Walkability of Three Downtown Vancouver Streets:
Evaluating the Physical and Perceptual Qualities of the Built Environment

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I would like to thank my dedicated supervisor, Dr. David Gordon, for his guidance, support, and feedback throughout the entire process of writing this report.

I also want to extend my gratitude to those in my class who gave their time, some unwillingly, to help me craft and edit this report. You know who you are.
Executive Summary

Walking is the simplest mode of transportation. It is free, convenient, requires no equipment, and is encouraged as part of a healthy lifestyle. Streets and sidewalks account for the majority of public space in a city and facilitate the mobility of automobiles, transit, pedestrians, and bicyclists. Far too often though, streets are designed for optimal vehicle efficiency, which overlooks the needs of pedestrians and undervalues the importance of a high quality walking environment. In order to accommodate rising automobile ownership and mitigate greater levels of congestion, improvements to mobility and changes to street design are often made at the expense of the pedestrian. It is therefore important that streets be planned and designed with all users in mind; one that provides an environment for pedestrians that is inviting, safe, aesthetically pleasing, and equipped with sufficient pedestrian amenities.

The objective of this report is to compare and assess the physical and perceptual qualities of the built environments of three downtown Vancouver streets: Granville St, Robson St, and Davie St. The observations and analysis specifically address the pedestrian aspects of a street. Through a walkability audit, this report examines how the presence of pedestrian features and streetscape elements affect the overall quality of a pedestrian environment. The research questions in this report include: 1) Focusing on the physical and perceptual qualities of the built environment, what pedestrian features and streetscape elements are either present of lacking on the three streets: Granville St, Robson St, Davie St? And, 2) How can the three streets be made more walkable and pedestrian-friendly through design?
RESEARCH METHODS AND EVALUATION CRITERIA
Three qualitative research methods were used to collect the information for this study: literature review and two forms of direct observation. The information collected from relevant literature and through direct observation was used to evaluate the physical and perceptual qualities of each street’s built environment. Direct observations were guided through the Pedestrian Environmental Data Scan (PEDS) audit tool, which is a walkability audit that provides a systematic assessment of a street’s physical environment. The PEDS audit tool consists of 36 criteria that are expected to affect walkability and the overall quality of a street’s pedestrian environment. The 36 criteria are grouped into five major sections: Environment, Pedestrian Facility, Road Attributes, Walking/Cycling Environment, and Subjective Assessment.

DATA ANALYSIS
A comparative evaluation of the observations and audit results was then performed in order to assess the physical and perceptual qualities of each street. The format of the PEDS audit tool provided a methodical approach and easily comparable structure to evaluate the presence and quality of pedestrian features on each street.

CONCLUSIONS AND RECOMMENDATIONS
Granville St
Granville St is an eclectic street that serves multiple functions and receives a high volume of pedestrian traffic both day and night. The reintroduction of a transit mall and limited availability of on-street parking provide for sufficiently wide sidewalks and a mix of pedestrian amenities (public benches, chairs, and street vendors). The pedestrian-oriented lighting builds upon the already illuminated character of the street and improves pedestrian safety at night. Along with the more functional features of the street, the use of distinct materials and unique design elements, such as the granite accents on the sidewalks, add visual appeal to the streetscape environment.

Overall, Granville St is equipped with a variety of pedestrian-oriented features and appears to be the most walkable of the three streets. However, direct observation and comparative evaluation have highlighted some areas of the streetscape environment needing improvement. The flexible parking poles on Granville St act as significant obstructions to pedestrian movement and waste valuable sidewalk space on select blocks. Despite obvious efforts to enhance the pedestrian environment through design elements and traffic calming techniques, Granville St could also benefit from
better defined crosswalks that provide a safer, more visible path for pedestrians when crossing the street. Lastly, the lack of street trees and greenery do little to break up the monotony of concrete and hard edges that dominate the appearance of the streetscape.

**Recommendations**

1) **Rethink flexible parking system**
2) **Make crosswalks more visible**

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**Robson St**

With an abundance of high-end stores and upscale eateries, Robson St attracts a high volume of pedestrian traffic and is one of Vancouver’s most famous shopping streets. The consistent building heights and mature street trees provide a relatively high degree of enclosure, help define the streetscape, and create a more human scale pedestrian environment. The presence of street vendors along Robson St, even in the winter months, adds vibrancy to the street.

Despite its popularity among tourists and locals, the pedestrian environment of Robson St is largely characterized by congested sidewalks of average quality with minimal pedestrian features. The Robson St sidewalks feel rather congested and narrow due to the large crowds and presence of path obstructions. Although it has a good selection of stores and restaurants to attract people to the street, Robson St provides very little in the way of pedestrian amenities that encourage people to stay. Robson St could benefit greatly by having more pedestrian-oriented features, such as public seating and street furniture. The overcrowded sidewalks are a clear signal that the pedestrian environment is insufficient and the needs of pedestrians are not being adequately met. The quality of the sidewalks in many areas is also an issue as tree root growth has
caused the sidewalks to heave, resulting in an uneven walking surface and an unsightly safety hazard.

At first glance, Robson St appears to be doing everything right in terms of its popularity and ability to attract thousands of people year round. Upon closer inspection, one will find that there is great potential for improvement when it comes to the pedestrian aspects of Robson St. In addition to being considered Vancouver’s most famous shopping street, Robson St has the potential to become Vancouver’s most popular pedestrian street.

Recommendations

1) Enhance pedestrian environment by widening sidewalks and narrowing road width
2) Use pedestrian amenities and design elements to make Robson St a destination street
3) Prevent future problems with uneven sidewalks by properly addressing street tree expansion

Davie St

Linking the West End with Yaletown, Davie St is located in the centre of the Davie Village in a much quieter, more residential part of downtown. The eclectic mix of restaurants, shops, and services along with the fact that Davie St is home to Vancouver’s LGBT community create a dynamic environment that is unique to Vancouver. That being said, the streetscape features and overall quality of the pedestrian environment are lacking in most areas and do not create an inviting walking environment. Building on its location, atmosphere, and eclectic charm and through some improvements to its streetscape, Davie St has the potential to become an attractive and memorable street.

Some sidewalk sections along Davie St feel narrow due to path obstructions and inadequate width. The overall lack of pedestrian amenities also prevents Davie St from being a highly walkable street. There are minimal pedestrian amenities that add any value to the streetscape environment, except basic garbage cans. With the exception of the sidewalk patios, there are no public seating options to allow people to sit and observe the activity on the street. Additionally, despite the amount of late-night activity that occurs along Davie St, it is surprising to not see any pedestrian-oriented lighting of any kind. For the most part, through observation Davie St looks and feels run down and generally neglected when compared to both Granville St and Robson St. The bright pink garbage cans and bus stops are the only unique physical features that add character and accentuate the Davie St streetscape. Although Davie St is seen as a popular neighbourhood hangout, the lack of pedestrian amenities and overall quality of the streetscape paint a much different picture.
Out of the three streets that were evaluated, Davie St was observed to be the weakest in terms of providing an environment that is inviting and accommodating for pedestrians. Streetscape improvements that focus on improving walkability would greatly enhance the quality of Davie St’s pedestrian environment.

**Recommendations**

1) **Add pedestrian amenities to the Davie St streetscape** (public seating, food vendors)
2) **Incorporate pedestrian-oriented lighting to add night-time ambience**
3) **Improve appearance of Davie St through streetscape beautification**

In conclusion, the presence of pedestrian features and the quality of a street’s pedestrian environment play a key role in the overall success of a street. Streets need to be planned and designed with all users in mind. In addition to the location, types of uses, and degree of social mix, the quality and level of walkability of a pedestrian environment depend heavily on the physical, designable characteristics of a street.

As a whole, Granville St appears to be more walkable with added pedestrian-oriented features, which can largely be attributed to the recent changes made through the Granville St Redesign. The redesign acknowledged the role pedestrians play in the success of Granville St and designed the street with the needs of pedestrians in mind. With a strong pedestrian focus, Granville St stands out as a street with a mixture of functional and aesthetically appealing features that create a comfortable and inviting streetscape of interest. This study has demonstrated that there is no one design fits all in terms of what makes a walkable, pedestrian-friendly street. The environment and physical make-up of each street is different and therefore requires its own design approach. What works on Granville St may not necessarily work in the context of Davie St or Robson St.

If Davie St or Robson St were to undergo any streetscape enhancements in the future, both could learn from the holistic approach used to redesign Granville St. It demonstrates that it is important to design streets for all relevant modes of transportation and to consider the often overlooked needs of pedestrians. This study has hopefully emphasized the importance of planning for pedestrians and provided useful insight into the quality of the pedestrian aspects of Granville St, Davie St, and Robson St.
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1 Introduction

Streets are an important part of every urban environment. They facilitate mobility and have a strong influence on the shape of a city’s urban form. Streets and sidewalks are the dominant public spaces in a city, which provide a framework for social interaction and community life (Jacobs, 1961; Gehl, 2010). Streets aid in the movement of automobiles, sewage, utilities, and clean water. They also facilitate pedestrian movement; however, the importance of planning for pedestrians is often undervalued and overshadowed by the needs of motorized modes of transportation (Litman, 2003). In order to accommodate rising automobile ownership and greater levels of congestion, improvements to mobility and changes to street design are often made at the expense of the pedestrian; the interests and safety of pedestrians are often outweighed by the benefits of improving automobile mobility and access (Lo, 2009).

In order to rebalance the functionality of street networks, individual streets need to be planned and designed with all users in mind. The complete streets movement takes a holistic approach to street design in an effort to produce streets that are safe, convenient, and inviting for drivers; bicyclists; public transit users; and pedestrians of all ages and abilities (Laplante and McCann, 2008). In contrast to the transportation planning practices that design streets for optimal vehicle efficiency, complete streets consider the needs of all modes of transportation in the planning process. The walking environment of a street and the needs of pedestrians are important factors to consider when designing a street.

Walking is part of most people’s everyday routine. It is the simplest mode of transportation, which is free, convenient, requires no equipment, and is encouraged as part of a healthy lifestyle (Forsyth & Southworth, 2008). Nearly every trip involves some walking. People walk to go to work, for exercise, to run errands, and for recreational purposes. Walking is also combined with other forms of transportation. Going from your car to your destination involves walking; accessing the nearest bus stop or train station, involves walking (Lo, 2009). It is therefore important that streets not only facilitate automobile movement but also provide an environment for pedestrians that is inviting, safe, aesthetically pleasing, and accessible, as well as equipped with sufficient pedestrian amenities.

Walkability is often described as a measure of how friendly an area is to pedestrians and typically accounts for the overall quality of walking conditions, including safety, comfort, and convenience (Litman, 2003). Past walkability research has predominantly focused on the macro-scale variables (population density, land use mix) and
socio-economic conditions of an area; however, there is a growing body of research with evidence to suggest that the built environment also has a significant effect on walkability and the quality of the pedestrian environment (Saelens and Handy, 2008). The qualities of the built environment, thought to have an effect on walkability, include the physical features (road width, sidewalk width, lighting, street trees, building heights) and the intangible, perceptual qualities (human scale, degree of enclosure, level of cleanliness, transparency) (Saelens and Handy, 2008). In response to this a number of observation-oriented audit tools have since been developed, which evaluate walkability based on the physical and perceptual qualities of a street’s built environment (Clifton, 2007). Understanding what makes a walkable street is paramount in creating cities that are more efficient, liveable, and sustainable.

The objective of this report is to assess the physical and perceptual qualities of the built environments of three downtown Vancouver streets (Granville St, Robson St, Davie St). The observations and analysis specifically address the pedestrian aspects of a complete street. Through a walkability audit, this report examines how the presence of pedestrian features and streetscape elements affect the overall quality of a pedestrian environment. Following a comparative evaluation of the three streets, recommendations will be made on how each street can be made more walkable and pedestrian-friendly through design.

1.1 RESEARCH QUESTIONS

In order to assess the quality of each street’s pedestrian environment and present recommendations on how to make them more walkable, the following questions have been posed:

1. **Focusing on the physical and perceptual qualities of the built environment, what pedestrian features and streetscape elements are either present or lacking on the three streets: Granville St, Robson St, Davie St?**

2. **How can the three streets be made more walkable and pedestrian-friendly through design?**

The following four chapters present the details of this report. Chapter 2 provides the contextual details of the study area and the background information on the three streets (Granville St, Davie St, Robson St). Chapter 3 outlines the qualitative research methods used in this study and provides a theoretical background to the set of evaluation criteria included in the PEDS audit tool. Chapter 4 analyzes the observations from the audit results and comparatively evaluates the quality of the each street’s pedestrian environment.
Chapter 5 draws upon the analyzed observations and provides conclusions about the quality of each pedestrian environment. From these conclusions, several recommendations will be made, which will discuss how each street can be made more walkable and pedestrian-friendly through design.
2 Setting the Scene

2.1 DOWNTOWN VANCOUVER CONTEXT

Vancouver continues to receive international admiration for its quality of life and achievements in urban planning. Much of this attention is directed towards the dynamic urbanism and built form in the downtown peninsula, which is one of the most compact urban centres in North America. Downtown Vancouver is blessed with spectacular natural surroundings and its urban fabric is characterized by densely packed towers, public waterfront, and urban greenery. Downtown Vancouver is often considered by many to be one of the most walkable and pedestrian-friendly areas of the city with a unique sense of place (Berelowitz, 2005; Punter, 2003).

There are many factors that have contributed to the walkability of downtown Vancouver that we see today. The establishment of an electric street car network in the 1890’s helped develop a fine grain of commercial streets and businesses in the downtown core (Berelowitz, 2005, Ch. 6). The traditional street cars may be a thing of the past but the resulting street network has remained relatively intact and has provided the underlying structure for Vancouver’s current urban form (Berelowitz, 2005). Densely packed buildings and consistent setbacks help define the street edges along many

Figure 2.1: West End neighbourhood in downtown Vancouver

Figure 2.2: Waterfront walking and cycling path in Coal Harbour
downtown streets (Berelowitz, 2005). Vancouver has been successful in achieving high urban densities without compromising the street environment (Gehl, 2010). In addition to the efficient street grid, the local population of downtown Vancouver also contributes to the level of walkability. From the apartment buildings in the West End to the sleek high-rise towers in Yaletown and Coal Harbour, over 75,000 people call downtown Vancouver home (Punter, 2003).

With higher residential densities and a large concentration of employment within close proximity to residential areas, downtown Vancouver provides an ideal environment for walking, cycling, and other forms of active transportation. To further illustrate the walkability of downtown Vancouver, a comparison of work trips by mode share is shown in Table 2.1. There is a significant contrast between the percentage of residents who choose to drive or walk to work between Vancouver and the downtown core. Due to the compact form and walkability of downtown Vancouver, 74% of residents walk to work, compared to 12% in Vancouver as a whole.

<table>
<thead>
<tr>
<th>Mode of Travel to Work</th>
<th>Vancouver (City)</th>
<th>Downtown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive</td>
<td>51%</td>
<td>10%</td>
</tr>
<tr>
<td>Public Transit</td>
<td>25%</td>
<td>10%</td>
</tr>
<tr>
<td>Walk</td>
<td>12%</td>
<td>74%</td>
</tr>
<tr>
<td>Cycle</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, 2006 Census data

Vancouver is a very green city, both in its sustainable initiatives and incorporation of urban greenery. Due to the temperate climate, tree-lined streets and lush greenery can be found throughout the city, which makes walking and cycling an attractive option year round (Punter, 2003). From the seawall that circumnavigates Stanley Park to the interconnected network of greenways and waterfront walking and cycling paths, downtown Vancouver provides for an accessible and attractive walking environment (Berelowitz, 2005).

In an effort to emphasize the importance of planning streets for pedestrians, this study compares the pedestrian environments of Granville St, Davie St, and Robson St. The location of each street segment and the audited portions of each street are illustrated in Figure 2.3. Granville St is audited between Davie St and Dunsmuir St; Davie St is audited between Broughton St and Burrard St and Robson St is audited between Jervis St and Hornby St. The following
sections provide the contextual details and background information pertaining to each street.

2.2 RATIONALE FOR THE CHOICE OF STREETS
The street segments in this study were chosen due to their location, popularity & prominence, and prevalence of pedestrian-oriented features. Purposeful sampling was used over random sampling in order to highlight key streetscape elements. All three streets are located in Downtown Vancouver and are among the most popular destination streets in the city. Granville St is in the heart of the city’s entertainment district, Robson St is considered Vancouver’s most famous shopping street, and Davie St is an eclectic and popular West End neighbourhood hangout. Although they all essentially function as commercial corridors or major retail streets within downtown Vancouver, there is significant variation between the physical, streetscape quality and pedestrian features of each. This variation in streetscape quality provides the foundation on which comparisons and recommendations will be formed in this study. By comparing a recently redesigned street (Granville St) with two relatively untouched streets (Davie St and Robson St), these three streets are ideal for carrying out a study of this kind, which seeks to evaluate and improve the walkability and overall pedestrian environments of three popular downtown Vancouver streets.
2.3 STREET CONTEXT

2.3.1 Granville St
Stretching from False Creek to Burrard Inlet, Granville St is one of the major north-south cross streets in downtown Vancouver. Located in the centre of the business and entertainment district, Granville St is an eclectic and vibrant street that attracts a wide range of people and activities throughout the year. This popular street serves a variety of purposes, depending on the block and the time of day. North of W Georgia St, Granville St is predominantly lined with office, commercial, and large-scale retail uses. South of W Georgia St, Granville St turns into the entertainment hub of downtown. This street comes alive particularly in the late night hours with its many nightclubs, live venues, and late night bars. There are 22 designated heritage buildings along this portion of Granville St, which adds to this street’s distinct identity and character.

