

FINAL REPORT: Safety in Numbers: An Analysis of Three Vancouver Cycling Routes

Group 12

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### Safety in Numbers: An Analysis of Three Vancouver Cycling Routes

The City of Vancouver has an ambitious goal for at least half of all trips Vancouverites make be through some kind of active transportation by the year 2020 (Zipf, 2018). To achieve this, it is necessary to ensure that everyone city-wide feels they have the space to be able to use active transportation safely. We surveyed cyclists at three popular seawall locations and collected data on cyclist perception of three criteria from the Design Guidelines for All Ages and Abilities Cycling Routes (Vancouver, 2017). The criteria assessed were determined as crucial factors in increasing the attractiveness of cycling based on findings in previous cycling literature. The criteria chosen were: traffic flow through pedestrian intersections, bike lane width, and bike route surface. We used large signs with a prompt asking cyclists their opinion on these factors, which they could indicate to us while riding with a thumbs up for yes, sideways for somewhat and a thumbs down for no. We also created a survey summarizing our project goals where cyclists could tell us what their main purpose in cycling was, and what changes they believe would be most impactful to improve the quality and safety of the bike route at which they were surveyed. The surveys were completed online only by a few participants, but gave our group context to the responses other riders were giving. The main findings indicate that despite most pathways being the width required by the Design Guidelines for All Ages and Abilities Cycling Routes (Vancouver, 2017), people still do not believe that there is adequate width to safely and comfortably accommodate everyone. The coexistence of pedestrian and cyclist traffic was identified as another area of particular concern. Cyclists feel there is no universal understanding of yielding to pedestrians, even with marked crosswalks. Therefore, future and current bike routes could benefit from an increase in lane width, as well as increasing clear signage to help direct the flow of traffic such as “yell or bell” signs, or “yield to pedestrian” signs.

## INTRODUCTION AND LITERATURE REVIEW

Cycling is a unique form of physical activity, as it can be used for both transportation and leisure. In either form, it has environmental benefits, is cost-efficient for users, and can help participants achieve daily physical activity at recommended intensity levels, lowering their chances of suffering from chronic health problems (de Geus et al., 2007). Therefore, it is in the interest of municipalities to promote cycling for improved health of the populous, as well as to reduce traffic congestion and the related environmental impacts (Urban Systems, 2015). There is a positive correlation between the availability of proper, cycling-specific infrastructure and the number of people choosing to cycle (Pucher et al., 1999). In fact, users will go out of their way and take longer trips in order to utilize cycling specific routes (Howard and Burns, 2001). Safety is, unsurprisingly, one of the most important factors cyclists consider when assessing facilities. Qualities such as smooth and even lanes, wide paths, barriers of separation between cyclists and traffic, and a well-kept path are among the top safety priorities that increase cyclists' comfort (Mertens et al., 2014). Dill (2009) notes that the solution to increasing comfort of riders may also lie in more paths that are either bike only, or are on very low-traffic streets, and that simply adding designated bike lanes to busy streets does not promote usage to the same degree. In order to see a marked increase in cycling, and all the related positive effects on a city and its residents, cycling infrastructure must not only be present, it must be inviting and safe for all cyclists to use.

Vancouver presents itself as a city that encourages healthy living and active forms of transportation. A recent investigation into its efforts to promote cycling safety for all users showed that there are still necessary changes to be made, especially on busy streets, to provide safe cycling routes (Urban Systems, 2015). With an ambitious goal to get half of all trips Vancouverites make to be either on foot, bike, or transit by the year 2020 (Zipf, 2018), the barriers to, and the facilitators of, active transportation need to be assessed and analyzed. Research and feedback in these areas is essential to meet the needs of those already cycling, as well as for those who want to try cycling for transportation or recreation.

Nearly half (40%) of people in Vancouver are using active transportation (Zipf, 2018), this can in part be credited to following Design Guidelines for All Ages and Abilities Cycling Routes (Vancouver, 2017). Some of the criteria include: thoughtfully designed intersections that clearly indicate movement for all types of traffic, comfortable lane width, and well-kept, even surfaces (City of Vancouver, 2017). The selection of these three criteria in particular is based on what previous literature has found to be crucial aspects of bike route use. The purpose of this study will be to collect and assess rider feedback through ranked survey questions and open-ended questionnaire forms. By surveying popular routes at points of high traffic and natural stops like coffee shops, parks, or bike racks, a large amount of data can be easily collected and then used to critique the infrastructure currently in place. The popular paths to be evaluated are three Vancouver Seawall locations: Olympic Village, Granville Island, and David Lam Park.

