COMING TO A STOP

All Ages and Abilities Bicycle Parking in New and Existing Development

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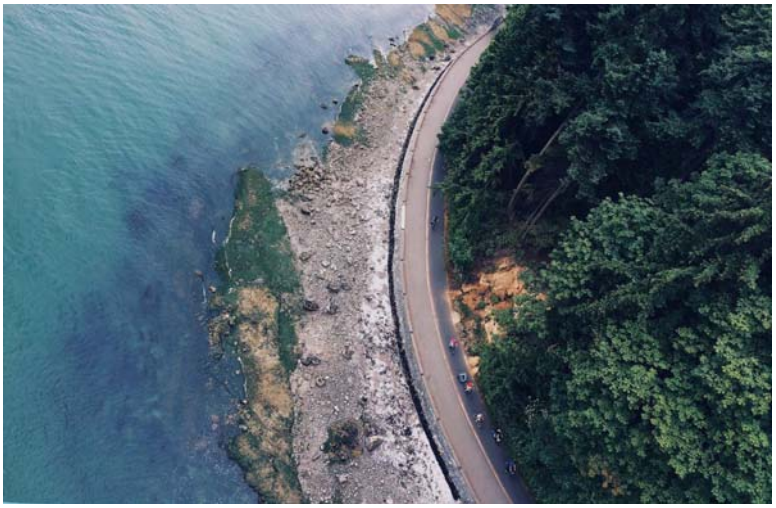

Figure 1: Biking the Seawall

Bike parking is about providing convenient, safe, secure parking for cyclists. It is not about "how do we fit the most bikes into the smallest space possible."

- Elco Gauw, Urban Racks

Figure 2: Crowded Parking

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CITY OF VANCOUVER | GREENEST CITY 2020 Green Transportation | a place of mind THE UNIVERSITY OF BRITISH COLUMBIA sustainability

Cycling is gaining speed in Vancouver.

Ridership has increased significantly since 2008, thanks in large part to significant upgrades to the city's bicycle network that have made cycling more safe, comfortable, and convenient. Unfortunately, both official and anecdotal reports indicate that the quantity and quality of bicycle parking has been unable to match this upsurge in ridership. Issues such as bicycle theft, insufficient space, and inconvenient facility locations are frustrating cyclists and threaten to slow the gains in cycling mode share. This report aims to address these issues by focusing on off-street, residential bicycle parking, which is an area of particular concern amongst cyclists.

The Vancouver *Parking Bylaw 6059*, which contains the city's bicycle parking regulations, needs to be updated in order to meet current and future demand. The minimum amount of required secure bike parking in multifamily buildings is insufficient and should be raised from 1.25 spaces per unit to 2 spaces per unit. The location of and access to bicycle parking are also important considerations, as these factors can inhibit users from using the parking facilities. Facilities should ideally be located at grade in a visible, convenient place that allows safe and efficient ingress and egress. Incentives such as density bonuses, expedited permitting, and reduced vehicle parking requirements can help encourage developers to go beyond the minimum and build outstanding bicycle parking facilities. Additionally, issues such as security, monitoring, enforcement, maintenance, and facility management all warrant increased attention in the bylaw.

Many people choose—or are forced—to store their bicycles in their living spaces, which carries a suite of challenges; bicycles are difficult to maneuver, they take up valuable living space, and occasionally, they are banned from elevators and hallways. Upgraded bike parking regulations will hopefully improve this situation, but there will always be people, especially those with expensive bicycles, who choose to store them in their unit. For this reason, the regulations surrounding in-unit storage must be clarified, granting bicycles the same treatment as strollers and wheelchairs when it comes to building access. Additionally, buildings should be designed with bicycles in mind, with sufficiently large hallways and doorways as well as at least one closet that is designed to hold a bicycle.

Figure 3: Biking the beach in Vancouver

1 EXECUTIVE SUMMARY

Bicycle parking facility design guidelines, which cover details such as bicycle rack type, layout, amenities, and installation procedures, also require updating. This level of detail, however, is likely best explained in a Bicycle Parking Facility Manual with clear and visually appealing graphics, rather than in a dry, text-only bylaw. The City of Vancouver should create this manual and link it to the bylaw, forming a two-document system such as that of San Francisco and Toronto. The manual would provide structure for planners and developers, allowing them flexibility in design yet ensuring that important aspects such as the use of proper materials and the provision of space for non-standard bicycles are considered.

Finally, the City of Vancouver needs to develop a strong retrofit program to facilitate the enhancement of bicycle parking in existing buildings. The first step is creating legislation that enables residents to initiate a retrofit and encouraging the conversion of vehicle parking and other underutilized spaces into bicycle parking. Once legislation is in place, the City should create a web-based program that simplifies the retrofit procedure, including instructions for residents and building management, links to helpful documents, and contact information for City staff and external organizations.

The recommendations in this report are ultimately intended to further the City's goal of providing safe, comfortable, and convenient bicycle parking for people of all ages and abilities (AAA). This goal is part of Vancouver's ambitious plan to become the "greenest city in the world by 2020" (City of Vancouver 2009). If these objectives are to become reality, Vancouver needs to implement bold and forward-thinking regulations that allow the continued growth of cycling and truly set the global standard for green transportation.

Figure 4: Network signage

2 INTRODUCTION

2.1 PROJECT BACKGROUND

The Greenest City Scholars Program is a collaboration between the City of Vancouver and the University of British Columbia (UBC) that supports Vancouver's *Greenest City 2020 Action Plan* (*GCAP*). Since 2010, UBC graduate students have worked with staff mentors at the City on a variety of research projects that correspond to the ten *GCAP* goals. In 2015, there were a total of twenty projects undertaken, making it the largest cohort of scholars to date.

This particular research project, which was initiated by the City's *Transportation 2040 Team*, aims to address the issue of off-street, residential bicycle parking. Vancouver's vision is to make cycling safe, comfortable, and convenient for people of all ages and abilities (AAA), and providing suitable bicycle parking is crucial to making this vision a reality. Often, bike parking is the weakest link in a person's trip, as it can be inconvenient, uncomfortable, and it may not meet demand. The AAA aspect is key, because there are currently many barriers that prevent people from parking their bicycles: not everyone is strong enough to lift a bike onto a vertical rack or down a flight of stairs, not everyone is comfortable being alone in a forgotten corner of a parking garage, and not everyone rides a standard-sized bicycle.

