of 60 feet or more (Coquitlam Station, R).

changes are located underneath buildings, lighting is set into the ceiling, usually in a utilitarian style.

Solar powered lighting is in use as some existing bus stop shelters in Vancouver (see inset), but no cases of solar power lighting could be confirmed at bus exchanges.



Solar panels built into shelters can provide some lighting needs using renewable energy. Vancouver (L), Seattle (R)

Recommendations: Lighting

- Q. Design lighting at a human scale.
- R. Choose attractive luminaires and fixtures.
- S. In underground or very dark exchanges, consider installing public art that incorporates light.
- T. Consider incorporating light into existing structures such as bollards, ID poles, or canopies.
- U. Consider incorporating solar powered lighting.



Combined human-scale and road lighting. Haney Place



This Montreal metro station uses public art to meet some of its lighting needs.

4.1.6 Other furnishings

Three other types of furnishings merit mention here: clocks, washrooms, and drinking fountains.

Clocks

Passengers waiting for buses need to know how much time they have before their bus leaves. A clock, or a digital information board that includes the time, would seem to be one of the most basic functional amenities that could be provided. However, they were not present at any of the exchanges visited. Vandalism is a potential problem, but clocks can be placed high enough to prevent vandalism, perhaps in conjunction with lighting. Vandalism may also be less likely where a station-style building, or an attendant, is present.

Washrooms

Public washrooms are a major convenience that is absent from bus exchanges. Customers at exchanges adjacent to SkyTrain stations may request access to locked washrooms from station attendants, if present, but this is not widely known or publicized. The resources required for adequate routine maintenance, as well as the risk of vandalism, can make the provision of public washrooms a challenge for transit agencies. Some municipalities are experimenting with stand-alone, self-cleaning public washrooms that can be accessed free or for a nominal charge. These experiments should be monitored closely to determine whether this style of public washroom could be successfully implemented at bus exchanges.



An automatic self-cleaning public toilet. Vancouver

Drinking fountains

Passengers on longer trips or in warm weather may appreciate the presence of a drinking fountain at transfer points in their journey. Although bottled water is now commonly available, frequently there is no store or vending machine within quick access of bus exchange passengers. Moreover, bottled water is ecologically unfriendly, not least for the distance it is often shipped, and the production and disposal of the plastic bottles. No water fountains were observed at the 24 sample exchanges. Water fountains are more vulnerable to vandalism than clocks because they must be placed where customers can approach them. Again, a building that can be locked after hours can limit the risk, as can staff presence and natural surveillance from pedestrian-oriented neighbourhoods.

Recommendations: Other furnishings

- V. Install clocks at bus exchanges.
- W. Consider ways of incorporating washroom facilities into bus exchanges, for example as part of station houses or as stand-alone self-cleaning public washrooms.
- X. Provide drinking fountains.

4.2 Landscaping

Landscaping covers a wide range of practices related to shaping and designing land in a way that will support the activities that will take place on its surface. Good landscaping creates both aesthetic and practical improvements, and complex land-

scaping work typically requires the expertise of registered landscape architects. Informally, when laypeople refer to landscaping, they are probably thinking primarily of aspects relating to surface coverage: plants and paving materials. This chapter focuses on plantings and paving as they relate to TransLink bus exchange design.

4.2.1 Plantings

Plants and trees are pleasing to the eye, oxygenate the air, and welcome birds and other life. Trees also provide shelter from sun and rain, and give structure to outdoor space. Appropriately selected and installed plantings can contribute to the ambience of the exchange, and provide long-term enjoyment with reasonable maintenance. Poor site preparation or plant selection can result in unhealthy plantings, pavement heaving, or drainage and other structural problems.

Although plants are part of natural ecosystems, not all plantings and planting practices are ecologically sustainable. Good plantings, once



Over one third of the 24 bus exchanges sampled have no plantings in the passenger waiting area. Coquitlam Station



Plantings can be functional as well as aesthetic. They can be used to define the edges of subareas (top), guiding pedestrian flow and breaking up large spaces. The edges of raised beds can also provide informal fair-weather seating (bottom).

established, require no more water than nature can provide and therefore do not use up our increasingly threatened water supply. Good planting practices do not involve the application of chemical fertilizers, herbicides or pesticides, which damage the environment both in their production and their reabsorption into local ecosystems.

Plantings at TransLink bus exchanges

At the TransLink bus exchanges sampled in this study, plants are infrequently present. Nine of the fifteen off-street exchanges have no plantings in the passenger waiting area. A further five have trees only.

Sometimes trees, plants, or lawns have been planted by the municipality, or by owners of properties adjacent to the exchange. Although these can be attractive, they are more distant from transit customers, not necessarily permanent, and quality cannot be controlled.



Examples of high-quality plantings at TransLink bus exchanges. Stanley Park Loop (top); South Surrey Park & Ride (bottom).

Notable plantings include Stanley Park Loop, featuring a lush bed of grasses and flowers ; and South Surrey Park & Ride with its extensive native plant beds (see insets). At the latter exchange, however, the plantings are only in the parking lot, not the concrete island where customers wait.

Recommendations: Plantings

Note: Please also refer to the Maintenance section (page 46) for further recommendations relating to plantings.

- A. Use plantings to improve passenger experience in waiting areas. When retrofitting existing areas, opportunities may be restricted, but creative solutions should be sought.
- B. Use plantings to define edges and delineate different areas of use, if appropriate.
- C. Find opportunities to combine planting beds with the provision of informal seating.
- D. Engage a registered landscape architect to design plantings and ground planes, and to establish an adequate budget for proper installation.

4.2.2 Paving

Paving is usually installed on surfaces that are to experience heavy pedestrian or vehicle traffic. The selection of materials depends on many factors such as the load to be carried, the desired aesthetic effect, and the cost of materials and labour relative to the project budget. Paving materials can be poured or pressed on site, such as asphalt or concrete; they can also be assembled from pre-

shaped units such as stones, bricks, or artificial materials.

Asphalt and concrete are practical and economical; however, these materials also have a number of drawbacks. Vast expanses of grey or black found at off-street exchanges are stark and unwelcoming. Functionally, large surfaces of dark asphalt create heat islands in the summer, and pale concrete can cause glare in bright sunlight.

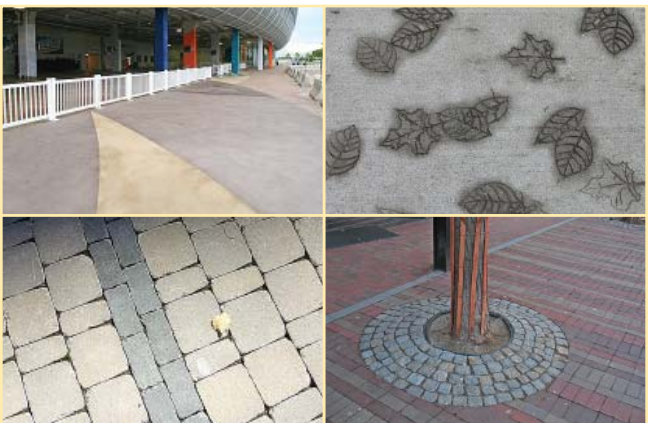
Also, because asphalt and concrete are impervious to water, they require connections to the storm sewer system, which both removes water from the local groundwater table and places a burden on sewer infrastructure at times when it is already most in demand. Some of these problems can be mitigated: concrete can be tinted, and paved areas can be bordered by infiltration trenches or bioswales that allow for temporary holding and gradual on-site reabsorption of stormwater.

The use of paving stones or bricks can produce some of the same problems of glare and impermeability as asphalt or concrete. Many types of pavers are available, and an appropriate pal-



In many of TransLink’s bus exchanges, the passenger area is completely paved. South Surrey Park & Ride

ette of colours can be attractive while reflecting or absorbing acceptable levels of light and heat. Paver materials can be water permeable, and can be laid in such a way that water can drain through the spaces in between the blocks. However, pavers tend to cost more than asphalt or concrete for materials and installation, and require specialized expertise to install and repair. Stamped concrete or asphalt can achieve a similar effect of slightly lower quality, but is much easier to maintain.



Textures and colours can be used for decorative effect and to delineate areas of different use.

Paving at TransLink bus exchanges

In many exchanges, asphalt and concrete are the only paving materials used. At some exchanges, other paving materials have been incorporated into the design. Borders of coloured pavers have been used for decorative effect, or where a rich ground plane has been achieved through patterned use of interlocking pavers.

Occasionally, exchanges are furnished with infiltration trenches or open ditches which allow

some of the stormwater to return to the earth on-site.

Recommendations: Paving

- E. Use textures, colours, and materials to enhance the visual appeal of the ground plane.
- F. Consider using paving as a cue for intended use of space.
- G. Use permeable paving, bioswales, rain gardens, infiltration trenches for on-site stormwater management.

4.3 Fare media sales



A few TransLink bus exchanges use contrasting pavers to combine aesthetic and functional purposes. Surrey Central

Prepaid fares, such as monthly passes or booklets of tickets, save time and money for customers and make bus boarding more efficient. The availability of these fare media are therefore beneficial



Infiltration trenches allow stormwater to be absorbed gradually and on site. *South Surrey Park & Ride*

to both the customer and the transit agency. They may be provided through ticket vending machines or from staff at the transit facility itself, or off-site through arrangements with private retailers.

TransLink does not currently sell fare media at bus exchanges. Exchanges that are adjacent to SkyTrain stations offer customers access to ticket vending machines (provided the station and exchange are close together), but these only sell fare media for immediate use, and passengers may be sensitive to buying tickets too far in advance of boarding their bus. Other types of fare media, as well as maps, are sold only at FareDealer outlets, mostly businesses with which TransLink has made a sales arrangement. Very few bus exchanges had FareDealer outlets within view of the waiting area.

Recommendations: Fare media sales

- A. Locate FareDealers at or near bus exchanges.

- B. At off-street exchanges, if the FareDealer is not in the exchange itself, directions to the FareDealer should be included at the central information board.



Monthly passes and books of tickets are sold mainly through private outlets. *Holdom Station*

5 Operations Structures

Enclosed buildings at TransLink bus exchanges are currently limited to small employee facilities. These are usually washrooms, but sometimes a break room is also present, and in a few cases there is office space. As these buildings are often the most prominent feature of the exchange, their appearance and the way they fit into the exchange has an effect on customer experience.

At the sample exchanges visited, these buildings are generally made of concrete blocks, with plain exteriors. Some effort has been made to make these attractive: paint, roofing style and materials. Blank walls and grilled windows hamper these efforts somewhat, and there is room to build upon the kind of aesthetic improvements already implemented.



Utilitarian housing for electrical operations detracts from the high design quality of furnishings at this exchange (*Haney Place, left*).

Artistic painting or covering for such structures provides customers with a more pleasant environment (*New Westminster, below*)

- D. When window grilles are necessary, choose attractive designs or commission them as public art.
- E. Install windows on crew room or supervisor office walls to allow natural surveillance.
- F. Avoid mirrored glass where possible.

Recommendations: Operations Structures

- A. Consider incorporating operations facilities into a station house building (cf. *Station-style Waiting Areas*, page 20).
- B. Use architectural or artistic features – such as windows, articulation, detailing and public art – on every exposed wall to relieve the visual bulk and create visual interest.
- C. Continue to use colour and peaked roofs for visual appeal.

6 Public Art and Interpretation

“The visual quality of the nation’s mass transit systems has a profound impact on transit patrons and the community at large. Mass transit systems should be positive symbols for cities, attracting local riders, tourists, and the attention of decision makers for national and international events.

“Good design and art can improve the appearance and safety of a facility, give vibrancy to its public spaces, and make patrons feel welcome. Good design and art will also contribute to the goal that transit facilities help to create livable communities.”

– US FTA Circular 9400.1A: *Federal Transit Administration Design and Art in Transit Projects*^c

Quotes to include as inset boxes

The term *public art* denotes any art installed in the public domain, for example in civic buildings and plazas, parks and streets, or in public areas of private buildings and grounds. *Interpretive* pieces are usually site-specific and seek to educate the public about historic, ecological, sociocultural or other aspects of the location. It may be as basic as an informative plaque, or as literal as the display of an artifact, but may also be more conceptually developed in ways similar to public art.

The functions of public art and interpretation



Good public art is diverse in scale, medium, and temporality. *Ventura CA transit centre (top); New York City subway (middle), Bellevue WA transit centre (bottom)*

can be to create beauty, provoke thought, engage the public, and create a sense of place. At transit facilities, high-quality permanent installations also demonstrate an investment the quality of infrastructure provided for customers. The US Federal Transportation Authority underscores the importance of public art in transit facilities, and makes funds available to support the inclusion of artistic elements in transit infrastructure (*see quote in inset box*). They can also be valuable community assets, shared and welcomed by members of the neighbouring community even if they are not transit users. (Further discussion of community integration can be found in Section 11 of this chapter, page 50.)

Because personalities and tastes vary, a key to successful public art and interpretation is variety. This variety may be in the physical aspects of the work, such as medium, scale, or location. It may also be in the creators: professional artists or historians, for example, or community groups or individual community members. Temporality can also create variety: temporary exhibits, such as Vancouver’s sculpture biennale, provide a refreshing rotation of pieces, and a counterpoint to other permanent works that help create a sense of place, familiarity, and continuity.

Art can also be a practical element, as a landmark for wayfinding, an component of structure or furnishings, or lighting. In order to achieve this, art needs to be considered as part of the site design, not as an add-on.

Public art and interpretation at TransLink bus exchanges

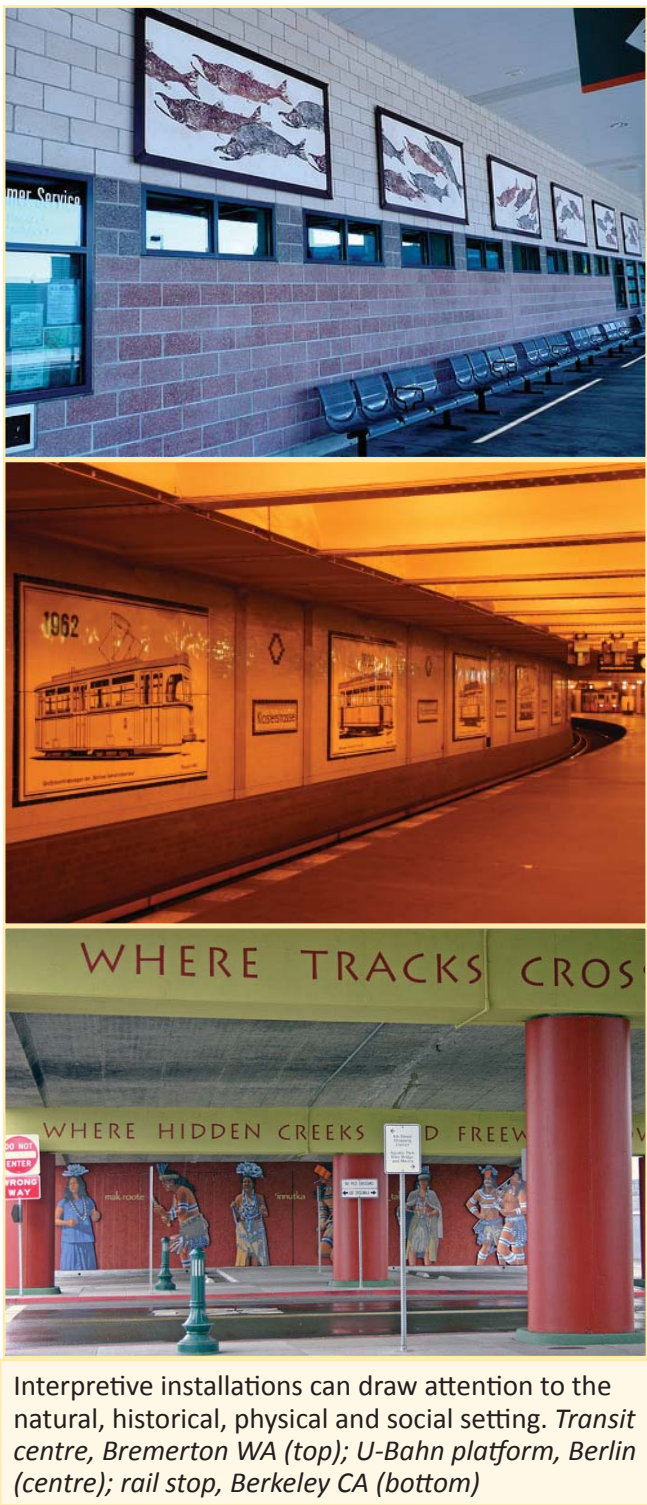
Bus exchanges in Metro Vancouver feature almost no public art or interpretive installations.

Where they have, they are non-TransLink initiatives. This contrasts with SkyTrain stations, particularly along the Millennium Line, which feature art and interpretive pieces (*see inset*). The Evergreen Line, now in its early stages of planning, is also slated to include public art components.^d

Many bus exchanges have higher passenger volumes, and longer wait times, than many SkyTrain stations, and are therefore arguably high-priority sites for artistic and interpretive amen-



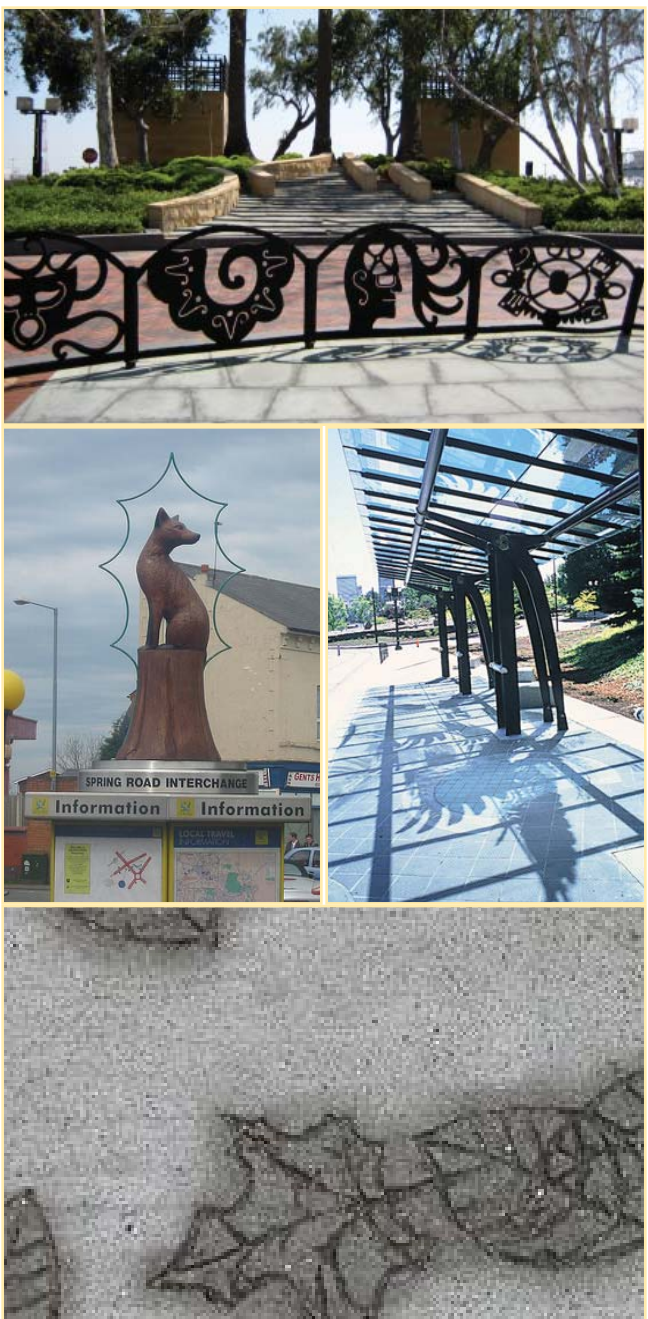
Public art at bus exchanges are non-TransLink initiatives and therefore rare – unlike at SkyTrain stations. *Clockwise from top L: Langley Centre, Knight & Marine, Lake City Way SkyTrain Station, Holdom SkyTrain Station*



ities. TransLink bus exchanges currently represent missed opportunities to improve customer experience and community relations through public art and interpretation.

Recommendations: Public art and interpretation

- A. Expand TransLink’s public art program to include bus exchanges.
- B. Include cultural, natural and historic interpretation as part of the public art program.
- C. Incorporate a variety of types of art: professional and community based, various scales, temporary/seasonal and permanent, whimsical and educational.
- D. Plan for public art and Involve artists early in the site planning process to allow for creative ways to incorporate art into the facility.
- E. Establish a process to ensure high-quality public art - for example proposals assessed by a jury composed of individuals with experience in public art provision.



Opportunities to combine public art with functionality abound. *Transit centre fence, Los Angeles (top); kiosk, Birmingham UK (centre L); shelter, Portland OR (centre R); pavement stamps, Vancouver (bottom).*

7 Information & Wayfinding

“Wayfinding means knowing where you are, knowing your destination, following the best route, recognizing your destination, and finding your way back.”

— Carpman Grant Associates, Wayfinding Consultants^e

[Note: TransLink is currently undertaking a major wayfinding review, which encompasses all infrastructure under TransLink’s jurisdiction, including bus exchanges. The observations and recommendations presented here are intended to inform that process, not undermine it.]

To successfully navigate a transit system, customers need to know where they are, where they are going, the best route between them, and how to know when they’ve arrived. The simplest kind of wayfinding, where the destination and path are clearly visible and recognizable, requires no intervention. However, large multimodal transit networks require a great deal of information to use, most of which is not self-evident. In order to be useful to the transit customer, the right information needs to be presented in the right way, in the right place, at the right point in the passenger’s journey. Too much or too little, too soon or too late, and the user will be frustrated or lost.

Wayfinding typically consists of signage, maps, and written information. At a bus exchange, customers require information about the exchange itself, and network information such as routes and schedules.



Four different names are used for the same intermodal facility (from L to R): at the exchange platform; outside the exchange, notably located neither the Park & Ride lot nor the entrance to it; at the WCE station; and the network map.

7.1 Exchange naming

The naming pattern for TransLink bus exchanges is inconsistent in three ways: different names for the same kind of facility, different naming the same facility when mentioned in different texts, and inconsistency as to which bays are part of the facility in the case of facilities with both an off-street and on-street component.

First, there are a number of names for the same kind of bus facility: Ladner Exchange, Haney Place, and UBC Loop are all off-street exchanges serving multiple routes. The variety of naming patterns represents a missed opportunity to communicate information through naming, so that customers know what kind of facility to expect from the name.

The second inconsistency in naming stems from the fact that the same facility may be identified differently in different media. For example, a single facility is labelled *Coquitlam Station*, *Coquitlam Park & Ride*, *Coquitlam Central*, and simply *Coquitlam* (see inset). Although these vari-

ations may seem trivial at first glance, it is more significant given that there are other facilities with similar names: *Coquitlam Recreation Centre*, *Port Coquitlam Centre* (an on-street exchange), and *Coquitlam Centre* (not an exchange but a nearby shopping mall).

As an example of the third type of inconsistency, the name *Marpole Loop* is sometimes used to refer only to the off-street loop. However, the on-street bays named *Hudson & Marine* on the TransLink map share the Marpole Loop bay numbering system. Adding to the confusion is that the on-street bays are not visible from the off-street facility, and no wayfinding signage links the two.

This report takes the position that in order to provide customers with simple and clear information about where they are and where they are going any transit hub with multiple transit modes should be designed as a single functional and aesthetic unit, and that a single name should be used consistently to refer to its role in all modes.

Name	Refers to	Comments
Exchange	An off-street bus-only facility, and any on-street bays associated with it	<i>Exchange</i> has popular currency and captures the idea that transfers happen here. If on-street and off-street bays are both present, they must share a common bay numbering system to be considered part of the same exchange
Station	A rail facility and any on-street or off-street bus stops associated with it	The public will expect that a rail facility will have bus connections, and using a single name for both will make it clear that bus and rail share a single facility. If on-street and off-street bays are both present, they must share a common bay numbering system to be considered part of the same station
Loop	An off-street facility serving as a stop and turnaround point for a single route, and has no on-street bays associated with it	<i>Loop</i> already has high popular currency, and captures the turnaround function without suggesting that transfers happen here.

TABLE II-6. Proposed Nomenclature of the Three Basic Transit Facility Types

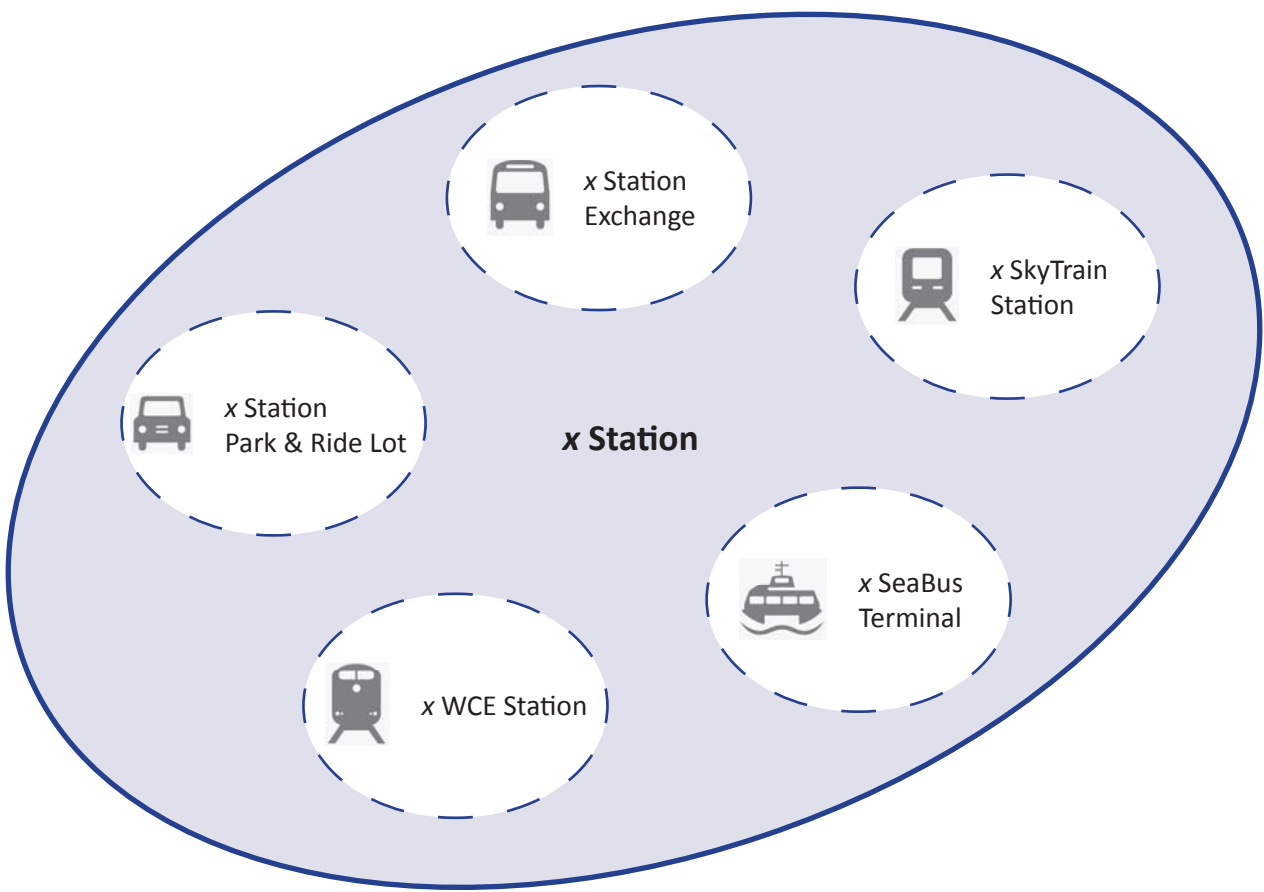


FIGURE II-7. Proposed Nomenclature of the Five Modal Zones of a Station

Recommendations: Naming

- A. Adopt the nomenclature system described below.
- The nomenclature system proposed here is based upon four principles:
1. Facilities are consistently named from a restricted set of distinctive facility types.
 2. Facility type names suggest a facility's role in the transit network, as relevant to the customer.

3. Multi-modal facilities have a single name, used consistently across modes. A set of additional, more precise names for each modal zone of a multimodal station are used only when the single overarching name would cause confusion.
4. A facility type name is warranted only for any bus hub that has at least one of the following characteristics: it has an off-street component, is part of a multimodal facility, or is a set of contiguous bays.

The first three principles are aimed at creating nomenclature that is simple and clear for customers. The resulting names are presented in Table II-6.

Principle 3 identifies two needs: an overarching name for a multimodal facility, and also a consistent set of names for each modal zone of that facility. Figure II-7 shows the proposed set of modal zone names, which are designed to be complete and unalterable. For example, *Park & Ride Lot* refers only to the parking lot area of a transit facility, and the term *Park & Ride* is no longer a facility

type name.

The fourth principle excludes the use of a facility type name for bus hubs that do not form a physically defined facility. Bus hubs excluded through Principle 4 should be named after a defining landmark (e.g. Park Royal) or neighbourhood (e.g. Caulfeild), or the closest intersection (e.g. Knight & Marine).

7.2 Exchange information

The kind of exchange information, users need to know includes what exchange they are at, where to catch the bus they need (if they have not completed the transit portion of their journey), and how to get to their destination on foot from the exchange (if they have completed the transit portion of their journey).

Some exchanges do not have any identifying signage; in others, the sign is only visible from certain places in the exchange. This sign is often atop a central information board, but it may be hard to identify this board at a distance, especially on long platforms, because of its positioning.

In order to find out which bay they need to wait at, passengers must check the flag at every ID pole until they arrive at the correct one. This is time-consuming, and if the bays are not all visible from one another, could be frustrating.



The arrow on this sign confusingly shows the direction of bus travel, not the direction the pedestrian should look for oncoming buses. *Production Way–University Station* (Note: as a result of an earlier draft of this document, these signs are now being revised.)



Customers benefit from route maps placed right at the stop. *Brooklyn (L), Chicago (R)*

Recommendations: Exchange information

- A. As much as possible, locate bus bays within sight of one another, and of the entrance to any adjacent station.
- B. At each bay, provide a map of the exchange showing where to catch each bus.
- C. Identify information boards with a highly visible ⓘ or ? symbol.
- D. Ensure that information boards (or signs directing to these boards) are highly visible and can be spotted from all passenger areas.
- E. Provide a table or diagram showing which bus to take to reach popular destinations served by routes leaving the exchange.
- F. Use only signs listed in TransLink’s *Transit Infrastructure Design Guidelines*.



Flat information panels are easily missed on long platforms (*Metrotown, top*). Distinctive posts or kiosks are more readily identifiable (*Albuquerque NM, bottom L; Modesto CA, bottom R*).

7.3 Network and route information

Passengers need to know at the very least what bus they should take, where they can catch it, when it comes. Route maps are also helpful, as are “spider” maps showing all destinations reachable from the exchange without transferring. If

WHERE TO CATCH YOUR BUS

COLESHILL PARKWAY BUS INTERCHANGE

BUS SERVICE DESTINATIONS

STAND A

VARIOUS COMMUNITY TRANSPORT VEHICLES USE THIS STAND. CONTACT DETAILS FOR THE OPERATORS ARE DISPLAYED AT THE STAND.

STAND B

SUTTON COLDFIELD, VIA WATER ORTON, CURDWORTH & MINWORTH ASDA - 757
WATER ORTON & YARDLEY - 590

STAND C

NUNEATON, VIA HAMS HALL, WHITACRE HEATH, THE ARLEYS, GALLEY COMMON & CHAPEL END - 717
TAMWORTH, VIA HAMS HALL & KINGSBURY - 767
ATHERSTONE, VIA HAMS HALL, KINGSBURY, HURLEY & BADDESLEY ENSOR - 777

STAND D

COLESHILL - 590, 717, 757, 767 & 777
BIRMINGHAM INTERNATIONAL - 717, 757, 767 & 777
CHELMSLEY WOOD - 590

BUS ROUTES

767
777
717
757
590

YOU ARE HERE

An exchange map combined with a basic “spider” map provides the most important exchange and route information for customers, in a minimum of space. *Coleshill UK*

complete system maps are provided, care must be taken to ensure they are clear and easy to read. Route and network information may need to be posted in more than one place, and will be most readily useful to users if it is consistently marked and predictably located.

Most TransLink bus exchanges have a map of the entire transit network, located in a central location. This map communicates important information, but is very dense and confusing, with small hard-to-read type. Moreover, the main system map is not in one piece; the user must look on the other side of the board to find inset maps or areas east of Surrey.

Route information is limited to the bus name and number on the pole flag, and the list of scheduled departures on the pole sleeve. Route maps are only available as part of the network map (if one is present).

Recommendations: Network and route information

- A. At the information board, provide a single large-type map that shows the entire service area.
- B. At each bay, post a route map for each bus that departs from there.
- C. At a central location, provide a “spider map” that shows the routes of buses serving the exchange.
- D. Consider installing real-time arrival information at exchanges, especially for routes with high passenger volume.



This sign at Port Coquitlam Centre is multiply confusing: the heading suggests the information is aimed at operators, not customers; and the abbreviation S/B might not be readily understood, especially by non-native speakers of English. Passengers unfamiliar with the area may not know how to get to *Wilson and Mary Hill* from the location of the sign at Shaughnessy and McAllister.

7.4 Temporary information

There is on occasion a need to communicate information to customers for a brief time only, as in the case of service changes or disruptions. These need to be communicated clearly and in a way that makes them stand out.

Short-term changes in routing or boarding are usually communicated through hand-written signs attached to ID poles, sandwich boards, or walls. These signs stand out from the pre-made signs on durable materials, and effectively signal the newness of the information to customers. However, the clarity of these handwritten signs varies, and may fall short of providing users with the information they need.