Over the years, Granville St has undergone many transformations to its streetscape environment and the type of traffic it accommodates. In the 1970’s, Granville St was turned into a transit mall, which was designed to revitalize the street’s tired appearance and bring life back to the inner city. This was in response to the network of underground retail being established below several buildings along Granville St, which was expected to have a negative effect on the level of activity on the street; in the following years, the underground shops remained popular and Granville St struggled to compete (Roy, 1980). In the mid 1980s, after much debate and concern over the effect of limiting vehicle traffic on local businesses, a large majority of the Granville Mall was abandoned and Granville St was reconfigured to accommodate general purpose traffic (Kemble, 1989; Punter, 2003).

![Figure 2.4: Granville St streetscape looking north](image)

A redesign of Granville St from end to end was completed in November of 2009 in an effort to create a high-quality, pedestrian-oriented thoroughfare that encourages enhanced transit service,
pedestrian movement, and streetscape amenities (City of Vancouver, 2009). The transit mall concept was reintroduced with a strong focus on pedestrian-oriented features. In addition to the transit mall, some of the implemented changes include: wider sidewalks, flex parking, street furniture, and enhanced pedestrian lighting. The portion of Granville St between W Georgia St and Robson St also includes a flexible civic event space that can be used for public events, and street festivals.

A comparison of pedestrian and vehicle volumes is illustrated in Figures 2.5, 2.7, and 2.10. The available data is sourced from the City of Vancouver’s 2001-2002 Pedestrian Study and Open Data Catalogue. Pedestrian volumes were collected between the periods of 10am to 2pm and 3pm to 6pm and vehicle volumes were collected at peak hours. For the most part, Granville St appears to accommodate a higher volume of pedestrians per day when compared to vehicle volumes. As you travel north along Granville St, there is a substantial increase in the volume of pedestrian traffic and a gradual decrease in vehicle traffic.
2.3.2 Davie St

Davie St is a popular neighbourhood hangout and east-west cross street that connects the heart of Yaletown with English Bay in the West End. The main commercial portion of Davie St is located between Burrard St and Jervis St, which also acts as the spine of the Davie Village. This area is also home to Vancouver’s LGBT community and contains an eclectic mix of restaurants, shops, services, and hotels. Catering to a diverse clientele, the Davie Village is a popular destination for both tourists and local Vancouverites.

Multiple 24-hour stores and businesses provide convenience and attract people from all over the downtown. Low-rise commercial uses account for the majority of building types along this portion of Davie St, which helps create a small, neighbourhood feel in the heart of a bustling downtown. The neighbourhoods adjacent to Davie St contain many medium and high-rise apartment buildings. As an important link between the residential portion of the West End and the main business and employment centres, Davie St accommodates its fair share of pedestrian and vehicle traffic.

A comparison of pedestrian and vehicle volumes on Davie St is shown in Figure 2.7. In contrast to Granville St, there is considerably less pedestrian traffic on Davie St. The volume of vehicles is consistent along the main stretch of the Davie Village and is fairly comparable to both Granville St and Robson St. The higher pedestrian traffic between Burrard St and Bute St can be attributed to the commercial uses that are concentrated in this area.

Figure 2.6: Typical storefronts along Davie St
Setting the Scene

10

Davie St

2.3.3 Robson St

Robson St is a popular retail strip that connects the West End with the heart of downtown. It offers a seemingly endless display of stores, people, and urban life and is often seen as Vancouver’s most famous shopping street (Kemble, 1989). Robson St has a long history as a commercial corridor in downtown Vancouver; in the 1890’s local shops lined the streetcar tracks that ran along the street (Robson Street Business Association, 2009). Over the decades, the street transitioned into popular brand name stores and high end restaurants. In addition to the many upscale stores and boutiques, an eclectic mix of specialty shops and ethic restaurants can be found along the lengths of Robson St. The many sidewalk cafes and restaurant patios add to the street life and atmosphere that characterize Robson St year round.

Robson St sidewalks are consistently full of tourists and bag-totting shoppers in search of the latest fashion trends. The demand for this prime retail space is reflected in the high retail rental rates that make Robson St one of the most expensive commercial streets in the country. Robson St is consistently recognized for the quality of shopping and entertainment it provides. Often considered the show
off street, it will likely continue to be the street to see and be seen on in Vancouver.

East of Howe St, Robson St intersects many busy cross streets where large scale commercial uses and mixed use residential towers dominate the streetscape. West of Howe St, along the main shopping portion of Robson St, ground level retail, hotels, and medium-rise residential buildings line the street. For the entire length of Robson St, there are two travel lanes with one parking lane on either side.

A comparison of pedestrian and vehicle volumes on Robson St is shown in Figure 2.10. As a reflection of its reputation as a popular retail strip, the volume of pedestrians along much of Robson St are some of the highest in the downtown core (City of Vancouver, 2002). Similar to Davie St, the volume of vehicles along Robson St is fairly consistent but still dwarfed by the sheer volume of pedestrians. The highest pedestrian volume on Robson St (39,303) is found between Hornby and Burrard St, which connects Granville Square with the main retail strip of Robson St.
Figure 2.10: Robson St
Comparison of Pedestrian and Vehicle Volumes
Adapted from: City of Vancouver, 2010;
City of Vancouver, 2002

<table>
<thead>
<tr>
<th>Location</th>
<th>Pedestrians</th>
<th>Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robson St</td>
<td>14,872</td>
<td>3,593</td>
</tr>
<tr>
<td>Bute St to Thurlow St</td>
<td>25,588</td>
<td>3,375</td>
</tr>
<tr>
<td>Thurlow St to Burrard St</td>
<td>23,218</td>
<td>3,173</td>
</tr>
<tr>
<td>Burrard St to Hornby St</td>
<td>39,303</td>
<td>2,633</td>
</tr>
</tbody>
</table>

Robson St
3  Research Methods and Evaluation Criteria

This chapter will begin by outlining audit tools as a research method with an explanation of the specific type that will be used in this report. This will be followed by a discussion of the audit tool criteria, which will provide the theoretical background behind the criteria. In addition, this section will outline the various qualitative data collection and data analysis methods that will be used to address the research questions. The final section of this chapter will outline the research limitations and explain how issues regarding validity, generalizability, and reliability will be addressed.

3.1  DEFINING AUDIT TOOLS

Audit tools are used in a range of applications to collect user perceptions and evaluate how different environments influence people’s travel behaviour. Some are designed for academic research, while others are geared more towards community engagement. There is also variation in the method of analysis. Some are purely qualitative while others can include a quantitative component.

Due to the growing interest in active living and the greater concern for the quality of public spaces, researchers have created a number of audit instruments that focus on the streetscape environment and measure the physical features that relate to walkability (Active Living Research, 2004).

Audit tools are a systematic observational method, which require an observer to collect data in person within a specified environment (Brownson, 2009). The researcher is typically instructed to drive, ride a bicycle, or walk the area of observation. The extent of the observations, depending on the type of audit, can consist of entire neighbourhoods, parks, trails, or single street segments. Following any observational directions specified in the audit, the observed characteristics are coded and later evaluated based on definitions and standardized criteria (Brownson, 2009). In terms of recording observations, some audits provide only a pencil and paper option while others include a hand held electronic format; the preferred option will depend on the level of detail being observed and the ability of the researcher. There is also considerable variation in the level of detail measured by each audit tool; some focus only on a couple of features while others are more in depth and include dozens of features that address many different environmental characteristics (Brownson, 2009).

The Irvine Minnesota Inventory and the Neighbourhood Environment Walkability Scale (NEWS) are examples of other audit
tools that are available to evaluate different aspects of walkability. Each audit tool is unique in that there is variation in the scope of observations and method of analysis. The Irvine Minnesota Inventory is a comprehensive audit tool that examines the impact of the built environment on levels of physical activity and walkability. This particular audit also includes a quantitative component to the analysis. The NEWS audit tool uses a questionnaire style tool to measure the perception of neighbourhood design features that are thought to be related to walkability. The focus of the observations and audit results will vary depending on which audit tool is used (Active Living Research, 2004).

3.2 ABOUT THE PEDS AUDIT TOOL

The audit tool used in this study is the Pedestrian Environment Data Scan (PEDS) audit tool, which was modelled after the Australian template: the Systematic Pedestrian and Cycling Environment Scan (SPACES) Instrument. This particular audit tool was chosen for its focus on the physical and perceptual qualities of a street’s built environment. It also includes a straight-forward approach, which provides an effective framework to analyze the audit results and compare different pedestrian environments.

The PEDS audit tool is designed to be a systematic assessment of the physical environment that evaluates the presence and qualities of streetscape features hypothesized to influence walkability (Active Living Research, 2004). Through on-site assessments, auditors make observations of the environment against specific criteria. The PEDS audit tool was created by a team of urban planning and health researchers: Dr. Kelly Clifton, University of Maryland; Andria Livi, University of Maryland; and Daniel Rodriguez, University of North Carolina. Its development was supported through a research grant from The Robert Wood Johnson Foundation Active Living Research Program.

The PEDS audit tool includes 36 criteria, which are grouped into five major sections: Environment, Pedestrian Facility, Road Attributes, Walking/Cycling Environment, and Subjective Assessment. (See Appendix C). Within each section, there are predominantly closed-ended questions (Likert scales and check boxes) with a few open-ended questions to incorporate researcher comments and opinions. The PEDS audit tool is specifically designed to evaluate street segments, which consist of both sides of one street block. Conducting the audit is a straight-forward process with easily repeatable steps. A map of the street segment is used as reference when making observations. Before any observations take place, the date, time, and street segment location are noted on the audit form. Researchers are advised to walk and observe the entire
segment once without writing anything down to get familiar with the environment and better understand the physical context of the street. During the second walk along the segment, each criterion is addressed and the observations are recorded on the form. To thoroughly complete each criterion, the protocol encourages researchers to go back and forth along the street segment multiple times. Any additional notes about non-traditional features or irregularities about the street segment are noted on the form as well. To start another street segment, the entire process is simply repeated. Once all of the audits are completed, a comparative analysis can be performed to evaluate the different pedestrian environments.

3.3 THEORETICAL BACKGROUND OF AUDIT CRITERIA

Within each of the four major sections of the PEDS audit tool, there are multiple criteria questions that focus on a different component of a pedestrian environment. Each criterion is based upon extensive research and literature to reflect environmental features that are considered to be key attributes of pedestrian environments that affect walkability (Active Living Research, 2004).

3.3.1 A: Environment

Section A, Environment, deals with streetscapes features that are less tangible but still important to consider when evaluating the quality of the pedestrian environment.

The uses present along a street are often a good indicator of the resulting quality of the pedestrian environment. Greater attention is being focused towards promoting mixed uses and understanding how they affect the pedestrian environment. A variety of land uses stimulate a variety of activities and provide the foundation for a lively street (Moughtin, 2003, p. 132). A mixture of uses along a street allows people and activities to interact at different times throughout the day (Jacobs, 1961). Fostering an environment that allows people to live, work, and play in the same area creates strong social diversity and an economically stimulating environment that can positively influence the associated pedestrian environment (Jacobs, 1961, p. 162).

The slope of a street can have a dramatic affect on the overall walkability of a street. A street with little to no slope is more accessible and is considered more inviting to walk on than one with a steep slope. A street with a gentle slope or slight change in grade can give way to a view, which can add visual interest and drama to
the streetscape environment; short of being a steep incline, the right amount of slope can add interest and appeal to a street that is lacking in substance (Jacobs, 1993). As illustrated in Figure 3.1, many streets in San Francisco are excellent examples where the steepness of the street has benefitted the popularity of the street. On the other hand, in areas where weather related issues can cause pedestrian hazards, such as slippery roads and icy sidewalks, the steepness of the street can deter pedestrian traffic.

The type of intersection can also affect the quality of a street’s pedestrian environment. In addition to accommodating vehicle traffic, intersections break up the physical footprint of a block; shorter blocks create frequent corners, which makes it easier for pedestrians and other forms of active transportation to access different parts of a city (Jacobs, 1961, p. 181). Streets that terminate with a dead end discourage pedestrian use. Cul-de-sac and dead-end streets force pedestrians to take a circuitous route and go out of their way to access what should be a short walking distance.

### 3.3.2 B: Pedestrian Facility

The type of pedestrian facility depends on the surrounding environment and the activities that will occur along it. Informal, dirt paths or trails are typically not aligned with a street and are often found in natural settings, parks or greenways, residential communities, or recreational environments. Paved paths or sidewalks are designed for high levels of pedestrian traffic and are usually provided adjacent to or parallel with a roadway. Sidewalks and walkways are considered key components of pedestrian-friendly streets and should allow pedestrians to experience safety, accessibility, comfort, and efficient mobility when walking along them (OTAK, 1997). In addition to simply accommodating pedestrian movement, streets and sidewalks are also the most prominent public spaces in a city (Jacobs, 1961, p. 29). Effective pedestrian facilities should provide an environment that encourages positive public interaction and efficient mobility.

![Figure 3.1: Sloped street in San Francisco, CA](Source: [www.pps.org])
The material of the pedestrian facility also influences pedestrian comfort and can affect the level of walkability (Gehl, 2010, p. 132). Sidewalks should have an even, non-slip surface that is comfortable for people of all ages to walk on. Accessibility and durability are key factors to consider when determining the type of path material to use. Sidewalks can also be made of materials that are more visually appealing and are chosen because of their aesthetic character.

The width of the pedestrian facility contributes significantly to the quality of the pedestrian environment and overall level of walkability on a street. To create a comfortable and inviting walking environment, the path or sidewalk should be wide enough to provide sufficient room for people to walk without bumping into other people or being pushed off the curb. When cars are given priority on the street, sidewalks are more of an afterthought and are often too narrow and overcrowded (Gehl, 2010). Consideration to the volume of vehicle and foot traffic is needed when determining the level of separation needed between vehicle and pedestrian traffic (Moughtin, 2003).

Sidewalks are meant to be for pedestrian use. However, pedestrians must share this space with a long list of obstacles and street hardware, much of which is required for traffic control matters (Fruin, 1971). The presence of obstacles can greatly affect the quality of the pedestrian environment. In order to create a comfortable and enjoyable walking experience for pedestrians, the pedestrian facility should be clear of unnecessary obstacles and physical interruptions. Traffic signals, lamp standards, parking equipment, planters, bus shelters, and all kinds of technical and utility hardware have unfortunately become part of the pedestrian landscape (Gehl, 2010). Careful consideration needs to be taken when considering the placement of objects within the path or sidewalk. Things that are designed to be pedestrian amenities (e.g.

![Figure 3.2: Utility box as path obstruction](image)
bicycle racks, newsstands, payphones), can become path obstructions and impede the flow of pedestrians when poorly placed on the sidewalk (Gehl, 2010).

People of all ages and abilities should have access to the amenities and services of a city. Curb cuts or curb ramps are intended to provide a smooth transition between the surface of the road and the surface of the sidewalk. They are designed for pedestrian accessibility and are located at marked crosswalks and intersections.

Pedestrians need safe and convenient access to facilities both along sidewalks and paths and across roadways. Sidewalks that are complete and connected to crosswalks and other sidewalks promote walkability and encourage use. Interconnected streets with multiple pedestrian connections offer direct routes with minimal out-of-direction travel (Moughtin, 2003).

3.3.3 C: Road Attributes

The condition, features, and size of a roadway can have a significant effect on the quality of the pedestrian environment. A pedestrian’s sense of safety is greatly affected by the volume and speed of traffic.

The separation of pedestrian and vehicle traffic is an ongoing issue in planning that deserves careful consideration in order to create safe and inviting pedestrian environments (Whyte, 1988, p. 68). On-street parking is a common form of parking found along many streets, as shown in Figure 3.3. This type of parking functions as a buffer between pedestrian and vehicle traffic. By slowing the speed of traffic, the presence of parked vehicles helps to create a safe walking environment.

On residential and commercial streets alike, residential homes and businesses often have driveways and vehicle entrances that access the main road. These driveways reduce the utility and continuity of sidewalks and can lead to pedestrian-vehicular conflicts in high traffic areas (Fruin, 1971).

Traffic control devices are used to reduce traffic speed through roadway design features. Traffic circles, speed bumps, and chokers are all examples of traffic calming measures, which are designed to enhance the pedestrian environment. Chokers, also known as curb extensions or curb bulbs, are a widening of the sidewalk at intersections and mid-block crossings to reduce the pedestrian crossing distance and improve the ability of motorists and
pedestrians to see one another (National Centre for Bicycling & Walking, 2002). This traffic control device lessens the time that pedestrians are exposed to oncoming traffic and provides additional space for street furniture and pedestrian amenities.

Crosswalks are found at most street intersections and designate the area where pedestrians are permitted to cross the roadway. An area with more crosswalks and sidewalk connectivity provides better pedestrian access and fosters a more walkable environment. In addition to crosswalks, there are other forms of crossing aids that are used by pedestrians. Types of crossing aids can include, pedestrian signals, overpasses/underpasses, flashing warning lights, and pedestrian crossing warning lights. While many of these features are designed to make things easier for pedestrians, some actually end up benefiting the car (Whyte, 1988). Pedestrian overpasses are a good example of a crossing aid that gives priority to the car over the pedestrian. The flow of traffic is essentially
uninterrupted by forcing pedestrians to climb up and over the roadway. Similarly, pedestrian flashing warning lights, while relatively simple, only warn drivers in advance of potential pedestrians crossing without actually making them stop (OTAK, 1997).

Integrating bicycle facilities into the street network is an important component of a high quality pedestrian environment. Bicyclists represent another form of foot traffic that also promotes more active, sustainable, and lively cities (Gehl, 2010). Just as pedestrians require sidewalks and paths to walk on, bicyclists need networks and facilities that are incorporated into the standard street network (Gehl, 2010). Depending on the level of use, on-road bicycle facilities can include striped bicycle lanes, wide curb lanes, paved shoulders, or separated bicycle lanes.

3.3.4 D: Walking/Cycling Environment
The elements of a street along with the overall image of the streetscape contribute to the quality of the walking and cycling environment. To create an inviting environment for both pedestrians and cyclists, streets should encourage walking and bicycling, foster a sense of community, and create opportunities for increased levels of physical activity (National Center for Bicycling & Walking, 2002).