2.2 RESEARCH OBJECTIVES, METHODS, AND LIMITATIONS

The objectives of this project are to (a) recommend updates to the parking bylaw in order to improve bike parking in Vancouver, (b) support the creation of a Bicycle Parking Facility Manual, and (c) design a retrofit program that enables and encourages owners of existing buildings to upgrade their bike parking facilities.

The first component of this research was a literature review to determine common issues and best practices for off-street, residential bicycle parking. This included an examination of reports, journal articles, and bike parking manuals as well as zoning regulations, planning codes, and bylaws from a variety of cities across North America and Europe. The research process also involved reaching out to both City staff and external subject matter experts. A variety of groups and individuals contributed, including *HUB Cycling*, a non-profit created to address cycling issues in Vancouver; Elco Gauw, a bike parking consultant from *Urban Racks*; and Adam Kebede, an independent consultant with *Spoken*. Additionally, a request for information was sent out to the Association of Pedestrian and Bicycle Professionals (APBP) and the National Association of City Transportation Officials (NACTO) e-mail listservs, and planners from Portland, Oregon and Washington, D.C. were interviewed. Finally, an informal survey was conducted via select e-mail listservs and social media (this will be explained further in Chapter 4).

Bicycle parking helps legitimize cycling as a transportation mode by providing parking opportunities equal to motorized modes.

- Association of Pedestrian and Bicycle Professionals 2010

There were a few research limitations of note that influenced this project, the first being the complexity inherent in the topic of bike parking. There are so many detailed and interconnected aspects to consider—location, access, rack type, materials, security, enforcement, etc.—that it is difficult to cover everything in one project, especially one that is limited to 250 hours of work as per the Greenest City Scholars contract.

This leads into the next limitation, which was the examination of bike parking in other cities. These cities were chosen for a variety of reasons, including degree of similarity to Vancouver, reputation as a progressive cycling city, and recommendations from knowledgeable professionals. However, given time constraints, it was impossible to discover all progressive bike cities or to read through every bylaw and zoning code that may have been relevant to the project. Additionally, accessing European legislation proved challenging due to language barriers and diverse legislative systems. Some European content was reviewed, but the extra time considerations involved led to a greater focus on North American cities.

3 CONTEXT

Figure 5: Bike Vancouver

The final challenge was that in the North American context, Vancouver is already considered to be a progressive cycling city, with many other cities using Vancouver's bylaws as positive example. That is not to say that improvements cannot be made, but many of the regulations that were examined were outdated compared to Vancouver. This meant that a very detailed examination was required in order to identify novel and innovative approaches to bicycle parking, adding to the complexity of the project.

2.3 REPORT STRUCTURE

The next portion of this report provides context for this project, including the growth of cycling in Vancouver (Chapter 3) and specific bike parking issues (Chapter 4). Chapter 4 also includes a collection of "residential bike parking stories" from Vancouver residents, with the full survey results available in Appendix B. Chapter 5 contains recommendations for updating the Vancouver parking bylaw. These recommendations are summarized in Appendix A, while detailed examples of legislation from other cities can be found in Appendix C. Chapter 6 contains recommendations for the creation of a Bicycle Parking Facility Manual, which would supplement the updated parking bylaw. Chapter 7 explains the current retrofit process in Vancouver and proposes a new retrofit program. Chapter 8 contains the summary and closing remarks, followed by references, image credits, and the appendices described above.

This report should be read with an open mind and an eye to the future. Currently, the quantity and quality of bike parking in Vancouver is inadequate. It is not enough to simply catch up to current demand, though; the City of Vancouver needs to be proactive and create positive spaces for both current and future residents. It may be the case that not every recommendation in this report will be feasible in the current political or economic context, but they are still worthy of careful consideration.

3.1 RELEVANT POLICY

Vancouver, British Columbia is a vibrant city of over 640,000 people nestled between ocean and mountains on Canada's west coast (BCStats 2014). The city is part of the Greater Vancouver Regional District (or Metro Vancouver), which has a population of 2.4 million (BCStats 2014). According to the *Greenest City 2020 Action Plan* (*GCAP*), Vancouver's mission is to become "the greenest city in the world by 2020," a lofty goal that sets the tone for planning and decision making throughout the city (City of Vancouver 2009). The *GCAP* goal most relevant to this project is "Green Transportation," which aims to improve transit, walking, and cycling.

The *Transportation 2040* plan, which was influenced by the *GCAP* and approved in 2012, also contains many actions geared towards cycling, including the following:

- C 2.1 *Provide abundant and convenient bicycle parking and end-of-trip facilities.*
  - C 2.1.1. *Periodically review policies for new developments to ensure abundant and conveniently located secure bicycle parking and end-of-trip facilities. Minimum requirements should support long-term mode share targets and ownership levels, and include convenient parking for visitors.*
  - C 2.1.2. *Develop a retrofit program to make it easier to add bicycle parking and other end-of-trip facilities to existing buildings.*

Another key document is the Vancouver *Parking Bylaw 6059*, with Section 2 (Definitions), Section 3 (Administration), and Section 6 (Off-Street Bicycle Space Regulations) being of particular importance to this report. The *Vancouver Building Bylaw* also plays a role in bike parking, as it controls aspects such as hall width, closet size, and shower facilities.

3.2 GROWTH OF CYCLING IN VANCOUVER

Using the *GCAP* and *Transportation 2040* plan—and building off of a superb natural setting, a mild climate, and a relatively simple grid network—Vancouver has become a Canadian leader in sustainable and active transportation. In 2014, Vancouver met its 2020 goal of achieving 50 per cent mode share by green transportation (City of Vancouver 2015b). Currently, only a small portion of that—about 5.5 per cent—can be attributed to cycling (City of Vancouver 2015a). The City of Vancouver is targeting seven per cent cycling mode share by 2020 and twelve per cent by 2040.

Based on the growth in cycling over the past few years, these targets are attainable. According to data from TransLink Trip Diaries, cycling volumes grew over 40% between 2008 and 2011, and are likely even higher today (City of Vancouver 2013). This growth is likely due to a number of factors, including new and improved infrastructure, education and promotion, and cultural shift.

While the City's focus on cycling network infrastructure has been fantastic, there needs to be an increased focus on bicycle parking if these facilities are to keep up with increased demand and help meet the *GCAP* and *Transportation 2040* goals. Effective bicycle parking is "part of a complete, multimodal transportation system," and "[t]he provision of good parking facilities directly encourages people to use their bicycles as a means of transportation" (Arlington County Commuter Services 2014).