Recommendations: Temporary information

- A. Use handwritten signs only when the need is urgent and the duration brief.

- B. Develop and use a distinctive sign template specifically designed to communicate temporary routing or stopping changes to passengers.

7.5 English-language literacy

Wayfinding at bus exchanges is currently heavily dependent on being able to read English. In areas with large populations of people who do not read English well, this may be a barrier to transit access.

People with limited English literacy skills may be able to better access the transit system if wayfinding materials are presented in a way that re-



Barriers to English-language literacy can be lowered by the use of maps and symbols, or multilingual text and phone links to multilingual information. Ottawa

duces the need for such skills. This may be in the form of pictograms, multiple languages, or both.

Special techniques for writing English, such as Simplified English, Basic English, or Special English, can also be employed to maximize accessibility.

Recommendations: English-language literacy

- A. Where possible, use non-linguistic symbols such as numbers, diagrams and arrows to minimize the degree of English literacy needed to successfully plan and navigate a trip.
- B. Where demand warrants, consider providing information in an additional language, for example Chinese or Punjabi.

8 Intermodal Integration

In this section, intermodal connections are examined: transfers between bus and bicycle, rail transit, and automobile (taxicab or private vehicle). Accommodations for HandyDART vehicles at bus exchanges are addressed separately in Section 10, *Universal Design* (page 49).

Transfers between bus and ferry are not specifically addressed in this report, because SeaBus terminals were not among the sample sites selected for study. However, the principles for good design will be similar to those for bus-rail interchanges.

8.1 Rail interchange

When a journey involves transferring from one transit mode to another, the customer is subjected to both a delay and an inconvenience. Unlike bus-only transfers, intermodal transfers almost always require movement between separate areas for each mode (*see inset*). If a necessary connection is difficult or unpleasant, it acts as a disincentive to take public transit.

Transit planning that focuses on customer experience should attend to the convenience and continuity of the transfer just as much as on the on-board segments of the journey. From the perspective of facility design, this means that the transfer should be the shortest possible distance, sheltered from unpleasant weather, and provide an aesthetically attractive setting.



Cross-platform intermodal transfers provide customers with easier, faster transfers. *Portland (top), Bad Herrenalb, Germany (bottom)*

Rail interchanges at TransLink bus exchanges

At some TransLink intermodal interchanges, the bus and rail platforms are organized such that transferring customers are not required to cross any vehicle lanes (for example, Nanaimo and Surrey Central stations). However, at many exchanges they must cross bus paths (such as at Edmonds Station) or even major streets (such as Bay 7 at Brentwood Station). In some cases, these

distances can be far enough away that there is little or no visual connection between the two (as at Coquitlam Central and Brentwood stations). Although not part of the sample sites visited for this study, bus connections at both SeaBus terminals also fall into this last category.

Footpaths connecting bus exchanges and stations are typically unsheltered. Given that transfers themselves discourage people from taking transit, having to walk through the rain can only exacerbate the situation. Metrotown is a notable exception; customers enjoy full coverage from the station platform to the bus island (*see inset*). At Brentwood Station, a canopy connects the SkyTrain station the bus exchange, stopping at the perimeter of the latter, leaving passengers exposed as they cross the bus lane and the island to reach the central shelters.

Where stations and exchanges are adjacent, such as at Surrey Central Station, wayfinding between the two can be intuitive and requires minimal signage. In the two sample sites where the station and exchange are separated by considerable distance and not visible from one another,

passengers unfamiliar with the layout may not be able to easily find their way. The angled walkway at Brentwood Station prevents the exchange from being visible to the customer, and no wayfinding signage is present. At Coquitlam WCE Station, signs for the station are few and poorly located, there are no signs at all directing to the bus exchange.

At almost all bus exchanges located at rail stations, the exchanges typically have fewer amenities and a lower design quality compared to the station. This is despite the fact that at many stations, more passengers use the bus than the SkyTrain (*see Figure II-5, page 21*), and bus wait times are longer due to lower service frequency than for the SkyTrain. In addition to creating an impression that bus users are less valued than rail users, this situation undermines the unified nature of the transit system, appearing as they do to be incidentally co-present facilities rather than a planned and seamless network.



Metrotown Station stands out among TransLink intermodal bus facilities for providing continuous shelter from the SkyTrain stationhouse (L) to the bus exchange waiting area (R).

Recommendations: Rail interchanges

- A. Design rail stations and bus exchanges as a single unified design concept, including intermodal transfer, to provide the experience of an efficiently integrated transit network through continuity of appearance and amenity.
- B. For intermodal transfer paths, minimize walking distances, provide adequate weather protection, and supply appropriate wayfinding.
- C. When retrofitting existing station-exchange pairs where the two elements are separated, consider moving the bus exchange to a location adjacent to or underneath the station, so that transfer distance is minimized and passengers are not required to cross any vehicle lanes.

8.2 Passenger Pick-up and Drop-off

Passengers boarding and alighting at bus exchanges may be connecting to or from automobiles as passengers. This may be a private car, or a taxicab. At transit hubs, separate spaces are often provided for passenger pick-up and drop-off (PPUDO), sometimes called “kiss and ride” areas. If adequate designated PPUDO areas are not provided, drivers may stop in unauthorized places that interfere with bus movement and cause hazards to pedestrians and traffic.

Drop off activity requires merely enough space for cars to stop briefly and platform or side-walk space for passengers to alight. Pickups, how-

ever, require additional space for passengers to wait, and this space needs to be sheltered and secure. More space is also required for vehicles, because drivers often have to wait for their passengers. This need for space is compounded where no separate taxi ranks are provided, and taxicabs can clog the PPUDO area.

PPUDO at TransLink bus exchanges

Passenger pick-up and drop-off areas are occasionally provided at TransLink bus exchanges. At Edmonds Station, separate areas are designated for PPUDO and for taxis. However, at the many exchanges where these are not provided at all, or are inconvenient, drivers may use whatever space they find suitable.

At Edmonds Station, for example, the HandyDART loading area functions as a *de facto* PPUDO space because its location is more con-



At Edmonds station, PPUDO activity is concentrated in the HandyDART zone. More convenient placement of the PPUDO area, or relocation of the HandyDART stop to within the bus zone, could alleviate this conflict.

venient than the designated area (*see inset*). At Production Way–University station, bus operators have reported that vehicles sometimes enter the bus loop to pick up and drop off passengers, which is both a nuisance and a hazard.

Recommendations: PPUDO

- A. Ensure that adequate and convenient PPUDO areas and taxi ranks are provided, to prevent stopping patterns that create hazards, disrupt transit operations or interfere with pedestrian movement.
- B. Where the urban environment already provides PPUDO space, ensure that adequate PPUDO space is reserved in anticipation of intensified use in the future.

8.3 Park & Ride

Another type of multimodal trip that involves transit and private vehicles occurs when customers drive themselves to the transit facility. This requires space to park, and a connection between the lot and the exchange. Park and Ride lots are located along major commuter corridors throughout the region, most often in the suburbs, Park and Ride lots may be purpose-built along with the transit facility, or may be arrangements with owners of private lots nearby.

Park and Ride lots typically situated where they will attract current car commuters: they are located within visible distance of major commuter routes, to attract riders. Because of the expense of below- or above-ground parking structures, Park

and Ride lots are usually in the form of large expanses of surface parking. This conflicts with the principles of pedestrian-oriented design, and creates a dilemma for the planner. One approach is to reduce the demand for Park & Ride facilities by concentrating development at transit hubs. Some municipalities, such as San Francisco^f, Chicago^g and Calgary^h, are now pursuing the redevelopment of surface parking lots as transit-oriented mixed-use development, with or without replacement of any parking stalls.

This report takes the pragmatic position that as surface Park and Ride lots are already in place in Metro Vancouver, and are unlikely to disappear in the near future, planners of transit facilities should endeavour to make them as well-designed as possible. Good Park and Ride lots are convenient for the customer, attractive, and well integrated into the urban fabric. Importantly, Park and Ride facilities need not be single-use areas: goods and services that depend greatly on convenience, such as gas stations, dry cleaning, and movie rental, are compatible uses for Park and Ride lots. Because of the large amount of land typically taken up by Park and Ride facilities, there is a particularly acute need for attractive and functional site design (*see also Site Design & Layout*, page 18) and community integration (*see page 50*).

Park & Ride at TransLink bus exchanges

TransLink has 19 Park and Ride lots, which exhibit a wide variety of configurations. The lots range from 9 spaces (Lions Bay) to 550 (Coquitlam Station). Most are free; six have a modest fee (\$2 per day or \$40 for 4 weeks). Some are in adjacent dedicated lots; others use parts of existing parking facilities and may be specifically designated or



The typical tall cobra-style lighting at South Surrey Park & Ride is unwelcoming to pedestrians, but this facility is made more attractive by the well designed plantings bordering the parking spaces (although unfortunately not the passenger waiting areas).

not.

Wayfinding to the facilities is highly variable. Some are well marked by directional signs on near-by roads and an identifying sign near the entrance. Others, such as South Delta Exchange and Phibbs Exchange, are completely unmarked, and would-be users who do not find out about them through word of mouth would need to take the initiative to discover them.

Most of the Park & Ride facilities are of very low aesthetic quality, with decaying or damaged structures and little effort made to create a pleasant ambience. The lots are usually designed exclusively for vehicles, and pedestrians are clearly unwelcome: they must walk in the vehicle lanes, lit by glaringly bright lighting set atop high poles, without weather protection. The relatively new South Surrey Park & Ride stands out as a facility surrounded by pleasant trees and plants, with attractive planting beds scattered throughout the

parking area also (see photo at, left). It is also commendable in its use of infiltration trenches at the edges of the parking lot to allow on-site storm-water management.

Recommendations: Park & Ride

- A. Ensure that directional and identifying signage is clearly visible to drivers on the main commuter route, both for wayfinding and publicity.
- B. Find opportunities and plan space for compatible land uses particular to the travel patterns of commuters.
- C. Incorporate weather-protected, designated pedestrian connections from the lot to the bus exchange, for example walkways in between parking rows.
- D. Provide infrastructure at both the pedestrian and vehicle level, for example light standards with fixtures at two heights.

“TransLink’s Transport 2040 Goal is to reduce greenhouse gas (GHG) emissions and have most trips in the region by transit, cycling and walking. This supports the Provincial Transit Plan to double the number of cycling, walking and transit trips by 2020.”

— TransLink 2009 10-Year Plan

8.4 Bicycle Integration

“Cycling is no longer the domain of kids, students, lycraclad adrenaline seekers and those that can’t afford a car.”

— Melbourne Cycling Account 2007

TransLink invests in infrastructure and programs to increase cycling mode share in the Lower Mainland, and one of the ways it does this is by facilitating the integration of cycling and transit. At bus exchanges, bicycle integration potentially involves four aspects:

- Bicycle movement within, into, and out of the exchange
- Bicycle parking
- Information and wayfinding
- Services for cyclists

At most bus exchanges, this commitment is evidenced exclusively by the presence of some form of bike parking, and there are opportunities to welcome cyclists more fully by providing more and better amenities. In addition to bicycle parking, this section explores designing for bicycle movement, information needs, and services for cyclists.



Accommodating bicycles at transit exchanges (Strasbourg, top) is more likely to meet with success than banning them (Stanley Park Loop, centre; Nanaimo Station, bottom).

8.4.1 Bicycle movement

In order to connect with a bus journey at an exchange, cyclists require entry and exit points at the perimeter of the exchange, and a path to the bus bays or parking areas, depending on whether they take their bikes on board. In the absence of designated lanes, cyclists must choose between the sidewalk and the bus roadway, both of which create potentially hazardous conflicts with other

modes.

Although municipal bylaws usually forbid riding on sidewalks, many cyclists are disinclined to dismount, especially when the distance is short, so interdictions are unlikely to meet with success. It is more effective to accommodate cyclists where possible with marked and segregated paths. If this is not possible, any directional signage and pavement markings need to be prominently placed.

Bicycle Movement at TransLink bus exchanges

At TransLink bus exchanges, cyclists are given very little guidance or accommodation for approaching or leaving the exchange, or where to ride within it. Exchanges usually have a sign prohibiting cycling. However, it is not sized or placed such that it can be read or even noticed from where cyclists enter the exchange – and the message is buried among a list of other forbidden activities (*see inset*). Given the lack of options, cyclists can be found riding in the bus zone or pedestrian footway, which is both dangerous and a nuisance. As intermodal bike-bus trips continue to grow in Metro Vancouver, the problem will only increase.

Recommendations: Bicycle Movement

- A. Design cycle travel paths into the exchange, anticipating entry and exit points, and connections to bike parking and waiting areas.
- B. If cyclists cannot be accommodated, place signs at the bicycle entrance to the exchange instructing where to dismount. Pavement markings throughout the pedestrian and bus areas should also be installed.

8.4.2 Bicycle Parking

“Secure longstay cycle parking is required at multimodal public transport interchanges, heavy rail stations, park and ride sites and principal bus and coach stations.”

– *Cycle Infrastructure Design*. UK Department for Transport, Scottish Executive, Welsh Assembly

The right bicycle parking can encourage cycling and reduce the incidence of bikes parked in inappropriate places. Good bicycle parking is sheltered, secure, conveniently located, and in adequate supply.

The most common form of bicycle parking is a rack, anchored to the ground and available for use free of charge. It is relatively cheap to provide and free to use, and can be accompanied by shelter. Bicycle lockers are increasingly common in North America as a more secure parking option, usually rented on a monthly basis.

Cyclists in some cities, especially on the west coast of the USA, are offered the option of premium bike parking at or near transit hubs. This may include a bike lockup, and attendant, mechanic, and other cyclist services; keys or swipe cards may be used to allow access to the secure parking area outside of normal attendant hours.

Bicycle Parking at TransLink bus exchanges

Among the sample sites visited, bicycle parking is frequently but inconsistently available. A few exchanges visited have no bicycle parking, but at

most exchanges bike racks are provided. The racks are typically of good functional design, with two contact points to support each bike.

At some exchanges, especially those at rail stations, bike lockers are available for a \$15 monthly rental charge. System-wide, lockers are provided at 26 bus exchanges, predominately at intermodal rail-bus facilities, with just 4 bus-only exchanges offering lockers. Parking is usually well-lit and placed in areas with good sightlines, but perceived risk of theft and lack of security staff at exchanges may contribute to the general under-



Instructions for cyclists are inconspicuous due to the small size of the sign, its location away from bike entrances or parking, and by being combined indiscriminately with a host of other instructions. Phibbs Exchange



TransLink bike racks and lockers are nearly always unsheltered. However, they are usually in high-visibility locations. South Surrey Park & Ride (top); Coquitlam Station (bottom)

use of racks.

Almost no racks or lockers are adequately sheltered from wind and rain which may also discourage use.

Recommendations: Bicycle Parking

- C. Provide sheltered bike parking at exchanges.



This bicycle parking facility at the University of Victoria (L) is well designed for rainy climates. In New York City, a style modelled on bus shelters incorporates a cycle network map (R).

- D. Discourage theft and vandalism by locating racks in well-lit areas with high natural surveillance from foot traffic or surrounding businesses, or active surveillance from station attendants if present.
- E. Locate bike parking close to bike entry and exit points, to reduce the risk of conflict with pedestrians.
- F. In exchanges with high existing or latent demand for bike parking, consider providing

space for premium parking facility.

8.4.3 Network and policy information

About Cycle Network and Policy Information

Cyclists have specific wayfinding needs, in addition to those addressed in *Information & Wayfinding* (Section 7, page 34). Adequate wayfinding maps and signage can make it easier for customers who combine transit and cycling in their journeys.

Cyclists need to know how to travel between bus exchanges and cycle routes or major destinations. They also need to know about the transit agency’s policies on bicycle integration. Like all wayfinding, clarity, simplicity, and timing are key – the provision of the just the right information at just the right point in a cyclist’s journey.



Good wayfinding signage between transit hubs and bike paths is an important part of bike-transit integration. *Proposed sign, Central Valley Greenway, New Westminster.*

Cycle Network and Policy Information at TransLink bus exchanges

There is little provision of information at the exchanges about TransLink’s bicycle policy and network. Information about how and when bike are accommodated on transit, when present, were provided at a central information board along with the transit network diagram, in small text amid all other system information.

No cycle network maps were found at the sample sites, and wayfinding signage for cyclists is similarly absent. No signs were observed at bus exchanges to direct cyclists to nearby bike routes and major destinations; nor were there signs on adjacent bike routes directing cyclists to the exchanges.

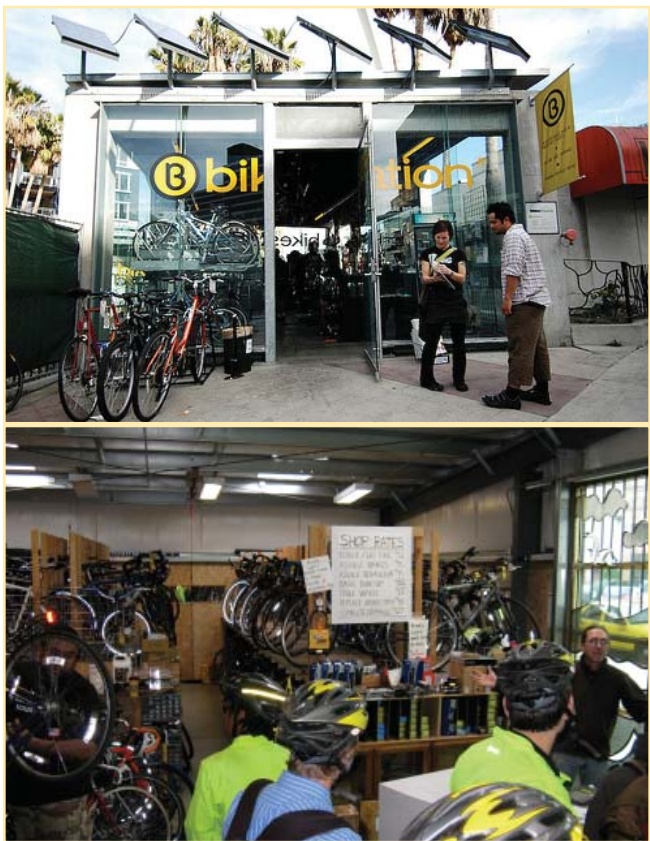
Recommendations: Cycle Network and Policy Information

- G. Provide cycle network map and policy information at a weather-sheltered location near cycle parking, or a central information board, or both.
- H. Install signs on nearby cycle routes that direct cyclists to the exchange.
- I. Install signs in bus exchanges that direct cyclists to nearby bike routes.

8.4.4 Services for cyclists

About Services for Cyclists

Some major transit hubs in Europe and the USA provide space for cycle services, often in conjunction with secure, supervised parking (see *inset*). These facilities may include air and water, full mechanic services, tool rental for on-site self-repair, sales of bicycles or bicycle accessories, and rentals of bicycles or trailers.



Full-service bike facilities can attract more bike-transit multimodal trips. *Long Beach CA bikestation (top); San Francisco CalTrain station (bottom).*

Where the bikeshed around a transit hub includes dense residential or employment land use, these kinds of services can increase cycling mode share and transit-bicycle integration.

Services for Cyclists at TransLink bus exchanges

None of the sample sites visited include services for cyclists, neither at the exchange nor within sight of the exchange.

Given that most off-street exchanges have not been designed to accommodate facilities other than those present, incorporating a major bike service facility could be challenging. However, as the busiest exchanges are those connected to SkyTrain stations, there may be creative opportunities to use space in and around the station. This could be an extension of the stationhouse, or perhaps a separate adjacent facility under the SkyTrain guideway. The exchanges at Metrotown and Surrey Central are examples where such a configuration might be feasible.

Recommendations: Services for Cyclists

- J. When designing new or renovating old exchanges with high existing or latent demand for cycling trips, consider providing space for cycle services.

9 Safety & Security

Customers have the right to expect that when they use the transit system, they will be reasonably protected from harm – to be both safe and secure. This report uses the terms *safety* to refer to protection from accidental harm, such as tripping on uneven pavement or being hit by a vehicle. *Security*, on the other hand, refers to protection from malicious acts, such as robbery or vandalism.

9.1 Safety

As a design issue, personal safety at bus exchanges is primarily a matter of ensuring that pedestrians from straying into the vehicle path. It also entails the positioning of furnishings in a way that will not cause injury to visually impaired people – for example unexpected steps, or protrusions from walls. Adequate lighting and appropriate maintenance are also important for customer safety.

9.1.1 Pedestrian segregation

Bus exchanges require pedestrians and buses to be in close proximity, increasing the chance of personal injury. A number of strategies are possible to reduce the chance of harm to customers

In some facilities, barriers are installed along the platform edge to protect passengers from entering the bus path. This design requires precise alignment of the stopped vehicle so that the doors match up with gaps in the barriers to allow passengers to board and alight.



Fencing protects customers from traffic at this BRT station. Gaps for boarding and alighting require precise alignment of the vehicle at stops. *Beijing*

More commonly, physical barriers are only installed away from bus bays, at the perimeter of the platform or of the entire exchange. Railings, fences or hedges are frequently used as barriers. Railings and fencing especially are sometimes considered indications of design failure, on the grounds that designers should anticipate desire lines and attempt to accommodate rather than block them.

Given the volume of large vehicles required in a bus exchange, and the large number of potential pedestrian desire lines in and out, it would seem difficult to avoid physical barriers in every case. Nonetheless, a more pleasing exchange will be achieved if the need such safety barriers can be prevented or minimized, and that when they cannot be avoided, that they are attractive – perhaps combined with landscaping or seating, or incorporating an artistic component.

Where pedestrian volumes or risk is low, customers may be warned by means of a change in colour, texture, or grade at the boundary of the pedestrian area. Where pedestrians must cross vehicle paths, a variety of crosswalk types may be

used: zebra-striped, raised, or signalized.



Tactile warning strips at curbside provide visual and textural cues to the boundaries of a pedestrian area, or significant locations such as the boarding area of a bus stop. *UK*

Large setbacks between shelters and bays at some exchanges prevent crowding that might cause customers to walk in the bus path. They also give waiting passengers some buffer space from the noise and exhaust of diesel-fuelled buses. Large setbacks can, however, become unattractive barren areas if not designed sensitively.

Pedestrian Segregation at TransLink bus exchanges

At the sample sites visited, platform edges are usually unmarked. Occasionally part of a curb

is painted, alerting customers to a drop off, or as a guide for bus operators manoeuvring in tight spaces.

Among the sample sites visited, when physical barriers are present they are most often in the form of fencing or railings. In almost all cases they appear to block desire lines that would cross bus paths at unmarked crossing points, but may also be used to protect pedestrians from steep drop-offs, or to close off a problem area. Generally the



TransLink typically does not mark platform edges except by a curb (*Haney Place, top L*) or if at grade, a painted line (*Marpole Loop, top R*). In some places, railings protect customers from vehicle traffic and other hazards (*Coquitlam Station, bottom*).

material is unpainted metal rails or chain link, giving a drab and industrial feel.

The few instances in which landscaping or decorative fencing has been used, the effect is considerably more pleasant.



Decorative fencing (Kootenay Loop, top) or plantings (Stanley Park, bottom) can prevent pedestrian movement in a more attractive way than the more commonly used chain link fence or galvanized steel railings. Kootenay Loop (top), Stanley Park (bottom)

Recommendations: Pedestrian Segregation

- A. Use fences, railings, and other barriers as sparingly as possible.
- B. As much as possible, accommodate desire lines (or, in new facilities, anticipate them) rather than blocking them.
- C. When a physical barrier is required, make it a positive contribution to passenger experience by using landscaping (for example, prickly shrubs or raised beds), decorative fencing, or by treating the barrier as an opportunity for public art.

9.1.2 Other safety issues: Lighting and maintenance

Passengers also require adequate lighting so that they can see where they are going, and identify any hazards that might lie in their path. As mentioned in Section 9.2.1, *Natural surveillance* (below), lighting *levels* were not included in this study, although some recommendations about lighting are included in Section 4.1.5, *Lighting* (page 26).

Poorly maintained ground planes have the potential to become tripping hazards. Good maintenance generally is also a security strategy, and is addressed in Section 9.2.3, *Maintenance* (page 46).

9.2 Security

Crime Prevention Through Environmental Design (CPTED) is a commonly used set of principles and practices for the physical design of spaces in order to reduce threats to people and property. The strategies fall into four categories: natural surveillance, territorial reinforcement, maintenance, and natural access control.

The last of these, natural access control, is less relevant in the case of bus exchanges. This is because these facilities must be highly permeable in order to allow buses in and out, and in most cases, to maximize pedestrian connectivity to the surrounding neighbourhood. For this reason, natural access control is not a focus of this analysis.

9.2.1 Natural surveillance

Natural surveillance, or what Jane Jacobs called *eyes on the street*, refers to the presence of legitimate users of the area whose mere presence deters would-be criminals.

Successful natural surveillance depends on the presence of legitimate users of the space. Residential and commercial density increases the number of pedestrians. Mixed use also helps, especially when the uses bring many people onto the street at different times: office and retail during the day, recreation, entertainment and dining in the evening and weekends. Residential uses foster pedestrian activity at all times of day.

People in cars can contribute to natural surveillance, but they are less effective than pedestrians in this capacity. Visual contact is limited by the speed at which vehicles pass through the area,

and for the driver, also by the attention required to operate the vehicle. Auditory contact is also limited, by closed windows and vehicle noise.

Unobstructed sightlines also are critical to natural surveillance. Large pillars, and bulky or tall plantings, and nooks in walls or between buildings can create hiding places. Offices, retail, or dining can offer natural surveillance but only if entrances and windows face the targeted area.



Phibbs Exchange (the oblong area in the centre of the photo above) is located within easy access of major roads, but the surrounding uses generate virtually no non-transit pedestrian activity within sight. The exchange functions as a timed transfer focal point, so very little natural surveillance occurs between bus pulses.

Natural Surveillance at TransLink bus exchanges

TransLink’s off-street bus exchanges rarely have adequate natural surveillance. They are frequently located in areas with few pedestrians, for example beside highways, near parking lots, or in industrial areas. On-street exchanges tend to perform better, but this depends on the street wall.



Natural surveillance requires not only density and mixed use, but street frontages that encourage pedestrian activity. Haney Place Exchange experiences crime problems, despite being in the heart of the community and adjacent to an RCMP station. The photos above, taken from the exchange island, show how the surrounding buildings turn their backs or sides on the exchange. As a consequence, few users of adjacent properties have occasion to pass near or even look at the exchange.

Deep parking lots, setbacks, opaque fences, or buildings that present a blank face to the street reduce opportunities for natural surveillance.

A pleasant sitting area attracts many people who use it as a social space – desirable from a CPTED point of view. However, strategies need to be in place to ensure it does not attract undesirable activities. Newton Exchange, for example, offers a leafy allée that attracts seniors and youth, but surrounding buildings face away from the exchange, and little pedestrian-oriented business means that few people other than transit users pass through the area.

Recommendations: Natural Surveillance

- A. Site new bus exchanges in relatively dense, mixed-use contexts with many legitimate users and high natural surveillance.
- B. Where opportunities exist, create relatively dense, mixed-use areas around existing bus exchanges.
- C. Ensure windows and entrances of adjacent buildings face the exchange.
- D. Ensure sightlines are unobstructed by pillars and opaque walls.
- E. Use the “3 and 7” rule for plantings: no plants higher than 3 feet, and trees and shrubs should be limbed up to a height of 7 feet.
- F. Where warranted by passenger volumes, security conditions, or community concern, consider establishing a dedicated or rotating human TransLink presence at bus exchanges, such as a FareDealer kiosk or a station manager.

9.2.2 Territorial reinforcement

A property that is indistinguishable from the public realm is more likely to be a site of crime because there is less of a sense that it is monitored. Reinforcing territory can be achieved by distinctive design such as paint schemes, paving treatments, or distinctive furnishings. Signage, gateways treatments, and uniformed staff also signal that the space “belongs to” someone and discourages would-be criminal by making them feel uneasy because they are not on their own territory.

Territorial Reinforcement at TransLink bus exchanges

The layout and furnishings necessary for the adequate functioning of an off-street bus exchange readily identify it as TransLink territory. Even when no buses are present, the islands, ID poles, and distinctive shelters and furniture identify it as different from its surroundings.

Recommendations: Territorial Reinforcement

The functional design requirements and operational activities of off-street TransLink bus exchanges are such that recommendations for additional or different territorial reinforcement are not needed.

9.2.3 Maintenance

A facility that is clean and in good repair shows evidence of a regular and official human presence. Good maintenance also plays an important role in achieving an attractive aesthetic environment.

In order to ensure well-maintained facilities, it must be clear what is considered unacceptable, and there must be a system in place to identify when maintenance standards have been breached. There must also be the financial resources and human expertise to perform the maintenance.

Staff who are already on site – for example garbage collectors, attendants at adjoining SkyTrain stations, or bus operators – are well positioned to identify when maintenance is needed. Dedicated staff or contractors could also be used, especially when specific knowledge is needed such as for landscaping.

Maintenance requirements can be reduced through careful selection of materials, designs, and plantings. Vandalism is difficult to control in unsupervised public space. Materials or coatings that are vandal-resistant may be more expensive, but may be more cost-effective over the life cycle of the object when maintenance is figured into the pricing.

Maintenance at TransLink bus exchanges

Structures and landscaping at TransLink bus exchanges are in varying condition, but cleanliness and need for repair are frequent problems.

Maintenance of Furnishings

Garbage cans stand out as frequently having broken or missing parts. At receptacles where users are required to push a flap in order to dispose of their waste, the panel is often dirty enough to discourage use. The sides and base are often also heavily soiled.



Poorly maintained paving and landscaping gives a sense of disregard for the customer, and can cause hazards or interfere with functionality. Clockwise from top L: Langley Centre, Newton Exchange, Langley Centre, Newton Exchange, Newton Exchange, Surrey Central Station

Maintenance of Landscaping and Paving

Lack of maintenance can result in trees interfering with proper functioning. Where diseased or problem plants have been removed, unsightly stumps and empty beds have been left instead of replanting (see *Newton Exchange inset, left*).

Interlocking pavers are inadequately maintained in places, with missing or heaved blocks. When repaired, these are sometimes merely patched with asphalt, leaving an uneven and unattractive surface.

At older exchanges, road markings are sometimes faded, limiting their usefulness.

Maintenance and Vandalism

Graffiti, breakage, and other forms of vandalism are common. Not only is it unattractive, it can undermine passengers' feelings of security because it suggests the facility is unmonitored and uncared for. In some cases vandalism also interferes with the proper functioning, for example reducing the legibility of information. Some of the damage observed at the sample sites appears to be longstanding.

Recommendations: Maintenance

- G. Budget appropriately for maintenance, and include life-cycle maintenance costs when selecting among different materials, designs, finishes, or plant species (specialists such as engineers and registered landscape architects should be consulted where applicable).
- H. Establish standards for the maintenance of structures, furnishings, ground planes and landscaping.

- I. Establish a protocol for regular monitoring of structures, furnishings, ground planes and landscaping for damage and soiling.
- J. Promptly perform any cleaning or repairs that are below standard, using "patches" only until proper repairs can be carried out.
- K. If structures are no longer to be used, maintain them until they can be removed.



Out-of-use shelters or other structures are sometimes poorly maintained. At Knight and Marine, an old wooden shelter has been retained, and structural reinforcement has been done in an insensitive and unappealing way (top, bottom L). Similarly, at Edmonds Station an off-vertical, wall-less shelter with a damaged bench stands at an unloading-only bay (bottom R).

9.2.4 Communication

Because crimes cannot be completely prevented, it is important that when they do occur, or seem imminent, people are able to get help easily. Bus exchanges that are located in dense mixed-use areas are more likely to have people within hearing distance around the clock (which can also act as a crime deterrent).

Telephones are useful both as a means to summon help, and also as a deterrent to would-be criminals. Although cell phones are increasingly common, they are less likely to be used by the poor and the elderly, both of whom are over-represented on transit. The American Association of State Highway and Transportation Officials (AASHTO) recommends 1 pay phone for every 50 people present, with a minimum of 2 pay phones per facility.

Depending on the physical and demographic context of the neighbourhood surrounding a bus exchange, the presence of pay phones may attract undesirable behaviours such as loitering or drug-dealing. Some cities have successfully experimented with pay phones that connect only with 9-1-1 from late evening until morning in order to address this problemⁱ.

Another emergency communication strategy involves the installation of special phones or intercoms that connect only to the transit security office. SkyTrain stations already have these in place, and bus facilities at post-secondary education institutions often have "blue light" phones connecting to campus security. Unlike SkyTrain stations, however, bus exchanges are typically not closed off outside of transit service hours, which makes the phones more susceptible to vandalism.

However, this is also the case for most public pay phones, and should not deter agencies from providing emergency communication options for passengers.

Communication at TransLink bus exchanges

Pay phones are inconsistently provided at TransLink bus exchanges. No bus exchanges have emergency phones or information lines connecting directly to TransLink staff. Although exchanges associated with SkyTrain stations may benefit from security and information phones at the latter, there is no signage to indicate their presence to customers at the exchange. Moreover, at some exchanges, such as Brentwood Town Centre and Coquitlam Station, the station and exchange are separated by a considerable distance.

Recommendations: Communication

- L. Install at least one pay phone or security phone at every off-street bus exchange not associated with a SkyTrain or WCE station.
- M. Install at least one pay phone or security phone at every off-street bus exchange associated with a SkyTrain or WCE station but not immediately adjacent to that station.
- N. Where an off-street bus exchange is associated with a SkyTrain or WCE station, and that station has a security phone, install signage alerting customers to the location of that phone.