The quality of the walking & cycling environment needs to be considered both during the day and in the evening. Adequate lighting should be provided for both vehicle traffic safety and pedestrian facilities. Proper lighting improves the sense of safety, reduces pedestrian accidents, and enhances the image of the area (Fruin, 1971). In order to create a comfortable and safe walking environment, an effective lighting design should provide uniform light distribution on the road or sidewalk surface (Fruin, 1971).

Achieving the appropriate amount of amenities on a street has a significant effect on the quality of the walking & cycling environment. Providing too many amenities along a street can add unnecessary sidewalk clutter and is a poor use of money and resources; conversely, providing too few amenities can make a space uninviting. Successful pedestrian spaces provide a variety of amenities in appropriate locations in an effort to encourage people to remain (Moughtin, 2003, p. 132).

Well-designed pedestrian amenities should be safe, aesthetically pleasing, convenient, and easy to use; amenities that reflect the needs of users not only enhance the streetscape environment but also encourage greater use of non-motorized transportation (National Center for Bicycling & Walking, 2002). The placement of
benches and public seating should consider the level of activity in
the area and the benefits of social interaction. Benches are often
located on streets and in public spaces to punctuate architectural
photographs and are designed to look good in plan-view (Whyte,
1988). It is also common for benches to be isolated from one
another and evenly spaced along the street (Whyte, 1988).

The design of public garbage cans can range from more portable
plastic or wire containers to permanent steel or concrete
containers. Similar to public benches, garbage cans are often
inefficiently located; more often than not, they are evenly spaced
along a street and are found in the same proportion on blocks with
high trash loads as on blocks with low trash loads. The functionality
of the container also depends on the size of the opening and the
capacity of the container (Whyte, 1988). Garbage cans that are too
small or poorly placed can result in over-flowing garbage and traces
of litter on the street or sidewalk. Small openings or door flaps are
often used to keep out rodents, rain, and undesirables. Designed to
conceal the trash and odour, this design feature can often
discourage use.

Wayfinding aids typically consist of directional signs or maps that
provide navigational assistance to people who may be unfamiliar
with the area. To ensure wayfinding aids are effective, it is
important to understand the information requirements of
pedestrians and bicyclists when navigating (May, 2003). While
simple street signs may be enough to give some pedestrians a sense
of direction, more detailed wayfinding signs noting identifiable
landmarks and distances may be required to assist more complex
navigational decisions. Effective wayfinding also helps to enhance
the confidence and trust of pedestrians who are unfamiliar with
their surroundings (May, 2003). Wayfinding signs must be large
enough to include enough helpful information without becoming
obstacles that contribute to visual clutter.

Often one of the most eye-catching and memorable parts of a
pedestrian environment are the trees that line the street. Trees
establish spatial boundaries for outdoor spaces and can provide a
sense of scale using texture and structure (Arnold, 1993). Planting
trees is a relatively inexpensive option to improve the pedestrian
environment of a street. Along with creating shade for a
comfortable walking environment, trees can become a functional
element on a street, acting as a visual buffer between pedestrians
and vehicles (Jacobs, 1961). The type of tree used, their placement
along the street, and the associated maintenance are all important
factors to consider when dealing with street trees (Jacobs, 1961).
The quality of the pedestrian environment is also influenced by the level of building articulation. The variation and cohesiveness in building facade design, both horizontal and vertical, help to create interesting and inviting streetscapes (Gehl, 2010). Building articulation can also influence the perception of walking distance; buildings with primarily narrow, short facades make the length of the street seem shorter and more manageable whereas buildings with strong, unified horizontal lines reinforce distance (Gehl, 2010). Creating strong building articulation, particularly on the ground floor, adds visual interest and creates a sense of place for pedestrians. Bringing visual interest to eye-level supports pedestrian activity and creates a pleasurable walking environment. Streets or public spaces with little to no building articulation can result in an environment that is perceived as unsafe and uninviting. Depending on the height of the building, articulation in building design can help frame and define the street (Gehl, 2010). Successful pedestrian spaces require a balance between buildings that visually dominate the street and buildings that have diverse facades, styles, and design treatments (Moughtin, 2003).

Building heights and sidewalk setbacks play a key role in shaping the image of the pedestrian environment. Achieving the proper ratio of street width to building height is a critical factor in good street design (Moughtin, 2003, p. 140).

The success of a street also depends on the level of public transportation that is provided. Bus stops are common on many streets and the type of stop or shelter that is provided affects the quality of the pedestrian environment. Depending on the climate of the region and the level of usage, bus stops typically consist a sign, a bench, or a shelter. A bus stop with inadequate facilities can create an uncomfortable waiting environment and discourage use.
3.4 DATA COLLECTION METHODS

In order to collect information for this study, three qualitative research methods were used: literature review and two forms of direct observation. The information sourced from the background literature and through direct observations was used to assess the audit results and comparatively analyze the pedestrian environments of each street. To support the observations, photographs and maps were used to demonstrate key pedestrian features and represent any contextual characteristics that pertained to each street segment. The following sections describe the purpose of each data collection method and how they were incorporated into the overall research design.

3.4.1 Literature Review

The information that was gathered in the review of relevant literature was drawn upon to give context to the general research topic, provide background to the criteria sections, and develop a better understanding of audit tools as a qualitative research method. In order to provide a well rounded foundation of information about streetscapes and elements of pedestrian environments, multiple sources of evidence were referenced from relevant literature in the field.

In review of relevant literature, a base of supporting information was formed to provide a solid understanding about the various components of the pedestrian environment and what contributes to streetscape quality. In addition to helping shape the research design of this study, the various sources of literature also gave context to the features being observed through the audit. In the data analysis portion of this report, the background information will again be drawn upon to give significance to what was observed and substantiate the final conclusions and recommendations.

The process of reviewing relevant literature is a widely used and trusted qualitative research method. Along with the clearly focused criteria and use of frequently referenced literature, this aspect of the data collection process helps create external validity.

3.4.2 Direct Observations

In this report, direct observation was the primary data collection method. Within this method, two forms of direct observation were used to collect information about the selected streetscapes: the PEDS audit tool and photographs. Together, these forms of direct observation were used to observe the streetscape features that were present on each street segment and assess the quality of the pedestrian environment.
The 36 criteria of the PEDS audit tool give the researcher a general direction in terms of what to observe; by specifying the streetscape features and facilities to focus on, the direct observations in this report were considered semi-structured. Each street segment required a separate audit form. The step-by-step nature of this type of audit tool provided a methodical approach to observe and later evaluate each streetscape. The PEDS audit tool also provided a detailed audit protocol, which informs researchers and outlines the procedural measures to be followed (see Appendix B). By following the operational steps and procedural template of the audit tool, this method creates research consistency and strong reliability.

Another form of direct observation that was used in the data collection stage of this report included the use of photographs. Photographs were used throughout the report to visually portray and provide context to the observed streetscape features.

Photographs and visual aids are intended to be used alongside other sources of evidence and not simply inserted as redundant representations of what is already written (Rose, 2007). In order to help answer the research questions, the photographs incorporated into the report need to be well documented and in the end serve a purpose.

Additionally, images from Google Street View were used to provide support for personal observations and photographs. Incorporating these images alongside the photographs taken in early January will provide the reader with a sense of what the streetscape environment is like in another season.

When direct observation is being used to gather information, the issue of subjectivity and construct validity come into question. Audit tools are inherently subjective as they are designed to collect people’s perceptions about different environments. By drawing from multiple sources of evidence, this form of data triangulation addresses construct validity, subjectivity, and provides multiple perspectives on the same issue (Yin, 2009). A strong background of supporting literature also helps to inform the researcher when evaluating environments and reduces researcher bias when analyzing the data.

3.5 DATA ANALYSIS METHOD

The information gathered through direct observation along with the background literature was used to analyze the streetscape features and pedestrian environments of each street. With the research questions in mind, the audit results were analyzed and discussed in a way that displays a resulting chain of evidence (Yin, 2009, p. 128). The audit results from each street section were compared against
each other to assess the streetscape features, noting any similarities or differences between the pedestrian environments of each street. The structure and format of the audit makes the criteria easily comparable. In addition to the data collected through direct observation, the background information from section 3.3: Theoretical Background of Audit Criteria was also drawn upon to analyze and compare the observations. Together these data analysis methods provided the basis upon which the recommendations for future streetscape improvements were made.

The same method of analysis was used for each street segment. Although the findings of this study were not intended to be generalizable to streets in general, the analytic approach was applied to several locations, which creates internal validity.

3.6 LIMITATIONS OF RESEARCH METHODS AND STUDY PARAMETERS

The purpose of this report is to assess the presence of physical streetscape features and evaluate the quality of each pedestrian environment. A comparable, four to six block portion of each street was examined and acted as the geographic extent of each street section. Direct observations took place between December 30th and January 6th, 2011. The direct observations and the basis for the analyses focused on the physical streetscape features and did not address the socio-economic issues or macro-level variables that may have had an impact on the quality of the pedestrian environments. Although inferences and observations were made about the patterns of movement and pedestrian usage along each street, this is still considered a non-participatory study of the pedestrian environment.

In order to validate the extent of this study, the research limitations need to be acknowledged. Typically, audits are administered by a group of people. This group usually consists of either a research team or members of the local community; in addition to the logistic coordination, this type of study typically involves a significant time commitment. However, due to the limited time allotted for data collection in this study, only one auditor was used to observe and evaluate the pedestrian environments.

The PEDS audit tool was conceived, designed for, and implemented for American environments. Given the similarities in culture and built environments between Canada and the United States, the three Vancouver street sections were considered an appropriate application for this type of audit tool. The PEDS audit tool is a qualitative research tool. Other tools that include a more
quantitative approach may be more appropriate for evaluating the existing and future capacity of pedestrian facilities.

Considering these research limitations, it is important to understand that the conclusions and recommendations that come out of the data analysis process are only representative of the case study streets and are not meant to be generalized to streets in general.

3.7 RESEARCH PROTOCOL
This last section outlines the major components used to undertake this study. Organizing the study components into a step-by-step format and creating a flow of information creates construct validity and strengthens the reliability of this report. Understanding how the different parts are connected and how the various sources of evidence connect to the final conclusions and recommendations facilitates the replicability of this study.

**Background Information:**
- Streetscape design literature
- Walkability and pedestrian planning literature
- Audit tools as a research method

**Report Topic and Research Questions:**
- Identify issue to be addressed
- Form research question(s)
- Establish significance of topic and relevance to planners

**Devise Research Approach:**
- Data collection methods
- Data analysis methods

**Data Collection:**
- Direct observations: PEDS audit tool, photographs
- Perform audit for each street segment, assessing each criteria question.

**Data Analysis:**
- Create audit result comparison tables
- Analyze observations and audit results from the three street
- Evaluate the quality of each street’s pedestrian environment and provide implications for walkability

**Conclusions and Recommendations:**
- From the data analysis, draw conclusions for each street and answer the research questions
- Provide recommendations for each street - How can each street be made more walkable and pedestrian-friendly through design?
4 Comparative Evaluation and Data Analysis

The PEDS Audit tool guided on-site observations of the three streets. The pedestrian environments were evaluated on 36 criteria under the five major sections (Environment, Pedestrian Facility, Road Attributes, Walking/Cycling Environment, and Subjective Assessment). Each section that follows identifies and compares the streetscape features of each street and how they affect the quality of the pedestrian environment, using the PEDS criteria sections.

4.1 ENVIRONMENT

The environment of a street can help shape the overall feel of a street and the surrounding neighbourhood. The types of uses along a street can have a significant effect on the activities that occur on the street and the resulting quality of the pedestrian environment.

4.1.1 Uses in Segment

All three of the streets are major commercial corridors in their respective neighbourhoods. Although each street contains a mix of Restaurant/Cafe/Commercial, Office/Institutional, and Housing, the spatial arrangement and quality of uses have a different effect on each street. Granville St is predominantly lined with a mix of late-night commercial establishments, live performance venues, and retail stores. There are hotels and residential high rises along the north and south ends of the street. Although Granville St is pretty calm during the day, the street comes alive with activity in the evening and late-night hours.

The main commercial portion of Davie St is located in the Davie Village between Burrard St and Jervis St. Along this portion, the uses include: small shops, restaurants, hotels, and residential buildings. As a popular neighbourhood hangout, the mix of uses in the Davie St Village provides convenient amenities to the surrounding residential neighbourhoods. Located away from the central business

Figure 4.1: Live performance venues and theatres on Granville St
and entertainment hub of the downtown, the uses along Davie St are more small scale, which contributes greatly to the local, neighbourhood feel of the area. Additionally, there are a number of 24 hour commercial establishments along the street. In contrast, Robson St is a busy, upscale shopping street where brand name retail stores and restaurants are the dominant uses. With only a few residential buildings among the mix, the majority of activity on Robson St involves retail shopping and dining. The commercial establishments on this street are of a higher quality, which is a direct reflection of Robson St’s high-profile location and reputation.

4.1.2 Slope
Adding to the atmosphere of a street, the presence of a slope can affect the overall pedestrian environment. The slight slope of Granville St adds some interesting drama to the streetscape, especially at night when lit up and viewed from the bridge or at the Robson St intersection. The grade of the street creates a comfortable walking environment and does not make walking or cycling difficult or strenuous. With no noticeable slope on the observed sections of either Robson St or Davie St, the pedestrian environments are not significantly affected.

4.1.3 Segment Intersections
In terms of the type of intersection, all three streets contain four-way intersections between each street segment. Given the consistent street grid in the downtown, all of the streets contain short blocks with cross streets at every intersection, which facilitates the flow of both vehicle and pedestrian traffic. Four-way intersections provide good connectivity to other streets and increase the overall accessibility to surrounding areas of downtown.

4.1.4 Summary and Evaluation of Environment
By comparing the audit results, as shown in Appendix A, the three streets appear to be quite similar with many of the same environmental characteristics; however, through comparative
evaluation it becomes clear that each commercial street serves a slightly different function and creates a unique pedestrian atmosphere. With very little variation in slope or type of intersection, the biggest difference between the three streets comes down to the type of uses present. The uses along Granville St attract a younger crowd with greater activity occurring in the evening. Robson St is a popular, high end shopping corridor that experiences a heavy volume of tourists and shoppers throughout the day. Davie St contains small shops and neighbourhood restaurants and provides the basic essentials for the surrounding neighbourhoods.

4.2 PEDESTRIAN FACILITY
The pedestrian facility, whether it is a concrete sidewalk or gravel path, is the foundation upon which all other pedestrian amenities or features are located. The width, material, distance from curb, and presence of obstructions are just a few of the variables that can affect the quality of the overall pedestrian environment.

4.2.1 Type[s] of Pedestrian Facility & Path Material
Beyond just being a surface to walk on, sidewalks can add character and visual interest to an otherwise underwhelming street. All three streets have concrete sidewalks, which is a commonly used paving material due to its durability. Standard concrete sidewalks were observed along the full length of both Davie St and Robson St. Granville St, due to the redesign, has exposed aggregate concrete sidewalks with ribbon-like granite bands that add unique visual interest to the sidewalk surface, as illustrated in Figure 4.3. Unlike the sidewalks of Davie St or Robson St, the Granville St sidewalks have added texture and contrasting materials, which helps set it apart from other streets in the downtown.

![Figure 4.3: Enhanced sidewalks on Granville St](image)
4.2.2 Path Condition/Maintenance
In addition to the path material, the quality of the sidewalk itself has a significant effect on the overall quality of the pedestrian environment. The relatively new sidewalks along Granville St consistently rated in good condition as they contained little to no cracks, bumps, or holes. In comparison, the condition of the sidewalks along much of Robson St and Davie St were less consistent. Some blocks rated as good while others rated as fair to poor, as they showed significant signs of wear and tear. The poor quality of some of the sidewalk sections can be attributed to the roots of the street trees. Not given enough room to grow, the roots cause the sidewalk slabs to lift and heave, which creates an uneven walking surface and a serious tripping hazard for pedestrians. The cracks and heaves are usually repaired with asphalt, which can result in an unsightly patchwork. A further discussion of street trees and uneven sidewalks can be found in section 4.4.4.

4.2.3 Path Obstructions
Path obstructions have unfortunately become permanent fixtures on most streets. Pedestrian amenities such as newspaper boxes, garbage cans, and lamp poles all serve a function or provide a service to pedestrians; however, when improperly placed, they can become more of a nuisance and can detract from the quality of the pedestrian environment. The flex parking poles along Granville St, as shown in Figure 4.4, are an example of a streetscape improvement that has resulted in a negative effect on the quality of the pedestrian environment. The purpose of the poles is to designate parking spots. In the evening, parking becomes prohibited and the sidewalk doubles in width. The vehicles may be gone but the network of poles is left behind to impede pedestrian movement.

Figure 4.4: Flex parking poles as path obstructions on Granville St
The presence of utility boxes, store displays, and restaurant patios can also act as path obstructions. The benefits of a wide sidewalk are greatly diminished with the presence of path obstructions, which take up valuable space and encroach upon a pedestrian’s comfortable walking environment. With the narrower sidewalks of Robson St and Davie St, path obstructions become much more of an issue. With an average width of approximately 3.2m (10.5ft), the sidewalks of Davie St are not very wide to begin with. With the presence of path obstructions (planters, store signs, large patios), this width is reduced even further, which causes a crowded walking environment and creates pedestrian bottlenecks along some sections.