## METHODS

The factors selected for investigation at each of the three routes are traffic flow through pedestrian intersections, bike lane width, and the surface of the bike route. These factors all play large roles in the safety and comfort of the cyclists that frequent the seawall, and can influence their degree of use. By assessing the current satisfaction of cyclists through observation, qualitative, and quantitative survey questions and analysis, implementation of safer environments for Vancouver's cyclists can be achieved. Undoubtedly, the best way to create optimal, impactful change for cyclists is by surveying them in the moment at the aforementioned seawall locations. The same three factors are assessed at all seawall locations because the routes are comparable in structure, and face similar safety and comfort implications.

The safety of an intersection depends on a variety of factors, including visibility of and in the intersection itself, signage, and clear movement of pedestrians (City of Vancouver, 2017). By designing intersections and routes thoughtfully to increase visibility and provide clear direction of movement (e.g. yield to pedestrian signs, painted crosswalks), a decrease in the number of cyclist and pedestrian conflicts should result. Therefore, it is necessary to gain information regarding current perceptions of how foot and bike traffic should coexist, and how these factors can be improved based on people's experiences and understanding out on bike routes.

The second factor to be explored is bike lane width. This plays an essential role in the safety and overall comfort level of cyclists of varying skill levels. Currently, according to the City of Vancouver (2017), the minimum standard bike lane measures are 2.5m (8ft) for unidirectional pathways and 3.0m (10ft) for bidirectional pathways. This spacing should allow clearance for conversational side-by-side cycling, and clearance for passing or oncoming cyclists. This specific factor can also be especially useful for newer cyclists, or families with children who are less experienced on bike routes and may face challenges when navigating alongside more experienced cyclists. Gaps in riding etiquette and knowledge can lead to more collisions and conflicts between cyclists. Moreover, pathways that can be ridden comfortably by more experienced riders may still be restrictive and intimidating for inexperienced riders. Therefore, by having standard, generous route widths across the city, new cyclists are ensured to feel safe and comfortable continuing to learn and enjoy using active transport, all while accommodating experienced cyclists with space to ride around slower cyclists.

The third aspect to be explored is the surface of the bike lane pathways. The texture, evenness, upkeep, and transition from one surface type to another all have an impact on safety (City of Vancouver, 2017). These factors can influence rider balance, wear and damage to bikes and riders, and reduction in visibility of painted traffic markings. Proper design of smooth and well-paved travel surfaces reduces the risk of falls and provides easy, comfortable riding for all. Additionally, variables such as Vancouver's infamous precipitation can play a role in the safety of the route, such as decreased grip due to rain. All cyclists feeling confident that their chosen bike route will be safe regardless of the weather can play a crucial role in deciding to use active transportation or not. Therefore, assessing how all riders feel about this factor is important, so that appropriate modifications can be made to help achieve Vancouver's active transportation goals.

The data collection for the Olympic Village, Granville Island, and David Lam Park Seawall routes was held on Thursday, March 15th from 11:30 AM to 2:40 PM. The weather was quite overcast and rainy, and we expected this to reduce our total number of respondents. Olympic Village was the first site visited between 11:30 AM and 12:30 PM, Granville Island was visited between 1:00 PM and 1:40 PM, and David Lam Park was visited between 1:50 PM and 2:40 PM. There were five posters used to collect our quantitative data; two described informed consent, and three had the questions for cyclists' opinions, such as "Do you feel pedestrian and cyclist traffic seamlessly coexist on this bike route?" (Appendix B). Cyclists were prompted to respond with a thumbs up for yes, a sideways thumb for somewhat, or a thumbs down for no.

For all three locations the surveyors lined up along the edge of the bike route and held the posters in sequence. The first poster stated that by answering the following questions the cyclist was automatically providing consent to have their responses used in the study. The next three survey posters were held in order, on which were printed the survey questions listed above. The four surveyors spread themselves out along the bike path roughly 30-40 meters apart; spacing between surveyors allowed cyclists time to read each poster and provide a response. Because of the weather and relatively low traffic, this method allowed the surveyors to optimize the cyclists passing by to try and get as many responses as possible, instead of rotating between one sign at a time. As cyclists approached, they were waved to and greeted to get their attention, and invited to participate in the study. Responses were recorded on individual cell phones and later consolidated into tables (Appendix D, Table 1).

Cyclists who slowed down and stopped to discuss the project with us graciously agreed to provide further insight and were emailed rather than given paper copies of the survey created for qualitative data (Appendix C). The online survey was created through "Qualtrics". The survey included the purpose of the project, procedures, the criteria assessed, project outcomes, benefits and risks, contact information of the course instructor, the names of the group members, and two clickable saying "I consent, begin the survey", or "I do not consent, I do not wish to participate". (Appendix C). After providing consent, participants were able to select the location at which they were contacted, their reason for cycling (e.g. transportation, recreation), what they believed would be the most impactful change to the safety and comfort of cycling at that location, and the rationale behind their choice. On the survey site, they were instructed to be specific with their answers for desired change.