10 Universal Design

“Transit agencies should create facilities that are usable by all passengers, including but not limited to disabled transit patrons. For instance, transit agencies should seek to accommodate ‘parents pushing strollers, travelers pulling luggage, the older man needing a little more time to cross a street’”

– *Accessing Transit: Design Handbook for Florida Bus Passenger Facilities*, citing the US National Easter Seal Society, Project ACTION (2005)

Universal design, barrier-free access, and similar terms have been used to refer to the design of buildings and public spaces for all users, regardless of limitations on physical or cognitive abilities.

A number of issues related to universal design arose as a result of the bus exchanges surveyed for this report. For example, some platforms were too narrow to allow wheelchair access; similarly, temporary changes in service are communicated through signs readable only by the sighted.

HandyDART stops stood out as particularly problematic. In some stations they appeared to have been located as an afterthought, fitted in wherever possible, rather than in well planned locations. Many exchanges had no HandyDART stops at all.

HandyDART users, operators, and vehicles have special requirements that need to be designed in to the exchange from the start. For ex-

ample, lifts are located at the back of HandyDART vehicles, so loading and unloading areas must be safe from vehicle traffic, and also allow wheeled access to the adjacent sidewalk or platform. HandyDART is a door-to-door service, so stop placement must allow operators to accompany customers to or from their connecting bus bay or station platform, while maintaining visual contact with the HandyDART vehicle for the safety and security of other HandyDART passengers inside.

Planning for barrier-free access requires extensive and specific knowledge of a variety of abilities that can influence individual transit needs. This expertise is attested in the *Universal Accessibility Guidelines for TransLink Fleet and Facilities*, endorsed by the TransLink board in 2007 as part of the *Access Transit* project. Detailed design recommendations are therefore not made here, instead deferring to the *Accessibility Guidelines*.

Recommendations: Universal Design

- A. Design bus exchanges in accordance with recommendations in the *Universal Accessibility Guidelines for TransLink Fleet and Facilities*.

11 Community Integration

“Facilities should be managed to ensure constant effort toward both expanding service/retail activities and enhancing the market and community potential of the site.”

– From Calgary’s *Transit Friendly Design Guide*

Although good public transit is itself a community benefit, bus exchanges can detract from the livability of their immediate surroundings. They can be unattractive due to poor design or maintenance, and may not be used by many members of the community. However, these facilities can also be designed in a way that physically and functionally integrates them into the neighbourhood, creating a community asset.

Providing goods and services is one way of integrating a bus exchange into its surrounding community. Businesses such as convenience stores, dry cleaning, flower stands and coffee shops are good candidates for a location that sees high numbers of transit customers, and at the same time appeal to non-transit users living and working in the vicinity. They could be located on the property of an off-street bus exchange, for example, in a station house or as a mobile cart. However, transit agencies also have the option of working with municipalities and the private sector to ensure these conveniences are available on non-transit property adjacent to an off-street or on-street exchange.

Communities may also benefit from functional aspects designed specifically for them.

These may be as small as the installation of a community bulletin board, or as significant as making space available for community policing offices. In larger transit hub developments, community gathering space could be made available. Even just having good pedestrian connectivity on all sides helps integrate the exchange into the community. Especially on large sites, poor linkages make the exchange an obstacle for pedestrians and separate it from the community.

A bus exchange that offers multiple community uses demonstrates corporate responsibility, and is less likely to be resisted by neighbours. Similarly, high quality design, landscaping, and public art are valued even by passersby – and low-quality ones are an eyesore. But by designing bus exchanges that are physically attractive and functionally useful community assets, transit agencies also benefit. When a bus exchange contributes to developing a vibrant, walkable neighbourhood core, it also attracts transit-oriented development, increasing the potential transit customer base. Community-oriented transit facilities can also benefit the transit agency by decreasing crime attractiveness: mixed uses generate the kind of day-long pedestrian traffic required for natural surveillance (see *Natural surveillance*, page 45), and high-quality, well-maintained facilities demonstrate an official presence and make for less attractive targets of crime.

Many of the issues discussed throughout this report stem from a design approach that prioritizes vehicle and passenger movement to the near exclusion of other considerations. The alternative approach adopted here, one that focuses on passenger experience, not only provides better customer service by creating more diverse and high-quality facilities, but can also be attractive



Community integration in Corpus Christi

The Staples Street bus station in Corpus Christi, Texas, illustrates how community-oriented design can produce a superior facility and stimulate improvements in a declining neighbourhood.

Priorities for this bus station included creating a sense of place and civic pride, contributing to neighbourhood economic development by improving the livability of the immediate community, as well improved transit operating efficiency and high quality passenger amenities.

The Spanish Mission-style architecture was designed to be a landmark, and reflects the history and population of the area. The presence of the community is also visible on the station walls: 1,500 decorative tiles, handmade by Corpus Christi residents.

Accommodations for small retail units and vending carts in a central plaza, as well as a focus on improving pedestrian flow through the exchange, help integrate the facility’s form and function into the community.

The station serves 14 bus routes and over 5,000 passengers per day.





Informal notices at TransLink bus exchanges suggest latent demand for a neighbourhood communication amenity such as a bulletin board or kiosk. *South Surrey Park & Ride (L), Marpole Loop (R)*

to neighbours and municipalities as part of a plan to maintain or enhance the social and economic vitality of a community.

Recommendations: Community Integration

- A. Develop and implement a strategy for early and ongoing meaningful engagement among the design team, operations staff, the municipality, and the community about how best to integrate the facility into the neighbourhood.
- B. Avoid single-use off-street exchanges.
- C. Commit to a program of design and maintenance that ensures that the facility is attractive when seen from the outside.
- D. Incorporate space for goods and services relevant to the community, e.g. a community policing office, local-serving retail, a news-

agent/convenience store.

- E. Implement a program for designing, installing and maintaining community bulletin boards.
- F. Clearly post who residents should contact if they have comments or complaints.

“[The goal is to] fully integrate transit stations into the communities they serve through transit-supportive urban design, architecture, public art, and innovative management techniques.”

– Project for Public Spaces, *Thinking Beyond the Station* campaign¹.

Notes & References

Notes

- a King County Department of Transportation. 2008. *Village at Overlake Station, Redmond WA – TOD*. Web page <<http://your.kingcounty.gov/kcdot/tod/overlake.stm>>. Accessed 29 November 2008.
- b The exchanges represented in this table are shown at right in Table II-7, *Siting of Sampled TransLink Bus Exchanges (Named)*.
- c US Federal Transit Administration. 1995. *Design and Art in Transit Projects*, C 9400.1A, 06-09-95. Web page <http://www.fta.dot.gov/printer_friendly/leg_reg_4129.html>. Accessed 18 Dec 2008.
- d TransLink. 2007. *Evergreen Light Rail Transit Project Preliminary Design* (Revision: 1 February 2007).
- e Carpmann Grant Associates, Wayfinding Consultants. Web page <<http://www.wayfinding.com/index.asp>>. Accessed 30 October 2008.
- f Personal communication with Mr. Val Menotti, Deputy Planning Manager - Stations, Bay Area Rapid Transit. 18 June 2008.
- g Center for Neighborhood Technology. 2006. *Paved Over: Surface Parking Lots or Opportunities for Tax-Generating, Sustainable Development?* Chicago: Center for Neighborhood Technology. Available online at <<http://www.cnt.org/repository/PavedOver-Final.pdf>>.
- h City of Calgary. 2005. *Calgary Transportation Plan*. Available online at <http://www.calgary.ca/DocGallery/BU/trans_planning/CTP_2005/ctp_2005_main_report.pdf>.

TABLE II-7. Siting of Sampled TransLink Bus Exchanges (Named)			
Urban form	Density of development (relative to municipality or area)		
	Low	Medium	High
Agricultural	South Surrey Park & Ride		
Mostly car-oriented	Coquitlam Central Stn	Marpole Loop	
	Guildford Exchange	Newton Exchange	
	Hudson & Marine	Park Royal	
	Langley Centre Exchange	Richmond Exchange	
	Nanaimo Stn	VCC-Clark Stn	
	Phibbs Exchange		
	Production Way – University Stn		
Both car- and pedestrian-oriented	South Delta Exchange	Edmonds Stn	Brentwood Stn
	Walnut Grove Park & Ride	Kootenay Loop	Haney Place
			Metrotown Stn
Mostly pedestrian-oriented	Stanley Park Loop		Surrey Central Stn
			Port Coquitlam Centre
			SFU Exchange

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ca/DocGallery/BU/trans_planning/CTP_2005/ctp_2005_main_report.pdf>.

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j Project for Public Spaces. *Thinking Beyond the Station*. Web page <http://www.pps.org/info/Thinking_Beyond_the_Station>. Accessed 10 December 2008.

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Image credits

The credits below are for images used in this chapter that were not produced by or for TransLink or the writer of this report. All aerial orthophotos were obtained from Google Earth.

Page 5. Village at Overlake Station, Redmond WA. <<http://www.metrokc.gov/kcdot/news/photos/2003/012703thisweekph1lg.jpg>>. Accessed 29 December 2008.

Page 8. Arnhem bus station. <<http://www.flickr.com/photos/marketingfacts/2855904214>>. Accessed 30 December 2008.

Page 8. Christchurch bus exchange. <<http://www.flickr.com/photos/marketingfacts/2855904214>>. Accessed 30 December 2008

Page 15: Automatic public toilet, Vancouver. <<http://vancouver.ca/engsvcs/streets/furniture/apt.htm>>. Accessed 17 December 2008.

Page 16: People sitting on planter ledge. <<http://www.flickr.com/photos/foundphoto-slj/584235525>>. Accessed 18 December 2008.

Page 17: Coloured concrete, Dolphin Stadium, Miami. <http://www.scofield.com/showcase_stadia4f.html>. Accessed 29 October 2008.

Page 17: Pavement stamps, Vancouver. <<http://www.flickr.com/photos/boris/68626>>. Accessed 28 October 2008.

Page 17: Pavers surrounding tree base, Burlington, VT. <<http://www.flickr.com/photos/nne-cap/2874145790>>. Accessed 28 October 2008.

Page 18: FareDealer outlet, Holdom Sta-

tion. <<http://flickr.com/photos/silly-gwailo/2801611123>>. Accessed 18 December 2008.

Page 20: Tiara, New York City Subway. <<http://www.flickr.com/photos/richard-winchell/477519666>>. Accessed 27 October 2008.

Page 20: Salish spindle whorl art, Holdom Station. <<http://flickr.com/photos/silly-gwailo/2802458490>>. Accessed 18 December 2008.

Page 20: Etched glass, Lake City Way Station. <<http://www.goldrayindustries.com/index.php/core/gallery/3/0/0>>. Accessed 18 December 2008.

Page 21: Dog kiosk. <<http://www.flickr.com/photos/bounder/43963012>>. Accessed 27 October 2008.

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Page 30: Bikestation, Long Beach CA. <<http://www.flickr.com/photos/bikeportland/2128028066>>. Accessed 30 October 2008.

Page 32. Tactile warning strip. <<http://www.pavingexpert.com/tactile01.htm>>. Accessed 29 December 2008.

Page 38. Staples Street Station (all photos). <http://www.pps.org/great_public_spaces/one?public_place_id=113#>. Accessed 29 De-

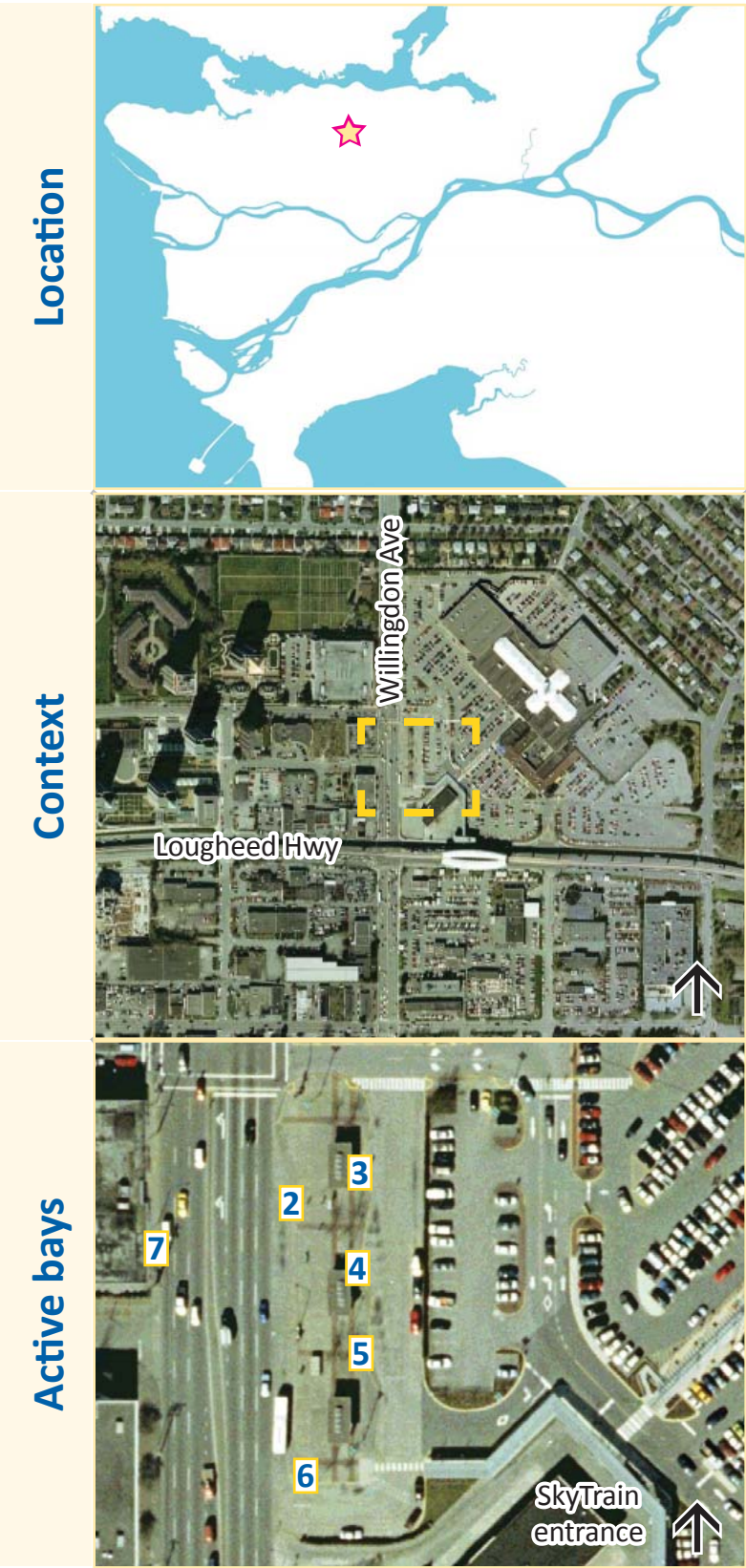
cember 2008.

III Site Analyses

Brentwood Town Centre Station	55
Coquitlam Station	56
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Guildford Exchange	58
Haney Place Exchange	59
Knight & Marine	60
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Marpole Loop	63
Metrotown Station	64
Nanaimo Station	65
Newton Exchange	66
Park Royal	67
Phibbs Exchange	68
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Production Way – University Station	70
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South Surrey Park & Ride	74
Stanley Park Loop	75
Surrey Central Station	76
VCC – Clark Station	77
Walnut Grove Park & Ride	78

III Site Analyses

Brentwood Town Centre Station



Quick facts

Municipality	Burnaby
Configuration	Off-street + on-street
Routes served	5
Active bays	6
Weekly boardings	26,028
Peak boarding hour	M-F 17:00-18:00
Boardings at peak hour	285
Frequent Transit Network	Yes
Intermodal interchange	Yes
Park & Ride	No

Key issues

Ambience. The exchange is surrounded by an arterial street (see photo *a*), a parking lot, and a disused-looking auto shop (*a*, *b*). Shelters are set back from the street (*g*), but the intervening concrete does little to improve the view or noise. An operator facility (*d*, *g*) presents a blank walls on all sides. Distinctive shelters (*c*) and trees (*g*) minimally offset the unpleasant surroundings.

Pedestrian orientation. Some letdowns align poorly with crosswalks (*e*), and there are no pay phones.

Cohesion. Bay 7 (*h*), across the street from the rest of the bays, is not easily visible and no map or signage is present to direct people to it.

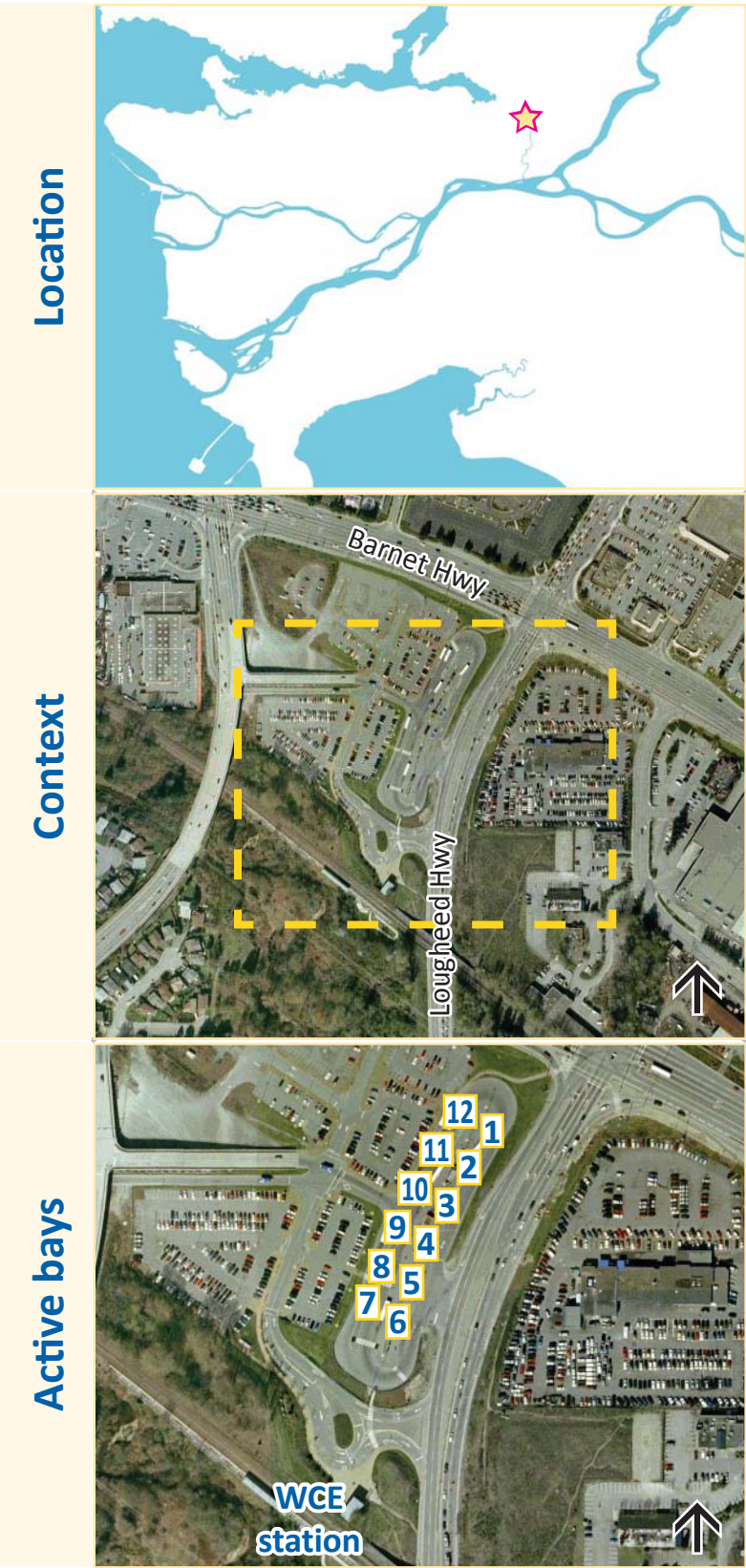
Seating location. The bench at Bay 7 (*h*) is some distance from the ID pole. Drivers might not see waiting passengers, especially at night.

Intermodal cohesion. Visibility is poor between the exchange and station, and directional signage is absent. Design quality and finishings at the exchange (*c*, *d*) compare unfavourably to those at the station (*a*, *b*, *f*). Moreover, the exchange is signed *Brentwood Mall*; the station, *Brentwood Town Centre*.



III Site Analyses

Coquitlam Station



Quick facts	
Municipality	Coquitlam
Configuration	Off-street
Routes served	18
Active bays	12
Weekly boardings	28,705
Peak boarding hour	M-F 08:00-09:00
Boardings at peak hour	664
Frequent Transit Network	Yes
Intermodal interchange	West Coast Express
Park & Ride	Yes, free

Key issues

Ambience. Visual appeal comes mainly from the vibrant colour scheme (a). Customers look out over an expanse of plain asphalt to the highway or park-and-ride lot (b), with mountains in the distance. The transit centre's concrete and metal grille exterior (a, f) are a missed opportunity for visual interest. The edges of the park-and-ride lot appear to be used for storage (jersey barriers) and dumping.

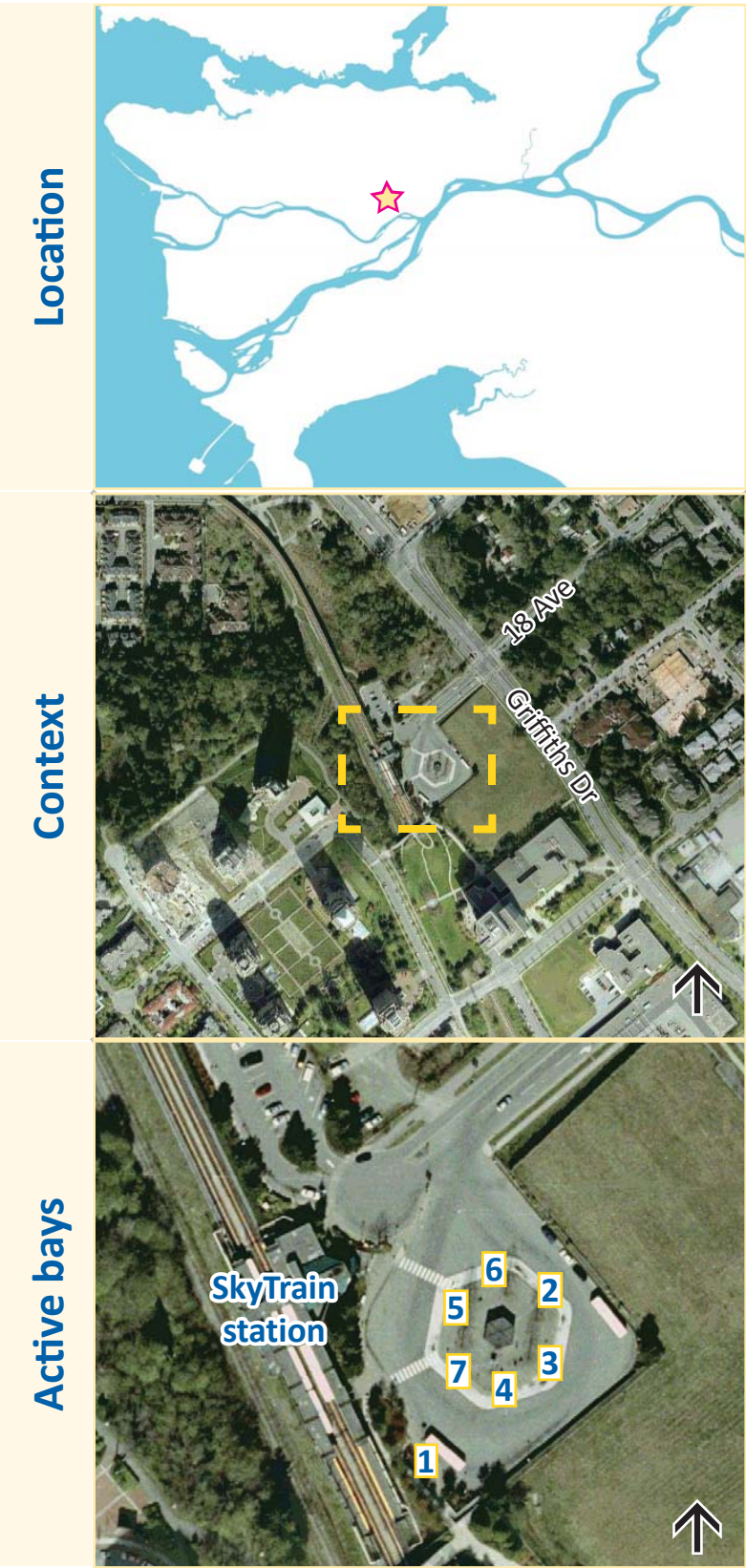
Weather protection. The wire grille walls of the shelters (c) do not protect from wind and rain (d). Most amenities (e, f, g) are completely unsheltered.

Pedestrian orientation. The exchange is isolated from any pedestrian-oriented development. In the exchange, lighting is far larger than human scale.

Intermodal cohesion. Despite far greater use, the quality of amenities and architectural merit at the exchange is far lower than at the station (j), and the connection between the two is unremarkable (h). Naming is also inconsistent (g, i).

Wayfinding for Park & Ride. Signage for drivers is poor, and turning around may be time-consuming due to the highway median and coarse street grid.





Quick facts

Municipality	Burnaby
Configuration	Off-street
Routes served	6
Active bays	7
Weekly boardings	34,690
Peak boarding hour	M-F 17:00-18:00
Boardings at peak hour	583
Frequent Transit Network	Yes
Intermodal interchange	SkyTrain
Park & Ride	No

Key issues

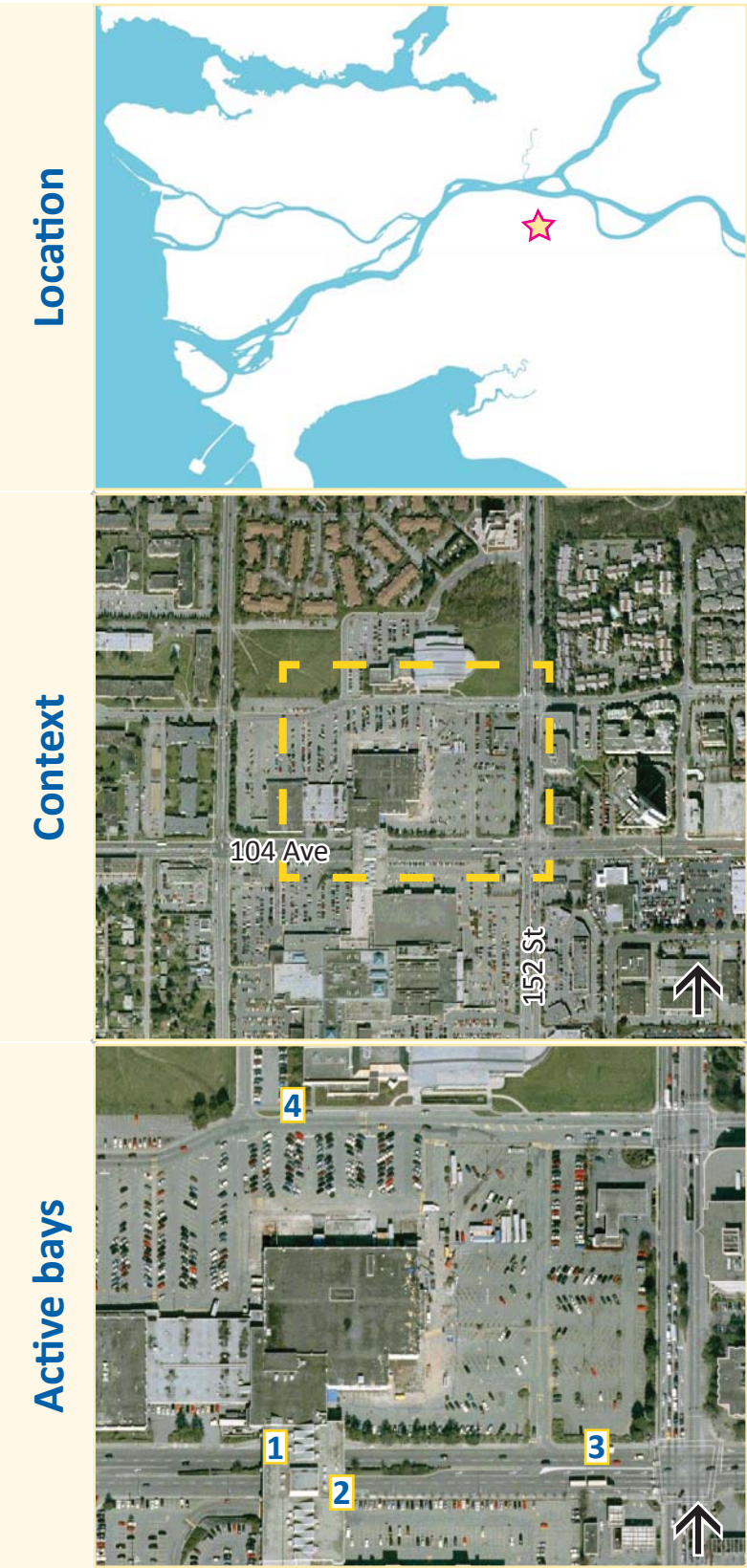
Ambience. A number of elements communicate neglect of the facility, and therefore the users. The effect of the distinctive central shelter (a) is muted by the ad panels, blank except for two announcing an event in 2004. Unhealthy trees (c) and a concrete retaining wall (d) are in need of visual improvement, and a faded zebra crossing (b) and poorly maintained shelters add to the sense of decay.

Pedestrian orientation. A well-designed connection to the south (f) is not mirrored at the busy north access point (g, looking toward the station, and h, looking outward). Rather than using the inconvenient path, arriving pedestrians cut through the bus entryway to the island (g). Departing users are given mixed messages: a crosswalk marked with an incongruous sign (e, h). Some letdowns are poorly aligned (g, i). Newspaper boxes are distant and not visible from the bus waiting area (j).

Seating. Seating is backless (a), and inadequate at peak times.

HandyDART. The HandyDART stop is not located in the bus-only area, and ends up being a *de facto* passenger pick-up and drop-off area (j).





Quick facts

Municipality	Surrey
Configuration	On-street
Routes served	11
Active bays	4
Weekly boardings	9,274
Peak boarding hour	M-F 15:00-16:00
Boardings at peak hour	156
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	No

Key issues

Ambience. Bays 1 and 2, located on busy 104 Avenue under the Guildford Mall overpass, are dark, unattractive, and noisy (a). Graffiti, uneven pavement, and strictly functional materials create an unattractive waiting environment. The hidden, dirty, oil-drum-style garbage can at Bay 4 (h) offers nothing more than the absolute minimum functionality.

Pedestrian orientation. Although the inside of the mall is a pedestrian environment, the bus stops outside it are surrounded by busy roads, blank walls, and parking lots.

Seating and shelter. The busiest two bays enjoy comprehensive shelter from the overpass and walls, but low-quality and inadequate seating (backless at Bay 1, d; and a concrete ledge at Bay 2, e). Seating at Bay 4 is an unsheltered low wall.

Wayfinding. Access between Bays 1 and 2 is blocked by a railing (b). Pedestrians are to use the mall as an overpass, although no indication of this is given at Bay 1. Confusing signs at Bay 2 (f) direct users to the mall entrance without clarifying that the mall itself is the overpass (g). No signage in the mall directs pedestrians to the bus stops.