### 4.2.4 Buffer between Road and Path

Parallel parked cars are a common element along many downtown streets. The full length of both Davie St and Robson St are lined with parked cars throughout much of the day. Although rows of vehicles may be considered an unsightly part of a streetscape, in the right application, they can provide an effective separation between vehicle and pedestrian traffic. When vehicles are not parked next to the curb, there is no buffer between the sidewalk and the roadway on either Robson St or Davie St.
Along a significant portion of Granville St, including the transit mall, the curb is quite low and there is no buffer. When combined with the reduced volume of traffic, the low curb edge facilitates mid-block crossing. With its central location and good access to public transit, Granville St can justify not having parked cars along every block. As part of the overall redesign, there was great effort put towards selecting elements and materials that are durable and capable of withstanding significant wear and tear. Having grass, landscaping, or bushes along this type of street would translate into increased maintenance costs and would prevent the street from being opened up during special events.

4.2.5 Path Distance from Curb
In addition to measuring sidewalk width, observations were made regarding the distance between the sidewalk and the road. Similar to a buffer, the distance of the sidewalk from the road can create a separation between vehicles and pedestrians. All three streets had sidewalks that were right next to the curb with no distance in between. In the case of Granville St, keeping in mind the large crowds that spill onto the street at night and during special events, having the sidewalk butt up against the road seems appropriate. For both Davie St and Robson St, the width of the sidewalk is too narrow along most blocks to include any significant distance between the sidewalk and the road. Having the sidewalk at the edge of the road also allows easy access to parked cars.

4.2.6 Sidewalk Width
The width of a sidewalk affects pedestrian comfort and the overall quality of the pedestrian environment. The Robson St sidewalks range from approximately 2.7m (9ft) to 6m (20ft) in width, depending on the block. Although some sidewalk sections of Robson St are wider and more accommodating than the average.

Figure 4.7: Busy Robson St sidewalks
commercial street, the width of the sidewalk seems inadequate for the high volume of foot traffic Robson St experiences. When you account for the lost sidewalk width due to path obstructions, the walkable portion of the street becomes narrower still.

The Davie St sidewalks are consistently 3.2m (10.5ft) wide and suffer from many of the same issues as those along Robson St. While it does not experience the same volume of foot traffic as Robson St, the Davie St sidewalks are also quite narrow with many

**Figure 4.8**: Cross section comparison – Typical cross section of Robson St, Davie St and two from Granville St
path obstructions. Having to constantly weave in and out of crowds or dodge oncoming people makes for an unpleasant walking experience and signals that the sidewalk is too narrow.

As previously mentioned in the section on path obstructions, the width of the sidewalk is further reduced with the presence of obstacles such as planters, newspaper boxes, and restaurant patios. Although restaurant or cafe patios add to the life of a street, without proper planning or sidewalk compensation, they can crowd the sidewalk and negatively affect the pedestrian environment.

In contrast to both Davie St and Robson St, Granville St is fortunate enough to have extra wide sidewalks, which range from 5.8m (19ft) to 7.6m (25ft) in width. Even with the relatively high volume of foot traffic, which is quite common along much of Granville St, the wide sidewalks provide a comfortable walking environment, as shown in Figure 4.9. The inviting sidewalks provide ample room for pedestrians to not only walk in both directions but also stop and sit in certain areas. The wider sidewalks are mainly due to the reintroduction of the transit mall and the fact that there is no on-street parking. A comparison of pedestrian and vehicle volumes can be found in Table 4.2.

<table>
<thead>
<tr>
<th>Table 4.1: Sidewalk Width Comparison</th>
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<tbody>
<tr>
<td>Granville St</td>
</tr>
<tr>
<td>Average sidewalk width</td>
</tr>
</tbody>
</table>

Figure 4.9: Wide sidewalks along Granville St between W Georgia St and Dunsmuir St
4.2.7 Curb Cuts, Sidewalk Completeness/Continuity, & Sidewalk Connectivity to other Sidewalks/Crosswalks

Given the downtown location and context of the three streets, there were no observable variations in regards to the presence of curb cuts, sidewalk completeness/continuity, or sidewalk connectivity to other sidewalks/crosswalks. Every intersection had sufficient curb cuts and there were no areas where the sidewalk was discontinuous. Every cross street also had sidewalks that connected to each of the selected streets. With continuous sidewalks and curb cuts, the sidewalks of Granville St, Davie St, and Robson St provide good pedestrian accessibility and street connectivity. People are thus given multiple opportunities to access or exit these streets.

4.2.8 Summary and Evaluation of Pedestrian Facility

In terms of pedestrian facilities, the factors that had the greatest effect on the pedestrian environment included: the condition of the sidewalk, the width of the sidewalk, and the presence of path obstructions. Overall, due to the redesign, the pedestrian environment of Granville St appears to have higher quality features that are more accommodating to the needs of pedestrians. The more decorative sidewalks along Granville St are in much better condition when compared to the other two streets. Cracks and uneven sidewalk slabs are prevalent along many parts of both Robson St and Davie St, which are aesthetically unappealing and pose a safety concern. Compared to the relatively narrow and heavily obstructed sidewalks of Robson St and Davie St, the extra wide sidewalks on Granville St create a comfortable and inviting walking environment. Addressing some of these concerns along Davie St and Robson St would significantly enhance the quality and appeal of the pedestrian environments.

4.3 ROAD ATTRIBUTES

Although the sidewalk may be viewed as the most important element in a pedestrian environment, the roadway and its many characteristics also have a significant effect on streetscape quality and the overall pedestrian environment. Accommodating both vehicle and pedestrian traffic in a mutually beneficial manner is a difficult balancing act that many streets struggle with.

4.3.1 Condition of Road

All three streets had roads that were observed to be in good condition with very few bumps, cracks, or holes. The road surface along Granville St is in particularly good shape due to the recent redesign, which included road resurfacing. Similarly, the road surfaces on both Davie St and Robson St looked to be well maintained with no areas in need of repair. The lane markings were also in good condition along all three streets. The quality of the road surface directly reflects upon the quality of the streetscape.
4.3.2 Number of Lanes

Just as sidewalk width contributes to a comfortable walking environment, the number of lanes and the resulting width of the roadway also affect the pedestrian environment. Both travel lanes and parking lanes were considered when observing the minimum and maximum number of lanes to cross the street.

A comparison of the number of lanes and total right-of-way for each street are presented in Table 4.3 and 4.4. Along much of Granville St, from Smithe St to Dunsmuir St, pedestrians have to only cross two lanes of traffic. Due to the wider sidewalks and absence of on-street parking, the distance it takes for a pedestrian to cross from one side of Granville St to the other is significantly reduced. This encourages pedestrian movement across the street and enhances pedestrian safety. South of Smithe St, Granville St widens to four lanes of general traffic. The additional two lanes widen the distance between the sidewalks and increase the time a pedestrian is exposed to oncoming traffic. In this case, the flexible parking spots that are provided on the sidewalk surface contribute to increased pedestrian safety. Acting as a curb bulge, the wider sidewalks that accommodate parked cars essentially narrow the actual road width from six lanes to four.

The width of the roadway of both Davie St and Robson St are quite comparable. Both streets are four lanes wide with two travel lanes and two parking lanes. In the daytime there are only two travel lanes; however, during peak traffic hours along certain segments of both streets, the two parking lanes become travel lanes. Unlike Granville St, which only provides parking on the flexible sidewalk surface, both Davie St and Robson St provide on-street parking. As a result, during certain times of the day, pedestrians must cross four lanes of traffic to cross these streets. Even with marked crosswalks...

<table>
<thead>
<tr>
<th>Table 4.2: Number of Lanes Comparison</th>
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<tbody>
<tr>
<td>Travel lanes</td>
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<td>--------------------------------------</td>
</tr>
<tr>
<td>Parking Lanes</td>
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<tr>
<td>Total Lanes</td>
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<tr>
<th>Table 4.3: Total Right-of-Way Comparison</th>
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<tr>
<td>Typical Sidewalk width</td>
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<td>Granville St</td>
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<tr>
<td>Typical Road Width</td>
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<tr>
<td>Granville St</td>
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<tr>
<td>Typical ROW width</td>
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<tr>
<td>Granville St</td>
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</tbody>
</table>
and the presence of crossing aids, wide streets with multiple lanes act as a barrier to pedestrians and can create an unfriendly environment.

4.3.3 Posted Speed Limit

In addition to the width of a street and the number of lanes it takes a pedestrian to cross from one side of the street to the other, the speed at which traffic is moving is an equally important factor to consider when evaluating the quality of the pedestrian environment.

The speed limit of any road within a municipality in B.C. is 50 km/hr unless otherwise posted. This is the case for all three streets. No speed limit signs were observed along the segments that were audited. The speed of traffic coming off the Granville St Bridge onto Granville St and into the rest of downtown appeared to be faster than 50 km/hr. The southern portion of Granville St experiences a relatively high volume of traffic when compared to the rest of Granville St and therefore felt less pedestrian-friendly. Further up Granville St, along the transit mall and into the flexible civic event space between W Georgia St and Robson St, traffic volume and vehicle speed was significantly lower.

Similar to Granville St, both Davie St and Robson St do not have a posted speed limit; however, in contrast to Granville St, traffic moves at a much slower pace along both Robson St and Davie St. The constant activity and presence of parked cars seems to slow
down traffic. Vehicles are forced to slow down due to the high turnover of parked cars along the main commercial portions of both Robson St and Davie St. On Robson St in particular, vehicles are also forced to slow down in response to jaywalkers.

4.3.4 On-Street Parking
As previously referenced in earlier sections, the presence or absence of on-street parking along a street can have many implications for the quality of a streetscape that go beyond just providing a convenient parking option. Granville St is free of parked cars from Dunsmuir St to Smithe St along the transit mall. South of Smithe St is where public parking is provided through the new flexible parking system. When permitted, vehicles park in between street trees on an extension of the sidewalk. In the discussion of path obstructions, the effect of the flexible parking lane on pedestrians was put into question. Although the sidewalk is wider, the presence of bollards, street trees, and various other pieces of street furniture turn this space into an urban obstacle course. During evening site visits when cars were prohibited from parking, pedestrians seemed to keep to the regular portion of the sidewalk where there were less path obstructions. Although it does offer a sizable separation between vehicles and pedestrians, it adds little to the quality of a pleasurable walking environment.

Figure 4.12: Flex parking spots on Granville St
Figure 4.13: Flexible parking poles placed throughout sidewalk environment along Granville St
Both Davie St and Robson St provide traditional on-street parking, which is controlled through parking meters. With very few off-street parking facilities adjacent to these two streets, there is relatively high demand for these on-street parking spots. The parked cars also act as a buffer between vehicles and pedestrians, which increases pedestrian safety. In many cities, the availability and location of parking is a contentious issue. Businesses and local BIA’s are traditionally strong supporters of either maintaining or increasing the supply of on-street parking. Pedestrians and active transportation supporters, on the other hand, view parked cars as an unsightly part of a streetscape.

4.3.5 Off-Street Parking Lot Spaces
Off-street parking options can include: parking structures, surface parking lots, or underground garages. None of the audited streets had a significant amount of off-street parking within a close proximity; however, parking structures and underground garages can be found on nearby streets. Along parts of Granville St, some businesses did provide customer parking in the alleyways. Space permitting, alleyways are an effective way to provide parking and hide unsightly utilities. Along the length of Robson St, there were no off-street parking lot options. On Davie St, the Shoppers Drug Mart is the only exception, which provides 34 off-street parking spaces between the building and the sidewalk. The off-street parking lot and larger building setback of the Shoppers Drug Mart does not blend in with the rest of the streetscape and changes the character of this part of Davie St.

4.3.6 Must You Walk Through a Parking Lot to Get to Most Buildings?
Given the high-density nature of much of downtown Vancouver, there were very few instances along any of the three streets where buildings had to be accessed through a parking lot. There are no parking lots on Granville St and the overall presence of cars is minimal. As previously mentioned in section 4.3.5, the Shoppers Drug Mart on Davie St is the only location where a building is accessed through a parking lot. This reflects a more suburban style development and does not compliment the narrow building facades common along the rest of the street. Having parking lots between a building and the sidewalk can create a less pedestrian-friendly environment as cars begin to dominate the landscape.

4.3.7 Presence of Medium to High Volume Driveways
Pedestrians have to be extra vigilant when walking along a street that has multiple driveways or access roads. Having pedestrians cross paths with vehicles can pose a significant safety concern. Only those driveways with a significant volume of traffic were included in the audit; residential driveways were not included. On Davie St, the
gas station at Burrard St and the Shoppers Drug Mart were the only locations where a medium to high volume driveway crossed the sidewalk. On Robson St, a hotel access road was the only instance where a driveway was observed. Granville St did not have any medium to high volume driveways to pose a concern for passing pedestrians.

4.3.8 Traffic Control Devices
Traffic control devices, crosswalks, and crossing aids are all elements of a streetscape that contribute to pedestrian safety. Each element plays a different role in managing the interactions between vehicles and pedestrians. Traditional traffic signals can be found at every intersection of Granville St, Davie St, and Robson St. With the exception of the intersection of Bute St and Davie St, the traffic signals are all fixed time signals that cycle in sequential order without pedestrian push buttons. To cross the street, pedestrians have to wait for the lights to change. Some view this arrangement as giving priority to vehicle traffic as pedestrians must wait for vehicles to pass. Others view the push button as false pedestrian amenity as they often do not affect the timing of the traffic signal and require pedestrians to essentially apply to cross the street (Gehl, 2010).

4.3.9 Crosswalks & Crossing Aids
Crosswalks come in a few variations depending on the street location and context. Two of the most common types of crosswalks are illustrated in Figure 4.14 and Figure 4.15. The simple two-line crosswalk, Figure 4.14, is often found at intersections where motorists are expected to stop for pedestrians. They designate the area in which pedestrians should cross the street. The other type is the zebra crosswalk, Figure 4.15, which is usually found near schools, mid-block crossings, and at intersections that are deemed to be dangerous to cross. The striped pattern is an attempt to make the pedestrian crossing area more visible to approaching motorists. Many of the intersections along Granville St use contrasting materials to mark crosswalks in place of painted lines. The contrast between the asphalt and the exposed aggregate crosswalk at these intersections is fairly indiscernible. At night, this contrast is further diminished. This may be a case where aesthetics over function has a negative effect on pedestrian safety.

Beyond the painted, two-line crosswalks, all three streets have minimal crossing aids to assist pedestrians in crossing the street safely. All of the crossings have the traditional pedestrian crossing signals (white man, amber hand) with only a select few equipped with audible signals. While many of the side streets had curb
extensions, there were none on Granville St, Davie St, or Robson St. Similar to the fixed time signals, which put cars ahead of pedestrians, the overall lack of crossing aids further demonstrates the improvements that could be made to increase pedestrian importance and safety along these three streets.

4.3.10 Bicycle Facilities

The location and provision of bicycle facilities are important to consider when designing a streetscape. The growing bicycle culture in Vancouver contributes to the need of adequate bicycle facilities.

Bicycle racks were the only type of bicycle facility that was observed on all three streets. Granville St had a few different styles of bicycle racks depending on the block. Oversized coils were found near Dunsmuir St, which could accommodate multiple bicycles. Smaller bicycle racks were found south of W Georgia St, which could only handle two bikes at a time, as shown in Figure 4.16. This type of bicycle rack is found, in varying styles, throughout Vancouver, as it takes up less room on the sidewalk than traditional bicycle racks. South of Robson St, for the most part, the availability of bicycle racks of any kind was few and far between. Also, considering Vancouver’s weather, it is surprising that none of the bicycle facilities are sheltered from the rain. Beyond the provision of bicycle racks, no other bicycle facilities (bicycle lanes, bicycle route signs) were observed along the audited sections of Granville St.
Davie St and Robson St also had minimal facilities that addressed the needs of bicyclists. Several different types of bicycle racks were found sporadically along Robson St and Davie St. When the racks were fully utilized, bicyclists were forced to use parking meters or street sign poles to lock up their bicycles. This is direct evidence that there is either a lack of bicycle racks or they are put in the wrong location. As no bicycle lanes exist on either street, bicyclists are forced to share the road between moving traffic and parked vehicles. This creates a serious safety concern as bicyclists have to manoeuvre between opening car doors and moving traffic. As a result, the minimal safety measures and lack of bicycle facilities creates an uninviting and unfriendly cycling environment that only appeals to the most risk-averse bicyclists. Safer bicycle routes and convenient facilities would encourage more people to access the streets by bicycle.

4.3.11 Summary and Evaluation of Road Attributes
Referring to Appendix A, the audit results appear to show little variation between the three streets in terms of road attributes. The main features that set these three streets apart include the number of lanes, the presence of parked cars, and crossing aids, or lack thereof. The narrower road width and minimal amount of on-street parking on Granville St allow for wider sidewalks and provide ample room for pedestrian facilities. Parked cars line both sides of Davie St and Robson St, which results in a wider road width and increases the time pedestrians are exposed to traffic. Pedestrian safety at crosswalks is a major concern for all three streets. Traffic signals and simple crosswalks are present at every intersection; however, there is a significant lack of crossing aids or features that address pedestrian safety. Overall, the road attributes of Granville St create a more inviting and pedestrian-friendly environment, when compared to either Davie St or Robson St.

4.4 WALKING/CYCLING ENVIRONMENT
There are a variety of streetscape features that contribute to the overall walking and cycling environment. From the path lighting and
trees that line the sidewalk to the height and articulation of building facades, environmental elements can provide many benefits to the pedestrian environment of a street.

### 4.4.1 Roadway/Path Lighting

The quality of a streetscape and the activities that occur along it can change dramatically from daytime to nighttime. Proper lighting plays a key role in the success of this transition. Cities install street lights primarily for the safety of motorists and pedestrians. Some street lights are made to illuminate the road surface while others are designed specifically to cast light onto the sidewalk and pedestrian environment. A good combination of all-purpose and mood lighting can extend the usable hours of a street and create a safe and inviting space for people to enjoy.

All three of the streets varied in their level of roadway or path lighting. Although all of the streets provided sufficient roadway lighting, only Granville St had effective path lighting for pedestrians. The Granville St redesign included a number of different lighting techniques. In addition to traditional street lights, a repeating pattern of light-rods provides enhanced pedestrian lighting. Running the entire length of Granville St in various heights, this form of accent lighting adds visual interest to the already illuminated character of the street, as illustrated in Figure 4.17 and Figure 4.18.
The effect of the light-rods combined with the glow of the historic theatre and live performance venue signs, creates a striking and memorable streetscape.