Improved parking leads to more cycling, which is a recipe for a healthy, happy, and sustainable city.

4

PARKING PROBLEMS

Bicycle parking is an important component of a comprehensive system of cycling infrastructure. It is especially critical for people living in multi-unit residential buildings, where the availability and quality of bicycle parking can be a significant determinant of bicycle ownership and cycling activity.

- Riekko 2013

4.1 BICYCLE PARKING BASICS

Before digging deeper into Vancouver's bicycle parking issues, it is important to briefly discuss bicycle parking in general. There are three broad categories of bike parking: short-term (two hours or less), long-term (more than two hours), and event (limited duration for special events) (Alta Planning + Design 2013). Many cities, including Vancouver, also use the terms Class A (or Class 1) and Class B (or Class 2) bike parking. In this case, Class A is referring to secure, long-term parking for residents or employees, whereas Class B refers to transient, short-term, or visitor parking (City of Vancouver 2014a). Bike parking can also be categorized as on-street and off-street. On-street is typically short-term, although outdoor public bicycle lockers would be an example of on-street long-term. Off-street can be either short- or long-term.

This report is focused on off-street, residential, Class A bicycle parking. In the context of this report, *residential buildings* generally refers to multifamily buildings such as apartment buildings, condominiums, and co-op housing. Due to a lack of available land and soaring housing prices, there is increasingly limited detached home ownership in Vancouver. Additionally, Riekko (2013) notes that there "has been less focus (or even an absence of regulation) on lower-scale residential buildings" such as detached houses, duplexes, and townhouses because residents of these buildings are typically able to find adequate bike storage without government intervention. In these housing types, there is more flexibility to use garages or sheds, and residents have more control over living spaces, allowing them to make bicycle-friendly modifications (Riekko 2013).

Apartments and condos, on the other hand, face a number of challenges when it comes to bicycle parking: floor space is limited, modifications are difficult or simply not allowed, accessing a unit with a bicycle can be challenging, and building management can ban bicycles from elevators, hallways, and balconies (Riekko 2013). Additionally, Riekko explains that most developers are not very keen to construct bike parking:

> *Developers may not consider bicycle parking a priority among competing interests for common space in a building; parking spaces for cars represent a viable market for developers in major cities, whereas bicycle parking spaces are typically not as marketable. Prospective condominium purchasers or tenants of rental buildings may not consider bicycle parking during their housing search, especially if they don't own a bicycle. Other considerations such as price, state of repair, unit size, building amenities, and vehicle parking are often more important considerations.* (Riekko 2013)

These challenges need to be addressed; as mode share continues to increase, more and more bike parking will be required. If parking is insufficient, gains in mode share may begin to slow, as people are less likely to purchase a bicycle if they have no place to store it (Riekko 2013). On the other hand, quality bicycle parking can help to legitimize cycling, "signaling to cyclists that they are invited and welcome" (Baerg 2012; Association of Pedestrian and Bicycle Professionals 2010). It is important to get it right in the first place, as bike parking retrofits can be very difficult and expensive. However, Riekko (2013) also cautions that "measures be reasonable, balancing these future needs without placing an undue burden on current residents."

4.2 OVERVIEW OF ISSUES

In 2008, the City of Vancouver reviewed bike parking and ownership in order to assess compliance to—and the effectiveness of—Vancouver's *Parking Bylaw 6059* (Macdonald and Memon 2008). When it came to residential buildings, the report found the following:

- Our survey of multiple residential developments confirmed that bicycle ownership is approximately 1.25 spaces per dwelling unit which is our by-law requirement.
- Most bicycle storage facilities were significantly underused. Overall less than half the provided spaces were used and only 28% of the vertical spaces used.
- Initially none of the bicycle storage areas fully met the City's security requirements.
- Five facilities had been retrofitted to improve security.
- People with high priced bikes generally would prefer to not use their current bicycle storage areas due to theft concerns.

Although nearly a decade old, these findings are a useful benchmark for today's bike parking issues. It is highly likely that the rate of bicycle ownership has increased since 2008 (See Chapter 5, Section 5.4 for details). Even if bicycle ownership has not increased in the years since 2007, policy should be based on *future* mode share projections, not the current numbers. It is likely that the second point regarding underused bicycle rooms is also outdated, as crowded bike rooms are now a significant issue in Vancouver. Where underutilized bicycle parking remains, the Danish Cyclists Federation (2008) has an explanation: "[e]mpty stands may be a sign that there are enough stands. But it may also be a signal from users that the parking solution does not work!"

The final three points—that the bicycle storage rooms were not meeting security requirements, that they were in need of retrofitting, and that cyclists refrain from using these rooms due to theft concerns—remain highly relevant. A recent Metro Vancouver study found that "a sizable proportion of bicycle owners surveyed are frustrated by the lack of secured and sufficient-sized bicycle parking facilities in their buildings" (Metro Vancouver 2012). When survey respondents who owned bicycles were asked if they used their buildings' bicycle parking facilities, a staggering 75 per cent answered "no" (Metro Vancouver 2012). The top three reasons for not using it were: (1) there is no bike facility; (2) bike facility is not trustworthy and/or they were unwilling to store an expensive bike with others; and (3) there was no more space in bike facility (Metro Vancouver 2012).

4.3 "YOUR RESIDENTIAL BIKE PARKING STORY"

The studies described above provide a general overview of the city's bike parking problems, but they fail to convey the true impact of this issue on the daily lives of Vancouverites. For many people, cycling is one of the most enjoyable activities in Vancouver, as it allows people to experience the city's many sights and sounds in an intimate and engaging fashion. For a growing number of people, cycling is also a primary mode of transportation. This means that bike parking problems can be a major disruption to citizens' enjoyment of the city and their daily working lives.

Storytelling was used to better understand the most pressing issues for cyclists in Vancouver. This can be a powerful technique as it allows real people to express themselves, revealing the nuances of a situation. In this case, an informal survey was used to elicit these stories, simply asking respondents to provide their "residential bike parking story." This question struck a chord: there were 93 responses, many of which contained evident emotion as people expressed their frustrations. There were positive tales of bicycle parking as well, but the overwhelming sentiment was that improvements are badly needed.

The survey was not intended to be representative of the Vancouver population; rather, it was simply meant to provide a small sample of real-life bike parking experiences. It was sent to City of Vancouver transportation staff, HUB Cycling's listserv, and the Facebook groups for Bike Vancouver and The School of Community and Regional Planning (UBC). The following two pages contain select stories that were particularly revealing or that represented a common issue. Appendix B contains the original survey and the complete set of responses.