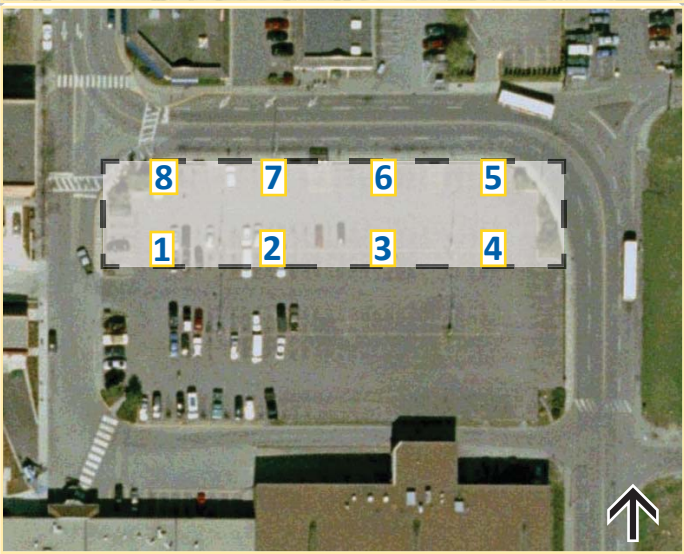
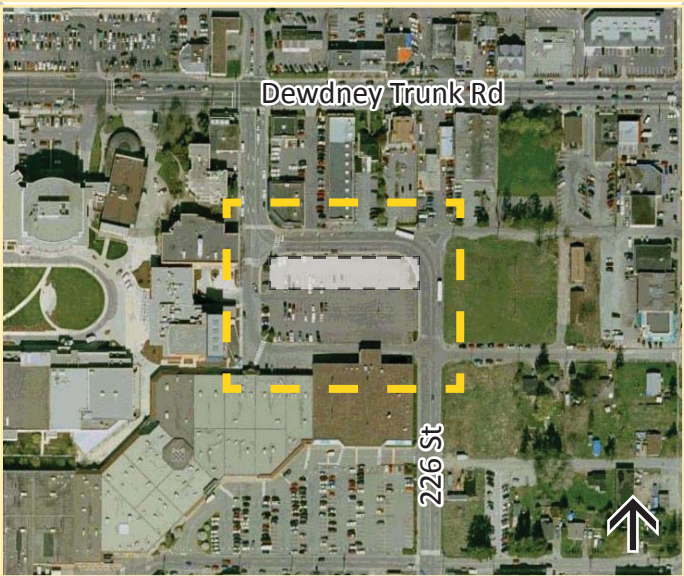
III Site Analyses

Haney Place Exchange

Location

Context

Active bays



Quick facts

Municipality	Maple Ridge
Configuration	Off-street
Routes served	9
Active bays	8
Weekly boardings	9,357
Peak boarding hour	M-F 15:00-16:00
Boardings at peak hour	151
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	No

Key issues

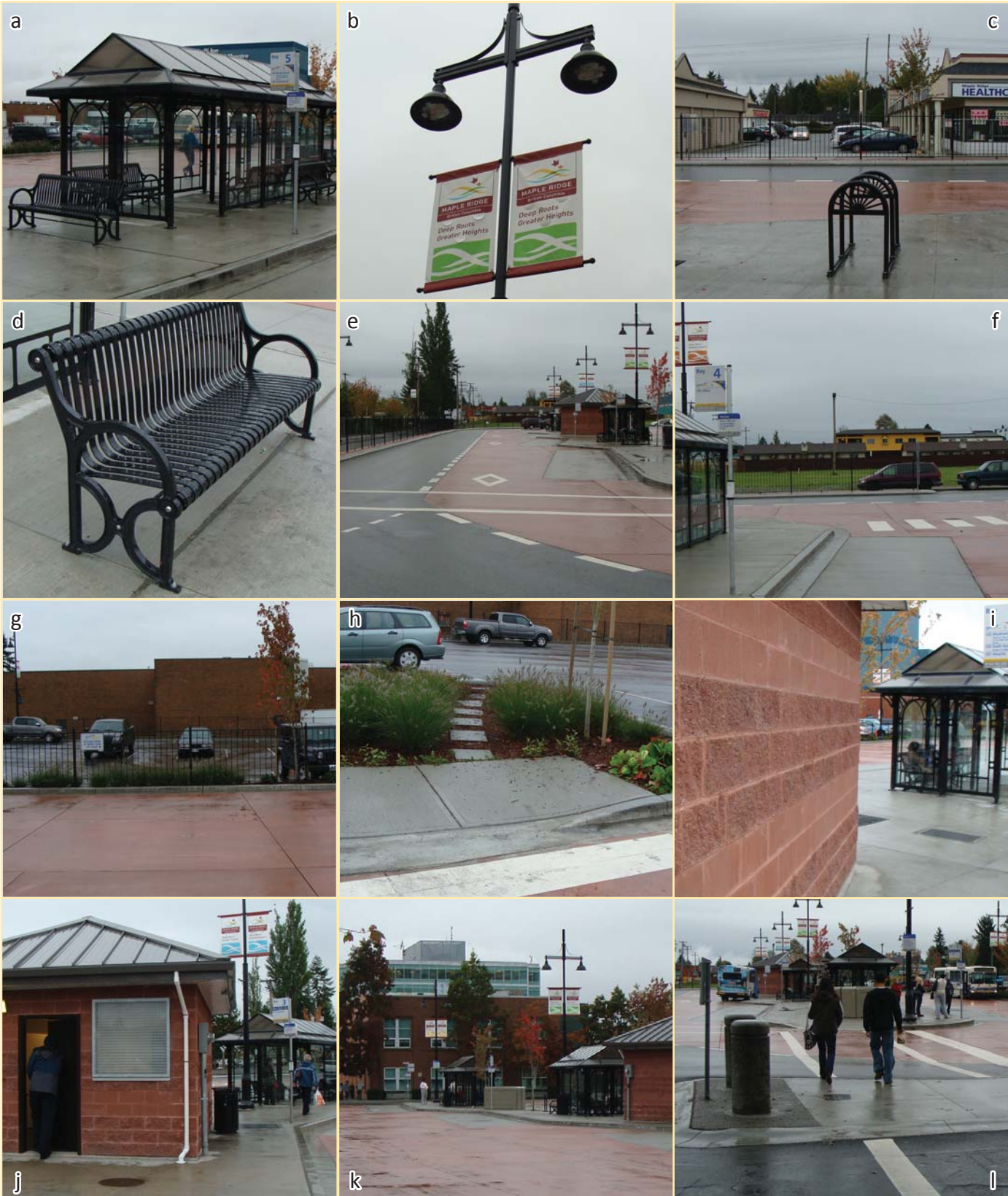
Note: This exchange is new, and no current aerial photo is available. The orthophotos at left show a grey rectangle where the current bus island currently sits.

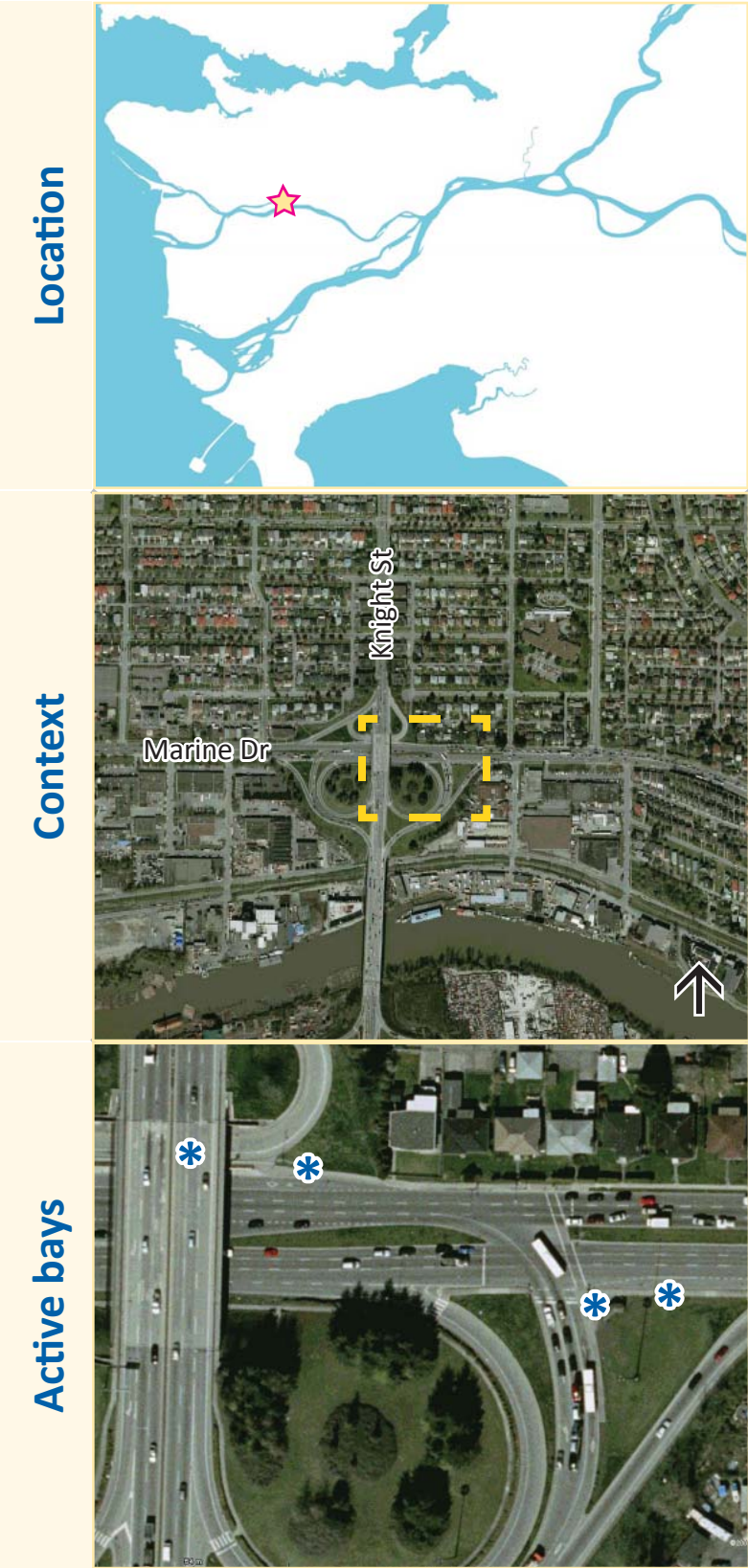
Ambience. Brand new, stylish furnishings (a, b, c, d) and tinted concrete (e, i) set this exchange apart from most. The plain concrete ground surface of the island, and the bleak views of parking and blank walls (g), a strip mall seen through a fence (c) and a vacant lot (f) detract from the experience.

Seating and shelter. Ample seating is located in roomy shelters with nearly floor-to-ceiling transparent walls that provide excellent weather protection (a, i). Translucent roofs allow in daylight.

Pedestrian orientation. A zebra crossing (f) allows eastern access to the exchange; at the western approach, a mid-road island shortens the time pedestrians must spend in the roadway. A desire line to the parking lot is accommodated with stepping stones – quaint, but not universally accessible (h).

Security. Adjacent buildings face their back or side to the exchange, minimizing passive surveillance.





Quick facts

Municipality	Vancouver
Configuration	Off-street + on-street
Routes served	4
Active bays	4
Weekly boardings	7,918
Peak boarding hour	M-F 16:00-17:00
Boardings at peak hour	146
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	No

Key issues

Cohesion. Although identified on TransLink’s transit map, and included in the CMBC Bus Stop Management System list of exchanges, the exchange does not present itself as a cohesive unit, and stops are not labelled as bays. The transit information board under the bridge is entitled *Knight Street* (a, b).

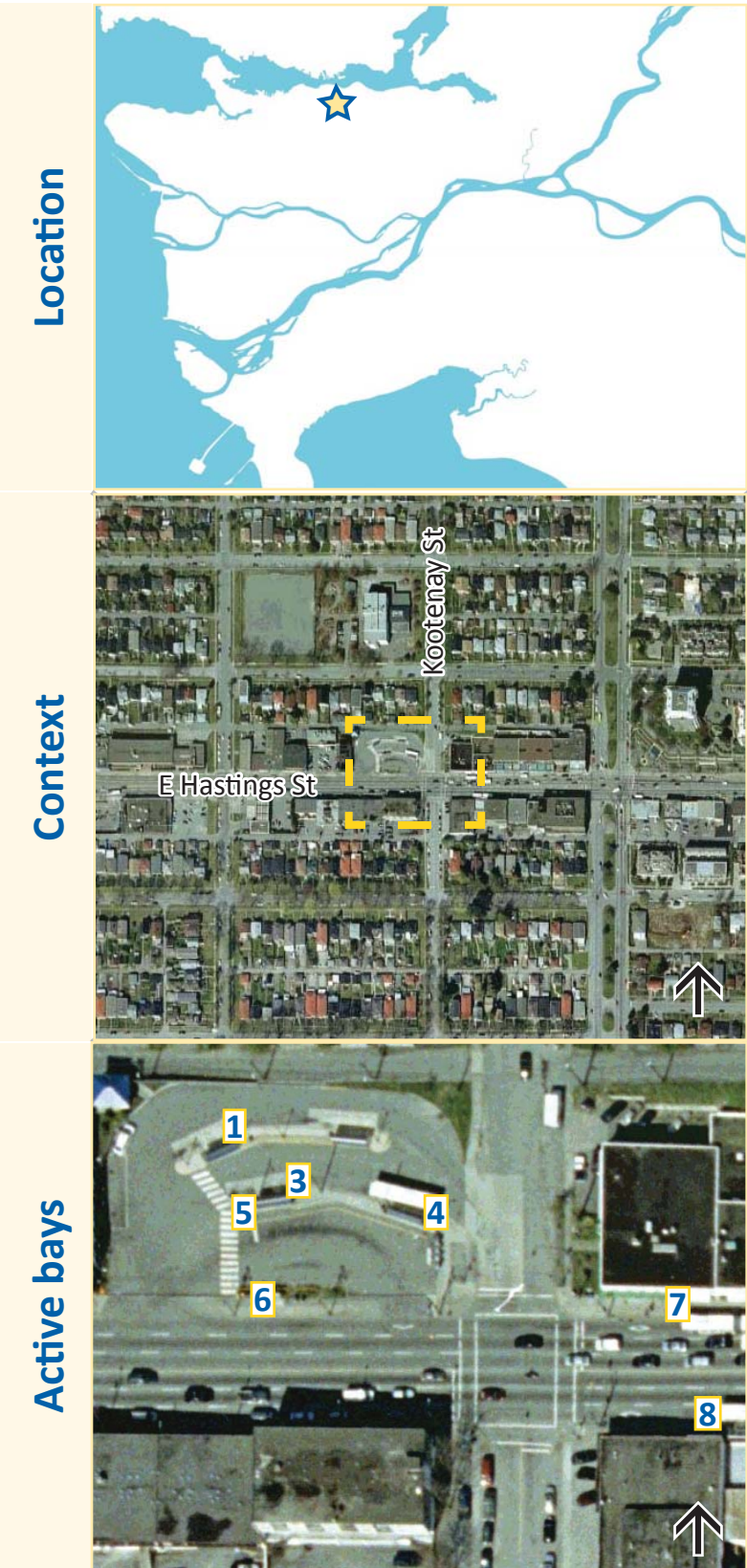
Ambience. Fast-moving vehicles and associated infrastructure dominate the space, creating a noisy, dirty, unpleasant and exposed waiting environment (a, d, j). The stop under the bridge boasts cast-concrete murals (c); some are in need of maintenance, as are some furnishings (h).

Pedestrian orientation. There is no pedestrian-oriented development or conveniences near the stops, apart from sidewalks and a crosswalk.

Seating and shelter. Some seating needs maintenance or replacement (d, e, f, g, h).

Wayfinding. A sign at the stop under the bridge (i) directs passengers across Marine Drive in such a way that they would be unable to access the stops on the south side. The appropriate crossing, at a traffic light, is unsigned and not easily visible from under the bridge (j).





Quick facts

Municipality	Vancouver
Configuration	Off-street + on-street
Routes served	9
Active bays	7
Weekly boardings	6,574
Peak boarding hour	M-F 07:00-08:00
Boardings at peak hour	101
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	No

Key issues

Ambience. Decorative fencing (a) and painted furnishings (c) brighten an otherwise purely functional environment. Chain link fencing, and sparing, poorly maintained landscaping (b) do little to improve the view of the lane to the north. Some furnishings also need maintenance. (d).

Pedestrian orientation. Narrow islands (c, e) suggest a facility designed to prioritize vehicles over people. On Hastings Street, a trash can and a mail-box are located some distance from Bay 6 (f).

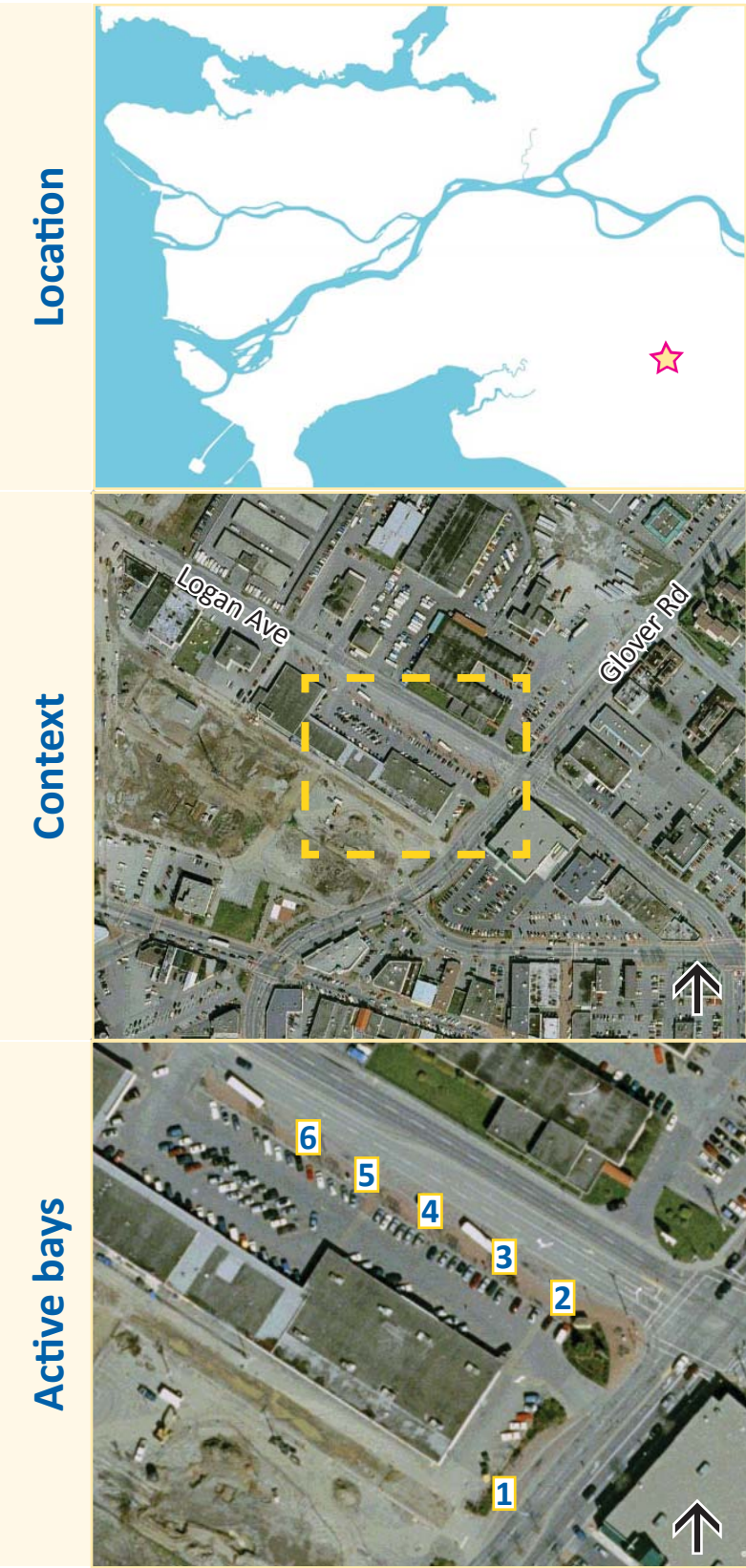
Seating & shelter. Wire mesh shelters at Bays 1-5 (c) offer poor weather protection. Bay 7 (g) provides passengers with shop overhangs, but no seating.

Cohesion & wayfinding. No map indicates that Bays 7 and 8 are part of the exchange. No signage directs passengers to or from these bays to the main area.

Universal access. The islands are narrow, and not wheelchair accessible (c, e).

Safety. To read the central information board, customers must stand in the bus traffic area (h). Strong desire lines run across the bus path (i) – in some places encouraged by gaps in the fencing (j).





Quick facts

Municipality	Langley City
Configuration	On-street sawtooth
Routes served	10
Active bays	6
Weekly boardings	6,735
Peak boarding hour	M-F 16:00-17:00
Boardings at peak hour	92
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	No

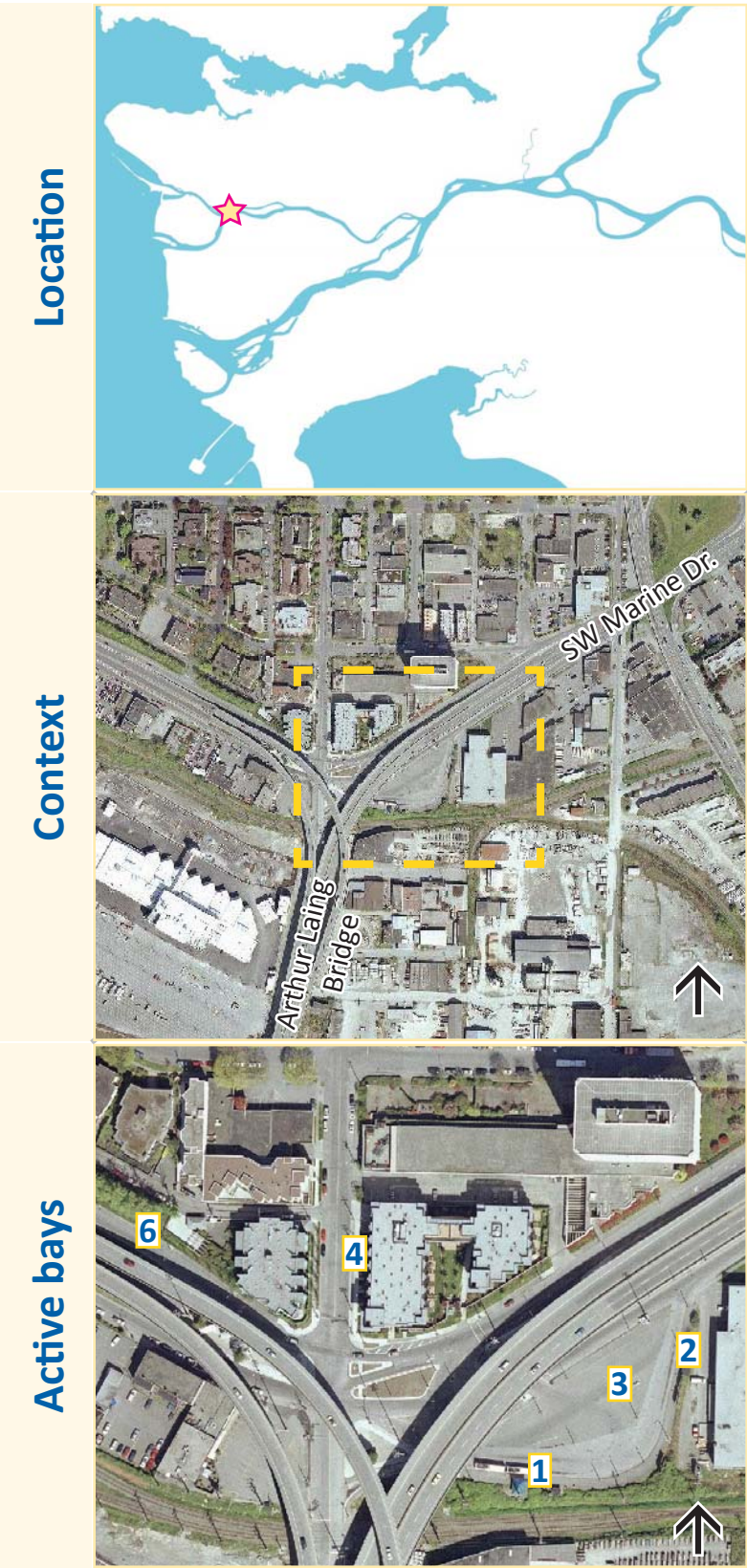
Key issues

Ambience. Two-colour interlocking pavers, broad-leaf trees and distinctive lampposts (a) show a care in urban design that has not been matched by appropriate maintenance (b, c, d). Art (e) and planters (e, g) have been placed far from the seating areas, and the surrounding views (h, i) are uninspiring. Unlike the attractively designed shelters (a, i), the concrete, windowless operator facility building (f) does not make a positive aesthetic contribution to the exchange.

Pedestrian orientation. A partly vacant strip mall is separated from the exchange by a parking lot, although connections have been provided (h). The remaining surrounding development is not pedestrian-oriented (i).

Seating & shelter. Shelters are of high design quality, with ample overhang to keep seated customers dry. Old-style phone booths (i) also offer good weather protection.





Quick facts

Municipality	Vancouver
Configuration	Off-street + on-street
Routes served	14 (3 off-street)
Active bays	5
Weekly boardings	3,851
Peak boarding hour	M-F 16:00-17:00
Boardings at peak hour	97
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	No

Key issues

Ambience. Blank, industrial views and blackberry brambles greet passengers at the off-street exchange, essentially a parking lot with bus paths (a, b, d). Bay 3 is rudimentary (b, e) and Bay 6 faces an off-ramp, but attractive housing flanks Bay 4 (g). A bunker-like operator facility (f) suggests danger.

Pedestrian orientation. No pedestrian-oriented development surrounds the off-street loop, and the lights are far larger than human scale (c).

Seating & shelter. Each bay has a different seating and shelter configuration (b, d, g, j, k). Some do not meet demand, or need maintenance.

Cohesion & wayfinding. No directional maps or signs link Bays 4 and 6 to the off-street loop. The main sign faces an off-ramp and is unreadable from within the exchange (h, i). The central information board has no identifying sign (f), and the Bay 6 shelter is signed *Hudson and Marine* (k).

Safety & universal access. To access Bay 3, passengers must walk through the bus path and parking area. Mobility-impaired passengers must do so from the bus entrance as there are no curb cuts.



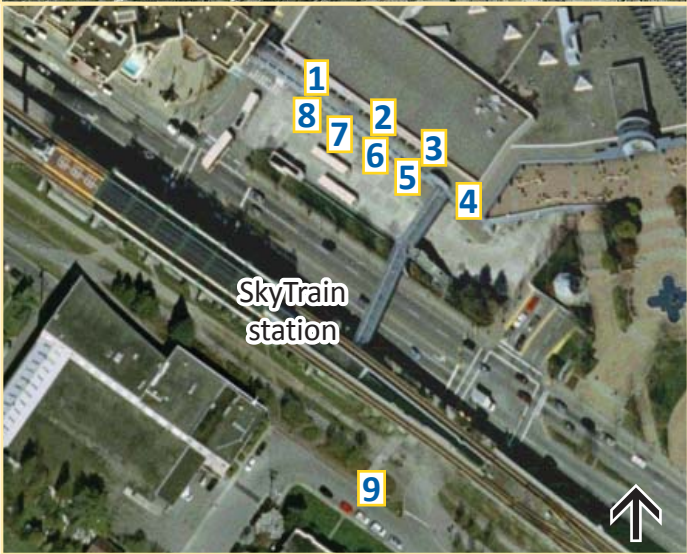
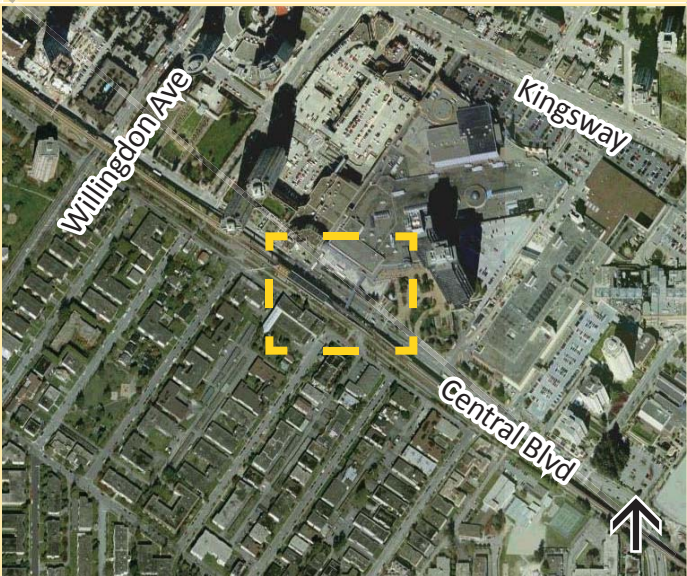
III Site Analyses

Metrotown Station

Location

Context

Active bays



Quick facts

Municipality	Burnaby
Configuration	Off-street + on-street
Routes served	12
Active bays	9
Weekly boardings	55,423
Peak boarding hour	M-F 17:00-18:00
Boardings at peak hour	794
Frequent Transit Network	Yes
Intermodal interchange	SkyTrain
Park & Ride	No

Key issues

Ambience. The exchange has a cave-like feel due to its location underneath part of Metrotown mall. Areas facing outward enjoy daylight and views of trees (a, b), but customers waiting at the dark inner bays face service areas or blank walls (c, d, e).

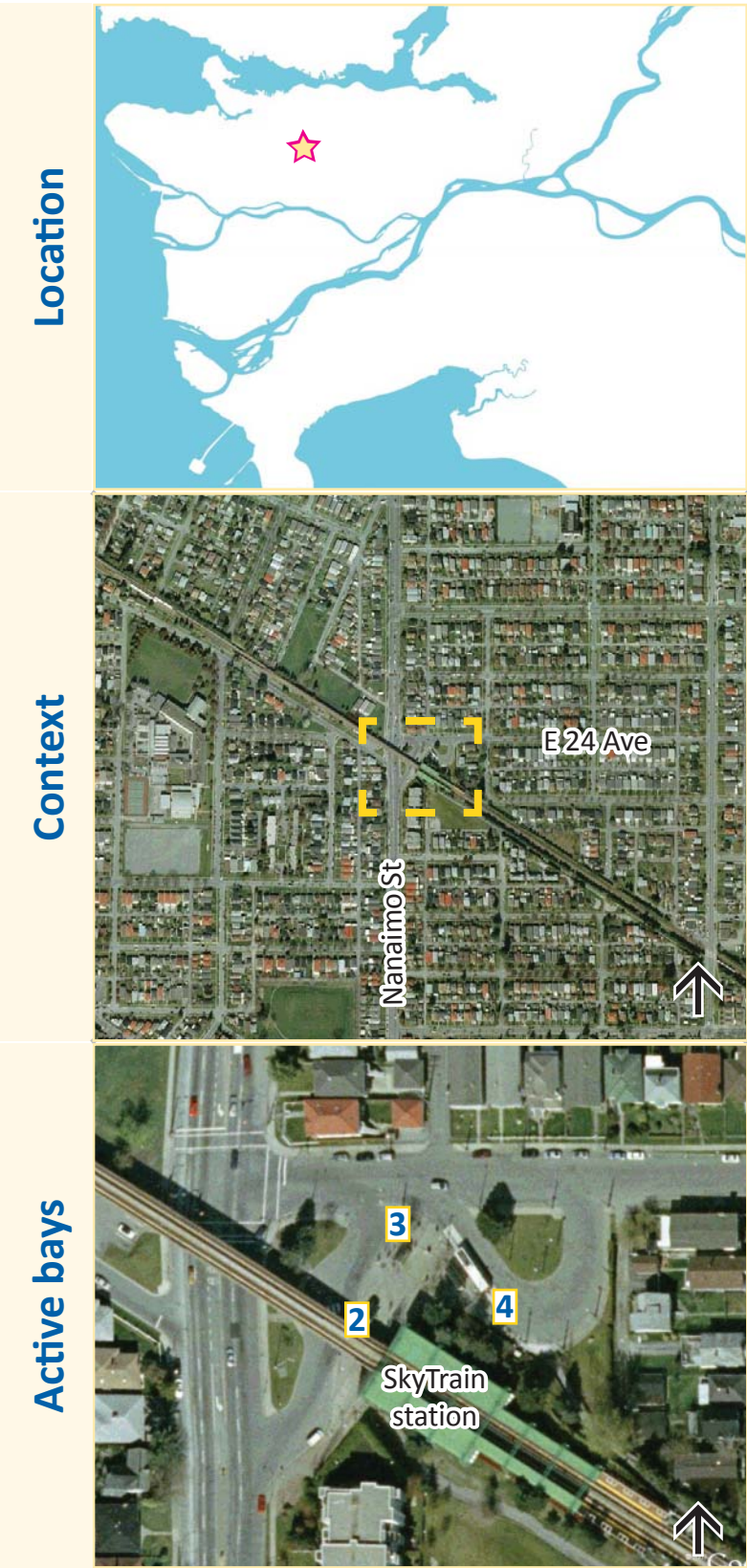
Pedestrian orientation. An escalator connects the exchange to the SkyTrain walkway (f). A pillar blocks the natural path of egress at the bottom, and aligns poorly with the main passenger flow (h), and poor design leads to awkward spaces underneath (i).

Safety. Railings cramp a connecting footpath, and some users with strollers or wheelchairs choose to walk in the service road instead (g).

Seating & shelter. The queuing and boarding areas of Bays 4-8 are not covered, so customers queue inward across the main pedestrian thoroughway (a), even blocking the escalator landing area. (j). Backless, wire grille benches (a, d) provide a minimum of comfort.

Cohesion & wayfinding. Bay 9 is separated from the rest of the exchange, with no map or signage directing customers to or from it.





Quick facts

Municipality	Vancouver
Configuration	Off-street
Routes served	2
Active bays	4
Weekly boardings	23,233
Peak boarding hour	M-F 16:00-17:00
Boardings at peak hour	425
Frequent Transit Network	Yes
Intermodal interchange	SkyTrain
Park & Ride	No

Key issues

Cohesion & wayfinding. The exchange consists of two separate bus loops (a, b), and no design features create the sense of a coherent unit. Bay 4 is not visible or signed from the station and other bays.