For the most part, Davie St and Robson St only have road-oriented lights. Robson St does have small spot lights that are directed towards the sidewalk; however, they are not continuous along the street and their effect is quite insignificant. The lack of pedestrian-oriented lighting on Robson St is somewhat compensated by the glow of the interior lights of the retail stores. Unfortunately, the stores along much of Davie St do not have the same effect and therefore the sidewalks and overall pedestrian realm are poorly lit in some areas. By only providing road-oriented lighting, vehicles are given priority on the street and pedestrians are left with an environment that can feel unsafe and uncomfortable for walking at night.

4.4.2 Amenities

The extent to which pedestrians and visitors are encouraged to remain on a street depends heavily on the quality and availability of public amenities. The design, placement, and prevalence of amenities such as benches, garbage cans, public art, and street vendors contribute greatly to the success of a pedestrian environment.

Permanent benches and chairs, street vendors, and garbage cans are some of the public amenities found along the sidewalks of Granville St. Most of these amenities are a result of the recent streetscape redesign. The benches and chairs along Granville St, as illustrated in Figure 4.19 and Figure 4.20, provide pedestrians and shoppers with a variety of seating options. Benches are often the token gesture of streetscape designs. Far too often they are pushed to the edge of a space and usually face into traffic. The benches along Granville St however come in multiple configurations and the chairs are set in groupings that face in different directions. Public space analysts commonly prefer movable seating; however, considering the late night activity on Granville St, durability a key priority.

Garbage cans were found regularly along Granville St, usually at the ends of each block. Some of the garbage cans were overflowing with trash scattered on the ground. This may be a related to the garbage cans being too small, too few garbage cans for the amount of pedestrian traffic, or the frequency of garbage pickup. Street vendors were clustered near the north end of the flexible civic event space near W Georgia St, which is a busy cross road for pedestrian traffic. Buskers and street performers were occasionally found along the other blocks of Granville St.
When compared to Granville St, the availability of public amenities along Davie St and Robson St pales in comparison. Although neither street has had the streetscape improvements like those on Granville St, the most basic public amenities are still lacking. Garbage cans, similar to those along Granville St, in size and design, were found evenly spaced along both Davie St and Granville St. Not counting the bus stop benches, there was not one bench along either Davie St or Robson St for public use. Food vendors and buskers are a common sight along Robson St, as they cater to the steady flow of shoppers and office workers that frequent this area. Despite being a local neighbourhood hotspot, the same cannot be said about Davie St, which was void of street vendors of any kind. The time of year when the observations were recorded may have affected the presence of street vendors. Without adequate seating or amenities to use, pedestrians and other visitors to the street are less likely to remain on the street.

4.4.3 Are There Wayfinding Aids?

From simple street signs to directional maps, wayfinding aids are another streetscape feature that can contribute to a comfortable walking environment. All three streets had a sufficient supply of the traditional street name signs at intersections and major crossings. Due to the Olympics, additional wayfinding aids are now a permanent element along Granville St, Davie St, and Robson St.
Approximately 100 information signs were installed throughout the downtown to provide wayfinding assistance, as shown in Figure 4.21. Information about Olympic venues and directions to major attractions were provided on these signs. Since the Olympics, these highly visible signs have been changed to include a 10 minute walking radius, location of major destinations, and directions to public transit. This type of wayfinding aid helps first time visitors feel more comfortable exploring the downtown without carrying a map or asking for directions. With a consistent wayfinding system throughout downtown, navigating different neighbourhoods becomes easier and people are able to visualize the overall street network more easily.

### 4.4.4 Number of Trees Shading Walking Area

The presence of trees along a street can contribute greatly to the pedestrian environment. Where appropriate, street trees can provide shade, add greenery to an urban setting, and help define an outdoor space. Green is often considered a calming colour and the leaves also help to filter and modulate direct sunlight. Trees can also provide movement and life to streets that are dominated by hard textures and concrete surfaces.

Compared to many other urban centres in Canada, like those in Calgary or Toronto, downtown Vancouver has a strong tradition of tree lined-streets. From the cherry trees in the West End to the orderly rows of trees in Yaletown, street trees are a common feature on Vancouver streets. Trees are present along all three of the observed streets. During the redesign process, many of the mature trees along Granville St were replaced with smaller trees on select blocks. The trees are not old enough yet to provide shade or add sufficient greenery to the street but over time they will fill in

![Figure 4.21: Wayfinding signs found on all three streets](image)
the surrounding streetscape. Given the scale of Granville St, it may have been more appropriate to plant larger, more mature trees. This would create a more dramatic streetscape and could have helped soften the hard edges of the street. The flexible civic event space is void of any trees or greenery. Despite the bustling crowds that fill this space on a regular basis, the blank wall of the Sears building and lack of greenery make this space feel quite stark and empty.

Unlike Granville St, both Davie St and Robson St are lined with mature trees. The trees along Davie St are not consistently spaced with some blocks having more trees than others. The trees along Robson St are equally spaced and fairly dense along the main commercial portion. With the lower building heights along both Robson St and Davie St, the street trees are a dominant feature of the streetscape without being overgrown or overpowering. When including trees in a street design, the size of the tree guards needs careful consideration. Failing to properly accommodate future tree growth can affect the health of the tree and can result in uneven sidewalks that require ongoing maintenance. This is the case for many of the trees along Robson St, as illustrated in Figure 4.22. As a result of not providing enough room for root growth, the sidewalks have begun to lift, which has caused a serious tripping hazard and safety concern for pedestrians. The patchwork of repairs also detracts from the aesthetic appeal of the streetscape and reflects poorly on the quality of the pedestrian environment.

Figure 4.22: Uneven sidewalks caused by inadequate tree pits and constricted tree roots (Robson St)
4.4.5 Degree of Enclosure

Good, walkable streets are thought to have a sense of enclosure. There are many qualities of a street and the surrounding built environment that can affect the degree of enclosure. These can include the height and mass of buildings in relation to the width of the street, the number of openings along the street, and the presence of street trees. The degree of enclosure felt on a street can also impact a pedestrian’s sense of safety and comfort.

<table>
<thead>
<tr>
<th>Table 4.4: Building Height to Street Width Ratio Comparison</th>
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<tbody>
<tr>
<td>Height to width ratio (typical block)</td>
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<td>---------------------------------------</td>
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<tr>
<td>1:1.5 to 3:1</td>
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There is not a consistent sense of enclosure along Granville St. The wide variation in building heights prevents a strong sense of enclosure along many of the blocks. Also, the new street trees are too small to provide any sense of natural enclosure. On average, the building height to street width ratio on Granville St ranges from 1:1.5 to 3:1, as shown in Table 4.5. Only the portion North of Robson St, where there are mature trees and the building heights are more uniform, is there any significant degree of enclosure.

The narrower road width and more uniform building heights along Robson St help to create a stronger sense of enclosure. The streetscape is also defined by the mature trees, which also provide a natural sense of enclosure. The building height to street width ratio is fairly consistent at 1:2 along most Robson St. The sense of enclosure on Davie St is lacking as the low building heights and presence of open lots create a monotonous and somewhat dull pedestrian experience. As a result, the building height to street width ratio is approximately 1:4.5. On the other hand, Like Robson St, Davie St benefits from the mature tree canopies that shelter and partially enclose the pedestrian environment. The concept of scale and the degree of enclosure help people feel comfortable in a space and relate to the streetscape environment. The building height to street width ratio is one tool to evaluate the level of enclosure.

4.4.6 Powerlines Along Segment?

Powerlines and utility poles are a common element along most streets, urban or suburban. Some streets have exposed powerlines and utility poles while others relocate them to alleyways or bury them underground. The location of powerlines on a street can significantly affect the look and feel of a streetscape.

Granville St has its main powerlines, transformers, and utility poles located in the adjacent alleyways between Howe St and Seymour St.
Removing these unsightly elements from the streetscape reduces the amount of street clutter and improves the overall appearance of the street. Robson St and Davie St have some minor wires running along the North side of the street with some located in the adjacent alleyways. Present on all three streets are the powerlines and overhead wires for the electric trolley buses. Electric trolley buses are more efficient, produce fewer emissions, and are quieter than gasoline or diesel buses; however, one of the disadvantages of this type of system involves the unsightly overhead wires and transfer points that can become an unsightly, chaotic mess at intersections. An example of this can be found at the intersection of Robson St and Granville St, as shown in 4.23. These wires create visual clutter and negatively affect the aesthetic appeal of a pedestrian environment. Unfortunately, the benefits of having quieter, more efficient buses come at the expense of the aesthetic quality of the streetscape.

4.4.7 Overall Cleanliness and Building Maintenance

The level of cleanliness and the condition of the buildings along a street reflect directly on the associated pedestrian environment and the character of a street. For the three streets that were observed, the level of overall cleanliness and building maintenance varied. Depending on the block, the presence of litter and overall cleanliness along Granville St ranged from good to fair. For the most part, there was virtually no litter or damaged facilities observed North of Robson St. South of Robson St, the presence of garbage and dirt along the sidewalks was more prevalent. The quality of the buildings and the perceived level of maintenance also changed.
depending on the location along Granville St. The location and frequency of garbage cans also affected the level of cleanliness and amount of overflowing garbage on the sidewalk.

The overall cleanliness and building maintenance along Robson St was consistently good. Despite the large volume of foot traffic this street accommodates on a daily basis, the amount of litter or damaged facilities was minimal. Additionally, the building facades are in great shape and well maintained. As an upscale commercial street with high end retail stores and restaurants, the appearance of the built environment is an important element in attracting customers. A clean street that is well maintained, regardless of its age, is attractive to pedestrians and helps create a comfortable and pleasurable walking environment. In contrast to Robson St, the overall cleanliness and building maintenance along much of Davie St was predominantly rated as fair to poor. In terms of the cleanliness of the sidewalks and the condition of the buildings, Davie St is definitely started to show its age, as shown in Figure 4.24. While not overrun with litter and graffiti, the pedestrian facilities were observed to be run down and fairly dirty. The presence of faded signs and dated storefronts also reflects the lower standard of building maintenance along Davie St. A dirty or poorly maintained street becomes uninviting to pedestrians and may be perceived as unsafe.

4.4.8 Articulation in Building Designs

The level of building articulation along a street is affected by how well the building designs and architectural elements come together to create a unified streetscape of interest. Architectural details and design cohesiveness play a key role in determining the character and atmosphere of a street. The treatment of surfaces, edges, and building mass all affect the level of building articulation.
Granville St is one of Vancouver’s most recognizable streets. It is home to a diverse mix of heritage structures, glass-clad buildings, and modern high-rises. Although each building is unique and has interesting architectural or design elements, when put side by side, the result can appear somewhat mismatched. The variation in building heights along Granville St also significantly affects the degree of building articulation. Although the Granville St streetscape may not be the most highly articulated, the mix of building designs reflects the eclectic character of the surrounding neighbourhood. Regardless of the perceived level of building articulation, Granville St will likely continue to be a popular downtown destination street.

The buildings along Robson St are more cohesive and come together to create a complementary streetscape. The majority of the buildings are under two stories, with the exception of a few high-rises. Although there is also a mix of building styles and architectural details along Robson St, the repetition of glass store fronts helps tie the streetscape together. The streetscape along Davie St is very much dominated by awnings and store signs, which is common for many neighbourhood commercial streets. Most of the buildings along the Davie Village portion of Davie St are only one storey tall. With very little of the building facade visible from the street, there

Figure 4.25: Comparison of typical building heights along: Granville St (top), Robson St (middle), and Davie St (bottom)
are minimal design elements along Davie St to contribute to a high level of building articulation.

4.4.9 Building Setbacks from Sidewalk
The buildings along both Granville St and Robson St are located at the edge of the sidewalk and therefore there are no building setbacks along either street. Although the building facades are staggered along the blocks, all of the businesses and storefronts are directly accessible from the sidewalk. With the exception of the Shoppers Drug Mart, all of the buildings along Davie St are also located at the edge of the sidewalk. Having minimal setbacks provides greater accessibility to shops and businesses and facilitates window shopping.

4.4.10 Building Height
Building heights along a street can have a dramatic affect on the streetscape environment. Views, sun exposure, and the scale of a street are all affected by building heights. The building heights along Granville St fluctuate from two to six storeys in the south end to twenty plus storeys north of Robson St. During on-site observations, the buildings seemed to be proportional to the width of the road. This variation in building heights also creates visual interest and provides pedestrians with a stunning viewscape. Taller buildings can also act as landmarks and wayfinding aids for people navigating the streets.

The majority of the buildings along both Robson St and Davie St are significantly lower than those of Granville St. The buildings along Robson St are predominantly two to four storeys. The buildings along Davie St are mainly one storey tall. Each street has one or more high-rises that tower over the street. The low building heights along both Davie St and Robson St provide maximum sun exposure and allow sunlight to flood the street. Taking full advantage of natural sunlight can dramatically improve the walking environment of a street.

4.4.11 Bus Stops
Bus stops come in many forms and are common elements of accessible streets. From a simple sign to a shelter to protect transit riders from the elements, bus stops contribute to the overall success of a pedestrian environment. Due to the recent redesign, Granville St is equipped with bus stops with shelters at every stop. Stops that experience a higher volume of riders had larger shelters. The sleek steel and glass shelters provide a bench for sitting and shelter from the wind and rain. Having used this style of bus stop in inclement weather many times before, it appears that the shelter design favours style over function. With the angled roof and only a
back and one side, this style of bus shelter does little to protect people from blowing rain, which can be common in Vancouver.

The same style of shelter is used on both Davie St and Robson St. Adding to the unique identity of the Davie Village and acknowledging the prominent LGBT community in the area, the bus shelters are painted bright pink. This splash of colour adds some much needed colour to an otherwise plain looking streetscape. Although bus shelters are an important pedestrian facility for transit users, when poorly placed on the pedestrian path, they can become path obstructions. This is the case on a couple blocks of Davie St and Robson St. With much narrower sidewalks, the bus shelters are sometimes located directly in the middle of the sidewalk. Having to navigate around the bus shelter can create pedestrian bottlenecks. To address this issue, some of the bus shelters on Davie St do not have the side wall, which allows people to walk more freely past them. Unfortunately, this in turn further reduces the effectiveness of the bus shelter.

Figure 4.26: Sleek bus shelters that offer minimal protection from wind and blowing rain (Granville St)

Figure 4.27: Modified bus shelter on Davie St that adds character to the streetscape
4.4.12 Summary and Evaluation of Walking/Cycling Environment

The walking/cycling environment of each street is affected by the presence of different amenities and the characteristics of the built environment. The streetscape features in this section were analyzed for their affect on the overall walking/cycling environment of each street. A detailed comparison of the audit results can be found in Appendix A. The pedestrian-oriented lights provide effective path lighting and complement the already illuminated character of Granville St, whereas Robson St and Davie St only provide road-oriented lighting. Granville St was also the only street to provide public seating in the form of benches and permanent groupings of chairs. On the other hand, only Robson St and Davie St had mature trees lining their streetscapes. The lack of mature trees on much of Granville St had a significant effect on the degree of enclosure felt on the street. Davie St showed visible signs of wear and tear and an overall lack of cleanliness, which reflects poorly on the walking/cycling environment. Robson St however, benefits from a highly enclosed streetscape, good overall cleanliness, and consistent building designs. In general, the walking/cycling environments of Granville St and Davie St, in varying degrees, rated better than that of Davie St.

4.5 SUBJECTIVE ASSESSMENT

Based upon the site visits, a subjective assessment was made about the overall walking and cycling environment of each street. Considering the elements of the pedestrian environment that were observed and the overall streetscape, each street was evaluated on two things: how attractiveness the street was for walking and cycling and how safe it felt for walking or cycling.

4.5.1 Granville St

Overall, Granville St has a fairly attractive streetscape with a lot of unique, eye catching elements. This provides for a pleasurable walking and cycling environment. It is definitely a destination street in the downtown core and the crowds are evidence of its popularity. The recent upgrades to the street, as a result of the Granville St redesign, have only enhanced the pedestrian environment. In terms of safety, with its wide sidewalks and reduces vehicle traffic, pedestrians can feel safe walking along the sidewalks of Granville St. On the other hand, Granville St does not feel very bike friendly. Although there are some bicycle parking facilities along the street, Granville St does not have dedicated bicycle lanes and is not a heavily used bicycle route in the downtown.

4.5.2 Robson St

Robson St is also an attractive street with its own personality and character that make it memorable for many different reasons. The
rows of mature trees and well maintained buildings provide a comfortable and attractive walking environment. Evidenced by its reputation as being the street to see and be seen on, Robson St has always been and will continue to be popular with tourists and locals. If there were more bicycle facilities provided on the street, Robson St would also be attractive for bicyclists; however, many bicyclists avoid Robson St due to the lack of bicycle lanes. In terms of safety, Robson St feels very safe, both day and night. There are always people on the street and pedestrians can feel safe crossing the road.

4.5.3 Davie St
Davie St is not the most attractive street and could benefit from some streetscape improvements. Davie St is a great neighbourhood street full of personality and charm; however, the built environment of the street does not reflect that. People do not go to Davie St to marvel in its beautiful architecture and attractive buildings. People return to Davie St because of the sense of community and the unique amenities and stores that line the street. Despite the narrow sidewalks and lack of pedestrian-oriented lighting, Davie St provides a relatively safe walking environment for pedestrians. Along the same lines as both Robson St and Granville St, Davie St does not accommodate bicyclists with bicycle lanes.

4.6 SUMMARY AND EVALUATION OF AUDIT OBSERVATIONS – ADDRESSING THE RESEARCH QUESTIONS
The purpose of this chapter was to analyze observations and audit results from each street. A comparative evaluation of the pedestrian environments has addressed the first research question, which focused on identifying the pedestrian features and streetscape elements that are either present or lacking on each street. In review of the analysis and through a detailed examination of the pedestrian environments, it is clear that the environment, pedestrian facilities, road attributes, and walking/cycling environment of each street are significantly different.