RESIDENTIAL BIKE PARKING STORIES

From Actual Vancouverites

There isn't enough parking of any kind at my apartment building—not enough for the cars and certainly not enough for bicycles. Instead, the landlords rent out the parking stalls to a valet service for neighbourhood restaurants. We have one enclosed room for secure bike storage, but it is overflowing. Tenants have asked to rent and pay for an entire parking stall to use for more bicycle storage, but the landlords have turned them down as the valet is more lucrative. Now we have bikes chained in the stairwells, which is a fire risk. I park my bike in my bedroom, but it is scratching the paint and makes marks on the floor every time I take it in and out. I am risking my damage deposit every time I move it. **It is a huge deterrent to cycling more often.**

- Christine

Not much to say and no complaints, but the bike storage is crammed. I am on the strata council and we just conducted a bit of bike room housekeeping (tag your bike or it gets tossed), thinking that the bike room cram was a result of old tenants/owners that had long since moved. Nope, still just as crammed. Basically means everyone is riding (or at least owns) a bike which is great, but **we need higher density storage.** Guess what the topic for the next meeting is?! Are you saying we get a grant for that?

- Keith

I live in a building in the Broadway Cambie area. In my building the storage area closes from midnight to 5am. Also my building does not allow bikes in the elevator. So **if I come home late I am not able to store my bike without breaking a strata rule**.

- Nick

My co-op turned an empty parkade room into bike storage. It is WAY too small for our building. We waited years to get a spot and I can barely fit my bike in it. **We recently got a long tail cargo bike** because we want to be able to transport our kids easily by bike **but there's no way we can park it in the secure bike room** so instead we park it in our parking stall, lock it to other bikes, and cross our fingers. I hope that the COV takes into consideration that bikes come in many shapes and sizes and that bike rooms will have a place for cargo bikes, too.

- Carrie

I live in a large condo tower downtown. The building was built in the late 1990s. The building has wonderful amenities (such as a gym, hot tub, and well appointed interiors), but bike parking is definitely not one of them. Although the building has an underground, secure bike room with bike racks, **getting in and out of the room is very difficult**. Although connected to the main ramp of the underground parkade, a narrow staircase with a tight 180 degree angled landing makes getting bikes in and out very difficult. Perhaps the current bike parking area was converted to its current use later in the building's history. The room is also overcrowding with bikes, and my partner and I have to double up and stack our bikes on the rack. Meanwhile, there are always many empty spaces in the parkade for automobiles. Our unit came with two parking space for automobiles, but we don't own a car and have difficulty renting out these spaces; the parking spaces can only be rented out to residents of the building. Condo bylaws also prohibit the use of these parking spaces for bikes or storage. Bikes are also banned from all the other public areas of the building (such as hallways and elevators).

- Jim

We live in a new (2010) condo building in the Olympic Village. We found out after we moved in that they converted the secured rooms in the parkade that were intended for bike parking into extra personal storage rooms that won't accommodate bikes... To get to my bike, I go down to P2, and walk all the way to the most removed and secluded corner of the parkade—**it is literally a dark and hidden corner at the back of the building**. Then I use a building key to get into the room, turn on the light, and unlock my bike. Then I ride my bike across P2 and up two sets up ramps to the street. My bike doesn't trigger the safety stop-go lighting that is in the parkade for cars, so I often am confronted with a big SUV coming down a ramp straight towards me with a driver who is surprised to see me there. The gel-coat on the parkade ramp is also crazy slippery when wet which adds another hurdle in the rainy months...

- Alex

I live in an apartment building with two large parking garages that sit half empty due to the fact that we are downtown. Our building policy is that we must keep our bikes either in our apartments or on our deck. Had two bikes stolen off my car in the garage. **I gave up my car to live downtown and at times feel that I might want to give up my bike to enjoy my living space.**

- Brian

See Appendix B for full list of responses.

For 5 years, I lived in a high-rise tower in Downtown Vancouver. The strata had a no exceptions policy that all bikes were required to be kept in the bike room, and that bikes were not to be brought up to units. The elevators had cameras, and fines were in place for offenders. The bike room seemed minimally secure. It was a chain-linked enclosure near the entrance to the parkade. Because there was insufficient space within the enclosed bike room, additional racks were placed outside of the enclosure, with bikes visible from the street through the building's garage door, enticing thieves. As avid mountain bikers, my girlfriend and I had a bicycles worth several thousand dollars. After being caught bringing the bike up to my unit and issued the warning, we followed the rules and left the bikes in the bike room. Sure enough, a break-in occurred, and our two nice mountain bikes were selected for theft among a bike room full of beater bikes and inexpensive commuters. Following the theft, the building management was quite unhelpful. Although they had required us to keep our multi-thousand dollar bikes in a facility that was clearly insecure, they took no responsibility for the loss and required us to use our own insurance. To make matters worse, the strata was unwavering of prohibiting bikes from going up to our unit once we sourced replacements. The building manager was sympathetic and turned a blind eye as we snuck our bikes into the elevator through the parkade, but a self-righteous unit owner tattled to the strata, and we were reprimanded. **We spent the duration of our lease sneaking the bikes upstairs in giant bags, then moved out to a more bike-friendly building.** It was inappropriate for the building to require us to leave such expensive bikes in such an inadequate storage facility, and they should have taken more responsibility following the theft given that we had followed their rules.

- Daniel

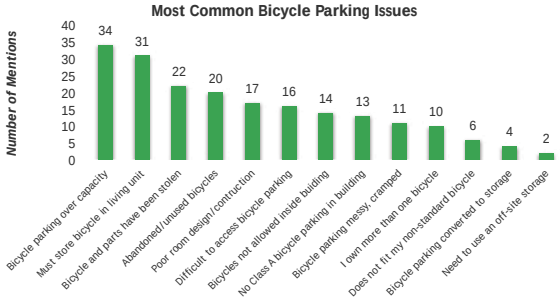
4.3.1 Story Analysis

While these stories reveal a wide array of issues, some clear patterns emerged upon coding the results. Figure 6 breaks down how many times each issue was mentioned in a story (note that individual responses often mentioned multiple issues). By far, the most common issue was the lack of available bicycle parking—34 people mentioned an overcapacity bike facility, while in 13 cases, there was no Class A parking in the building. Crowded and messy bicycle facilities were seen as problematic, with 20 complaints of abandoned and unused bicycles. Bicycle parking was also difficult to access (16) and insecure, with 22 mentions of theft. Thirty-one respondents indicated storing a bicycle in their unit, often because the bicycle was expensive and they did not trust the parking facility. In 14 cases, bicycles were banned from hallways, elevators, and/or balconies.