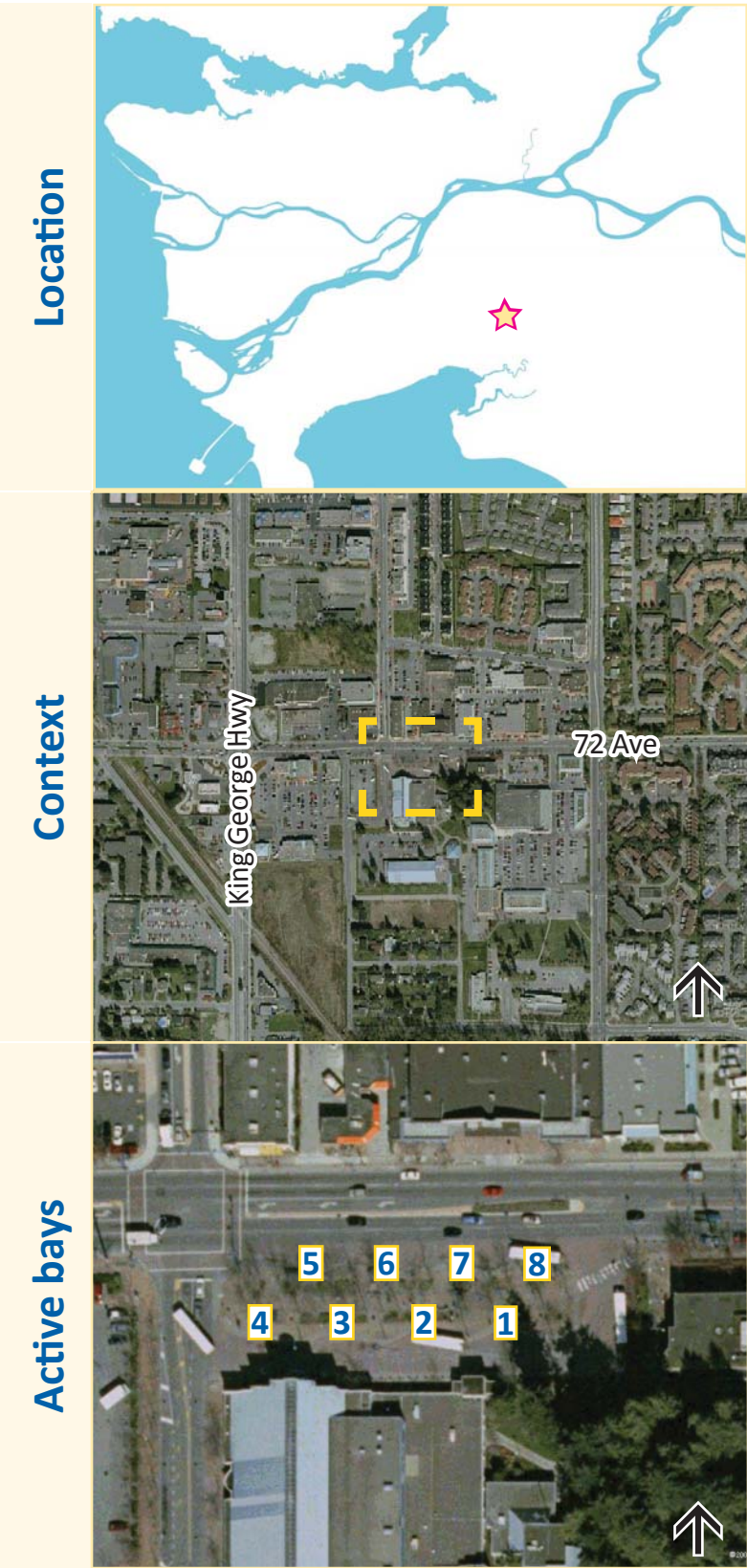
Ambience. A feeling of functionality dominates, but mature trees somewhat offset the oppressive effect of the overhead concrete guideway (a), and a decorative pattern enhances the ground plane (c).

Pedestrian orientation. The large sidewalk in front of the station entrance accommodates passenger surges (a). A poorly located shelter blocks access to a zebra crossing (f), and desire lines beside the stairs to the busy Nanaimo Street crosswalk (g) suggest that the stairway is inadequate.

Seating & shelter. Seating and shelter are present but do not meet demand. Wire-mesh shelter walls (f) offer poor protection from blowing rain.

Cycling interface. The BC Parkway passes directly through the exchange without giving cyclists any direction. Westbound cyclists meet a sidewalk with no curb cut (h, right side), leading them to turn right and continue on the sidewalk (g). Eastbound cyclists often ride through the bus area, against traffic.





Quick facts

Municipality	Surrey
Configuration	Off-street + on-street sawtooth
Routes served	9
Active bays	8
Weekly boardings	20,506
Peak boarding hour	M-F 16:00-17:00
Boardings at peak hour	338
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	

Key issues

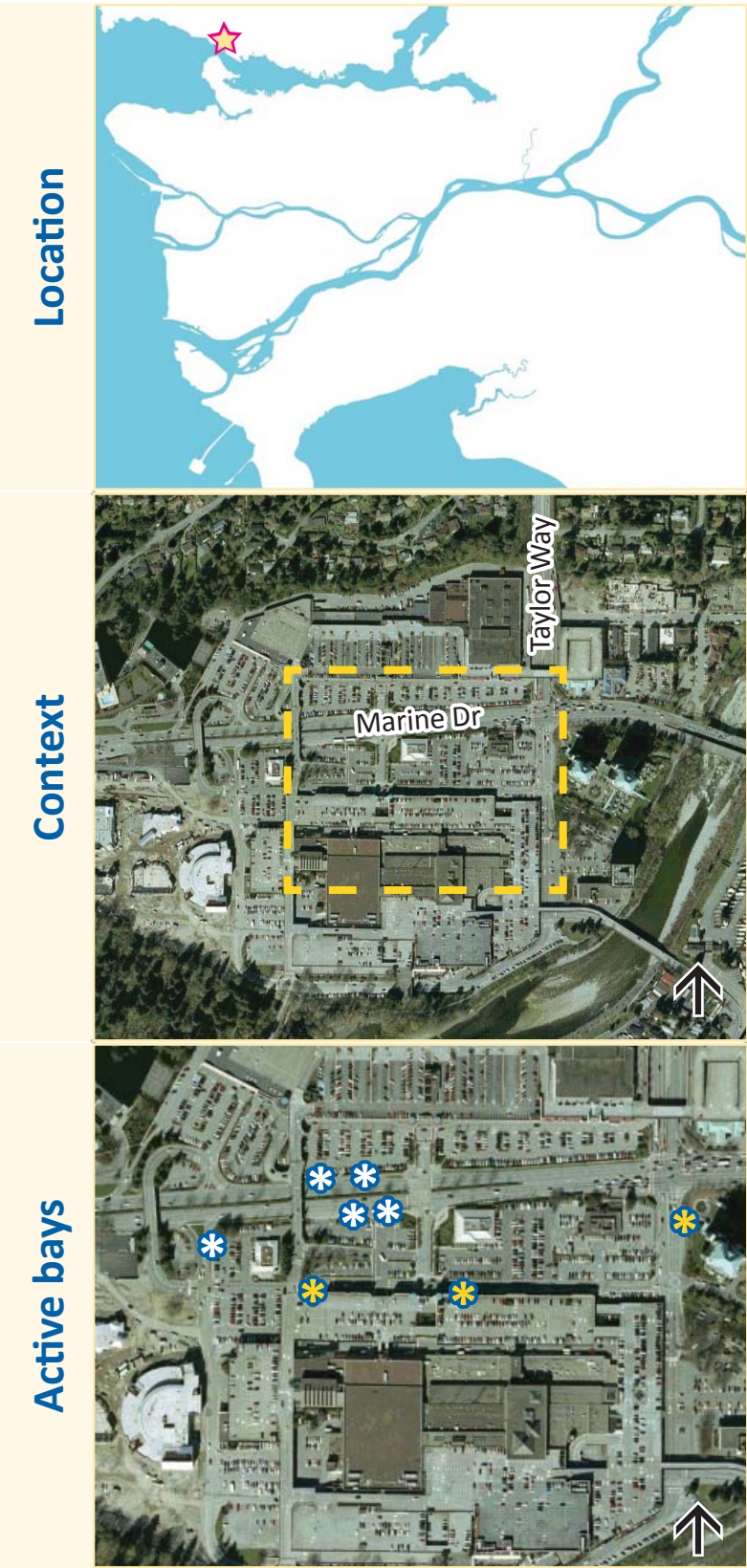
Ambience. Mature trees form a pleasant canopy along the length of the central waiting area and footway, enhanced by distinctive light standards (a, b, c). The effect is muted by the need for cleaning and repairs of fixtures, landscaping, and the ground plane (d, e, f).

Pedestrian orientation. Nearby shops and institutions are generally car-oriented (g). Major buildings to the east and south turn their backs on the exchange (h).

Security. The features which make the inner areas of the exchange pleasant also pose some security risks. The mature foliage blocks sightlines, and the crescent-shaped seating arrangement also invites loiterers. On the other hand, it also encourages desirable non-transit users who provide passive surveillance. The flanking buildings that face away from the exchange represent a missed opportunity to animate the area and provide eyes on the street.

Seating & shelter. Bays on the street have standard TransLink shelters, but inner bays have no shelter, and the only seating is in the central area and of relatively low design quality.





Quick facts	
Municipality	West Vancouver
Configuration	On-street
Routes served	10
Active bays	7
Weekly boardings	24,606
Peak boarding hour	Sun. 18:00-19:00
Boardings at peak hour	562
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	Yes, free

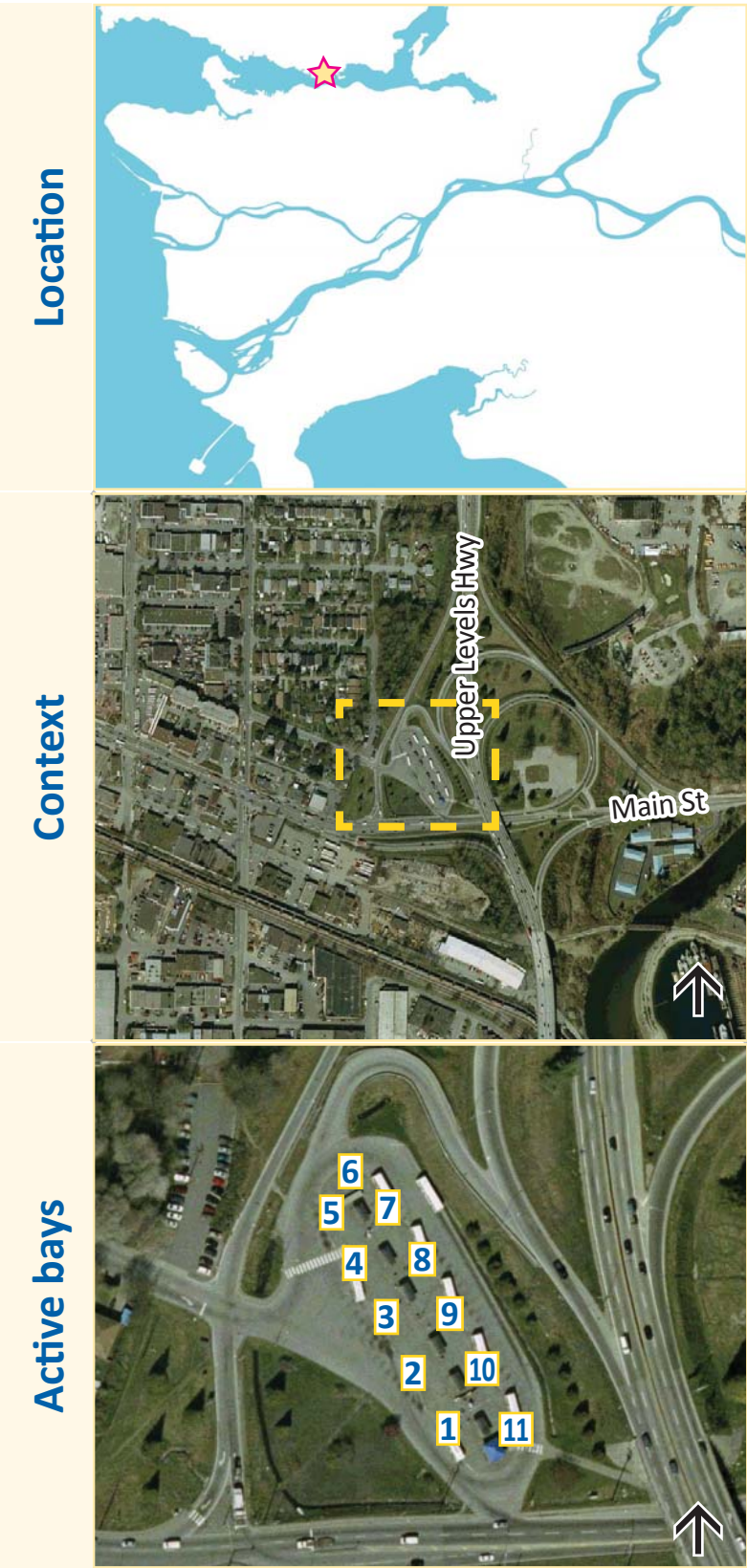
Key issues

Cohesion & wayfinding. Park Royal presents itself as a location that happens to be well served by buses, rather than as a coherent transit exchange. Little information is available to direct passengers effectively to other bays. This is particularly significant because at the morning peak, eastbound buses stop in the mall parking lot instead of on Marine Drive (yellow stars on the *Active bays* map, left). Directional signage is located only at the main stop on Marine Drive and is poorly maintained (b). The stops are hard to spot (c, d), and signs refer confusingly to park and ride (e, g).

Ambience. Shelters are distinctive, but poorly maintained. Greenery along Marine Drive somewhat mitigates the drabness of the abutting mall parking lots. Photocopied schedules for West Vancouver buses, taped to shelters (h), give a sense of low quality. Morning-peak-only stops (c, d) feel like cramped, borrowed space.

Universal access. A well-marked walkway from the Marine Drive stop aligns poorly with the curb cut, and is blocked by a hedge (i). Access to one of the morning-only stops is a narrow sidewalk obstructed by stairs (c).





Quick facts

Municipality	N. Vancouver District
Configuration	Off-street
Routes served	10
Active bays	11
Weekly boardings	42,657
Peak boarding hour	M-F 08:00-09:00
Boardings at peak hour	710
Frequent Transit Network	No
Intermodal interchange	No
Park & Ride	Yes, free

Key issues

Ambience. Phibbs exchange is an expanse of asphalt surrounded by highways and off-ramps. Trees and berms form a partial visual barrier (a, b). Landscaping is absent from the passenger waiting area, and is minimal and sparse on the surrounding lands. Brightly painted structures (c) provide the only relief from the otherwise vehicle-oriented infrastructure. Many furnishings are in need of maintenance (g-j).

Pedestrian orientation. Large setbacks between bus bays and shelters provide a good, if stark, buffer (b). This width allows excellent lengthwise circulation. Newspaper boxes and trash bins hamper crosswise movement (d), and crowd the central information board (e). Lighting is larger than pedestrian scale (a, c). A desire line to the Park & Ride lot is not accommodated (f), and sidewalks at bus entrances have no crosswalks (l, m). Nearby retail is auto-oriented.

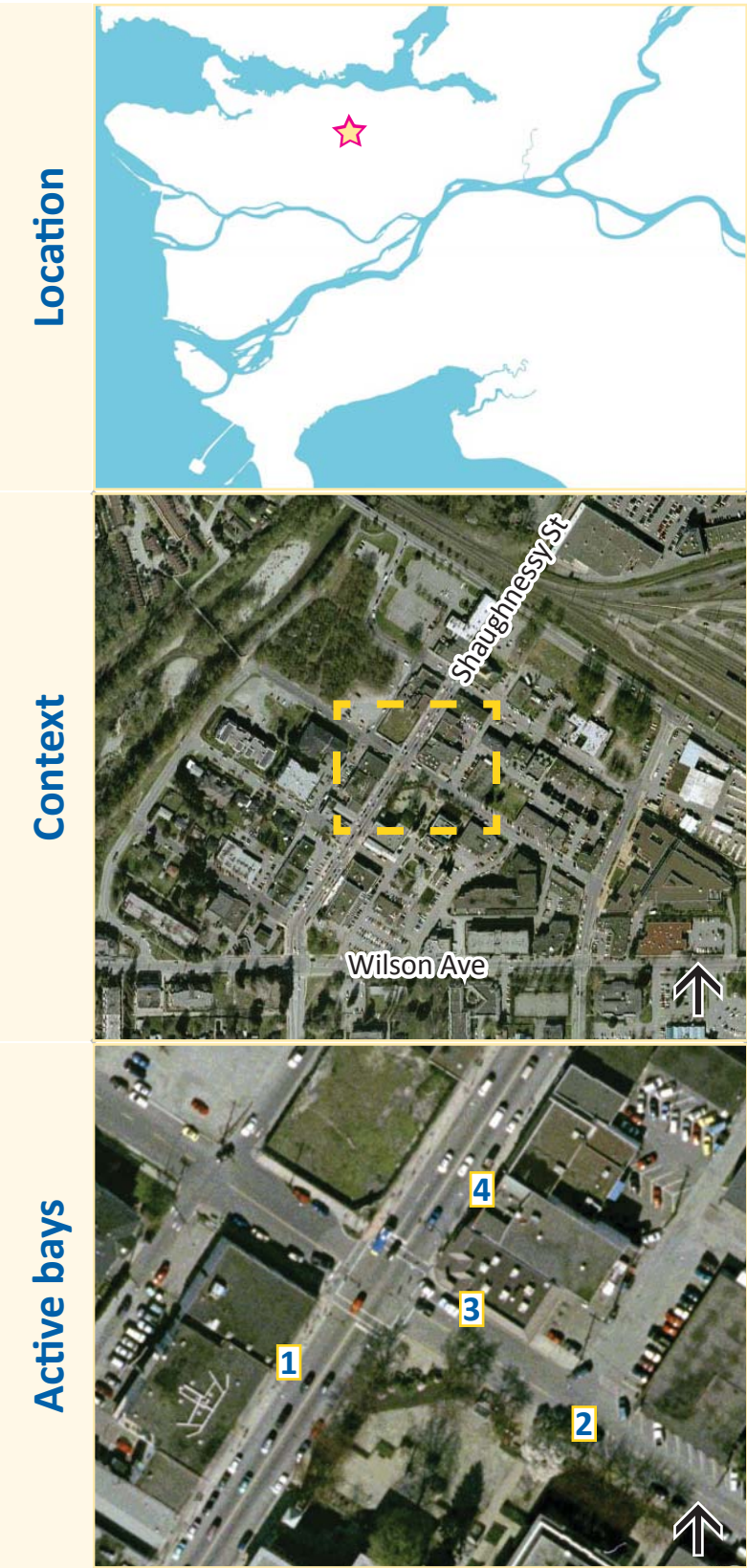
Universal access. Letdowns align poorly at the western zebra crossing (k). Shelters are large enough to accommodate wheelchairs and scooters, but only in front of the bench seating (c).

Security. The isolated setting allows for virtually no passive surveillance.



III Site Analyses

Port Coquitlam Centre



Quick facts

Municipality	Port Coquitlam
Configuration	On-street
Routes served	4
Active bays	4
Weekly boardings	2,045
Peak boarding hour	M-F 12:00-13:00
Boardings at peak hour	29
Frequent Transit Network	No
Intermodal interchange	No
Park & Ride	No

Key issues

Cohesion & wayfinding. The exchange consists of four on-street stops near the same intersection. Not all stops have clear sightlines to the others, and no signage orients customers who wish to transfer.

Ambience. Stop furnishings themselves are minimal (a, b, c), but the fine-grained, pedestrian-oriented streetscape provides visual interest. Very basic benches adorned with advertising (c, e) impart a sense of lower-quality service.

Pedestrian orientation. Ample sidewalks, zero set-backs, and narrow shopfronts retail make this exchange highly pedestrian oriented. Light standards incorporate cobra-style fixtures for vehicle traffic (a) and human-scale lighting for pedestrians (b).

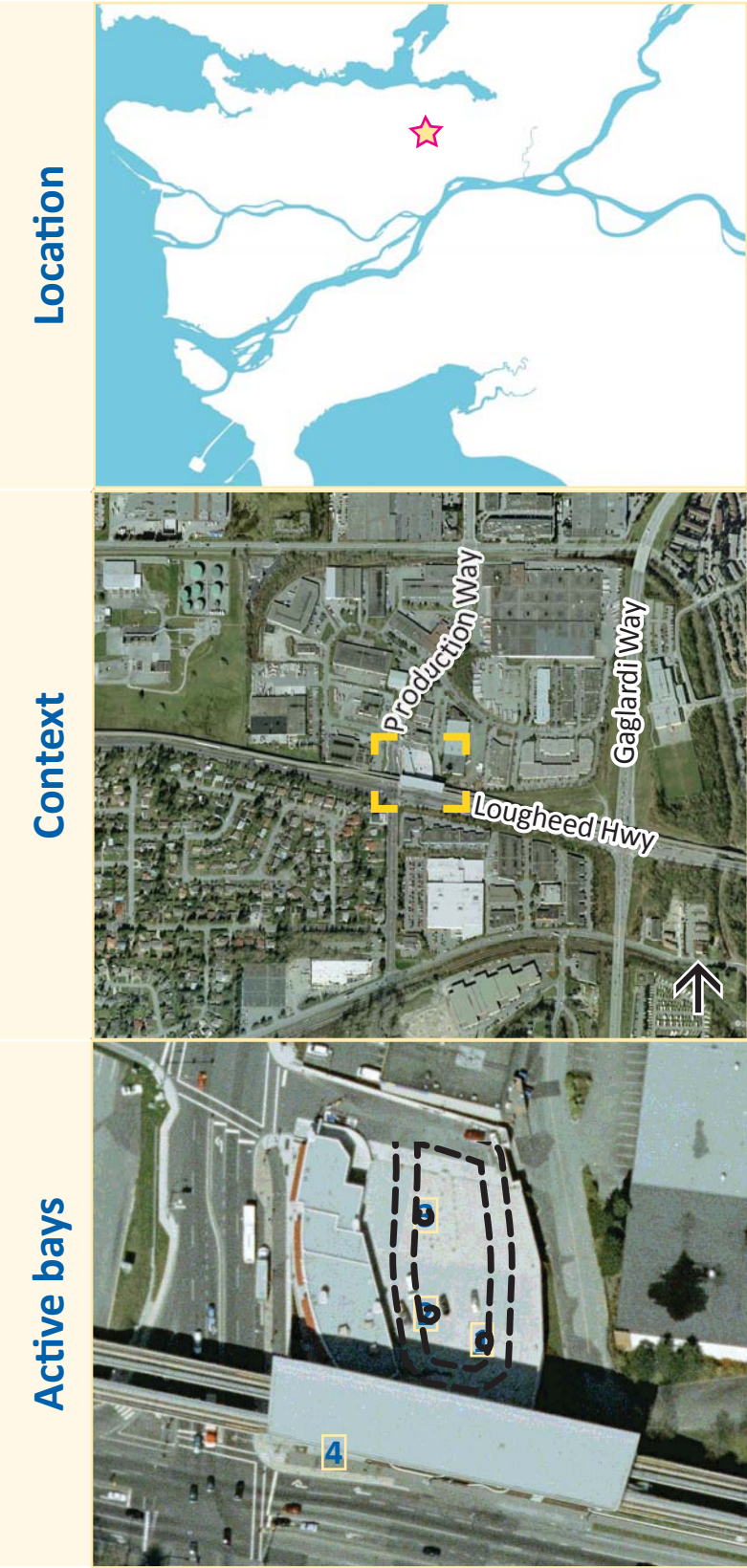
Security. Mixed uses, medium density, and pedestrian orientation promote round-the-clock passive surveillance.

Seating & shelter. Bay 2 has no immediate shelter or seating; attractive shelter and seating outside Veterans' Park is distant enough to be of questionable use (f). At other bays, passengers are sheltered by building awnings or overhangs (a, b, c).



III Site Analyses

Production Way – University Station



Quick facts

Municipality	Burnaby
Configuration	Off-street + on-street
Routes served	4
Active bays	4
Weekly boardings	28,946
Peak boarding hour	M-F 08:00-09:00
Boardings at peak hour	937
Frequent Transit Network	Yes
Intermodal interchange	SkyTrain
Park & Ride	No

Key issues

Ambience. There is virtually no evidence of any attempt to create a pleasant waiting environment. Patrons wait underneath a building (a), facing blank walls on all sides (b-e). They stand on unadorned concrete floors, above them hang exposed pipes, ducts and sprayed fire retardant (b), covered with netting to keep out birds. The exchange feels like leftover space, determined by structural and service needs of the building above (d, f). Useless areas have been created and then fenced off (g).

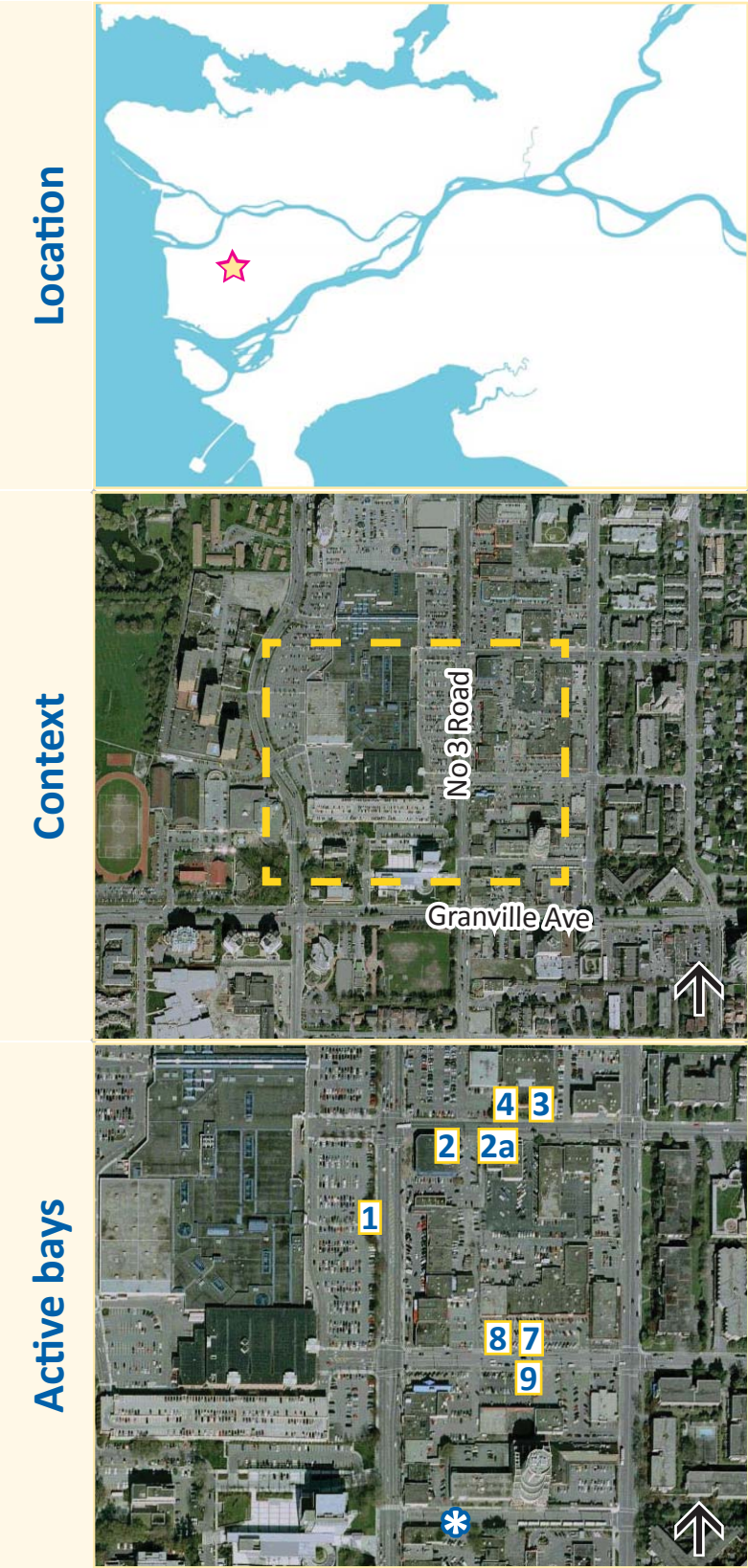
Pedestrian orientation. Garbage cans are the only amenities at Bays 1-3; newspaper boxes and pay phones are located in the station lobby. Fast food and a convenience store are close by in the station development (h).

Security. Little passive surveillance except from SkyTrain lobby (h) and platform (j).

Seating & shelter. Bays 1-3 have no seating but excellent shelter (a). At Bay 4, for unloading only, the station overhang provides shelter but is too high to thoroughly protect transferring passengers.

Cohesion & wayfinding. Poor wayfinding from SkyTrain concourse.





Quick facts	
Municipality	Richmond
Configuration	On-street
Routes served	16
Active bays	8
Weekly boardings	32,295
Peak boarding hour	M-F 16:00-17:00
Boardings at peak hour	606
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	No

Key issues	
------------	--

Cohesion & wayfinding. This exchange has little sense of unity. The on-street stops are quite distant from one another, separated by large blocks; the northbound 98 B-Line stop has no bay number (represented by a star on the *Active bays* map at left). The only wayfinding assistance is a complicated sign showing changes during Canada Line construction – handwritten additions attest to the usability limitations of the way this information is presented (c).

Ambience. Most stops have traffic in the front and parking lots behind, creating an unpleasant waiting environment (a, b, d). Furnishings are mostly low-quality; the high quality B-Line stops suffer from graffiti, extensive scratching, and lack of cleaning (e).

Pedestrian orientation. Retail and food outlets are concentrated in this area, but virtually all are oriented to automobiles. A pedestrian walkway and zebra crossing link Richmond Centre to the southbound B-Line stop (k).

Seating & shelter. Not all stops have seating (a, f, j); many have no or insufficient shelter (i). Patrons must wait exposed (f), although at one stop they make do with a nearby shop awning and planter (j).



Location

Context

Active bays



Quick facts

Municipality	Burnaby
Configuration	Off-street
Routes served	5
Active bays	4
Weekly boardings	38,268
Peak boarding hour	M-F 15:00-16:00
Boardings at peak hour	1,047
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	No

Key issues

Cohesion & wayfinding. At the east end of campus, this is one of two major stops at SFU, and is also the terminus. The other stop is effectively separate. A campus map conveniently located at the kiosk near Bay 1 helps orient alighting passengers (b).

Ambience. The predominant concrete, asphalt, and metal railings do not foster an enjoyable waiting environment. However, the surrounding trees, architecture, and urban design are pleasant (a, d, g).

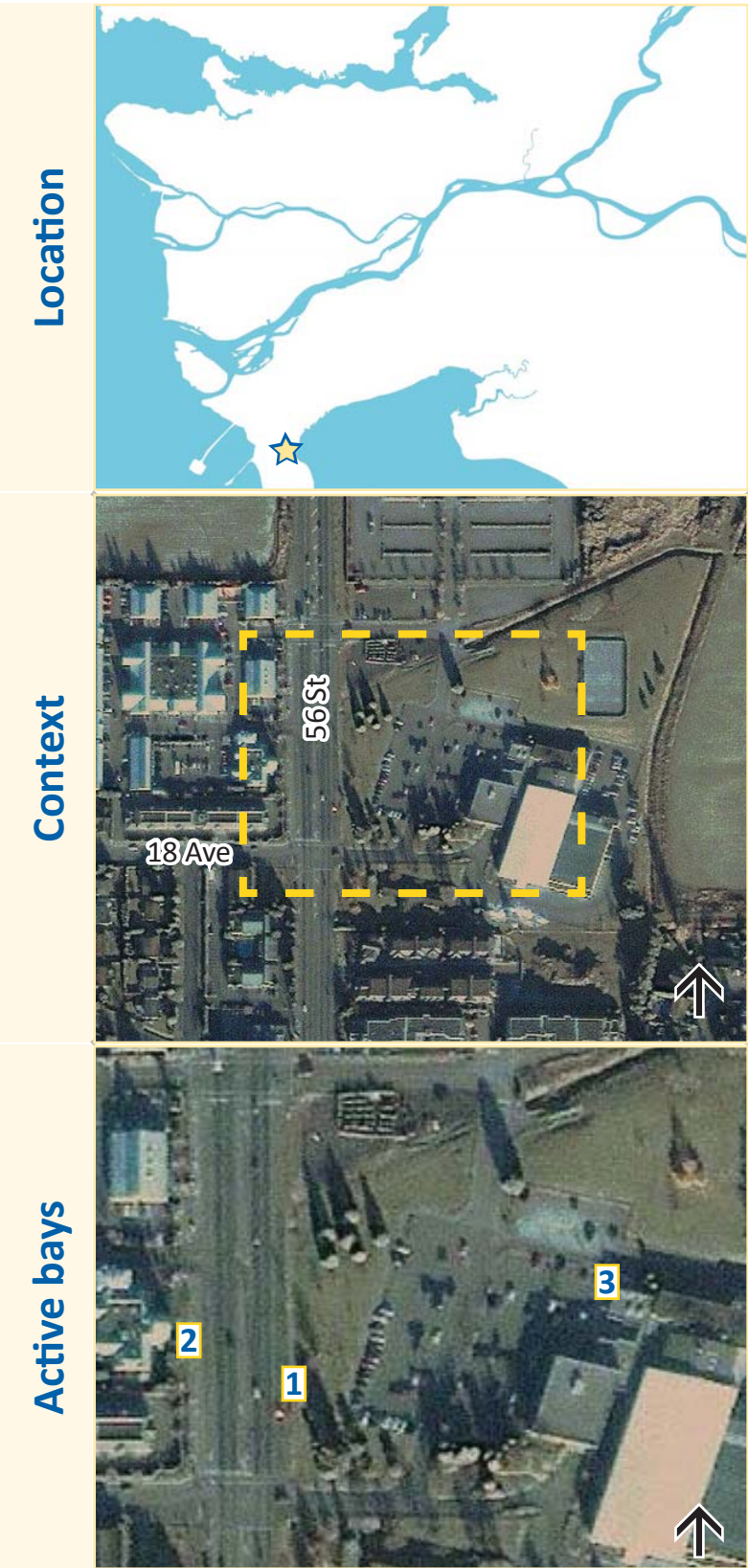
Pedestrian orientation. No crosswalks are marked; customers walk directly across the bus lanes (c). The waiting islands are small and very narrow (a), resulting in crowding at peak times. Lighting is not human scale (a). The adjacent mixed-use development includes pedestrian-oriented retail (a).

Seating & shelter. Seating and shelter are basic and do not meet demand. The quality of the furnishings contrast highly with the surrounding street furniture (g) and the stop at the centre of campus (h).

Security. One of the university's blue-light emergency phones is located at the kiosk (b).

Ecological sustainability. Recycling bins for paper and containers are also near the kiosk (e, f).