All three streets are in different areas of downtown and are predominantly lined with commercial, retail, and office uses. The live performance venues and late night bars of Granville St create a much different pedestrian environment than the high-end retail stores along Robson St or the small-scale restaurants and shops along Davie St. The type, condition, and width of the sidewalk contributed greatly to how pedestrian-friendly each street was. The Granville St redesign utilized visually appealing materials and extra wide sidewalks to create a comfortable walking environment. In comparison, the Davie St sidewalks are relatively narrow and those along Robson St are uneven and full of path obstructions.
It was also noted that each street addresses the interaction of vehicles and pedestrians differently. Both Davie St and Robson St take advantage of parked cars as a buffer between the sidewalk and the roadway. Granville St on the other hand, restricts the volume of vehicle traffic with a transit mall and only provides on-street parking on select blocks, which reduces the need for a significant buffer. All three streets are equally well equipped with curb cuts at every intersection and the sidewalks are all complete with good connectivity to surrounding sidewalks.

In terms of road attributes, the condition of the road for all three streets was rated as good, as very few bumps, cracks, or holes were observed. Due to the transit mall, much of Granville St is only two lanes wide, which further limits the volume of traffic on the street and creates a safer crossing distance for pedestrians. Davie St and Robson St are consistently four lanes wide and are frequently filled with vehicles, both moving and parked. In keeping with the traditional street grid and original building forms, with the exception of the Shoppers Drug Mart on Davie St, all three streets have buildings that are oriented at the sidewalk edge. Fourteen out of the fifteen intersections are controlled by fixed time signals and seem to favour efficient vehicle movement over pedestrian movement. Davie St and Robson St provide the basic two-line crosswalk at every intersection while Granville St uses contrasting materials to define the crosswalk area. There was a minimal presence of bicycle facilities on all three streets. Bicycle racks of varying designs were observed along the lengths of Granville St, Davie St, and Robson St. Bicycle lanes and covered bike racks were not found on any of the streets.

In addition to pedestrian facilities and road attributes, the elements of the walking/cycling environment contribute greatly to the pedestrian environment of each street. The light-rods on Granville St provide functional lighting for pedestrians and give the streetscape a unique identity. Capitalizing on the wide sidewalks, the Granville St redesign also included ample public seating arrangements (multiple bench configurations, permanent groupings of chairs). All three streets are well equipped with easily readable wayfinding aids, which benefits both locals and tourists. Despite being relatively older streets with no major streetscape enhancements, both Robson St and Davie St benefit from mature trees, which provide shade, a form of natural enclosure, and help soften hard surfaces. All three streets are popular downtown streets that receive a fairly high volume of foot traffic; however, the overall cleanliness along Davie St and parts of Granville St were rated much lower than Robson St. Although transit users are provided with bus
shelters on most stops, the design and placement of many of them negatively affected the surrounding pedestrian environments.

Overall, Granville St seemed to be the most pedestrian-friendly of the three streets, which can be largely attributed to the wider sidewalks, the abundance of public seating options, pedestrian-oriented lighting, and street configuration. All of these streetscape features are a direct result of the recent Granville St redesign. Robson St and Davie St have many similar pedestrian environment characteristics; however, the eclectic store fronts, overall cleanliness, and vibrant street life of Robson St create a more inviting streetscape for pedestrians. Although Davie St is located in a diverse neighbourhood, full of character and local charm, this is not reflected in the quality of the pedestrian environment.

The next chapter builds upon the audit observations and provides conclusions about the quality and state of the pedestrian environment of each street. It will include a recommendations section to address the second research question: how can each street become more pedestrian friendly through streetscape improvements?
5 Conclusions and Recommendations

Following the analysis of observations in Chapter 4: Comparative Evaluation and Data Analysis, this chapter further addresses the first research question and summarizes the key observations made about the quality of each street’s pedestrian environment. Drawing from these conclusions and in response to the second research question, several recommendations will discuss how each street could become more walkable through design.

A direct comparison of the audit results can be found in Appendix A, which illustrates the variation in pedestrian quality between the three streets. Comparing the streets by each criteria point outlines the strong points from each street and identifies the aspects of the pedestrian environment that could be improved upon.

5.1 CONCLUSIONS

5.1.1 Granville St

Granville St runs through the heart of downtown Vancouver’s business and entertainment district. This popular street contains a mix of retail, live performance venues, and late night establishments. Granville St is an eclectic street that serves multiple functions and receives a high volume of pedestrian traffic both day and night. The reintroduction of a transit mall and limited availability of on-street parking provide for sufficiently wide sidewalks and a mix of pedestrian amenities (public benches, chairs, and street vendors/performers). The pedestrian-oriented lighting builds upon the already illuminated character of the street and improves pedestrian safety at night. Along with the more functional features of the street, the use of distinct materials and unique design elements, such as the granite accents on the sidewalks, adds visual appeal to the streetscape environment.

Despite the extensive redesign and the many positive pedestrian features that were added to Granville St, direct observation and comparative evaluation have highlighted some areas needing improvement. Path obstructions can be found on all three streets; however, the flexible parking poles on Granville St act as significant obstructions to pedestrian movement and waste valuable sidewalk space on select blocks. Despite obvious efforts to enhance the pedestrian environment through design elements and traffic calming techniques, Granville St could also benefit from better defined crosswalks that provide a safer, more visible path for pedestrians when crossing the street. Lastly, the lack of street trees and greenery do little to break up the monotony of concrete and hard edges that dominate the appearance of the streetscape.
Overall, Granville St appears to have found a functional balance between the users of the street (pedestrians, motorists, public transit users, bicyclists). The changes to the streetscape have enhanced the pedestrian environment without adversely compromising the automobile and public transit functions of the street. Granville St is now equipped with a variety of pedestrian features and streetscape elements that create a lively, walkable street.

5.1.2 Robson St

With an abundance of high-end stores and upscale eateries, Robson St attracts a significant amount of pedestrian traffic and is one of Vancouver’s most famous shopping areas. There are many factors that contribute to the walking environment of Robson St. The consistent building heights and mature street trees provide a relatively high degree of enclosure, help define the streetscape, and create a more human scale pedestrian environment. The presence of street vendors along Robson St, even in the winter months, adds vibrancy to the street.

Despite its popularity among tourists and locals, the pedestrian environment of Robson St is largely characterized by congested sidewalks of average quality with minimal pedestrian features. Although it has a good selection of stores and restaurants to attract people to the street, Robson St provides very little in the way of pedestrian amenities that encourage people to stay. In response to best practice streetscape literature and through comparative evaluation, Robson St could benefit greatly by having more pedestrian-oriented features, such as public seating and street furniture. Gehl (2010) states that the extent of staying activities on a street contributes greatly to the quality of a public space (p.134).

As discussed in section 4.2.6, the Robson St sidewalks feel rather congested and narrow due to the large crowds and presence of path obstructions. In regards to the interactions of automobiles and pedestrians, Robson St still feels dominated by vehicles and road traffic; however, on-street parking acts as a significant buffer between vehicle traffic and the large crowds on the sidewalk. The overcrowded sidewalks are a clear signal that the pedestrian environment is insufficient and the needs of pedestrians are not being adequately met. The quality of the sidewalks in many areas is also an issue as tree root growth has caused the sidewalks to heave, resulting in an uneven walking surface and an unsightly safety hazard.

At first glance, Robson St appears to be doing everything right in terms of its popularity and ability to attract thousands of people
year round. Upon closer inspection, one will find that there is great potential for improvement when it comes to the pedestrian aspects of Robson St. In addition to being considered Vancouver’s most famous shopping street, Robson St has the potential to become Vancouver’s most famous pedestrian street. Understanding how to better accommodate pedestrians on Robson St will help shape Robson St into a more complete street.

5.1.3 Davie St
Linking the West End with Yaletown, Davie St is located in the centre of the Davie Village in a much quieter, more residential part of downtown. The eclectic mix of restaurants, shops, and services along with the fact that Davie St is home to Vancouver’s LGBT community create a dynamic environment that is unique to Vancouver. That being said, the streetscape features and overall quality of the pedestrian environment are lacking in most areas and do not create an inviting walking environment. Building on its location, atmosphere, and eclectic charm and through some improvements to its streetscape, Davie St has the potential to become an attractive and memorable street.

Similar to Robson St, some sidewalk sections along Davie St feel narrow due to path obstructions and inadequate width. The overall lack of pedestrian amenities also prevents Davie St from being a highly walkable street. Beyond basic garbage cans, there are no other pedestrian amenities that add any value to the streetscape environment. With the exception of the sidewalk patios, there are no public seating options to allow people to sit and observe the activity on the street. In addition, despite the amount of late-night activity that occurs along Davie St, it is surprising to not see any pedestrian-oriented lighting of any kind. For the most part, through observation and when compared to both Granville St and Robson St, Davie St looks and feels run down and generally neglected. The bright pink garbage cans and bus stops are the only unique physical features that add character and accentuate the Davie St streetscape. Although Davie St is seen as a popular neighbourhood hangout, the lack of pedestrian amenities and overall quality of the streetscape paint a much different picture.

Out of the three streets that were evaluated, Davie St was observed to be the weakest in terms of providing an environment that is inviting and accommodating for pedestrians. Streetscape improvements that focus on improving walkability would greatly enhance the quality of Davie St’s pedestrian environment.
5.1.4 General Study Conclusions and Lessons Learnt for the Three Streets

There are many factors that go into designing a street for people that is inviting, safe, and walkable. The built environment and availability of pedestrian-oriented features affect how people use the street and ultimately contribute to the overall quality of the pedestrian environment. Wide, unobstructed sidewalks that provide space for pedestrian amenities and good accessibility to surrounding areas help create a comfortable walking environment. Finding the right balance of vehicles and pedestrians on a street and facilitating safe interactions between the two is an equally important element of a successful street. A good street may be functional but a great street is markedly superior in character and quality (Jacobs, 1993). Design elements and visually appealing features can enhance the atmosphere and identity of a street. Pedestrian-oriented lighting, street trees, and the design and articulation of buildings all add value to a pedestrian environment. In addition to the location, types of uses, and degree of social mix, the success of a pedestrian environment depends heavily on the physical, designable characteristics of a street.

As a whole, Granville St appears to be more walkable with added pedestrian-oriented features, which can largely be attributed to the recent changes made through the Granville St Redesign. The redesign acknowledged the role pedestrians play in the success of Granville St and designed the street with the needs of pedestrians in mind. With a strong pedestrian focus, Granville St stands out as a street with a mixture of functional and aesthetically appealing features that create a comfortable and inviting streetscape of interest.

Granville St does a good job at balancing the needs of motorists, public transit users, and pedestrians through the design of the street. As previously mentioned, there is no one design fits all in terms of what makes a complete street and the findings of this study are no different. There are many features of Granville St that could be used to enhance the pedestrian environments of both Davie St and Robson St; however, each street serves a different purpose and therefore requires its own design approach. What works on Granville St may not necessarily work in the context of Davie St or Robson St. That being said, this report finds that Granville St has been successful in creating an environment that is inviting, safe, and accessible for all types of users, with a renewed sense of awareness surrounding the needs of pedestrians.
If Davie St or Robson St were to undergo any streetscape enhancements in the future, both could learn from the holistic approach used to redesign Granville St. It demonstrates that it is important to design streets for all relevant modes of transportation and to consider the often overlooked needs of pedestrians. The analysis in this report has hopefully provided useful insight into the quality of the pedestrian aspects of Granville St, Davie St, and Robson St.

Drawing upon the analysis and conclusions from each street, the following sections address the second research question. Recommendations for each street outline some measures that could be implemented to address the issues that were observed on each street.

### 5.2 Recommendations

#### 5.2.1 Granville St

The Granville St redesign has added substantial value to the Granville St pedestrian environment. Building upon the historic built form, the changes to the streetscape address many pedestrian concerns, which were highlighted in the PEDS audit. That being said, there are still a few areas of concern regarding the quality of the pedestrian environment, which could be improved through design.

The following outlines and describes the recommendations that are intended to make Granville St more walkable.

**Granville St Recommendation #1: Rethink flexible parking system**

As discussed in section 4.2.3, the poles that mark the flexible parking stalls along select blocks of Granville St clutter the sidewalk and act as path obstructions. The benefits of a wide sidewalk are greatly diminished with the presence of these poles. When the majority of Granville St is void of any on-street parking, is maintaining a limited number of on-street parking stalls worth the negative impact on the sidewalk environment? Rethinking a way to establish a physical barrier or removing the flexible parking stalls altogether would create a consistent, unobstructed pedestrian path. This would also provide space for additional pedestrian amenities that are lacking along this portion of Granville St. Any plans to replicate this type of parking system on other streets should consider the negative impact it imposes on pedestrian mobility and the pedestrian environment as a whole.

**Granville St Recommendation #2: Make crosswalks more visible**

An effective crosswalk should be clearly marked and highly visible to improve pedestrian safety when crossing the street. As discussed in
section 4.3.9, the crosswalks on Granville St are fairly indiscernible as contrasting road materials (asphalt and exposed aggregate) are used in place of painted lines. This becomes an even greater issue at night when visibility is reduced. To increase pedestrian safety and enhance the quality of the pedestrian environment, it is recommended that all crosswalks be clearly differentiated from the rest of the road with either painted lines or a distinct pattern. Figure 5.1 demonstrates that crosswalks can be functional as well as visually appealing. This recommendation is a relatively simple solution that would have a substantial impact on the quality and safety of the Granville St pedestrian environment. This type of treatment could also be used to distinguish crosswalks on both Davie St and Robson St.

5.2.2 Robson St
To create a more inviting and comfortable pedestrian environment that better accommodates the needs of those walking on Robson St, the following recommendations encourage a redistribution of space and focus mainly on enhancing the sidewalk environment. Re-evaluating the amount of space allotted to vehicles is a motivating factor behind many of the recommendations. With greater efforts put towards the quality of the pedestrian environment, Robson St can go from a good street to a great street.

Robson St Recommendation #1: Enhance pedestrian environment by widening sidewalks and narrowing road width.
According to the Vancouver Pedestrian Study (2002), the audited sections of Robson St receive some of the highest volumes of pedestrian traffic per day in the downtown core. From 14,872 per day between Broughton St and Jervis St to 39,303 per day between Howe St and Burrard St, the total pedestrian counts are evidence of a busy pedestrian environment. If an opportunity to redesign Robson St comes about, it is recommended that the roadway width be reduced by narrowing the lanes. Studies would need to be completed to determine the appropriate lane width and the effect on bus routes. This streetscape improvement would provide additional pedestrian space without removing any on-street
parking, which provides many benefits to businesses. When the parking lanes become travel lanes, the narrower lanes would help slow the speed of traffic yet still allow for efficient traffic circulation. To take this recommendation one step further and substantially increase the amount of pedestrian space on Robson St, one or both lanes of parking could be removed. Due to the contentious nature surrounding the removal of parking, this would require additional impact studies and extensive stakeholder consultation.

**Robson St Recommendation #2**  
*Use pedestrian amenities and design elements to make Robson St a destination street.*

In review of the audit results, it became clear that Robson St offered very little in terms of pedestrian amenities that encouraged people to stay on the street. Additionally, there is a lack of distinct design features that provide visual interest to the streetscape. Looking to Granville St for inspiration, Robson St could use public amenities and a cohesive design to create an identity for itself beyond its land uses. A streetscape with unique design elements could include distinct pedestrian amenities such as wider sidewalks, public seating, art installations, planters, and lighting treatments. This focus on design and public amenities would enhance the overall pedestrian environment and provide some visual interest to Vancouver’s most famous shopping street.
Robson St Recommendation #3
Prevent future problems with uneven sidewalks by properly addressing street tree expansion
As discussed in section 4.2.2 and section 4.4.4, uneven sidewalks are a common occurrence along Robson St, which is a result of failing to properly accommodate tree root growth. The uneven sidewalks and unsightly patchwork of repairs reflects poorly on the quality of the overall pedestrian environment. If a redesign were to occur on Robson St, it is recommended that all street trees be equipped with larger tree pits that provide adequate volume for root growth. In addition to the size of the tree pit, the use of tree grates is an important element for healthy street trees. Street trees that are encased in cement or asphalt up to the base of the tree are often referred to as ‘tree coffins’ or ‘tree vaults’, which is the case for trees along Robson St. Proper tree grates that are raised off of the roots prevent soil compaction and allow sufficient drainage. As a result, the trees are healthier, less maintenance is required, and sidewalks are less likely to be negatively affected.

Figure 5.3: Example of large tree pit with raised tree grate to prevent soil compaction and aid proper drainage (France)
Source: (www.sineugraff.com)
5.2.3 Davie St
Of all three streets, Davie St has the least walkable environment with the fewest pedestrian amenities or positive streetscape features. Recommendations for Davie St address the aesthetic inadequacies of the street and build upon the distinct character that is unique to Davie St. It should be noted that a successful revitalization of Davie St would require improvements that go beyond changes to just the physical streetscape environment.

Davie St Recommendation #1
Add pedestrian amenities to the Davie St streetscape (public seating, food vendors)
The presence of food vendors and public amenities can have a dramatic effect on the atmosphere of a street and the usability of a pedestrian environment. As discussed in section 4.4.2, Davie St is lacking in public amenities. Garbage cans were the only type of pedestrian amenity observed on the street. Providing comfortable public seating would make Davie St more inviting and would encourage socialization. The addition of public seating would also build upon the neighbourhood hangout atmosphere already present on Davie St. Food vendors or other types of street vendors could also improve the pedestrian environment of Davie St. Like the Japadog stand at Burrard St and Smithe or the roasted chestnut carts along Robson St, successful food vendors could become a permanent fixture along Davie St.