There were a few other notable patterns as well. Ten people owned more than one bicycle, some of which were non-standard designs such as cargo bikes and trailers. Seven stories indicated that there were unused vehicle parking spots at their buildings that could be used for bike parking, while four respondents noted that their building had already undergone a retrofit (although in some cases, additional parking was still required). Other stories mentioned inadequate guest parking, residents fighting over parking spaces, a facility that is not accessible 24 hours a day, and a woman who felt unsafe in her parking garage.

A small portion of respondents indicated being satisfied with some or all aspects of their bicycle parking. Ten respondents mentioned good security, six had adequate space, and five were able to easily access their parking. Only two people mentioned having access to some kind of amenity like a bike pump or work bench. A survey like this presents an excellent chance to air frustrations, which could partially explain the low number of positive responses. In this case, however, this is likely indicative of the generally poor quality and quantity of bicycle parking in Vancouver.

Figure 6: Coded survey results



4.4 WHY ARE THESE ISSUES OCCURRING?

4.4.1 Inadequate Regulations

Vancouver's *Parking Bylaw 6059* is meant to ensure a high standard of bike parking, but its provisions lack clarity, precision, and foresight. In the field of bike parking, "the devil is in the details," and unfortunately, the bylaw leaves too much up to interpretation, allowing savvy developers to get away with ineffective bike parking. Developers are not purposely undermining cyclists for the fun of it; they are simply trying to save money and maximize profits, and because the current regulations allow it, bike parking is often relegated to small, leftover spaces in a building. On the other hand, the bylaw can at times be unnecessarily constrictive—if a building contains underused automobile parking and residents wish to convert some of it to bicycle parking, this process can be tremendously arduous (see Chapter 7).

One major issue is that bylaws are generally based on minimums, which are in reality "the beginning of inconvenience" (Elco Gauw interview 2015). Minimums, such as the minimum amount of required bicycle parking or the minimum aisle width in a bike room, are often treated as "recommended standards"—only the most bike-friendly developer would consider exceeding these base requirements. Worse yet, developers and contractors often take shortcuts, lowering expenses by cutting into these minimums. As a result, users often end up with uncomfortable, insecure, and inadequate bike parking. In order to avoid this issue, minimums need to be set high enough so that even when shortcuts are taken, an adequate experience is guaranteed. Developers are like highway drivers; if regulators want cars to travel no faster than 120km/h, the safe choice is to set the speed limit at 110km/h, not 120km/h (Elco Gauw interview 2015).

4.4.2 Poor Design

Inadequate regulations are partially to blame for poor facility design, but it also comes down to the choices made by planners, developers, and contractors. Designing high quality bicycle parking requires thoughtful consideration of a number of elements: rack type, aisle spacing, enclosure type, door construction, facility location and access, etc. As soon as one element is designed inadequately, the entire facility can become compromised.

Vancouver's bicycle theft epidemic is evidence of this. Between 2008 and 2012, auto theft, robberies, and break-and-enters all dropped significantly, yet bike theft rose from 1,179 to 1,812—a 50 per cent increase (Skelton 2014). This spike in thefts mirrors the increase in cycling mode share, and without better design, this trend is set to continue.

Figure 7: Bicycle theft

4.4.3 Lack of Monitoring and Enforcement

Even the strongest regulations and most progressive designs can be useless if there is no monitoring or enforcement. Monitoring is necessary to ensure that policies and regulations are achieving their intended results. Enforcement is crucial to ensuring that the provisions in the bylaw are being followed. To be effective, these must be done on a regular basis, which is a significant challenge due to a lack of resources. However, it is no use updating bylaws and developing progressive design standards if there is no enforcement to back it up.

4.5 THE STATUS QUO

The problems described above will not be news to planners and developers—bike theft, crowded bike rooms, and disputes between occupants and building management are known problems for Vancouver's bicycle scene. The question is whether or not planners and developers are learning from these problems. An increased focus on bike parking is evident in some new developments, especially on the commercial side—the Microsoft Vancouver Development Centre is a positive example. However, even at a time when cycling is becoming more and more popular, many new developments are still providing sub-par bicycle parking facilities due to a combination of inadequate regulations and poor design. The following case study is a prime example of this.

5 BYLAW UPDATES

Recommending updates to bicycle parking regulations requires [not only] an assessment of existing conditions, but also the application of policy, forecasting trends in bicycle ownership, and good planning judgement.

- Riekko 2013

5.1 HOW TO READ THIS CHAPTER

Chapter 5 makes up the bulk of this report as it contains all recommended updates to the *Parking Bylaw 6059*. Some of the recommendations are general in nature, while others constitute fine details. In order to make this information digestible, this chapter has been divided into twelve sections that correspond to various aspects of the bylaw. Each section contains (a) a brief explanation of the problem, (b) discussion, and (c) recommendations. These recommendations are summarized in Appendix A.

Additionally, the sections may reference snippets of bylaws or regulations from other cities. These external examples are important because they show the specific wording used in other cities. However, in order to preserve readability and not have lengthy pieces of legislation in the middle of this report, these examples have been placed in Appendix C. Hyperlinks join text in Chapter 5 to the corresponding example, and clicking the arrow button (↖) next to the example in Appendix C allow readers to jump back up to the correct section of Chapter 5.

Note that these recommendations were made primarily with **off-street, Class A, residential bicycle parking** in mind. Many other general suggestions are also included, but this is not a comprehensive review. Further research is required for short-term, special event, commercial, and institutional bike parking.

5.2 STATEMENT OF PURPOSE

Problem

As Chapter 4 illustrates, the parking bylaw does not seem to be fulfilling its purpose. This statement is misleading, however, because it is currently unclear what constitutes the parking bylaw's purpose. There is no context or introduction provided in the bylaw.

Discussion

Many cities, including Portland, Oregon and Cambridge, Massachusetts, begin their bicycle parking regulations with a statement of intent or purpose. This section can be brief, but it is important in setting the stage for the regulations that follow. If a clear purpose is articulated, it can also be used to defend various pieces of the bylaw if they come under question from planners, developers, or the general public.