Quick facts

Municipality	Delta
Configuration	On-street
Routes served	6
Active bays	3
Weekly boardings	1,078
Peak boarding hour	Sat. 11:00-12:00
Boardings at peak hour	37
Frequent Transit Network	No
Intermodal interchange	No
Park & Ride	Free

Key issues

Cohesion & wayfinding. There is little to suggest the the three stops are designed to form an exchange. Bay 3 is not visible from the other bays, and like all TransLink exchanges, no information about the lay-out of the exchange is present.

Ambience. Bays 1 & 2 face each other across six traffic lanes, and feature pleasant shelters of high quality design (a, b, c). Bay 3, located on an access road in front of the community centre, is relatively poorly appointed, with no dedicated shelter or seating, and uneven ground creates a puddling problem (f).

Cycling interface. Bays 1 and 2 do not have cycle parking (a, c), despite the exchange being located on a cycle route (d, e). Bay 3 has a bike rack nearby provided by the community centre.

Universal access. A strong desire line between Bay 1 and the community centre parking lot – which functions as an informal park and ride – has a crushed gravel surface (g). Passengers unable to use this path must use a longer route, and travel in the roadway of the community centre access road, then onto the sidewalk on 56th Avenue.



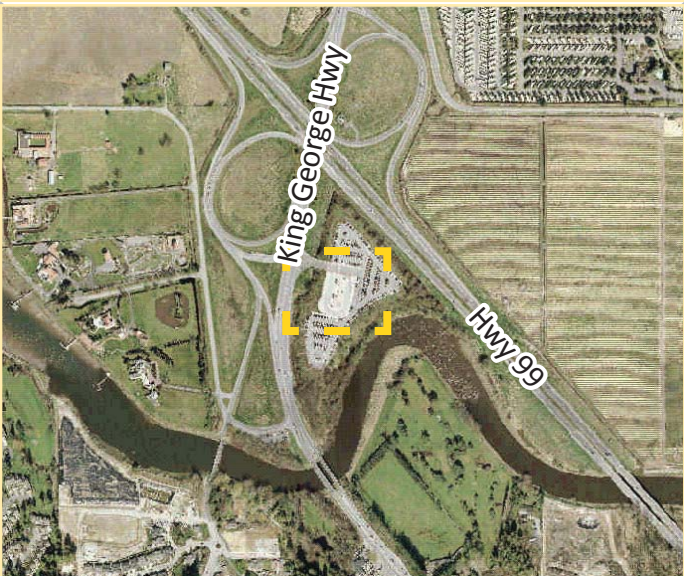
III Site Analyses

South Surrey Park & Ride

Location

Context

Active bays



Quick facts

Municipality	Surrey
Configuration	Off-street
Routes served	5
Active bays	4
Weekly boardings	1,338
Peak boarding hour	M-F 06:00-07:00
Boardings at peak hour	72
Frequent Transit Network	Yes
Intermodal interchange	No
Park & Ride	

Key issues

Ambience. The open concrete island feels sterile and windswept (a); the surrounding greenery is more pleasant. Plain furnishings (a, b, d) contrast with the varied, attractive plantings (f, g).

Wayfinding. Good signage on the highway directs passengers arriving by car, although complex pavement markings upon arrival (c) may be confusing.

Pedestrian orientation. Zebra crossings (c) and side-walks (d) assist pedestrians closest to the island. The cobra lights are scaled to vehicles, not humans (d).

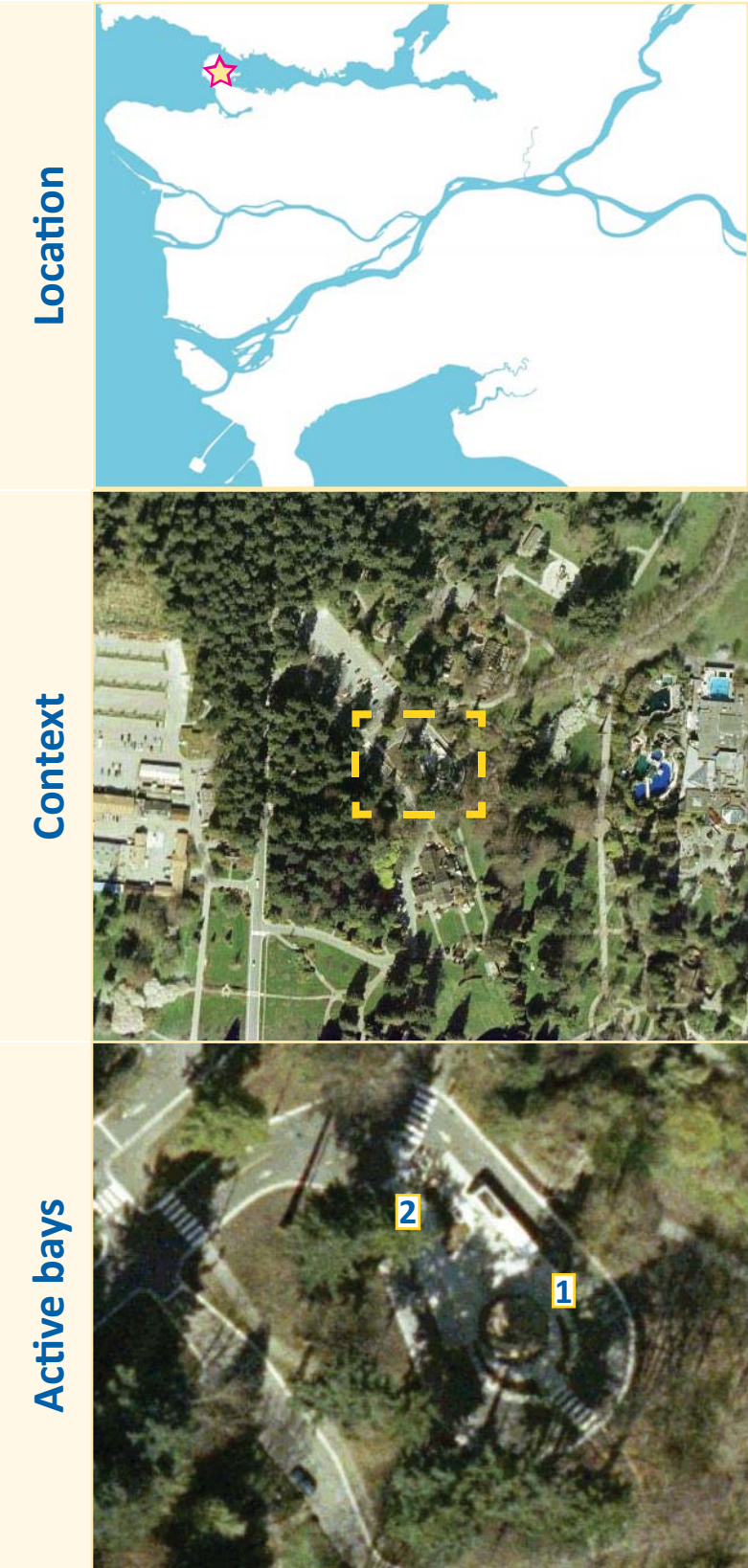
Seating & shelter. At the busiest bays, there is a lot of shelter but little seating (b). Some shelters provide little wind protection – wind and blowing rain is likely an issue in this exposed location.

Security. Passive surveillance is virtually absent, and no security phones are provided.

Cycling interface. Amenities include lockers and racks, plus cyclist-controlled highway crossings (e). No direction is given within the exchange.

Ecological sustainability. Native plants reduce the need for water, fertilizer, and pesticides (f), and infiltration trenches manage water runoff on-site (g).





Quick facts

Municipality	Vancouver
Configuration	Off-street
Routes served	1
Active bays	2
Weekly boardings	2,685
Peak boarding hour	Sun 17:00-18:00
Boardings at peak hour	138
Frequent Transit Network	No
Intermodal interchange	No
Park & Ride	No

Key issues

Ambience. A beautiful wooded setting surrounds this exchange. Plantings, wooden benches and a gazebo and benches are attractive in design and break up the grey asphalt of the island (a, b, e).

Cohesion & wayfinding. A park map assists alighting passengers (f), but those departing may not easily find the exchange due to lack of signage, even from nearby footpaths (g). Many customers were unsure of where to board, perhaps confused by the many laying-over buses and the fact that some operators allowed boarding at Bay 1 (h, i). Cyclists may find themselves riding in the bus path due to poor signage (c).

Pedestrian orientation. The exchange is conveniently close to many popular park destinations. A desire line between the bus loop and the park trolley is not accommodated, so many people cross the bus path and walk on the grass (d).

Seating & shelter. Generous seating and shelter is provided (a, e).

Security. The secluded setting limits the amount of passive surveillance, as does the surrounding foliage shielding the loop from nearby activity centres.





Quick facts

Municipality	Surrey
Configuration	Off-street + on-street
Routes served	21
Active bays	13
Weekly boardings	69,510
Peak boarding hour	M-F 16:00-17:00
Boardings at peak hour	1,292
Frequent Transit Network	Yes
Intermodal interchange	SkyTrain
Park & Ride	No

Key issues

Ambience. The high passenger volume and the physical presence of the station (c) and of the Central City development give a sense intensity to this exchange. This is slightly at odds with the sparse suburban feeling created by the intervening surface parking and low density land uses (see *Context*, left).

Several design features add visual interest: decorative pavers (e), a custom-designed central shelter with skylights (a, h), and the use of the SkyTrain stationhouse and guideway to create a gallery-type area (c, d), although the latter does not entirely rise above the drab effect of the plain and extensive concrete. Cleanliness is an issue in several place. The operator facility presents mirrored windows and blank walls to the public (b, f).

Wayfinding. Bays 11-13 are not in sight of the other bays, and no signage informs passengers as to the exchange layout.

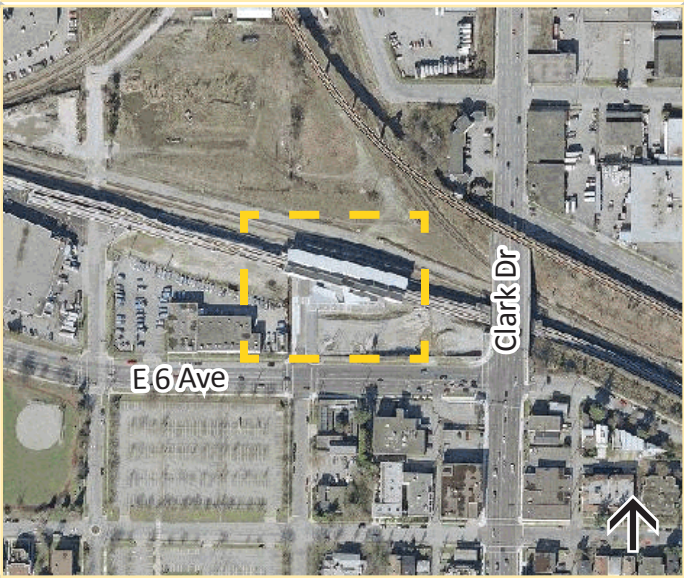
Pedestrian orientation. The station development, and the facing street, house pedestrian-oriented convenience stores, food, and varied retail (c, g). Good pedestrian connections link to Central City and the community centre.



Location

Context

Active bays



Quick facts

Municipality	Vancouver
Configuration	Off-street
Routes served	1
Active bays	1
Weekly boardings	8,221
Peak boarding hour	M-F 07:00-08:00
Boardings at peak hour	297
Frequent Transit Network	Yes
Intermodal interchange	SkyTrain
Park & Ride	No

Key issues

Ambience. The single bus bay feels like a design afterthought relegated to leftover space. The SkyTrain guideway overhead, gravel surfaces, chain-link fence and lack of landscaping all contribute to the bleak feel (a, b, c). A beautiful mountain panorama, is visible over an overgrown industrial lot (d).

Cohesion & wayfinding. The bus bay is not readily visible from the station exit or pedestrian approach (g), and no wayfinding assistance is provided.

Pedestrian orientation. Passengers walking to East 6th Avenue may find themselves on gravel (h) or in the roadway (j). The circuitous path from the station requires pedestrians to cross the service road (b, g). Passenger queues block the narrow sidewalk (b).

Seating & shelter. The wire mesh shelter does not meet demand and provides poor wind protection. Queuing passengers are unsheltered (c).

Intermodal integration. The station and bus bay have virtually no conceptual integration; the station aesthetics are far more pleasant (e, f).

Security. There is no passive surveillance of the bus stop, which is isolated even from the SkyTrain lobby, and there is evidence of bike theft (i).



III Site Analyses

Walnut Grove Park & Ride



Quick facts

Municipality	Langley
Configuration	On-street
Routes served	4
Active bays	2
Weekly boardings	2,384
Peak boarding hour	M-F 16:00-17:00
Boardings at peak hour	69
Frequent Transit Network	No
Intermodal interchange	No
Park & Ride	Yes, free

Key issues

Ambience. The two unnumbered bus bays are surrounded by car-oriented development, with a parkade on one side, surface parking on the other. There is little visual interest or activity, but plantings improve the streetscape somewhat (a). Furnishings are in need of maintenance (c, d, e).

Cohesion & wayfinding. A large sign identifies the entrance to the shared Park & Ride lot (g), although the first signage drivers see upon entering the parkade forbids them from parking instead of directing them to the appropriate area (f).

Pedestrian orientation. A crosswalk links the east-bound stop to the park and ride lot; bulges shorten the crossing distance (b).

Seating & shelter. Shelter and seating are basic (a, d).

Security. The upper deck of the unstaffed parkade is particularly isolated (h) and could pose a risk to passengers, vehicles, or vehicle contents, especially when dark. The lot does not appear to be well used.



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1 Introduction

The individual site analyses and the description of system-wide issues that have been presented thus far demonstrate the variability in the level of passenger experience that TransLink bus exchanges offer customers. In this chapter, quantitative measures are employed to measure exchanges' performance on each issue, and then rank the exchanges according to need for design repair. This is followed by suggestions for how the evaluation method piloted in this sample could be refined and expanded.

2 Quantitative Comparisons of Exchanges

Quantitative measures are useful both to identify current performance and to establish priorities for repair. At the level of the system-wide issues described in the previous chapter, the range and absolute value of the exchange scores show how well TransLink is performing on that issue. Furthermore, some of the issues, such as the provision of waste receptacles, are ones that might be addressed independently because they are discrete objects, relatively context-independent, and can benefit from economies of scale for purchase and installation.

There is also, however, a need for overall measurement or ranking of exchanges. In order to address system-wide issues that are site-specific (for example, the relationship of an exchange to an adjacent rail station), or physically integrated across a large part of the site (such as landscaping), a whole-site approach needs to be taken. Indeed, even for issues that involve discrete and relatively context-independent elements, a strong case can be made that they should nonetheless be addressed as part of holistic review of the site in order to ensure a well co-ordinated approach to redesign. Therefore, following the measurements and rankings for individual issues, a composite measurement and ranking is calculated to prioritize sites for overall design repair.

2.1 Measurements and Rankings by Issue

Each system-wide issue described in Chapter 3 is based on a number of features. For example, the issue of safety and security includes features such as the presence of non-transit pedestrian activity, and the availability of security or pay phones. These features are listed in full in Appendix X, along with the scores of each exchange for each feature.

Because the issues have different numbers of features, the average rather than the sum of individual feature scores were used to evaluate each exchange for each issue. As every feature was given a score out of 1 (usually 0, 0.5, or 1), this method allows each issue to have an issue-level score out of 1, making cross-issue comparison easier.

In presenting the issue-level scores, the issues have been grouped into categories, as shown below. Note that an Aesthetics category has been created, encompassing landscaping, public art, and the design quality of furnishings and structures. It was felt that for this stage of the analysis, a measure of the overall aesthetic quality would be valuable. Note also that Universal Design is not included, due to the limitations described in Chapter II, Section 10, *Universal Design* (page X).

These groupings will become the basis for the overall rankings; this is described in more detail in the Section 2.3, *Overall Measurements and Rankings* (page X).

Issues rankings are relatively self-explanatory. Because of this, and because detailed examination of system-wide issues have already been presented, discussion of the rankings is brief.

TABLE IV-1. Transit Facility Design Issues, Grouped by Category

Issue category	Issues
General Approach to Design	Siting Holistic Approach
Aesthetics	Public Art & Interpretation Design, materials, finishing
Passenger Amenities – Physical Comfort	Seating Shelter
Passenger Amenities – Other	Newspaper boxes Other amenities Lighting Scale Garbage Cans
Information & Wayfinding	Network & Route Information Exchange Information
Intermodal Integration	Bicycle Integration PPUDO Rail Interchange
Safety & Security	Safety Surveillance - Natural Surveillance - Dedicated Communication Maintenance
Community Integration	Community Integration

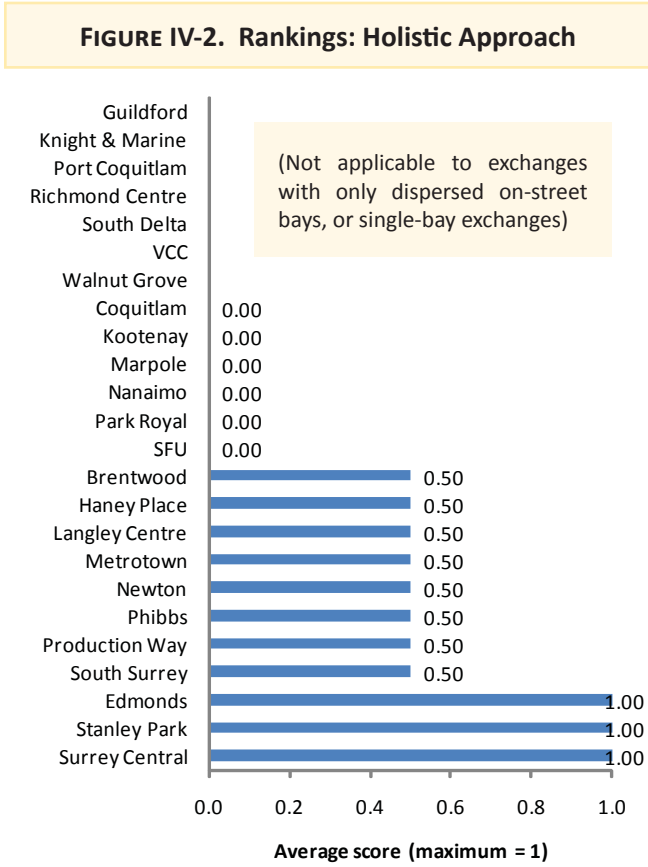
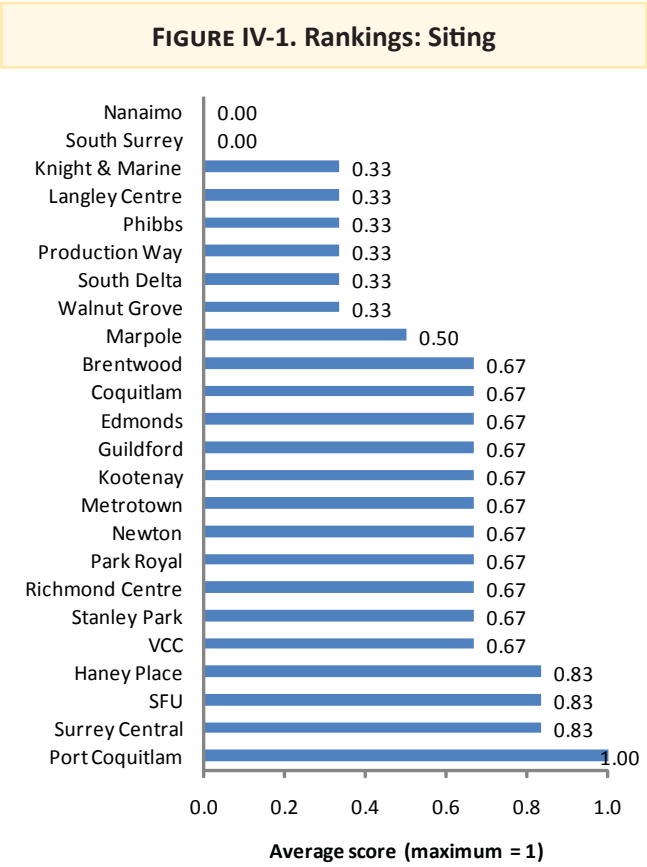
2.1.1 General Approach to Design

The two issues considered here as part of the general approach to design are siting and holism.

Siting was scored on three dimensions: density relative to the surrounding context, single- or mixed-use, and a pedestrian-friendly setting. Poorly sited exchanges occur throughout the region, from North Vancouver to Walnut Grove and South Delta. Port Coquitlam stands out as a well-sited exchange in the old city centre, surrounded by mixed-use development and a walkable environment. Haney Place, SFU, and Surrey Central

are also notably well located at major activity centres.

Few exchanges take a holistic approach to design. The ones that do are not necessarily the most aesthetically pleasing, for example Edmonds Station Exchange, but do create a sense of place by centralizing amenities and customers.



2.1.2 Aesthetics

Aesthetics were scored for two categories: the presence of public art or interpretive pieces, and general appearance. The latter category involved rating seating, shelter, and other furnishings for design quality and finish; paving; landscaping, and whether views were taken advantage of (or unattractive views screened).

As noted earlier, the sample exchanges fare poorly for aesthetics overall. The relatively better-performing sites benefit from natural surroundings (Stanley Park) or views (Nanaimo Station Exchange), but in some cases it is due to attention

to furnishings and landscaping.

Only two exchanges have public art components, neither of which are TransLink initiatives. This is an area where much more could be achieved.

FIGURE IV-3. Rankings: Aesthetic Considerations

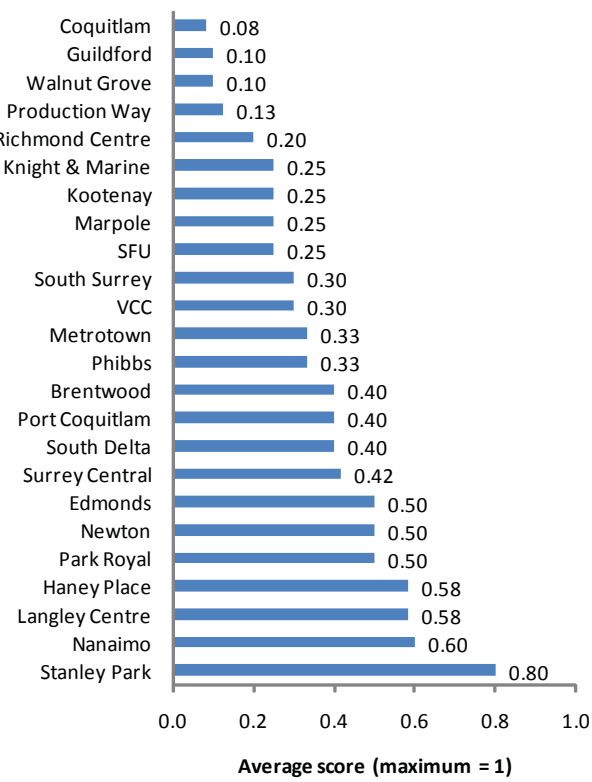
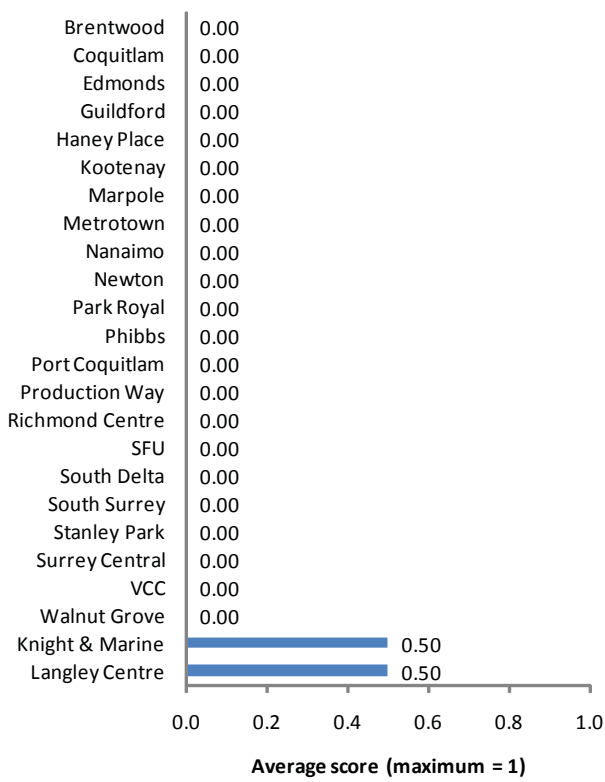


FIGURE IV-4. Rankings: Public Art & Interpretation



2.1.5 Information & Wayfinding

Exchanges were scored for two categories of information: information about the exchange itself, and information about bus routes and network.

Exchange information included an identifying sign, wayfinding signage, a map showing the layout of bays and where customers could catch which buses, and a numbering system for bays. The rankings show that the differences among exchanges are minimal regarding passengers’ ability to easily plan their journey and navigate through the ex-

changes. It is difficult to identify any exchanges as having low need for wayfinding intervention. The lack of exchange information is particularly detrimental at Park Royal, with its distantly separated, poorly marked bays and time-of-day variation in stop locations.

The network and route information score was based on the presence of a network map, schedule information and route maps for the buses serving the exchange, real-time arrival and departure information, and whether a customer could speak with a customer service representative in person or on the phone. Generally, network and route in-

formation is lacking overall, but tends to be better at exchanges where interchange with “premium” modes such as rail or B-Line buses.

FIGURE IV-5. Rankings: Network & Route Information

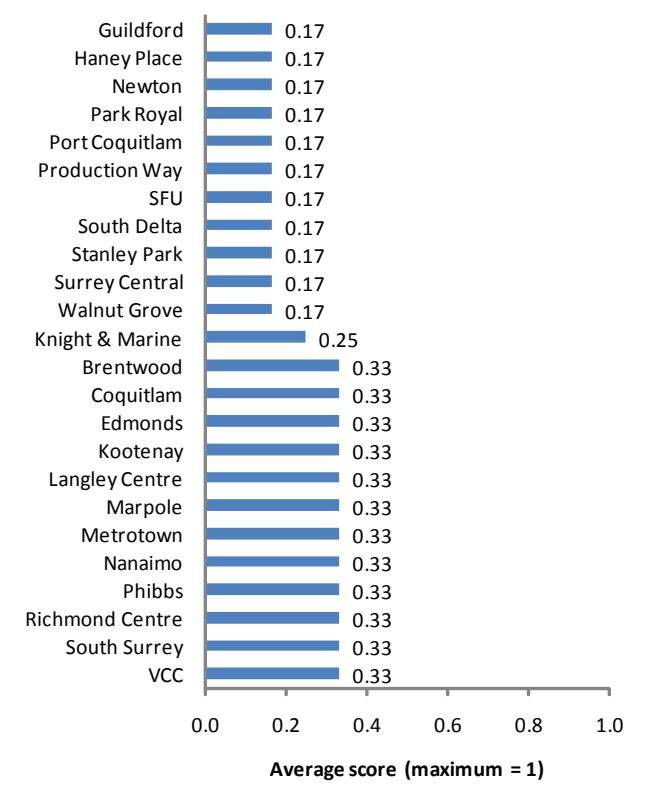
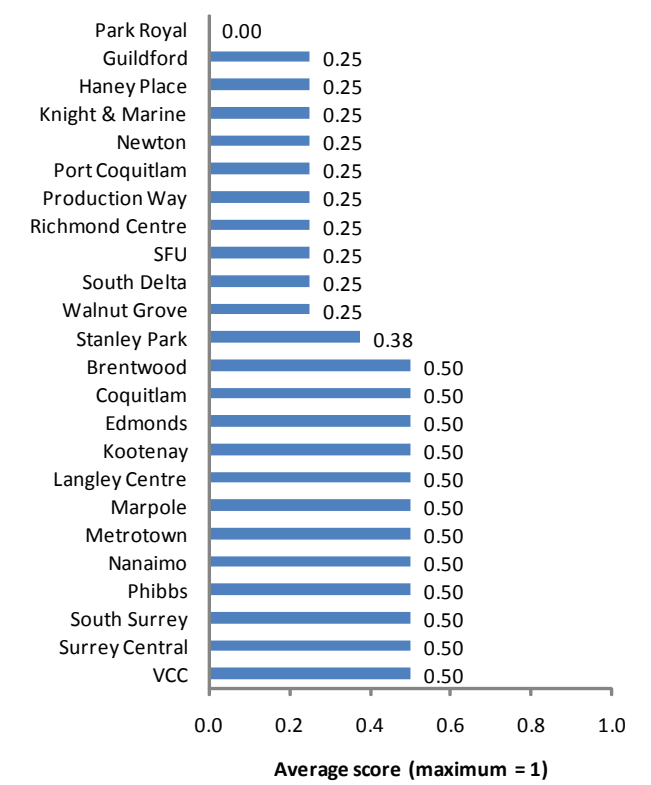


FIGURE IV-6. Rankings: Exchange Information



2.1.3 Passenger Amenities – Physical Comfort

Seating and shelter comprise the amenities providing physical comfort.

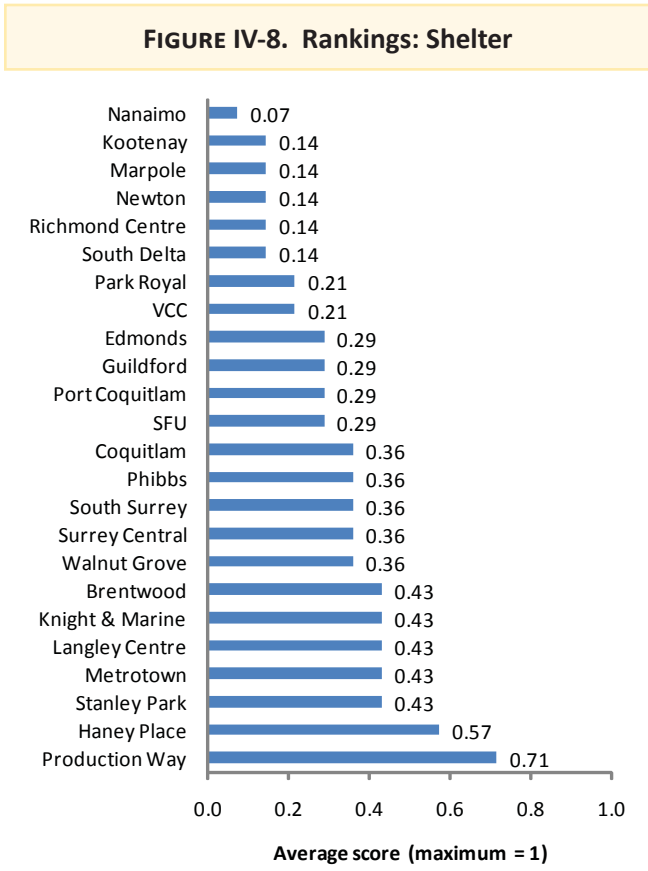
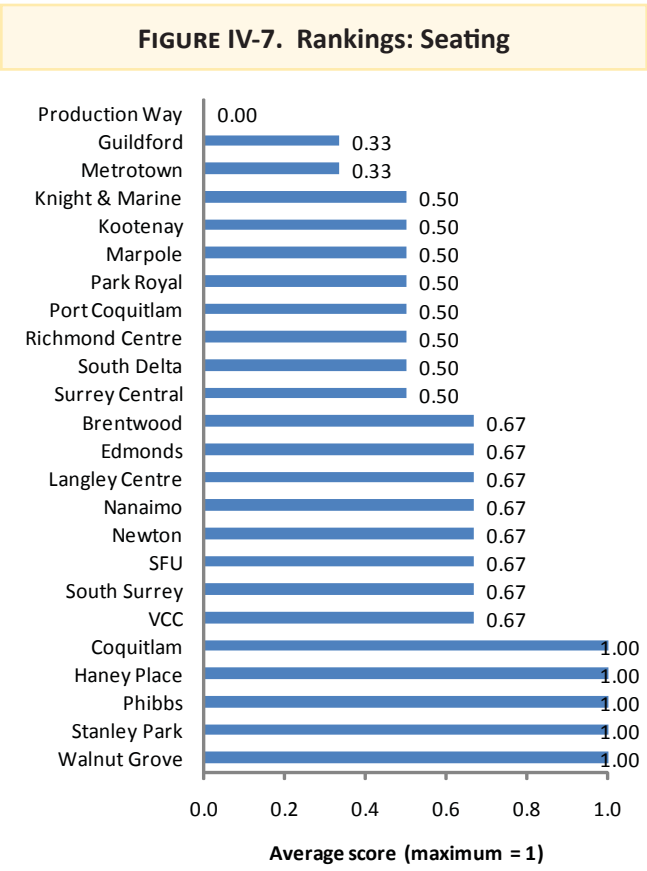
Seating was evaluated for whether it was present, whether it provided back support, and whether there were armrests or other means to assist customers in seating themselves and rising. Only one exchange, Production Way – University, features no seating. Seating issues at other exchanges stem mostly from insufficient or poor quality

seating. Guildford and Metrotown exchanges experience space constraints, making intervention less than a simple matter, but in other cases the installation of more or better seating would be a relatively straightforward matter.

Shelter scores included assessment of whether all bays had sheltered waiting areas, whether the shelter would meet the demand if all waiting passengers needed to use it, its coverage (waiting areas, boarding areas, paths), and whether the shelter was enclosed or heated. The shelter scores and rankings suggest that an overall reconsideration is needed as to how TransLink provides shel-

ter. The two highest-ranking exchanges for shelter, Production Way and Haney Place, do so for rather different reasons. At Haney Place, care has been taken to install attractive shelters that are well designed to protect against wind and rain, though not at boarding or queuing areas. At Production Way, extensive shelter is provided by the overhanging office building above the exchange-station complex.

The provision of high quality shelter, especially from rain, is one of the most crucial needs at passenger waiting facilities in Metro Vancouver’s climate, and deserves well thought out solutions.