Figure 5.4: Popular Japadog stand on Burrard St (Vancouver, BC)
Source: (www.closetcanuck.com)

Davie St Recommendation #2
Incorporate pedestrian-oriented lighting to add night-time ambience
With a number of late-night and 24-hour businesses on Davie St already, there is a need for pedestrian-oriented lighting. As discussed in section 4.4.1, the lack of pedestrian-oriented lighting along Davie St creates an uninviting and unsafe walking environment. Enhanced pedestrian lighting would also improve the night-time ambience and could be used to create a design statement that expresses the unique identity of Davie St. As another
opportunity to add colour and visual interest the streetscape, pedestrian-oriented lighting could greatly enhance the Davie St experience.

Davie St Recommendation #3
*Improve appearance of Davie St through streetscape beautification*

Davie St has the potential to become a street that is admired not only for its personality and eclectic atmosphere but also for the quality and overall appearance of its streetscape environment. As discussed in section 4.4.7, Davie St has definitely seen better days in terms of its level of cleanliness and overall quality of pedestrian facilities. In order to create a more attractive Davie St, it is recommended that streetscape enhancements be implemented, which could include but are not limited to floral planters and greenery treatments, public art, and street furniture. Colour is often a simple and effective way to infuse life into an otherwise dull streetscape. As shown in Figure 5.6, hanging flower baskets are a simple and effective way to improve the appearance of an urban environment. Each of the enhancements should work towards improving the perception and aesthetic appeal of Davie St, as well as increasing business and property values. Creative design solutions can be an effective way to define the quality and character of the streetscape environment.
5.2.4 Recommendation Applicable to all Three Streets

*Improve bicycle amenities through sheltered bicycle parking facilities*

Although this report focuses on walkability and the pedestrian aspects of a streetscape, the following recommendation addresses the needs of bicyclists*

Vancouver is one of many cities in North America working towards making bicycling a more accessible mode of transportation that appeals to a wider demographic. In combination with the network of separated bike lanes being established throughout downtown, improving the provision and quality of bicycle parking facilities would go a long way in creating a more comfortable and appealing cycling environment.

The general lack of bicycle amenities, in varying degrees, was observed on all three streets. Despite the many changes made to Granville St, very little was done to adequately accommodate bicyclists, beyond simple bike racks. On Robson St, space-saving bicycle racks can be found in limited quantities along each block. Not unlike Granville St or Robson St, Davie St was also lacking in the provision of bicycle facilities. As discussed in section 4.3.10, there is a demand for more bicycle parking facilities along Davie St as it was common to see bicycles locked up to parking meters and street signs. In addition, it was also noted that despite the rainy weather in Vancouver, there are no bicycle parking facilities on any of the three streets that offered any kind of shelter or weather protection. It is recommended that sheltered bicycle parking facilities be located at key locations where there is greater demand for longer term bicycle storage. (refer to Figure 5.7). The example from New York City offers effective weather protection for multiple bicycles and provides added value by including a map of local bicycle routes. Determining the appropriate placement of this type of amenity will
require careful consideration. Improper placement in the pedestrian environment could turn it into a path obstruction. The City Centre Skytrain Station on Granville St is one location where this type of facility would be warranted.

5.3 LIMITATIONS AND FUTURE RESEARCH

The objective of this report was to assess the physical and perceptual qualities of the streetscape environments of three streets in downtown Vancouver and make recommendations on how each could be made more walkable through design. This study used the PEDS audit tool to conduct a systematic assessment of three pedestrian environments.

The audit included 36 evaluation criteria, which helped guide observations and provided a framework to conduct a comparative evaluation. This particular audit tool predominantly focused on the physical streetscape features, which were hypothesized to have an influence on walkability. With a limited scope of observations, this audit tool excludes many other environmental, spatial, and social factors that influence walkability. That being said, this was neither the objective of the PEDS audit tool nor the intent of this research. Overall, the PEDS audit tool was an efficient an effective tool to examine one aspect of walkability in a short period of time.

To do a more comprehensive examination of a streetscape environment and the determinants of walkability, additional evaluation criteria would need to be included in the audit. Following the analysis of the audit results, a few limitations of the PEDS audit tool were also noted. In regards to the audit criteria, more detailed explanations of specific audit criteria would help improve audit consistency. For the slope criteria, it may be useful to use grade percentages for reference. It may also be more appropriate to observe the operating speed of traffic rather than the posted speed limit as this may be a more realistic measure for pedestrian safety.

The method of analysis in this research was purely qualitative and relied on the observations of one researcher to perform the audit and formulate informed conclusions. Some of the evaluation criteria were objective (number of lanes, width of the pedestrian facility) while others were more subjective (overall cleanliness and building maintenance, path obstructions, path condition). For future research purposes, the issue of subjectivity and researcher bias may be further addressed through the use of multiple auditors. Increasing the number of auditors will never eliminate the subjective nature of the evaluation criteria; however, it would provide multiple perspectives on the same environment, which could strengthen the reliability of the data analysis. Similar studies
in the future could incorporate a quantitative component into the research design and data analysis. Some of the criteria in the PEDS audit tool, such as slope and sidewalk width, could be easily comparable through GIS with a more quantitative approach.

Future research could also benefit from multiple data collection periods, where audits evaluate the streets at multiple times of the year. This would provide a more comprehensive collection of observations and would expand the scope of analysis. While a change in season may have a minimal effect on some physical features, there could be significant variation in the perceptual qualities of the observed streets. Through observation and analysis of data, a bicycle-oriented solution was recommended for all three streets. By going beyond the pedestrian aspects of a street and recognizing the needs of other users, this study stressed the importance of a more holistic approach to designing complete streets.

Lastly, the conclusions that were formed from observations and data analysis were never meant to be generalizable to streets in general. The conclusions and recommendations in this report are only applicable to the three case study streets (Granville St, Robson St, Davie St). Recommended improvements to one street may not be suitable to another street, regardless of their proximity or location to one another. Each street has a different set of characteristics and qualities that set it apart from every other street.
References


Appendix A: Audit Results
### A. Environment

<table>
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<tr>
<th>Uses in segment (all that apply)</th>
<th>Granville St</th>
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<th>Davie St</th>
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<tr>
<td>Industrial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacant/Undeveloped</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation</td>
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<td></td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Slope</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slight Hill</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steep Hill</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Segment Intersections</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment has 3 way intersection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment has 4 way intersection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment has other intersection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment deadends but path continues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment deadends</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segment has no intersections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type(s) of pedestrian facility</td>
<td>Granville St</td>
<td>Robson St</td>
<td>Davie St</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>Pedestrian Street (closed to cars)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidewalk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paved Trail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>footpath (worn dirt path)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Path Material (all that apply)</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paving Bricks or Flat Stone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dirt or Sand</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Path Condition/Maintenance</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good (very few bumps/cracks/holes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair (some bumps, cracks, holes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor (many bumps, cracks, holes)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Path Obstructions</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poles or signs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parked cars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garbage cans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buffers between road and path</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hedges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landscape</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Path distance from curb</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>At edge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1.5m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;1.5m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sidewalk width (metres)</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;2.4m</td>
<td>5.8</td>
<td>5.8</td>
<td>5.8</td>
</tr>
<tr>
<td>between 1.2m and 2.4m</td>
<td>5.8</td>
<td>5.8</td>
<td>5.8</td>
</tr>
<tr>
<td>&lt;1.2m</td>
<td>7.6</td>
<td>7.6</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td>6.7</td>
<td>6.7</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>3.6</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curb cuts</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sidewalk completeness/Continuity</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalk is complete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidewalk is incomplete</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sidewalk connectivity to other sidewalks</th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of connections</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Davie St</td>
<td>Robson St</td>
<td>Granville St</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>-----------</td>
<td>--------------</td>
</tr>
<tr>
<td>Davie St to Helmcken St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helmcken St to Nelson St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nelson St to Smithe St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smithe St to Robson St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robson St to W Georgia St</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>W Georgia St to Dunsmuir</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hornby St to Burrard St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burrard St to Thurlow St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thurlow St to Bute St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bute St to Jervis St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bute St to Jervis St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jervis St to Broughton St</td>
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</table>

**C. Road Attributes**

<table>
<thead>
<tr>
<th>Condition of Road</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good (very few bumps/cracks/holes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair (some bumps/cracks/holes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor (many bumps/cracks/holes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under Repair</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of lanes</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum # of lanes to cross</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Maximum # of lanes to cross</td>
<td>4</td>
<td>4</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Posted speed Limit</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>None Posted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(km/h)</td>
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<table>
<thead>
<tr>
<th>On-street parking</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel or Diagonal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Off-street parking lot spaces</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26+</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Must you walk through a parking lot to get to most buildings?</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/No</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Presence of med-hi volume driveways</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;4</td>
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<table>
<thead>
<tr>
<th>Traffic control devices</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>traffic light</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop sign</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>traffic circle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>speed bumps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chokers or chicanes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
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<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Crosswalks</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Crossing Aids</th>
<th>Davie St</th>
<th>Robson St</th>
<th>Granville St</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield to Pedestrian Paddles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian Signal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median/Traffic island</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curb Extension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overpass/Underpass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian Crossing Warning Sign</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flashing Warning Light</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share the Road Warning Sign</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle Facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>No bicycle facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle Route Signs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Striped bicycle lane designations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visible bicycle parking facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle crossing warning</td>
<td></td>
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</tbody>
</table>
## D. Walking/Cycling Environment

<table>
<thead>
<tr>
<th></th>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davie St to Helmcken St</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Helmcken St to Nelson St</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Nelson St to Smithe St</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Smithe St to Robson St</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Robson St to W Georgia St</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>W Georgia St to Dunsmuir</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Hornby St to Burrard St</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Burrard St to Thurlow St</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Thurlow St to Bute St</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bute St to Jervis St</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bute St to Jervis St</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Jervis St to Broughton St</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Roadway/Path lighting

- Pedestrian-oriented lighting
- Road-oriented lighting
- Other lighting
- No lighting

### Amenities

- Public garbage can
- Benches
- Water Fountain
- Street vendors/Vending Machines
- No amenities

### Are there wayfinding Aids?

- Yes/No
- No

### Number of trees shading walking area

- Many/Dense
- Some
- None or very few

### Degree of enclosure

- Highly enclosed
- Some enclosure
- Little to no enclosure

### Powerlines along segment

- None
- Low voltage/Distribution line
- High voltage/Transmission line

### Overall Cleanliness/Building Maintenance

- Good (no litter/graffiti/broken facilities)
- Fair (some litter/graffiti/broken facilities)
- Poor (much litter/graffiti/broken facilities)

### Articulation in Building Design

- Highly articulated
- Some articulation
- Little to no articulation

### Building setbacks from sidewalk

- At edge of sidewalk
- Within 20 feet of sidewalk
- More than 20 feet from sidewalk

### Building height

- Short
- Medium
- Tall

### Bus Stops

- Bus stop with shelter
- Bus stop with bench
- Bus stop with signage only
- No bus stop
### E. Subjective Assessment

<table>
<thead>
<tr>
<th>Granville St</th>
<th>Robson St</th>
<th>Davie St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davie St to Helmcken St</td>
<td>1 1 1 2 1</td>
<td>2 1 1 2</td>
</tr>
<tr>
<td>Helmcken St to Nelson St</td>
<td>2 2 1 2 1</td>
<td>2 2 2 2</td>
</tr>
<tr>
<td>Nelson St to Robson St</td>
<td>1 1 1 1</td>
<td>3 3 4 4</td>
</tr>
<tr>
<td>Robson St to W Georgia St</td>
<td>1 2 2 2</td>
<td>3 3 4 1</td>
</tr>
<tr>
<td>W Georgia St to Dunsmuir</td>
<td>1 2 2 2</td>
<td>4 4 4 4</td>
</tr>
<tr>
<td>Hornby St to Burrard St</td>
<td>1 1 1 1</td>
<td>1 2 2 1</td>
</tr>
<tr>
<td>Burrard St to Thurlow St</td>
<td>4 4 4 4</td>
<td>1 2 2 1</td>
</tr>
<tr>
<td>Thurlow St to Bute St</td>
<td>1 1 1 1</td>
<td>3 3 4 1</td>
</tr>
<tr>
<td>Bute St to Jervis St</td>
<td>3 3 4 1</td>
<td>4 4 4 4</td>
</tr>
<tr>
<td>Bute St to Jervis St</td>
<td>3 3 4 1</td>
<td>4 4 4 4</td>
</tr>
<tr>
<td>Jervis St to Broughton St</td>
<td>4 4 4 4</td>
<td>1 2 2 1</td>
</tr>
</tbody>
</table>

Segment is...  
.....is attractive for walking  
.....is attractive for cycling  
.....feels safe for walking  
.....feels safe for cycling

1 - Strongly Agree  
2 - Agree  
3 - Disagree  
4 - Strongly Disagree
Appendix B: Audit Protocol
Appendix B: Audit Protocol

The following section presents the audit protocol, which provides context for each criteria question and describes how each is evaluated. When applicable, photographs and diagrams will be included to provide visual reference and assist the researcher in identifying physical environment features. Auditors should be familiar with the audit protocol prior to conducting the audit but may also refer to it while on site. Specifics are given about how each criteria question will be evaluated and what measures will be taken during direct observation. In order to create a comprehensive description of the criteria questions, the audit protocol from both The PEDS audit tool along with the codebook from The Irvine Minnesota Inventory instrument were referenced.

Section 0: Segment Number and Type

0. Segment Type
For each segment, observe the level of automobile traffic on the road. Although most roads will experience some fluctuations in volume throughout the day, this observation is meant to represent the typical volume of traffic. Paying attention to the number of vehicles passing through the segment is more important than the speed of vehicles.

- **Low volume road**: Vehicle traffic is minimal along the street segment.
- **High volume road**: There is a steady stream of vehicles at any one time travelling through the street segment.
- **Bike or Ped path (skip section C)**: The path is designed for pedestrians or non-motorized modes of transportation so therefore, no vehicles are permitted.

Section A: Environment

1. Uses in Segment
For each segment, identify EVERY USE that is present along the street. Only those types that have direct access, via a driveway, entrance, or walkway, to the street should be recorded.

**Housing-Single-Family Detached**: Houses for one household only, house stands alone. May be rental or owned.

**Housing-Multi-Family**: Houses for two households, houses share at least one wall. May be rental or owned.

**Housing Mobile homes (including manufactured homes)**: Freestanding units, temporary or permanent structures, that are constructed elsewhere and driven to site.

**Office**
- Offices: Includes work spaces that are not primarily oriented to the public, such as administrative facilities. Does not include industrial/manufacturing.
Service facilities (including insurance offices, funeral homes, dry cleaning, Laundromats, etc.): Includes non-retail, non-financial facilities that may have customers, such as insurance offices, funeral homes, dry cleaning, Laundromats, etc.

Office/service, other: Includes offices not described above.

Institutional
- Religious institution (church, temple, mosque, etc.): Any structure intended to hold religious/spiritual events.
- Hospital, medical facility, health clinic: Includes hospitals, urgent care facilities, and medical centers that serve large numbers of people, and that resemble facilities more than offices. Does not include private doctors’ offices.
- Institutional, other: Institutional uses not described above. Does not include office (below).

Restaurant/Cafe/Commercial
- Retail stores/restaurant: Includes uses that sell food or other goods or (nonfinancial) services to the public (e.g., delis, restaurants, fast food, coffee shops, clothing stores, etc.)
- Bank/financial service: Includes financial institutions and those that provide financial services to the public
- Hotel/hospitality: Includes hotels, motels, bed and breakfasts, etc.
- Car dealership: Includes places that sell new or used automobiles.
- Gas/service station: Includes places that sell gas and that repair motor vehicles. Includes oil change, brakes, etc.
- Commercial, other: Commercial uses not described above. Does not include offices.

Industrial
- Light industrial: Includes uses involved in production of light manufacturing and industry. Typically “clean” industries. Includes auto paint and auto body repair shops.
- Medium or heavy industrial: Includes uses involved in production of heavy manufacturing and industry. Typically less clean industries. Includes chemical plants, oil wells, etc.
- Industrial, other: Industrial uses not described above. Does not include gas or service stations.

Vacant/Undeveloped
- Vacant: A building or structure with no occupants or furnishings.
- Undeveloped: A lot or parcel of land that is without any building, structure or improvement

Recreation
- Gym/fitness center: Includes public or private gymnasiums or fitness facilities.
- Movie theatre: A building where films are shown to an audience.
- Recreational, other: Recreational use not described above (e.g., pool). Does not include public spaces, above.

2. **Slope**
For each segment, estimate how steep or hilly the street is. No grade calculations are required to determine the slope of the street.
- **Flat**: No distinguishable change in grade is noticeable as you walk along the street.
- **Slight Hill**: A street that has a slight incline, where the change in grade is marginal. The slight incline does not make it difficult to walk up hill.
- **Steep Hill**: A street that has a significant incline, where the change in grade is substantial. The steepness is such that walking or even biking becomes difficult.

3. **Segment Intersections**
At the end of each street segment, observe and determine the type of intersection. How does the road network connect each street segment with the surrounding streets?
- **Segment has 3-way intersection**: Commonly referred to as T or Y intersections, this type of intersection connects three street segments.
- **Segment has 4-way intersection**: The most common type of intersection where two streets cross one another. This type of intersection is common with a grid street pattern. Variation can exist in terms of the angle in which the streets cross (perpendicular or skewed).
- **Segment has other intersection**: Having 3 or more street segments intersect.
- **Segment dead ends but path continues**: The flow of automobile traffic ends but pedestrians and other forms of transportation can continue via a path or walkway.
- **Segment dead ends**: The path for all forms of movement is terminated at the end of the street segment.
- **Segment has no intersections**: The street segment does not intersect with any other street.
Section B: Pedestrian Facility

If there is no pedestrian facility in the segment, skip to Section C: Road Attributes. Assess the type, quality, and physical characteristics of the pedestrian facility that is present along the street segment.