The City of Vancouver should emphasize that the purpose of the parking bylaw is to ensure safe, comfortable, and convenient bicycle parking for people of all ages and abilities. It could also discuss the importance of bicycle parking in the overall bicycle network, as well as the *GCAP* goal of making "walking, cycling, and public transit preferred transportation options" (City of Vancouver 2009).

Recommendations

- That the bylaw begin with a statement of purpose or intent that would provide context for the regulations that follow.

5.3 CLARITY AND READABILITY

Problem

The parking bylaw has been criticized for being unclear or difficult to understand. When a bylaw is confusing, it will not be implemented or enforced correctly, leading to inadequate bicycle parking facilities.

Discussion

The first step in making a bylaw clear and understandable is to explain all key terminology. Section 2 of Vancouver's bylaw contains all parking-related definitions. The only bicycle-specific terms, however, are "bicycle space," "bicycle space, Class A," and "bicycle space, Class B" (City of Vancouver 2014a). There are many other terms that should be defined in order to clarify Section 6.

The bylaw differentiates between a "bicycle room" and a "bicycle compound" but fails to define them, which could cause confusion. The City of North Vancouver and City of Victoria each offer good but contrasting definitions of these terms; in North Vancouver, a bicycle room has opaque walls, but in Victoria, bicycle rooms "are locked rooms or cages" (City of Victoria 2011). This illustrates the potential for confusion. Other terms to define include "bicycle locker," "bicycle corral, "expanded metal mesh," and "non-standard bicycles." Davis, California provides a simple definition for alternative bicycles. Expanded metal mesh would be best described with images in a separate bike parking facility manual (see Chapter 6).

After definitions, the document needs to flow logically and be divided into clear sections. The current bylaw is divided into sections for Class A and Class B parking, but within these sections, it jumps from topic to topic. There are many small subsections that contain minimum measurements for aisle width, rack spacing, etc., which seems disorganized. In order to be effective, a bylaw needs to be rigorous, but if it contains too much detail, it can become both challenging to understand and overly constricting. There needs to be a fine balance between providing structure and allowing flexibility. This can be achieved in part by moving much of the specific measurements and design aspects to a stand-alone facility manual, which will be discussed in Chapter 6.

One final point is that the *Vancouver Building Bylaw* contains a small segment on bike parking (Item 3.7.2.12. *Bicycle Parking Facilities*) that describes the requirements for water closets, washbasins, and showers in non-residential buildings. This segment is referenced in the parking bylaw, but for clarity, it would be much simpler to move this item from the building bylaw into the parking bylaw. That way, developers and planners would not have to flip back and forth. Toronto is an example of a city that lists shower requirements in their bicycle parking bylaw.

Recommendations

- That the bylaw provide definitions for the terms described in Section 5.3 of this report.
- That the bylaw be reorganized to increase its clarity and effectiveness.

5.4 BICYCLE PARKING RATIOS

Problem

The *Transportation 2040* calls to "[p]rovide abundant and convenient bicycle parking and end-of-trip facilities," stating that "minimum requirements should support long-term mode share targets and ownership levels, and include convenient parking for visitors" (City of Vancouver 2010). As Chapter 4 explained, the minimums listed in the parking bylaw (Item 6.2: Table or Number of Required Off-Street Bicycle Spaces) are not meeting current requirements, let alone supporting long-term mode share targets.

Discussion

This is one of the most important sections of the parking bylaw because it dictates the availability of bicycle parking and shapes all future construction. Therefore, it is absolutely critical that the bike parking minimums are in line with future mode share targets, as called for in the *Transportation 2040* plan. Vancouver's minimum of 1.25 Class A spaces for each dwelling unit in multifamily dwellings is inadequate for current demand, yet it is one of the highest ratios in North America. Many cities have much lower ratios of Class A spaces per dwelling: New York (0.5), Seattle (0.75), San Francisco (1), and Los Angeles (1) are just a few examples (City of New York 2015; City of Seattle 2015; City and County of San Francisco 2013; City of Los Angeles 2015). European ratios were more difficult to determine, as some are calculated in different ways or based on of national standards. For example, residential buildings in Denmark normally require two to 2.5 bicycle spaces for every 100 square meters of floor area (Bølling-Ladegaard and Celis 2008).

In North America, only Portland, Oregon and Boulder, Colorado were found to require more bike parking than Vancouver. Boulder requires two spaces per dwelling, but only 75 per cent of those need to be Class A, meaning that their ratio is actually 1.5 spaces per dwelling (City of Boulder 2015). Portland has a "Central City Plan District" (explained here) in which it requires 1.5 Class A spaces per dwelling (City of Portland 2015). Outside of the Central City, the requirement drops to 1.1 per dwelling. While Portland's ratio of 1.5 appears to be the joint-highest in North America, developers and architects in the city are worried that it is not sufficient for the demand in certain projects (see Hassalo on Eighth case study below).

The issue of bike parking ratios in residential buildings is directly tied to the question of bike ownership, but unfortunately, there are no current, reliable numbers for Vancouver. A 2008 survey conducted by the City indicated that bicycle ownership was approximately 1.25 bikes per unit, but given the increased mode share, this number has likely risen. Metro Vancouver conducted a survey in 2011 that indicated 68 per cent of households own one or more bicycles, although this sample included an unspecified number of UBC residents who are not technically part of the City of Vancouver (Metro Vancouver 2012).

It also appears to be common for people to own multiple bikes in Vancouver, although again, there are no reliable statistics on this at the moment. Vancouver is a world-class mountain biking destination; many people commute and ride recreationally on road bikes and hybrids; families increasingly rely on bike trailers and cargo bikes for transporting children and goods; and electric bicycles are rapidly growing in popularity. One City staff member indicated that his two-person household owned seven bikes; another owned ten bikes for a family of four, with more bikes to come. While these cases likely represent the exception rather than the norm, it is worth further investigating how many bicycles exist in Vancouver.

Denmark and the Netherlands are two of the most cyclist-friendly countries in Europe, so it is worthwhile referencing their bicycle ownership statistics. Nine out of ten Danes own a bicycle, while in Copenhagen specifically, four out of five households have access to a bicycle (Cycling Embassy of Denmark 2015; City of Copenhagen 2014). Seventy-three per cent of people in Amsterdam own a bicycle, while ownership is 88 per cent nationally (Ministerie van Verkeer en Waterstaat 2009). The Netherlands is also the only nation in Europe with more bicycles than residents—on average, the Dutch owned 1.11 bikes per person in 2004 (Ministerie van Verkeer en Waterstaat 2009). This is an important finding because it shows that even though bicycle ownership is only 88 per cent, the average number of bicycles is greater than one per person. Clearly, enough people own multiple bicycles to make up for the 12 per cent who do not own one.