2.1.4 Passenger Amenities – Other

The design adequacy of three other amenities were examined: newspaper boxes, garbage cans, and lighting. Other amenities were part of the site analyses, but were not present at any of the sample sites.

Newspaper boxes received full marks if they were present, neatly organized, and out of main pedestrian paths. The lack of newspaper boxes at four exchanges is fairly easy to address. Inconvenient location hampers others, as do unattractive design, which may require more closely

considered intervention to rectify.

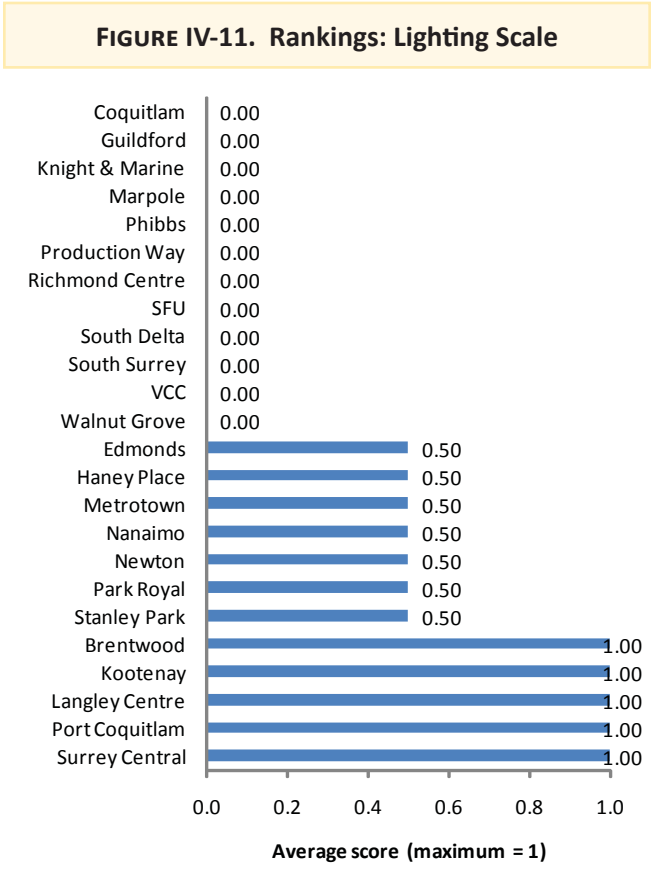
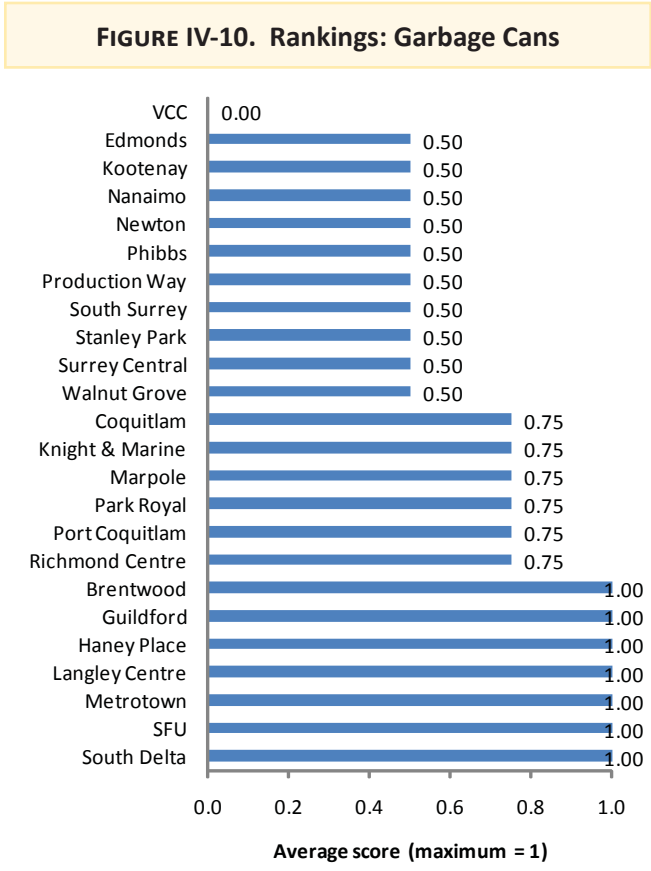
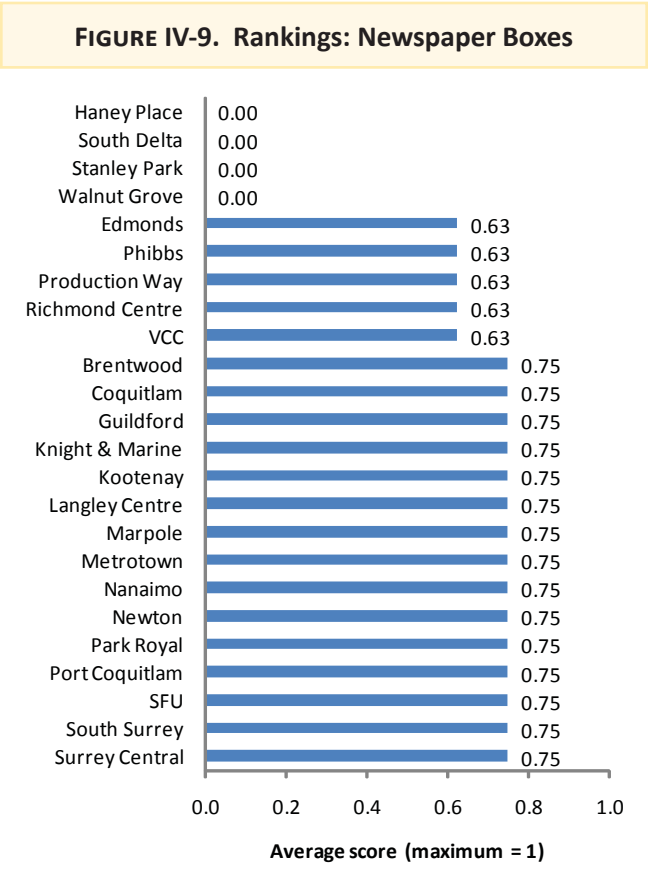
Garbage cans were scored on the basis of whether they were present, and whether their design allowed touch-free use. The lack of garbage cans at VCC Station Exchange is easily rectified. The recommendation for touchless receptacles would, if followed, go a long way towards addressing the scores of the bulk of the remaining exchanges.

Lighting at TransLink bus exchanges in the sample is mostly installed at a scale inappropriate for pedestrians. At on-street-only exchanges, this is currently due to lighting provision by muni-

cipalities or BC Hydro. Developing a system-wide approach to lighting delivery is desirable, and an consideration of the various approaches taken at the exchanges at Brentwood Station, Kootenay Loop, and Surrey Central Station would be a good starting point.

None of the stations feature any of the other amenities investigated: clocks, drinking fountains, and washrooms. Thus, they all score zero on this measure (and no chart is shown). Clocks are the easiest of these to implement. Because of infrastructure and security requirements of drinking fountains and washrooms, policies should be re-

viewed as recommended in Chapter II, *System-Wide Issues*, to explore where and how these other amenities should be provided.



2.1.6 Intermodal Integration

Intermodal integration is generally poor for all modes: private vehicle, bicycle, and rail. Park & Ride lots were only a secondary focus of the site analyses, and scoring was not done for this.

Four needs for passenger pickup and dropoff (PPUDO) were rated: space for vehicles, seating and shelter for customers waiting for their ride, taxi ranks, and phones for calling taxis (pay phones or dedicated taxi phones). Passenger pick-up and drop-off scores are relatively low, reflecting the frequent lack of designated taxi and PPUDO space,

minimal consideration for passenger comfort and convenience as they wait for their private vehicle connection. Success at higher-scoring exchanges are partly due to circumstantial factors enabling convenient *vehicle* use, such as adjacent parking lots or quiet streets.

Bicycle integration was rated for parking (the presence of racks and lockers, and whether the parking was sheltered), directions for cyclists using the exchange, the presence of a cycling network map, the presence of wayfinding signage directing cyclists to and from the exchange and the nearest cycle route, and the presence of cyclist services.

The integration of bicycles is generally lacking, and indicates a need for a specific consideration for bicycles from the outset of the design process.

Rail interchange design was rated favourably if adequate wayfinding was present (if not obvious), if the connection was sheltered, and if the rail and bus facilities were designed as a coherent unit and were of equal design quality. Rail integration fares poorly. More holistic design, and an attention to relative quality of passenger environment at bus passenger waiting facilities, are needed.

FIGURE IV-12. Rankings: Passenger Pickup & Dropoff

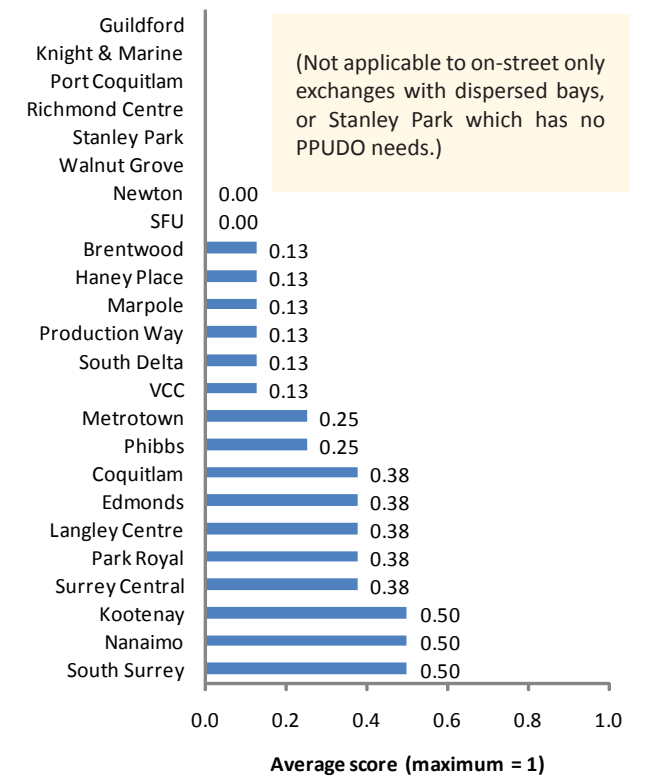


FIGURE IV-13. Rankings: Bicycle Integration

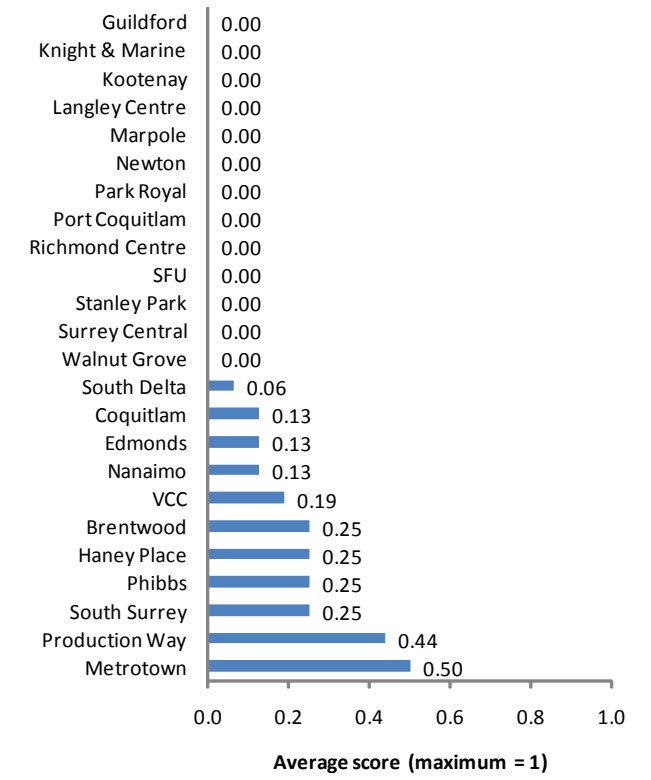
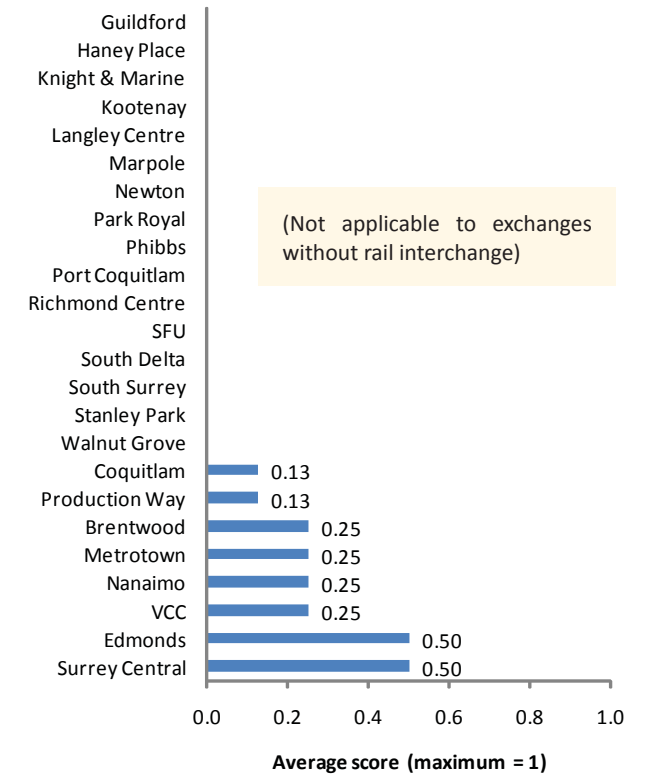


FIGURE IV-14. Rankings: Rail Integration



2.1.7 Safety & Security

Passenger safety is generally well maintained, a testament to the careful planning of the engineers who design the facilities. Included in the assessment of safety were grade separation, crosswalk marking and other ways of segregating passengers and vehicles; ramps where crosswalks met the platform; adequate platform capacity; and whether desire lines encouraged people to step into vehicle traffic. Poorly-scoring exchanges tend to be those where customers’ desire lines involve crossing traffic lanes without marked crossings. The two facilities with multiple drive-through

islands are at the bottom of the list, followed by Park Royal, where passengers arrive at some bays by walking through a vast parking lot.

Natural surveillance was scored based on sightlines into and within the exchange (by passers-by, through windows, and from passing cars), and whether help was within earshot. Natural surveillance is highly variable. Those that fare the best are either on-street or in dense, mixed-use contexts.

The presence of security cameras, and surveillance from security staff (intermittent or constant) were verified to determine the rating for dedicated surveillance. Intermittent patrols are

uniformly provided. More dedicated surveillance could be implemented, but it is suggested that dedicated surveillance should be increased only where good design has failed to overcome security problems.

FIGURE IV-15. Rankings: Safety

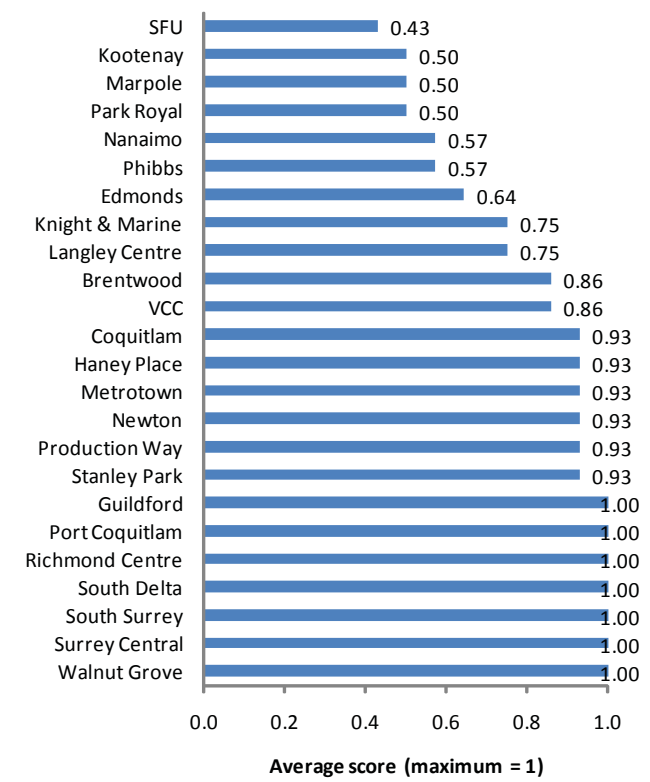


FIGURE IV-16. Rankings: Natural Surveillance

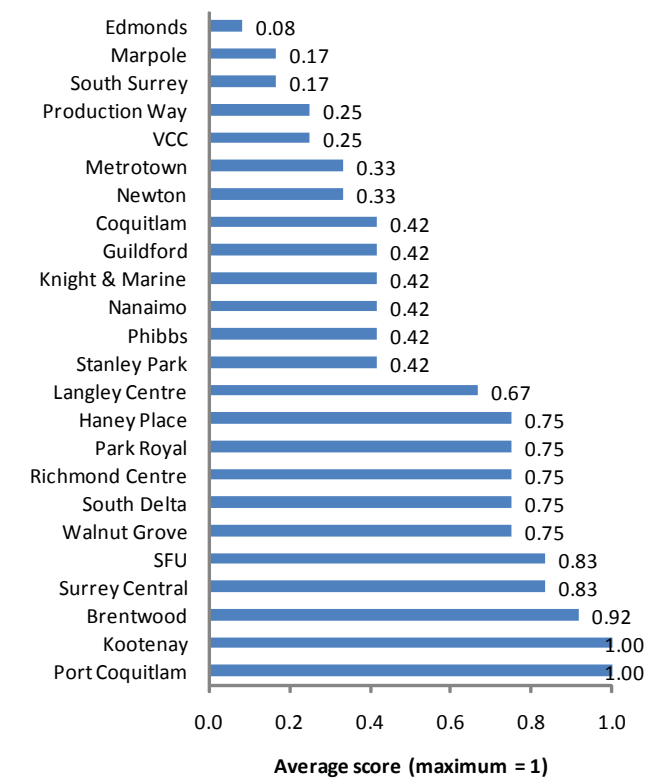
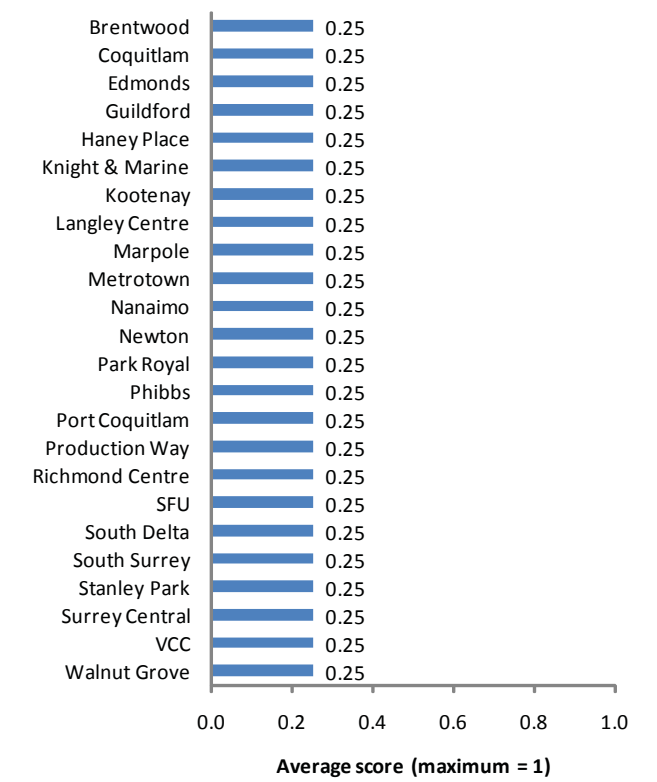


FIGURE IV-17. Rankings: Dedicated Surveillance

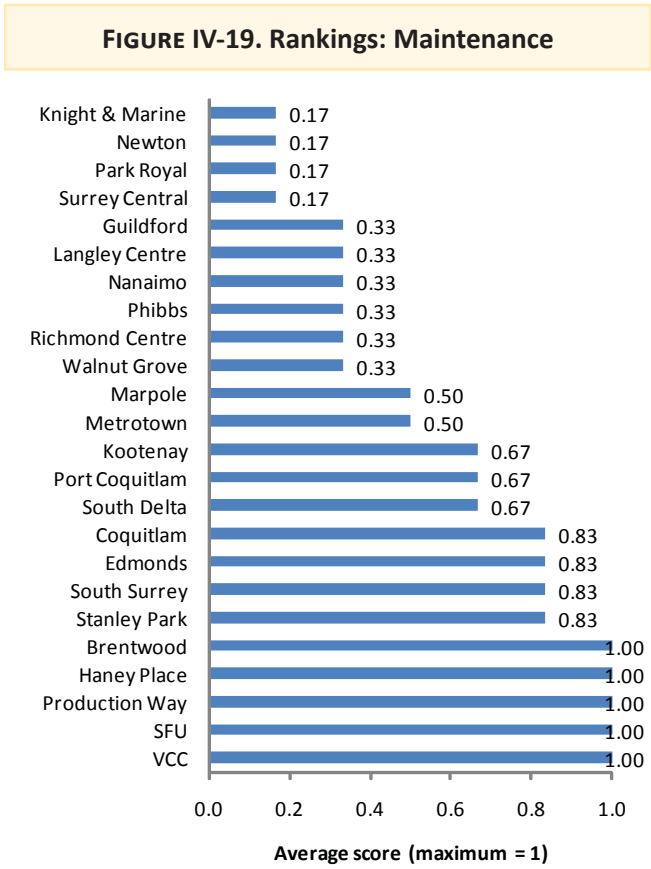
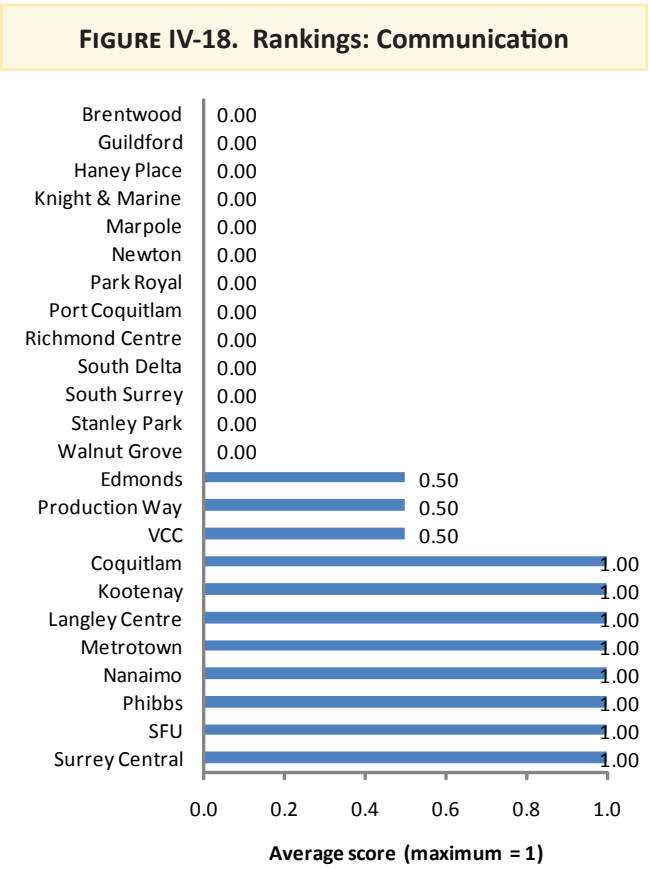


Safety & Security (continued)

Communication can be greatly improved by the introduction of pay phones or security phones at the exchanges scoring zero on this issue. As mentioned earlier, where there is a concern that pay phones will attract drug activity, they could be programmed to allow only 9-1-1 calls for the most problematic times, or security cameras trained on the phones could be an effective deterrent.

Maintenance scores reflect cleanliness, repair, and litter. The highest-scoring facilities are those that are relatively new (VCC–Clark,

Production Way, Haney Place, South Surrey Park & Ride). Maintenance could be targeted at individual stations, but an overall system for identifying and quickly rectifying maintenance issues is unquestionably a preferable long-term strategy.



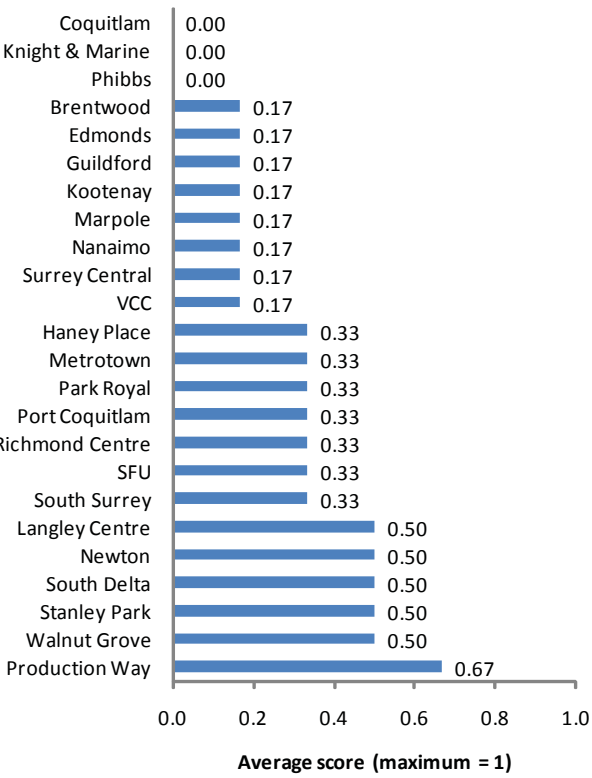
2.1.8 Community Integration

Community integration is difficult to measure, but this study chose three aspects as representative: whether it presented an attractive face to the community, whether it enhanced or blocked connectivity, and whether the community could make use of it. Examples fulfilling the last criterion could be an attractive seating area, a meeting space, or a bulletin board).

The worst-performing exchanges for community integration are those where the location itself offers little community with which to integrate

- essentially a siting question. The group next up the scale, however, are facilities where more could be done, but this would take a large-scale, site-by-site intervention to rectify, and would involve working with municipalities to create the kind of transit-oriented development that makes bus exchanges a community asset.

FIGURE IV-20. Rankings: Community Integration



2.2 Overall Measurements and Rankings

In order to establish the overall evaluation of exchanges, two factors are considered here. The first is a measure of design quality determined through the site assessment. The second is the number of passengers affected by the station design. This section explains how the calculations involving these factors were performed, and presents the results of those calculations.

2.2.1 From features scores to priority rankings

All features pertaining to an issue have been averaged to create an issue score, used in previous section. It would be inaccurate to create for each exchange an overall score that is based on these issue scores, however. The issues vary in importance, for example, garbage cans and community integration are both issues, but the latter is weightier. To address this problem, issues have been grouped into issue categories of more comparable performance. These categories are the same as those used to group the issues for presentation in the Section 2.1, *Measurements and Rankings by Issue*. Thus the sum of features of each issue category results in an issue category score. The overall exchange score is the sum of these issue category scores.

However, as a measure that considers only the design of the exchange is, the issue category score is inadequate measure of the need for upgrading because it does not take into consideration the number of people who will benefit from improved design features. In order to establish exchange-by-exchange priority for upgrading, then,

the overall design scores are then weighted according to the number of boardings per week occurring at each exchange, yielding a priority index. Because higher need is associated with higher boardings per week but lower overall design score, the inverse of the design score has been used to calculate the priority index. Thus, a high priority index value indicates high need for redesign:

Priority Index = 1 / Overall design score * Weekly Boardings

Table IV-2, *Calculation of Overall Rankings*, shows the calculation of priority indices for each of the exchanges, followed by a priority ranking. These rankings are shown graphically in Figure IV-21, *Exchanges ranked by overall need for design repair*.

2.2.3 Discussion of the overall rankings

The rankings here are illustrative of what an evaluation of all exchanges might look like. However, because the rankings shown here are based on a subset of TransLink passenger facilities, they may not include facilities with a higher need of design repair.

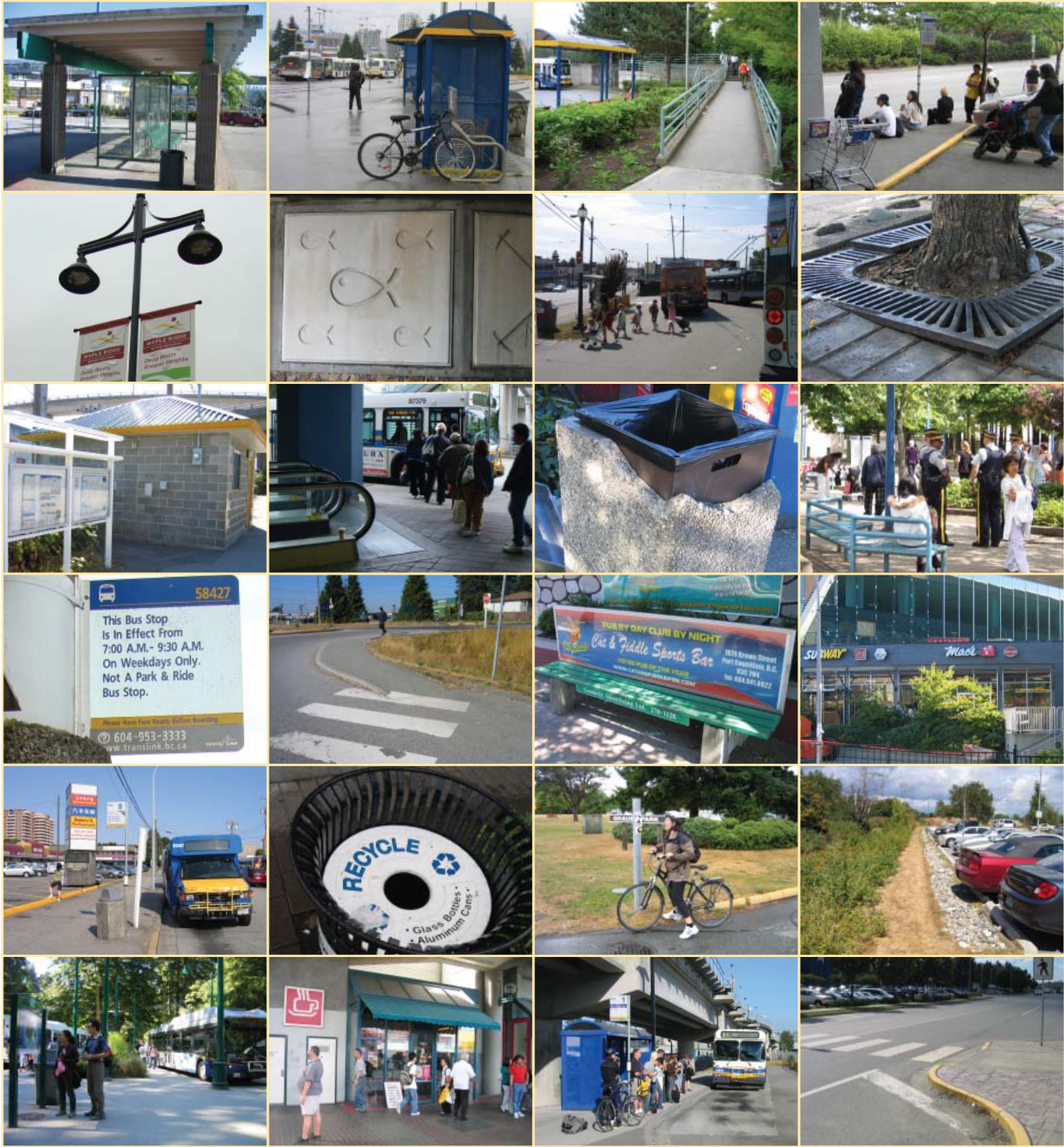
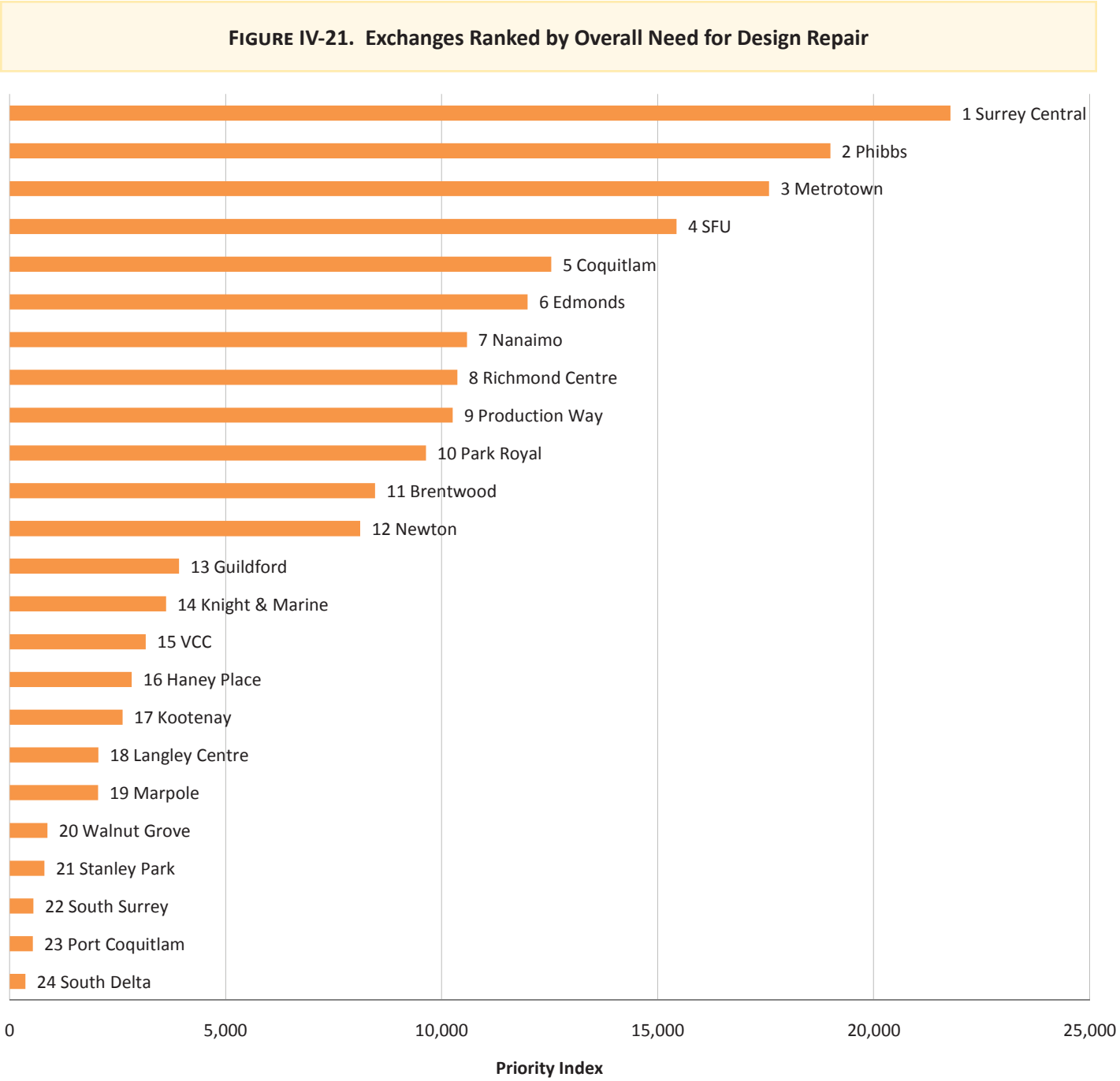
TransLink is currently redesigning or planning to redesign Surrey Central (ranked 1st in need), Metrotown (3rd), SFU (4th), Edmonds (6th), Richmond Centre (8th; buses will be redirected to Canada Line stations), Newton (12th) and Langley Centre (18th). Some of these reflect priorities for redevelopment and densification on the part of the municipality or entity having jurisdiction. Although they are not all ranked highly for design repair need, the opportunity to improve customer experience is none-