4. Type(s) of pedestrian facility
Identify the type of pedestrian facility that is present along the street segment. Depending on the setting, pedestrian facilities may exist on both sides of the street or only on one side.

- **Footpath (worn dirt path):** An informal path created by repeated foot traffic straying from the provided path or sidewalk. Evidence of this type of path signals the need to create more formal pedestrian improvements.
- **Paved Trail:** A paved walkway that is not associated with a roadway.
- **Sidewalk:** A walkway will only be considered a sidewalk if it is associated with a roadway.
- **Pedestrian Street (closed to cars):** A street segment that is reserved for pedestrians only and vehicle traffic is prohibited. The entire right of way is designated for pedestrian use.
5. **Path Material** (Select ALL that apply)
For each street segment, identify the material the pedestrian facility is made of. Even if one material is just a patch in the sidewalk, please mark it as well.
- Asphalt
- Concrete
- Paving Brick or Flat Stone
- Gravel
- Dirt or Sand

6. **Path Condition/Maintenance**
For each segment, observe the general condition of the pedestrian facility. Pay attention to the maintenance of the surface material in terms of any signs of damage or poor upkeep.

**Poor (many bumps/cracks/holes):** A sidewalk will be considered “poor” if a stroller cannot be pushed along the sidewalk without many jarring motions and/or if it clearly needs to be replaced (patches would not be sufficient).

**Fair (some bumps/cracks/holes):** A sidewalk will be considered “fair” if a stroller can easily be pushed along the sidewalk with few jarring motions to the passenger and/or it only needs patches or other minor repair.

**Good (very few bumps/cracks/holes):** A sidewalk will be considered “good” if a stroller can easily be pushed along the sidewalk without jarring motions to the passenger and/or it needs no repair at this time.

**Under Repair:** A sidewalk will only be considered “under repair” if there is evidence of work being done to improve the sidewalk. Orange cones are not enough. If construction work is being done adjacent to the sidewalk, blocking it off as a result, it is considered “under repair.”

7. **Path Obstructions**
NOTE: An object is only a path obstruction if it severely reduces or completely blocks off the pedestrian facility. Threshold: Could you get by in wheelchair or while pushing a stroller? For this question, you are looking at potential obstructions on ALL pedestrian facilities on the street. In other words, if there are two sidewalks and only one has obstructions, please write down those obstructions.
- Poles or signs:
- Parked Cars:
- Greenery:
- Garbage Cans:
- Other:
- None:
8. **Buffers between road and path**
For each segment, observe the type of buffer, if any, which exists between the pedestrian facility and the road. The level in which a buffer acts a deterrent to pedestrian movement will vary depending on the type of buffer. Some buffers only increase the space that separates the road and the pedestrian facility without preventing movement; Other types of buffers act as a physical barrier to pedestrian movement.

- **Fence:** A solid barrier that is specifically positioned to prevent pedestrians from crossing the street at undesignated crossing points.
- **Trees:** Trees are only a buffer if they are part of a landscape/grass buffer or if they occur regularly enough on the street to discourage pedestrians from walking along the roadway. Trees within a grass buffer count as a buffer.
- **Hedges:**
- **Landscape:** A strip of plants or other greenery between the road and the sidewalk. Can be flush with the ground or in a raised planter.
- **Grass:** A strip of grass along the edge of the sidewalk separating the road from the sidewalk. Often planted in between rows of trees that line the road edge.
- **None:**
9. Path Distance from Curb
Measure or estimate the distance of the sidewalk from the edge of the curb. Take into account any of the buffers that were noted in the above question 8.

- **At edge**: The sidewalk is directly next to the curb and in turn the roadway. There is no significant buffer or barrier between the two areas.
- **<5 feet**: 
- **>5 feet**: 

![Images of sidewalk at different distances from curb]

**NOTE**: If possible, use a tape measure to measure the distance and round up to the next integer. If no tape measure is available, measure by using your feet and rounding to the next highest integer. If it seems too dangerous to walk to the roadway, measure by using context clues. If the sidewalk distance from the curb varies, use the average or typical distance.

10. Sidewalk Width
For each segment, measure or estimate the width of the sidewalk from edge to edge.

- **<4 feet**: 
- **Between 4 and 8 feet**: 
- **>8 feet**: 

![Images of sidewalks with different widths]
If possible, use a tape measure to measure the distance, not including the curb, and round up to the next integer. If no tape measure is available, measure by using your feet and rounding to the next highest integer. If sidewalk width varies, use the average or typical width.

11. Curb cuts
For each segment, count the number of curb cuts that are included in the pedestrian facility. As illustrated in the pictures below, a curb cut is an inclined section of the sidewalk that makes it at the same level as the road. Curb ramps are designed for the access of wheelchairs and for those with mobility impairments.
- None:
- 1 to 4:
- >4:

![Curb Cut](image)

12. Sidewalk completeness/continuity
This refers to the completeness of the sidewalk WITHIN the segment.
- **Sidewalk is complete**: a sidewalk is complete if it does not have any breaks within the segment.
- **Sidewalk is incomplete**: a sidewalk is incomplete if it ends or has gaps within the segment.

13. Sidewalk connectivity to other sidewalks/crosswalks
This refers to the number of connections the segment sidewalk has to crosswalks and other sidewalks. Stop signs at the end of the segment can be treated as a crosswalk. This will be scored as follows:
At the beginning of the segment, looking backward 180 degrees, +90 degrees and –90 degrees: how many sidewalks or crosswalks are there?
At the end of the segment, looking forward, +90 degrees and –90 degrees: how many sidewalks or crosswalks are there?
In the middle of the segment: are how many sidewalks or crosswalks are there?

These three scores should be added to make up the connectivity score. A very well connected segment will have a score of six plus any crosswalks that may exist along the segment. Connections to other sidewalks via crosswalks are shown in red in the above diagram. The above diagram has 8 connections. On a low volume residential segment there does not need to be a crosswalk in order to count as a connection. Connections made by crossing the street to another side where a sidewalk exists does not count.

Section C: Road Attributes

14. Condition of Road
For each segment, observe the general condition of the road. Look for any evidence of unrepaired damage or poor upkeep.

- **Poor (many bumps/cracks/holes):** the potholes, cracks, etc. present would cause a vehicle driving the segment to rock, dip or otherwise disrupt driving.
- **Fair (some bumps/cracks/holes):** there are potholes, cracks etc., but not enough to cause problems for a vehicle driving the segment.
- **Good (very few bumps/cracks/holes):** there are no large potholes or other problems that would cause problems for a vehicle driving the segment.
- **Under Repair:** A roadway will only be considered “under repair” if there is evidence of work being done to improve it. Orange cones are not enough.
15. Number of lanes
Count ALL lanes (even if it is a high volume road), including turn only lanes and/or “suicide lanes” one would need to cross the road at its widest point along the segment.
- Minimum number of lanes to cross
- Maximum number of lanes to cross

16. Posted speed limit
Check the “None posted” box unless there is a sign WITHIN the segment that displays the speed limit. Even if there is a sign outside the segment, within plain view, it does not count.
- None Posted
- (Kph): ______

17. On-Street parking
If pavement is unmarked, check “parallel” only if there are cars parked within the segment or if parking signs are present.
- Parallel or Diagonal
- None
18. Off-street parking lot spaces
Count all off-street parking spaces in the segment. Cars in single family home driveways do not count. Only cars in actual parking lots count (apartment complexes, commercial parking, office parking etc.) There must be access to the lot from the segment.

<table>
<thead>
<tr>
<th></th>
<th>0-5</th>
<th>6-25</th>
<th>26+</th>
</tr>
</thead>
</table>

19. Must you walk through a parking lot to get to most buildings?
For this question, the origin point of walking to the buildings will be from the sidewalk. If there is no sidewalk, origin point will be the curb of the roadway.

- Yes
- No

20. Presence of med-hi volume driveways
High-medium volume driveways are driveways that often have cars pulling in and out, like commercial driveways or driveways of apartment buildings. Single-family residential driveways are low volume and should not be counted here.

- < 2
- 2 to 4
- >4

21. Traffic control devices
Count only the traffic control devices within the segment, not those that are visible but outside the segment (they will be captured when the next segment is surveyed.)

- Traffic Light:
- Stop Sign:
- Traffic Circle: A raised island in the middle of an intersection designed to slow vehicle traffic and reduce the occurrence of accidents. Triangular traffic control devices can also be counted under this category.
- Speed Bumps: Raised strips along the road surface that act as a traffic calming measure on local roads to slow the speed of vehicle traffic. Sometimes painted orange or marked with triangles to warn drivers of their presence.
- Chicanes or Chokers: chicanes are a series of narrowings or curb extensions that alternate from one side of the street to the other forming S-shaped curves. Chokers are curb extensions at midblock or intersection corners that narrow a street by extending the sidewalk or widening the planting strip.
22. Crosswalks
For each segment, note all marked crosswalks in segment. “Marked” refers to lines on the pavement (but not automobile stop lines) or signs, lights or signals.
- None
- 1 to 2
- 3 to 4
- >4

23. Crossing Aids
Locate and record the presence of any crossing aid devices that are present within the segment.
- Yield to Pedestrian Paddles:
- Pedestrian Signal:
- Median/Traffic Island
- Curb Extension
- Overpass/Underpass
- Pedestrian Crossing Warning Sign: street sign without flashing light. Children at play signs can also be included here. Yield signs for cars do not count.
- Flashing Warning Light
- Share the Road Warning Sign
- None

24. Bicycle facilities
For each segment, observe and record the presence of any bicycle facilities.
- Bicycle route signs
- Striped bicycle lane designation
- Visible bicycle parking facilities: these facilities must be useable by the public, not for private use only
- Bicycle crossing warning.
- No Bicycle facilities
Section D: Walking/Cycling Environment

25. Roadway/Path lighting
For each segment, observe and record the presence of any roadway and/or path lighting.
- **No Lighting**: there is no artificial lighting in the area.
- **Road-oriented lighting**: there are public light fixtures that aim light at the road or are very high and illuminate broad expanses.
- **Pedestrian-scale lighting**: there are public light fixtures that aim light at the walking path.
- **Other lighting**: lighting from stores, apartments etc. that lights the road and/or pedestrian path.

26. Amenities
For each segment, observe and record the presence of any amenities that are for public use. The amenities must also be visible and accessible from the pedestrian path in order to count. Anything that would be considered an accessory or additional benefit of the sidewalk environment.
- **Garbage Cans**: only public use garbage cans count. Residential garbage cans do not count.
- **Benches:**
- **Water Fountain:**
- **Street Vendors/Vending Machines**: this includes soda machines, candy machines, public pay phones, mailboxes and newspaper dispensers.

27. Are there wayfinding aids?
For each segment, observe and record the presence or lack of any wayfinding aids. Types of wayfinding aids can include maps, directional signs, or directories of public amenities or attractions.
- **Yes**: A wayfinding aid is a sign identifying the name of the cross streets. Any sign visible from the segment at the pedestrian level counts as a wayfinding aid, even if it is actually located on another segment.
- **No:**

28. Number of trees shading walking area
For each segment, observe and record the presence of trees that line the street and/or sidewalk. This type of vegetation in between the sidewalk and the roadway is different than a buffer in that the trees in this section are spaced far enough apart that they do act as a solid barrier.
- **None or Very Few**: the path is not shaded by any trees (or only one tree) along the segment. (less than 25% is covered)
- **Some**: the path is covered between 25 and 75% of the way.
- **Many/Dense**: more than 75% of the path is shaded by trees.
29. **Degree of enclosure**

For each segment, observe the degree of enclosure that is created in the space. Degree of enclosure refers to the edges of a site which define the visual boundaries of an open space. For this question, take into account both the architectural elements, buildings, and natural features (trees, bushes etc.) when evaluating the level of enclosure.

- **Little or no enclosure**: the view from the sidewalk is open in both directions for more than 15 feet for most of the segment. It is a wide-open, unconstrained space.
- **Some enclosure**: the view is partially enclosed, but there is still some wide-open spaces.
- **Highly enclosed**: the buildings lining the street are within 10 feet of the sidewalk and there is a cross-sectional design ratio of approximately one (height) to two (width), or less.
30. **Powerlines along segment?**
For each segment, observe the presence and type of powerlines that line the street. Power lines that cross or run parallel to the segment all count in this question.
- **No**
- **Low Voltage/Distribution Line**
- **High Voltage/Transmission Line**

31. **Overall cleanliness and building maintenance**
For each segment, observe the level of cleanliness that is associated with the building and pedestrian facilities that line the street. Leaves, branches, and brush, all count towards the cleanliness based on the amount and if it is clearly visible and in the pedestrian path.
- **Poor**: there is noticeable garbage, graffiti and/or broken glass along the segment.
- **Fair**: there are a few wrappers, or other litter but no graffiti or other garbage evident.
- **Good**: there is no obvious garbage, graffiti, litter or broken glass in the segment.

32. **Articulation in building designs**
For each segment, determine the level of articulation in building design. In this context, articulation in building design refers to the way in which a building ‘reads’ from the street and positively contributes to the overall streetscape facade.
- **Little or no articulation**: the façades of buildings along the segment are unadorned and do not have many window openings.
- **Some articulation**: the façades of buildings along the segment are similar in style and/or are not very ornate.
- **Highly articulated**: the façades of buildings along the segment are complex and varied. Highly articulated does not translate into homogenous building design but rather that the design and composition of each building reinforces the character and continuity of the streetscape.

33. **Building setbacks from sidewalk**
For each segment, observe and estimate the setback distances of the majority of the buildings along the street from the sidewalk.
- **At edge of sidewalk**
- **Within 20 feet of sidewalk**
- **More than 20 feet from sidewalk**
34. Building height
Along each segment, note the height of the buildings that represent the dominant building height along the street.
  - **Short**: 1-2 stories, except with big box buildings or other buildings with tall floors.
  - **Medium**: 3-5 stories (with same exceptions.)
  - **Tall**: buildings taller than 5 stories (with same exceptions.)
NOTE: Average height is to be measured here, not the maximum or minimum height.

35. Bus Stops
For each street segment, observe the type of bus shelter present on the street.
  - Bus stop with shelter
  - Bus stop with bench
  - Bus stop with signage only

Source: BC Transit
**Section SA: Subjective Assessment**

Enter 1, 2, 3 or 4 for:
1 = Strongly Agree
2 = Agree
3 = Disagree
4 = Strongly Disagree

Segment...
... is attractive for walking
... is attractive for cycling
... feels safe for walking
... feels safe for cycling

- Response to the “attractive” question should answer the question: “would you want to walk/bike this segment?” This includes finding the area aesthetically pleasing and existence of destinations.
- Response to the “safe” question for walking should take into consideration not only walking along the sidewalk but crossing the street. The administrator should think of walking the segment with a 10 year old child. Would a child be safe walking the segment?
- Response to the “safe” question for cycling should take into consideration existence of a bicycle lane and speed of local traffic. A segment can only score a 1 in this question if the traffic goes below 25 miles an hour or there is a formal bicycle lane present.
Appendix C: PEDS Audit Tool Form
### A. Environment

1. **Uses in Segment (all that apply)**
   - Housing - Single Family Detached
   - Housing - Multi-Family
   - Housing - Mobile Homes
   - Office/Institutional
   - Restaurant/Cafe/Commercial
   - Industrial
   - Vacant/Undeveloped

2. **Slope**
   - Flat
   - Slight hill
   - Steep hill

3. **Segment Intersections**
   - Segment has 3 way intersection
   - Segment has 4 way intersection
   - Segment has other intersection
   - Segment deadends but path continues
   - Segment has no intersections

### B. Pedestrian Facility (skip if none present)

4. **Type(s) of pedestrian facility (all that apply)**
   - Footpath (worn dirt path)
   - Paved Trail
   - Sidewalk
   - Pedestrian Street (closed to cars)

### C. Road Attributes (skip if path only)

11. **Curb cuts**
   - None
   - 1 to 4
   - > 4

12. **Sidewalk completeness/continuity**
   - Sidewalk is complete
   - Sidewalk is incomplete

13. **Sidewalk connectivity to other sidewalks/crosswalks**
   - Number of connections

### D. Walking/Cycling Environment

24. **Bicycle facilities (all that apply)**
   - Bicycle route signs
   - Striped bicycle lane designation
   - Visible bicycle parking facilities
   - Bicycle crossing warning
   - No bicycle facilities

25. **Roadway/path lighting**
   - Road-oriented lighting
   - Pedestrian-scale lighting
   - Other lighting
   - No lighting

26. **Amenities (all that apply)**
   - Public garbage cans
   - Benches
   - Water fountain
   - Street vendors/vending machines

27. **Are there wayfinding aids?**
   - No
   - Yes

28. **Number of trees shading walking area**
   - None
   - Some
   - Many/Dense

29. **Degree of enclosure**
   - Little or no enclosure
   - Some enclosure
   - Highly enclosed

30. **Powerlines along segment?**
   - Low Voltage/Distribution Line
   - High Voltage/Transmission Line

31. **Overall cleanliness and building maintenance**
   - Poor (much litter/graffiti/broken facilities)
   - Fair (some litter/graffiti/broken facilities)
   - Good (no litter/graffiti/broken facilities)

32. **Articulation in building designs**
   - Little or no articulation
   - Some articulation
   - Highly articulated

33. **Building setbacks from sidewalk**
   - At edge of sidewalk
   - Within 20 feet of sidewalk
   - More than 20 feet from sidewalk

34. **Building height**
   - Short
   - Medium
   - Tall

35. **Bus stops**
   - Bus stop with shelter
   - Bus stop with bench
   - Bus stop with signage only
   - No bus stop

### Subjective Assessment: Segment…

Enter 1, 2, 3, or 4 for 1=Strongly Agree, 2=Agree, 3=Disagree, 4=Strongly Disagree

- …….is attractive for walking.
- …….is attractive for cycling.