Another reasonable benchmark would be to say that every Vancouverite should have access to a bicycle. Vancouver is not yet at the stage where bicycles outnumber people, but a ratio of one to one is a good place to plan for—even if ownership levels are not quite there yet, there is a good chance that this will occur in the near future. Assuming this one bike per person ratio, occupancy then becomes important. The average number of persons per household in Vancouver in 2011 was 2.2 (Statistics Canada 2011).

In order to truly become the greenest city in the world, Vancouver needs to ensure that its regulations are bold and progressive enough to match its ambitious goals.

However, looking only at apartment buildings (which is the focus of this study), the average goes down to 1.7 per household (Statistics Canada 2011). One bike per person times 1.7 persons per household means that there would be 1.7 bicycles per household. When compared to the current ratio of 1.25 Class A spaces per dwelling, there is a clear mismatch: 0.45 bikes per household are without secure parking.

Unit size is another variable worth considering. A Toronto study found, unsurprisingly, that bicycle ownership increases consistently with unit size, going from 0.7 bikes per unit in one-bedroom downtown units to 0.9 bikes per unit in two-bedroom units downtown (Riekko 2013). A study from Eugene, Oregon explains that parking requirements should increase as the number of bedrooms per unit increases, recommending one space per unit for studio, one-bedroom, and two-bedroom units, but two spaces per unit for a three-bedroom unit (Alta Planning + Design 2013).

Increasing the bike parking ratio from 1.25 to 1.7 would just meet demand if an average ownership rate of one bike per person were assumed. Looking forward and considering that there will be (a) future investments in cycling infrastructure, (b) continued normalization and promotion of cycling, (c) a demographic that is less auto-oriented, (d) a culture where many households own multiple bikes for different purposes, and (e) further increase in non-standard bicycle use (e.g. cargo bikes, trailers, etc.) causing more people to own multiple bicycles, a ratio of 1.7 per unit is not progressive enough and is hardly greater than cities like Portland or Boulder.

This report recommends a ratio of two Class A bicycle spaces per unit. This should provide enough spare bicycle parking to adequately future-proof buildings, which is important because retrofits can be extreme-

5.4.1 Hassalo on Eighth Case Study

Hassalo on Eighth is a 21-storey, three-building apartment project in Portland, Oregon that will provide more long-term bike parking than any other project in the United States (Andersen 2014). The development is promoted as an "eco-community" for people who walk and bike—one building is even named the "Velomor," which "combines 'velo' with 'amore' to form 'love of biking' — celebrating Portland's biking culture" (American Assets Trust Inc. 2015). It is located in the Lloyd District, which falls within the jurisdiction of Portland's Central City plan and thus requires 1.5 bicycle spaces per unit.

Hassalo on Eighth contains 657 dwellings and will provide the minimum requirement of 990 Class A bike spaces plus an additional 115 Class B spaces, resulting in a total of 1,105 bicycle parking spaces (Andersen 2014). Five hundred and forty-seven of the Class A spaces will be provided in the "Bike Hub," a massive underground valet parking complex (Andersen 2014). Project architects, however, are concerned that the bicycle parking will be insufficient for demand based on the bike-friendly location of the development and the expected demographic—young, urban professionals with families (Andersen 2014). Designer Scott Mizée explains that two bicycles per unit is a realistic estimate for demand in the area and that for family units, "special attention needs to be paid to cargo bikes and trailers" (Andersen 2014). Mizée explains that planners and developers cannot "over-estimate the need for cargo bike and larger city bike spaces in large residential developments in central Portland," a statement which applies to Vancouver as well (Andersen 2014).

Figure 9: Velomor, which is marketed towards cyclists, is part of the Hassalo on Eighth development.

ly difficult. Consideration should also be given to increasing this ratio for units with three or more bedrooms. The Dutch may have phenomenal ridership, but one look at their sidewalks and plazas—which are often packed to the brim with parked bicycles—shows what can happen when ridership increases without a reciprocal increase in parking supply. Vancouver is at a critical stage where ridership has started to take off, so the City should heed this warning from the Netherlands and plan for the future.

Recommendations

- That the minimum number of required off-street bicycle spaces for multiple dwelling units be increased from 1.25 to 2. Consideration should also be given to increasing this ratio for units with three or more bedrooms.

5.5 IN-UNIT STORAGE

Problem

Many building occupants choose—or are forced—to store bicycles in their living units, often due to a lack of available parking space, a fear of theft, or both. Unfortunately, storing bicycles in units can be very difficult due to a lack of space within the unit or an inability to access the unit with a bicycle, either due to building design or because of regulations banning bicycles from hallways, elevators, lobbies, and/or balconies.

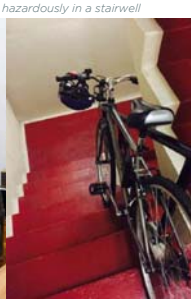
Discussion

When living units are being designed, bicycle parking is not typically a consideration. However, as the stories in Chapter 4 express, storing a bicycle in a small dwelling unit is a challenge that many Vancouverites encounter. The City should focus first and foremost on ensuring that adequate bicycle storage is available outside of dwelling units, but there will always be circumstances that require in-unit storage—someone who owns two or more bikes, for example, will likely need to store one or more of them in their unit, especially if these bicycles are extremely valuable.

Reminding architects and developers about the needs of cyclists is a good place to start, as they may come up with solutions on their own. However, the City could also actively encourage—and perhaps require—each unit in a new development to contain at least one interior closet or storage area that is large enough to store a bicycle. This could mean designing a front closet that is deep enough to fit a standard adult bicycle when hung vertically, while still allowing the door to close. Occupants who do not store their bicycle in their unit would of course be free to use that space for other purposes (and would likely be excited to have a larger storage area). Additionally, ensuring that hallways and doorways are wide enough to allow the passage of a bicycle without damaging

Figure 10: Bicycles in a living room
Figure 11: Clug bike clip, a Vancouver invention
Figure 12: Bicycle parked hazardously in a stairwell





walls may convince more strata councils and building managers to allow bicycles inside buildings.