TABLE IV-2. Calculation of Overall Rankings												
	Aesthetic considerations	Community integration	General approach	Information & wayfinding	Intermodal integration	Passenger amenities	Public art & interpretation	Safety & Security	Total score of all issue categories	Weekly boardings	Priority index	Priority rank
Surrey Central	0.42	0.17	0.88	0.30	0.22	0.48	0.00	0.74	3.19	69,510	21,775	1
Phibbs	0.33	0.00	0.38	0.40	0.27	0.39	0.00	0.47	2.25	42,657	18,992	2
Metrotown	0.33	0.33	0.63	0.40	0.40	0.46	0.00	0.61	3.15	55,423	17,575	3
SFU	0.25	0.33	0.63	0.20	0.00	0.41	0.00	0.66	2.48	38,268	15,435	4
Coquitlam	0.08	0.00	0.50	0.40	0.19	0.43	0.00	0.68	2.29	28,705	12,536	5
Edmonds	0.50	0.17	0.75	0.40	0.28	0.35	0.00	0.45	2.89	34,690	11,991	6
Nanaimo	0.60	0.17	0.00	0.40	0.25	0.30	0.00	0.47	2.19	23,233	10,586	7
Richmond Centre	0.20	1.00	0.67	0.30	0.00	0.33	0.00	0.63	3.12	32,295	10,362	8
Production Way	0.13	0.67	0.38	0.20	0.30	0.52	0.00	0.63	2.82	28,946	10,257	9
Park Royal	0.50	0.50	0.50	0.10	0.11	0.38	0.00	0.47	2.55	24,606	9,631	10
Brentwood	0.40	0.17	0.63	0.40	0.22	0.48	0.00	0.79	3.08	26,028	8,456	11
Newton	0.50	0.33	0.63	0.20	0.00	0.37	0.00	0.50	2.53	20,506	8,112	12
Guildford	0.10	0.50	0.67	0.20	0.00	0.40	0.00	0.50	2.37	9,274	3,919	13
Knight & Marine	0.25	0.00	0.33	0.25	0.00	0.45	0.50	0.41	2.19	7,918	3,616	14
VCC	0.30	0.17	0.67	0.40	0.20	0.27	0.00	0.61	2.61	8,221	3,148	15
Haney Place	0.58	0.33	0.75	0.20	0.21	0.48	0.00	0.76	3.31	9,357	2,824	16
Kootenay	0.25	0.17	0.50	0.40	0.17	0.35	0.00	0.68	2.52	6,574	2,614	17
Langley Centre	0.58	0.75	0.38	0.40	0.13	0.45	0.00	0.59	3.28	6,735	2,052	18
Marpole	0.25	0.17	0.38	0.40	0.04	0.30	0.00	0.34	1.88	3,851	2,049	19
Walnut Grove	0.10	1.00	0.33	0.20	0.08	0.38	0.00	0.63	2.72	2,384	875	20
Stanley Park	0.80	0.50	0.75	0.25	0.00	0.40	0.00	0.63	3.33	2,685	806	21
South Surrey	0.30	0.33	0.13	0.40	0.33	0.37	0.00	0.58	2.44	1,338	548	22
Port Coquitlam	0.40	1.00	1.00	0.20	0.06	0.40	0.00	0.77	3.82	2,045	535	23
South Delta	0.40	1.00	0.33	0.20	0.08	0.26	0.00	0.69	2.97	1,078	363	24

theless welcome. Municipalities that show an interest in developing in a way that supports transit should be rewarded with high quality facilities that will act as an incentive for similar redevelopment in other areas.

From a customer experience perspective, TransLink may wish to consider working with municipalities to prioritize Phibbs Exchange (ranked 2nd) and Coquitlam Exchange (5th) for future design upgrades. Coquitlam Exchange will integrate with

the planned Evergreen SkyTrain line, representing a golden opportunity to create transit-oriented development in what is currently an area designed almost exclusively for private automobiles. Redevelopment at Phibbs Exchange, however, is less obvious as its position along Highway 1 at the foot of the Ironworkers Memorial bridge does not make it attractive for pedestrian-friendly mixed-use development. Relocation of this hub might be a better option, but would require careful study of how its role in the network can be maintained.



3 Next steps

This study has provided a first step towards the development of customer-oriented transit facility design guidelines. Below is a description of the next steps recommended to achieve this goal: garner support, broaden the scope for evaluation, refine the evaluation tool, and engage in a formal consultation process.

3.1 Garner support

In order to proceed further, funding must be secured. In order to do so, proponents must demonstrate both the need for an value of higher quality, customer-oriented passenger facility design.

Developing design guidelines to improve customer experience risks being undervalued, especially during times of fiscal austerity. Decision-makers may be reluctant to commit to the costs of upgrading existing facilities and designing new ones to higher standards. In order to secure support for such improved facilities, higher quality design must be viewed as necessary, valuable, and appropriate.

Necessity for higher, customer-oriented standards of design can be demonstrated in part by analyses such as the current report, outlining the deficiencies in the service TransLink currently provides. Value, however, must be presented through a sound business case. At the very least, this must contain case studies showing increased value from improved design – through increased ridership, decreased vandalism or security costs, or improved public profile. Elasticities that show

the value of design improvements should also be sought, although these are difficult to establish due to the context-dependent nature of facility design. However, combined with case studies, they would be a compelling argument for the development and implementation of the kind of design guidelines proposed here.

Finally, decision-makers must be convinced that such improvements are appropriate given the stated corporate goals. At TransLink, the recent 30-year plan clearly supports improved facility design, as outlined in Chapter I, Section 3.1 (page X). The initiative would benefit from being framed in terms of fulfilling the goals of TransLink’s long-range strategic plan.

The kinds of design features recommended here are not radical; rather, they are becoming the new standard. Currently, the American Public Transit Association is creating Sustainability and Urban Design standards for passenger facility environments, and these standards will cover many of the same areas embraced here in a similar fashion. When completed, this manual will be a welcome benchmark to which facility designers can point when making the case for better customer-oriented design.

3.2 Broaden the scope for evaluation

A comprehensive set of design guidelines would need to address all transit modes, to ensure continuity of customer experience across the transit system. The assessment procedure described in the previous chapters needs to be expanded and refined if it is to apply more broadly. Evaluation would have to be applicable to all modes, so that

the assessment tool could be executed at any passenger facility.

A number of issues would require more thorough incorporation in the assessment than was possible in the current study. Lighting levels, ecological impact, Universal Access and Crime Prevention Through Environmental Design (CPTED) are all complex topics to assess. Expertise in these areas – from engineers, ecologists, landscape architects, urban designers and CPTED and accessibility professionals – should be sought in order to ensure their thorough and accurate treatment in assessment and recommendations. Input from experts on these topics will similarly be necessary when producing the final design guidelines.

3.3 Refine the evaluation tool

The evaluation tool used in this study could be further refined to account for more variables, and to adjust the impact of those variables on the overall score for each exchange.

Adjust the relative importance of issues

As mentioned above, the overall rankings as presented in this report are calculated on an assumption that all issues are of equal importance. If an agency wanted a finer-grain measurement tool, it could weight the issues (or even omit some – giving them an effective weighting of zero).

Include passenger volume projections when prioritizing facilities

Exchanges were weighted according to current passenger volume. However, a more desirable

measure would be one that anticipates future use. If a municipality has plans to intensify development around an exchange, its priority for redesign should be higher than for another comparable exchange with no such development plans.

Consider point-in-journey patterns

Passenger facilities that are primarily transfer points have different needs than those that are primarily trip origins or destinations. The recommendation was made in this report that exchanges be located in dense, mixed-use areas that are supportive of transit. However, TransLink currently has a number of exchanges that are in low-density areas where transfer is nearly the sole use. This may be to or from other buses (Ladner Exchange), rail (Port Haney Station), or private vehicles (South Surrey Park & Ride).

It is unlikely that all of these facilities can be relocated or significantly developed, mainly due to the expense of doing so. In light of this, transfer-dominant facilities need to be evaluated and designed in a way that reflects the way they will be used for the foreseeable future. A more robust set of design guidelines would have different requirements for these facilities. For example, community integration may be difficult in the low-density areas in which they are located, and the viability of retail or other services may be limited.

Create a facility typology and link types to recommended levels of amenity

Deciding what level of amenity to provide would be streamlined if the design guidelines included recommendations for different types of facility. This topic has already been touched upon in the foregoing comments on the special charac-

teristics of transfer-dominant facilities.

Amenities).

A simple typology based on passenger volume and key destinations works well for on-line bus stops, but is less well suited to the complex nature of exchanges. A typology for exchanges would likely be more usefully conceived of as a collection of dimensions, each of which involves a continuum of requirements (see Table IV-3, *Dimensions of Bus Exchanges That Influence the Provision of*

TABLE IV-3. Dimensions of Bus Exchanges That Influence the Provision of Amenities		
Characteristics	Dimension	Example of influence
User characteristics	Passenger volume	More passengers warrant higher amenity levels
	Park & Ride volume	High volume of Park & Ride patrons require more sensitivity to urban design, pedestrian orientation
	Transfer vs. Destination proportions	The less a facility is used as a destination, the less viable commercial services will be
System characteristics	Bus volume	Higher volumes of buses warrant space management, for example separate layover facilities or dynamic bay assignments
	Intermodality	Intermodal facilities require more attention to wayfinding
	Timed-transfer focal point vs. random transfer	Timed transfer points discourage the use of time-intensive amenities, especially if headways are long
Development context characteristics	Land use context	Single-use and low-density facilities will likely require more security interventions
	Density context	
	Pedestrian-oriented vs. auto-oriented design (includes road types)	Auto-oriented sites should be disfavoured in the site selection process unless municipalities have a commitment to redevelop to a more transit-friendly form
Physical characteristics	On-street vs. off-street	Off-street facilities require more attention to community integration, but also offer more opportunities for placemaking
	Site size	Large sites are potentially more disruptive to the urban fabric, but also allow opportunities for mixed-use development

3.4 Engage in a formal consultation process

This preliminary design review was produced without a formal consultation process. Evaluation and the development of guidelines would require planners to consult with transit users, facility neighbours (including businesses, residents and institutions), and all affected levels of government. Their needs and goals should be heard and, where possible, they should be partners in the development of transit facilities that will be viewed as beneficial by all.

4 Conclusion

The scoring and ranking of issues and exchanges presented in this chapter illustrate how such an evaluation might be conducted on a comprehensive scale, and the kind of direction it can provide. It presents a framework that is precise enough to be replicable, and flexible enough to be modified if desired to reflect relative weights of different issues.

As applied here, the framework provides insight into current levels of customer-oriented design at TransLink bus passenger facilities. The results show that TransLink provides a wide range of customer experience levels for most issues examined. Overall, however, they demonstrate that TransLink’s bus exchanges are welcome sites for design improvements that will enhance customer experience. This need, combined with TransLink’s commitment to improve the quality of their facilities as part of their drive to meet provincial transit, walking and cycling mode share targets, means that TransLink is in an enviable position to be among the first to implement the kind of user-centred design that will soon be the industry standard.

Feature	Description
Sit-Mixed	Mixed use
Sit-Dense	Relatively intensive use (e.g. Major employers; high-density residential; major destination)
Sit-Walk	Pedestrian-oriented urban design
Gen-Holis	Design of bus mode area is holistic: unified shelter, waiting area, amenities (not applicable to on-street-only exchanges)
Seat	All bays have seating
Seat-back	All seating has backs
Seat-arm	At least some seating has armrests
Sh-all	All stops have sun, wind & rain protection
Sh-qty	Where shelter exists, adequate supply to meet demand
Sh-cov-wtg	Where shelter exists, it covers waiting areas
Sh-cov-brdg	Where shelter exists, it covers boarding/queuing areas
Sh-cov-oth	Where shelter exists, it covers phones, info boards, trash cans, newspaper boxes etc.
Sh-enclose	Waiting area is fully enclosed
Sh-ClimCon	Waiting area is climate controlled
Tr-Present	Present
Tr-Notouch	Touchless
News-Present	Present
News-OutOfWay	Out of pedestrian path
News-Neat	Neatly lined up, corralled, or in a single unit
News-HQD	Consistent high quality design (0.5 for moderate or inconsistent quality)
Lt-scale	Human-scale lighting (<12'; 0.5 if 12-18')
Oth-WC	Public washrooms
Oth-Clock	Clock
Oth-H2O	Drinking fountain
Ret-FareDe	FareDealer outlet
Ret-Mart	Convenience store (0.5 if at immediately adjacent station)
Ret-Café	Café (0.5 if in immediately adjacent station)
Art-Interp-Feat	Public art, fountain, historic information
ExInf-Name	Exchange has an easily visible name sign
ExInf-Wayf	Wayfinding signageto adjacent modes or destinations
ExInf-Map	Exchange map
ExInf-BayNum	ID poles with bay numbers
Inf-Map-net	Network map
Inf-Map-rout	Route map
Inf-Sched-rout	Route schedule

Feature	Description
Inf-Realtime	Real-time bus arrival information
Inf-CustSvc	Customer service staff present
Inf-CustSvc-Tel	Customer service phone
Rail-Hol	Holistic design of bus and rail facility
Rail-Qual	Equal quality of bus and ALRT/rail/ferry facilities
Rail-ConxShelt	Sheltered connection to/from each mode
Rail-Wayf	Obvious path between modes (intuitive, signs)
PPUDO-car	PPUDO space (0.5 = informal, e.g. an adjacent parking lot)
PPUDO-SeatShel	PPUDO space has seating & shelter
PPUDO-taxi	Taxi rank present
PPUDO-PayTel	Pay phone available in exchange or immediately adjacent station
Bike-Rack	Adequate bike rack (0.5 if at immediately adjacent facility)
Bike-RackShel	Cover over bike rack
Bike-Lockr	Bike lockers
Bike-LockrShel	Cover over bike lockers
Bike-direc	Clear signage and/or road markings for how cyclists are to access the exchange
Bike-map	Bike network map
Bike-wayf	Signage to/from exchange and cycle routes
Bike-svs	Bike services available
Saf-Grade	All waiting and boarding areas are grade-separated from bus traffic
Saf-PedSeg	Pedestrians can walk safely in and through the exchange, and if necessary, barriers prevent unsafe paths
Saf-PlatCapac	Platform is appropriately sized and laid out to accommodate passenger volume
Saf-Desire	Pedestrian paths conform to desire lines without obstacles (clear & direct)
Saf-BusXing	Zebra or signalized crossings of bus path
Saf-RoadXing	Pedestrian-controlled or zebra crossings at road crossings required to approach the exchange on foot
Saf-Ramp	Letdowns present and aligned with crosswalks and line of travel
Sec-Seelnt	Clear sightlines within exchange
Sec-SeeExt	Clear sightlines into and out of exchange
Sec-SurvCar	Passive surveillance from passing vehicles (0.5 if separated by pkg, setbacks, etc.)
Sec-SurvPed	Passive surveillance from non-transit foot traffic
Sec-SurvBldg	Passive surveillance from adjacent residences or commercial units

Feature	Description
Sec-SurvHear	Passive surveillance from adjacent residences or commercial units
Sec-AcSurvCam	Security camera(s)
Sec-AcSurvStaff	Security staff or attendant (0.5 if intermittently present)
Sec-MaintCln	Structures, furnishings, landscaping & pavement are clean
Sec-MaintRep	Structures, furnishings, landscaping & pavement are in good repair
Sec-MaintLitr	Exchange has little or no litter or debris
Sec-Tel	Security or pay phone (0.5 if in immediately adjacent station)
Cmty-PhysInteg	Physically integrated with other uses (0.5 if near other uses)
Cmty-aesth	View from outside is attractive or mitigated or hidden
Cmty-use	Community uses (for on-street-only sites)
Aes-Des-SeatShel	Seating & shelter
Aes-Des-garb	Garbage cans
Aes-Des-Pav	Ground plane (variety of colour, texture)
Aes-Des-OpsBldg	Operations buildings
Aes-Landsc-HQD	Landscaping (0 = no landscaping)
Aes-View	Pleasant or interesting view, & ugly views screened

These tables show the score for each feature measured at site visits. Blank cells indicate that the feature is not applicable to that site. See Appendix B for an explanation of feature codes and scoring.

Key to exchange names:

Bre	Brentwood Town Centre Station
Coq	Coquitlam Station
Edm	Edmonds Station
Gui	Guildford Exchange
Han	Haney Place Exchange
Kni	Knight & Marine
Koo	Kootenay Loop
Lan	Langley Centre Exchange
Mar	Marpole Loop
Met	Metrotown Station
Nan	Nanaimo Station
New	Newton Exchange
Par	Park Royal
Phi	Phibbs Exchange
Por	Port Coquitlam Centre
Pro	Production Way–University Station
Ric	Richmond Centre
Sim	SFU Exchange
SoD	South Delta Exchange
SoS	South Surrey Park & Ride
Sta	Stanley Park
Sur	Surrey Central Station
Van	VCC–Clark Station
Wal	Walnut Grove Park & Ride

Feature	Bre	Coq	Edm	Gui	Han	Kni	Koo	Lan	Mar	Met	Nan	New	Par	Phi	Por	Pro	Ric	Sim	SoD	SoS	Sta	Sur	Van	Wal
Sit-Mixed	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0
Sit-Dense	1.0	1.0	1.0	1.0	1.0	0.0	0.5	0.0	0.5	1.0	0.0	0.5	1.0	0.0	1.0	0.5	1.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0
Sit-Walk	0.0	0.0	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.0	0.5	0.0	0.5	0.0	0.0	1.0	0.5	0.0	0.0
Gen-Holis	0.5	0.0	1.0		0.5		0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5		0.5		0.0		0.5	1.0	1.0		
Seat	0.5	1.0	1.0	0.5	1.0	1.0	0.5	1.0	1.0	1.0	1.0	1.0	0.5	1.0	0.5	0.0	0.5	1.0	0.5	1.0	1.0	0.5	1.0	1.0
Seat-back	0.5	1.0	1.0	0.5	1.0	0.5	1.0	1.0	0.5	0.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Seat-arm	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0		0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
Sh-all	1.0	0.5	1.0	0.5	1.0	0.5	0.5	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	0.0	1.0	0.0	0.5	1.0	0.5	0.5	1.0
Sh-qty	1.0	1.0	0.0	0.5	1.0	0.5	0.0	1.0	0.0	0.5	0.0	0.0	0.0	1.0	0.5	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0
Sh-cov-wtg	1.0	1.0	1.0	0.5	1.0	1.0	0.5	1.0	0.5	1.0	0.0	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5
Sh-cov-brdg	0.0	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sh-cov-oth	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sh-enclose	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sh-ClimCon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tr-Present	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0
Tr-Notouch	1.0	0.5	0.0	1.0	1.0	0.5	0.0	1.0	0.5	1.0	0.0	0.0	0.5	0.0	0.5	0.0	0.5	1.0	1.0	0.0	0.0	0.0		0.0
News-Present	1.0	1.0	0.5	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	0.0	1.0	0.0	1.0	0.5	0.0
News-OutOfWay	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	0.5	1.0		1.0		1.0	1.0	
News-Neat	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0		1.0	1.0	
News-HQD	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Lt-scale	1.0	0.0	0.5	0.0	0.5	0.0	1.0	1.0	0.0	0.5	0.5	0.5	0.5	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	0.0
Oth-WC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oth-Clock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oth-H2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ret-FareDe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ret-Mart	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.5	0.0	0.5		0.0		1.0		0.0		0.0	0.0	1.0	0.0	
Ret-Café	0.0	0.0	0.0		0.0		0.5	0.0	0.0	0.5	0.0	0.5		0.0		1.0		0.5		0.0	0.5	1.0	0.0	
Art-Interp-Feat	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ExInf-Name	1.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
ExInf-Wayf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
ExInf-Map	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ExInf-BayNum	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Inf-Map-net	1.0	1.0	1.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	0.5	0.0	0.5	1.0	0.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	0.5	0.0
Inf-Map-rout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inf-Sched-rout	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Inf-Realtime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inf-CustSvc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inf-CustSvc-Tel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Rail-Hol	0.0	0.0	1.0							0.0	0.5					0.0						0.0	0.0	

Feature	Bre	Coq	Edm	Gui	Han	Kni	Koo	Lan	Mar	Met	Nan	New	Par	Phi	Por	Pro	Ric	Sim	SoD	SoS	Sta	Sur	Van	Wal
Rail-Qual	0.0	0.0	0.0							0.0	0.0					0.0						0.5	0.0	
Rail-ConxShelt	1.0	0.5	0.0							1.0	0.5					0.0						0.5	0.0	
Rail-Wayf	0.0	0.0	1.0							0.0	0.0					0.5						1.0	1.0	
PPUDO-car	0.5	0.5	1.0		0.5		0.5	0.5	0.5	0.0	0.5	0.0	0.5	0.0		0.0		0.0	0.5	1.0		0.5	0.0	
PPUDO-SeatShel	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	
PPUDO-taxi	0.0	0.0	0.0		0.0		0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	1.0		0.0	0.0	
PPUDO-PayTel	0.0	1.0	0.5		0.0		1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0		0.5		0.0	0.0	0.0		1.0	0.5	
Bike-Rack	1.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.5	1.0	0.0	0.0	0.5	0.0
Bike-RackShel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Bike-Lockr	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Bike-LockrShel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bike-direc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bike-map	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bike-wayf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bike-svs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saf-Grade	1.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Saf-PedSeg	0.5	1.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	0.5	1.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	1.0
Saf-PlatCapac	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.5	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Saf-Desire	1.0	1.0	0.0		0.5		0.0		0.0	1.0	0.0	1.0		0.5		1.0		0.0		1.0	1.0	1.0	0.0	
Saf-BusXing	1.0	0.5	1.0		1.0		1.0		0.0	1.0	1.0	1.0		0.5		1.0		0.0		1.0	1.0	1.0	1.0	
Saf-RoadXing	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Saf-Ramp	0.5	1.0	0.5		1.0		1.0		1.0	1.0	0.5	0.5		0.0		0.5		0.0		1.0	1.0	1.0	1.0	
Sec-Seelnt	1.0	1.0	0.0	0.0	0.5	1.0	1.0	0.5	1.0	0.5	0.0	0.0	1.0	1.0		0.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0
Sec-SeeExt	1.0	1.0	0.0	0.0	1.0	0.5	1.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0
Sec-SurvCar	1.0	0.5	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	0.5	1.0	0.0	1.0	0.5	1.0	0.0	0.0	1.0	0.0	1.0
Sec-SurvPed	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	0.5	0.0	1.0	0.5	0.5	1.0	1.0	0.0	1.0	1.0	0.0	1.0
Sec-SurvBldg	1.0	0.0	0.0	0.0	0.5	0.0	1.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	1.0	0.0	0.5	1.0	0.0	0.0	0.0	1.0	0.0	0.0
Sec-SurvHear	0.5	0.0	0.5	0.5	0.5	0.0	1.0	0.5	0.0	0.5	0.5	0.5	0.5	0.0	1.0	1.0	0.5	0.5	0.5	0.0	0.5	0.5	0.5	0.5
Sec-AcSurvCam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sec-AcSurvStaff	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sec-MaintCln	1.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	0.5	0.0	1.0	0.0
Sec-MaintRep	1.0	1.0	1.0	0.0	1.0	0.0	0.5	0.0	0.5	0.5	0.0	0.0	0.0	0.5	1.0	1.0	0.5	1.0	0.0	0.5	1.0	0.0	1.0	0.0
Sec-MaintLitr	1.0	0.5	0.5	1.0	1.0	0.5	0.5	1.0	1.0	0.5	1.0	0.5	0.5	0.5	1.0	1.0	0.5	1.0	1.0	1.0	1.0	0.5	1.0	1.0
Sec-Tel	0.0	1.0	0.5	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.5	0.0	1.0	0.0	0.0	0.0	1.0	0.5	0.0
Cmtty-PhysInteg	0.5	0.0	0.5	0.5	0.5	0.0	0.5	1.0	0.5	0.5	0.0	0.5	0.5	0.0	1.0	1.0	1.0	0.5	1.0	0.0	0.5	0.5	0.5	1.0
Cmtty-aesth	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.5	0.5	0.5	0.0	0.0	1.0	0.0	0.5	0.5	1.0	1.0	0.0	0.0	
Cmtty-use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aes-Des-SeatShel	0.5	0.5	1.0	0.0	1.0	0.5	0.5	1.0	0.5	0.5	0.5	0.5	1.0	0.5	0.0		0.0	0.0	1.0	0.0	1.0	1.0	0.5	0.0
Aes-Des-garb	0.5	0.0	0.5	0.5	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Aes-Des-Pav	0.5	0.0	0.5	0.0	0.5	0.0	0.0	1.0	0.0	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	0.0

Feature	Bre	Coq	Edm	Gui	Han	Kni	Koo	Lan	Mar	Met	Nan	New	Par	Phi	Por	Pro	Ric	Sim	SoD	SoS	Sta	Sur	Van	Wal
Aes-Des-OpsBldg		0.0			0.5	0.5	0.5	0.5	0.5	0.0				0.5				0.5	0.0	0.5	1.0	0.0	0.0	0.0
Aes-Landsc-HQD	0.5	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.5	0.5	0.5	0.0	0.5	0.0	0.5	0.0	0.0	0.5	1.0	0.0	0.0	0.0
Aes-View	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.5	0.5	1.0	0.0	0.0	0.5	0.5	0.5	1.0	0.0	0.5	0.0

	Brentwood	Coquitlam	Edmonds	Guildford	Haney Place	Knight & Marine	Kootenay	Langley Centre	Marpole	Metrotown	Nanaimo	Newton	Park Royal	Phibbs	Port Coquitlam	Production Way	Richmond Centre	SFU	South Delta	South Surrey	Stanley Park	Surrey Central	VCC	Walnut Grove
Aesthetic considerations	0.40	0.08	0.50	0.10	0.58	0.25	0.25	0.58	0.25	0.33	0.60	0.50	0.50	0.33	0.40	0.13	0.20	0.25	0.40	0.30	0.80	0.42	0.30	0.10
Aesthetic considerations	0.40	0.08	0.50	0.10	0.58	0.25	0.25	0.58	0.25	0.33	0.60	0.50	0.50	0.33	0.40	0.13	0.20	0.25	0.40	0.30	0.80	0.42	0.30	0.10
Community integration	0.17	0.00	0.17	0.17	0.33	0.00	0.17	0.50	0.17	0.33	0.17	0.50	0.33	0.00	0.33	0.67	0.33	0.33	0.50	0.33	0.50	0.17	0.17	0.50
Community integration	0.17	0.00	0.17	0.17	0.33	0.00	0.17	0.50	0.17	0.33	0.17	0.50	0.33	0.00	0.33	0.67	0.33	0.33	0.50	0.33	0.50	0.17	0.17	0.50
General approach	0.63	0.50	0.75	0.67	0.75	0.33	0.50	0.38	0.38	0.63	0.00	0.63	0.50	0.38	1.00	0.38	0.67	0.63	0.33	0.13	0.75	0.88	0.67	0.33
Siting	0.67	0.67	0.67	0.67	0.83	0.33	0.67	0.33	0.50	0.67	0.00	0.67	0.67	0.33	1.00	0.33	0.67	0.83	0.33	0.00	0.67	0.83	0.67	0.33
Holistic approach	0.50	0.00	1.00		0.50		0.00	0.50	0.00	0.50	0.00	0.50	0.00	0.50		0.50		0.00		0.50	1.00	1.00		
Information & wayfinding	0.40	0.40	0.40	0.20	0.20	0.25	0.40	0.40	0.40	0.40	0.40	0.20	0.10	0.40	0.20	0.20	0.30	0.20	0.20	0.40	0.25	0.30	0.40	0.20
Network & route information	0.33	0.33	0.33	0.17	0.17	0.25	0.33	0.33	0.33	0.33	0.33	0.17	0.17	0.33	0.17	0.17	0.33	0.17	0.17	0.33	0.17	0.17	0.33	0.17
Exchange information	0.50	0.50	0.50	0.25	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.25	0.00	0.50	0.25	0.25	0.25	0.25	0.25	0.50	0.38	0.50	0.50	0.25
Intermodal integration	0.22	0.19	0.28	0.00	0.21	0.00	0.17	0.13	0.04	0.38	0.25	0.00	0.13	0.25	0.00	0.28	0.00	0.00	0.08	0.33	0.00	0.22	0.19	0.00
Rail interchange	0.25	0.13	0.50							0.25	0.25					0.13						0.50	0.25	
Passenger Pick-up & Drop-off	0.13	0.38	0.38		0.13		0.50	0.38	0.13	0.25	0.50	0.00	0.38	0.25		0.13		0.00	0.13	0.50		0.38	0.13	
Bicycle integration	0.25	0.13	0.13	0.00	0.25	0.00	0.00	0.00	0.00	0.50	0.13	0.00	0.00	0.25	0.00	0.44	0.00	0.00	0.06	0.25	0.00	0.00	0.19	0.00
Passenger amenities	0.48	0.43	0.35	0.38	0.48	0.43	0.35	0.48	0.30	0.46	0.30	0.37	0.38	0.39	0.43	0.52	0.31	0.41	0.25	0.37	0.40	0.48	0.27	0.36
Shelter	0.43	0.36	0.29	0.29	0.57	0.43	0.14	0.43	0.14	0.43	0.07	0.14	0.21	0.36	0.29	0.71	0.14	0.29	0.14	0.36	0.43	0.36	0.21	0.36
Seating	0.67	1.00	0.67	0.33	1.00	0.50	0.50	0.67	0.50	0.33	0.67	0.67	0.50	1.00	0.50	0.00	0.50	0.67	0.50	0.67	1.00	0.50	0.67	1.00
Retail outlets	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.33	0.00	0.33	0.00	0.00	0.00	0.83	0.00	0.17	0.00	0.00	0.17	0.67	0.00	0.00
Other amenities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Newspaper boxes	0.75	0.75	0.63	0.75	0.00	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.63	0.75	0.63	0.63	0.75	0.00	0.75	0.00	0.75	0.63	0.00
Lighting scale	1.00	0.00	0.50	0.00	0.50	0.00	1.00	1.00	0.00	0.50	0.50	0.50	0.50	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.50	1.00	0.00	0.00
Garbage cans	1.00	0.75	0.50	1.00	1.00	0.75	0.50	1.00	0.75	1.00	0.50	0.50	0.75	0.50	0.75	0.50	0.75	1.00	1.00	0.50	0.50	0.50	0.00	0.50
Public art & interpretation	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public art & interpretation	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Safety & Security	0.79	0.68	0.45	0.50	0.76	0.41	0.68	0.59	0.34	0.61	0.47	0.50	0.47	0.47	0.77	0.63	0.63	0.66	0.69	0.58	0.63	0.74	0.61	0.63
Safety	0.86	0.93	0.64	1.00	0.93	0.75	0.50	0.75	0.50	0.93	0.57	0.93	0.50	0.57	1.00	0.93	1.00	0.43	1.00	1.00	0.93	1.00	0.86	1.00
Natural surveillance	0.92	0.42	0.08	0.42	0.75	0.42	1.00	0.67	0.17	0.33	0.42	0.33	0.75	0.42	1.00	0.25	0.75	0.83	0.75	0.17	0.42	0.83	0.25	0.75
Maintenance	1.00	0.83	0.83	0.33	1.00	0.17	0.67	0.33	0.50	0.50	0.33	0.17	0.17	0.33	0.67	1.00	0.33	1.00	0.67	0.83	0.83	0.17	1.00	0.33
Dedicated surveillance	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Communication	0.00	1.00	0.50	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.50	0.00	1.00	0.00	0.00	0.00	1.00	0.50	0.00