The issue of bicycles being banned from hallways, elevators, lobbies, and/or balconies seems to be fairly widespread. Strata councils, landlords, and building owners establish these regulations in order to protect buildings from damage, to keep them clean, and sometimes for aesthetic reasons (bikes on balconies are often considered an eyesore). These building managers are motivated to keep maintenance costs low, but for the most part, bicycles are unfairly targeted. Is a muddy bicycle tire any different than muddy boots or sports equipment? Is the risk of a bike damaging an elevator or hallway any greater than the risk posed by a bulky stroller or wheel chair? For whatever reason, bicycles have developed a stigma and are often treated unjustly.

A simple way to solve the problem of wet and muddy bicycles is for both new and existing developments to provide bike washing and drying stations outside of buildings (Timothy Welsh [Hub Cycling] interview 2015). If cyclists are able to quickly clean off dirt and grime before entering the building, conflict could be greatly reduced. Additionally, interior walls should be coated in mark-resistant finishes that are easy to clean (Timothy Welsh [Hub Cycling] interview 2015).

Both New York City and San Francisco have passed laws requiring that tenants be allowed to bring bicycles into commercial buildings. Tenants in each city simply need to request bicycle access, at which point management must either provide a bicycle access plan outlining which elevators or hallways are appropriate for use or request an exemption for safety reasons (New York City Department of Transportation 2015; City and County of San Francisco 2012). In San Francisco, the building must either provide secure bicycle parking or allow bicycles in the building (City and County of San Francisco 2012).

New York's approach is particularly impressive, as the city has set up a web-based program called "Bikes In Buildings" in order to help implement their "Bicycle Access to Office Buildings Law" (New York City Department of Transportation 2015). The program explains the law to tenants, employees, and building owners, making implementation of the law relatively simple for all parties. Neither New York nor San Francisco have extended this law to residential buildings, but nonetheless, these regulations provide a powerful precedent that Vancouver should build on.

Recommendations

- That the City of Vancouver encourage or require every unit in all new developments to contain at least one interior closet or storage area that is large enough to store a standard adult bicycle. The City should also ensure that hallways and doorways are wide enough to allow the passage of a bicycle without damaging walls.
- That the City of Vancouver create a law that requires building owners and managers to allow bicycles in residential buildings. This legislation could be modeled on of New York's and San Francisco's recently established laws.

5.6 LOCATION AND ACCESS

Problem

The location of bicycle parking in Vancouver is often inconvenient, uncomfortable, or unsafe. Bike parking is frequently a poorly thought out, last-minute addition to a building plan, getting relegated to one or more otherwise unusable spaces. Often, it ends up in underground parking garages, which causes a number of issues. As a result of these poor location choices, accessing bike parking can be uncomfortable or even impossible, depending on a cyclist's fitness, comfort levels, or bicycle type.

Discussion

Section 6.3.6 of Vancouver's parking bylaw states the following in regards to access and location:

> *The bicycle room, compound, or lockers shall be located no lower than the first complete parking level below grade and shall have direct access to outside, except that a location more than one level below grade may be permitted where an elevator is supplied offering direct access to outside. There shall be no stairs on the access route, except that the Director of Planning may allow stairs provided a wheel ramp of a minimum width of 150 millimetres is provided without cutting into the stair tread.* (City of Vancouver 2014b)

Furthermore, Item 6.3.8 states that "[t]he entry door to a bicycle room or bicycle compound, or bicycle lockers, shall be within sight of building parking security, where such exists, an elevator, or an entrance" (City of Vancouver 2014b). This wording is fairly standard when compared to other North American bylaws and zoning codes, and many improvements are possible.

First of all, the bylaw should require that bicycle parking be located in a "safe, comfortable, and convenient location." The National Policy & Legal Analysis Network to Prevent Childhood Obesity (NPLAN) sample ordinance requires that parking be "safely accessed by bicycle and by foot in a way that minimizes conflicts with motor vehicles," while San Francisco requires "safe and convenient access to and from bicycle parking facilities" and requiring it to be "at least as conveniently located as the most convenient nondisabled car parking" space (City and County of San Francisco 2013; National Policy & Legal Analysis Network to Prevent Childhood Obesity (NPLAN) 2012). Making bicycle parking as convenient as motor vehicle parking would prevent bicycle cages from being located in the furthest depths of parking garage, where there is little surveillance or safety. San Francisco's code is extremely detailed when it comes to access and location—potentially too detailed, as the code segment is quite lengthy. However, it serves as an excellent example of legislation that the City of Vancouver should examine more closely.

Secondly, the bylaw seemingly assumes that bicycle parking will be located in a parking garage. While this is the case in most buildings, it is by no means an ideal solution—locating bike parking in garages "requires riders to ride up ramps designed for cars, which can prove to be a disincentive for using such spaces" (City of Los Angeles 2015). There are also safety concerns, especially for women, which will be discussed in Section 5.7. The City should outline a clear hierarchy of bike parking locations, making it clear that while a parking garage can be an acceptable location, it should not be considered the *default* location.

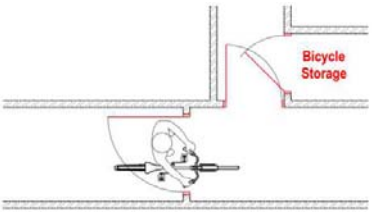


Figure 13: An example of a facility with poorly designed access; the doors and tight turning radius make it difficult to maneuver.

Best practice dictates that secure bicycle parking be located at grade and have a dedicated entrance for cyclists (Bølling-Ladegaard and Celis 2008; City of Toronto 2008). Any access hallways should be sufficiently wide to allow two cyclists to pass one another and easily navigate the space, and constriction points should be minimized (San Francisco Planning Department 2013). Any doors should be located and designed so that it is easy for a cyclist to open and move through—automatic doors are preferred, but they should at least have a slow-closing mechanism that gives cyclists time to enter (Cambridge City Council 2010). The Vancouver General Hospital (VGH) Cycling Centre is a fantastic local example of these best practices. These design details are likely better suited for a separate bicycle parking facility manual rather than the bylaw (see Chapter 6).

In cases where these best practices are not possible, the following standards should be met. If the parking is located above or below grade, a dedicated access ramp with a width of three meters is preferred, as this minimizes conflicts with motor vehicles (City of Toronto 2008). If a dedicated ramp is not possible, the ramp should be sufficiently wide to provide safety for cyclists—"[s]ingle lane ramps shared with motor traffic with a width of between 2.75m and 3.25m