The responses to the three questions were both tabulated and visualized as pie graphs, split by location. These were then used to identify trends within and between sites. Qualitative results were collected from the Qualtrics survey and examined for common themes (Appendix D, Figures 1-5).

Several problems were encountered during data collection and analysis. First, inclement weather likely reduced overall ridership during the sampling period. Secondly, the sampling period did not include peak commuting times, and moreover only one day of the week was sampled. Gaining varied responses from participants using the routes for leisure, social contact, exercise, or transportation was difficult due to the limited time spent at the locations. Additional data collection, including on a weekend, different time of day, and different weather could all serve to increase the strength of our results. The poor weather also was not conducive to us

taking the time to walk around to coffee shops or other popular stopping points, and it likely discouraged people from slowing down to chat with us and answer our survey questions.

## RESULTS

### Quantitative Data

There were six respondents at Olympic Village, and five respondents each at Granville Island and David Lam Park. Photos of the data collection sites are included for context (Appendix E). Data are presented in a site-specific manner and not aggregated, since rider feedback is only relevant to the location at which it was gathered. The response with the greatest number of selections is considered to be the prevailing sentiment regarding that particular factor on that bike route. If there is a tie between two options in the greatest number of responses, it will be considered a mixed opinion. This allows us to consider which factors require the greatest attention, and if there are differences between locations for each factor.

Results were fairly consistent when comparing a given factor across locations. The area most in need of attention is the perception of how cyclists and pedestrians interact on the routes. None of the locations had a majority-positive response. While Olympic Village and Granville Island had majority opinions that there was somewhat- good cyclist-pedestrian interaction, Granville Island did have a considerable negative perception. They also did not have any positive responses. David Lam Park, while the only location having positive responses, was still dominated by somewhat-positive and negative responses (Figure 1).

- “Do you feel pedestrian and cyclist traffic seamlessly coexist on this bike route?”

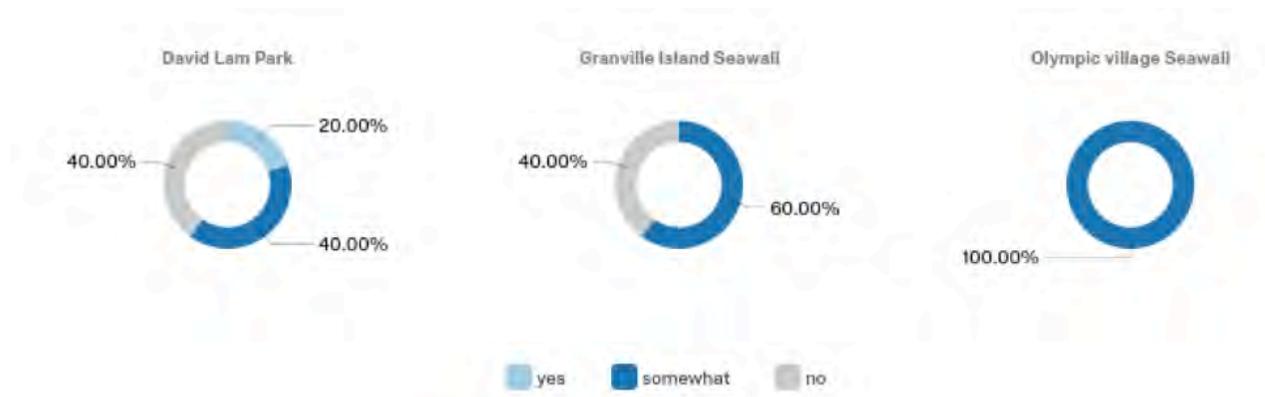


Figure 1. Responses to “Do you feel pedestrian and cyclist traffic seamlessly coexist on this bike route?”

Location	Overall opinion
David Lam Park Seawall	Mixed; between somewhat and no
Granville Island Seawall	Somewhat
Olympic Village Seawall	Somewhat

Table 1. Overall opinion of bike route for traffic flow

The perception of bike path width was also divisive, though results were generally more positive than for the previous question. Both Olympic Village and Granville Island were similar with the majority of respondents agreeing that the path was somewhat wide enough for all riders. A smaller proportion agreed that it was wide enough. There were no respondents who thought that the path was definitely not wide enough. David Lam Park was more uncertain, with responses covering the entire range from yes to no. As a whole, though, the perception appears to be generally positive (Figure 2).

- “Do you feel the bike route is an adequate width for all cyclists?”

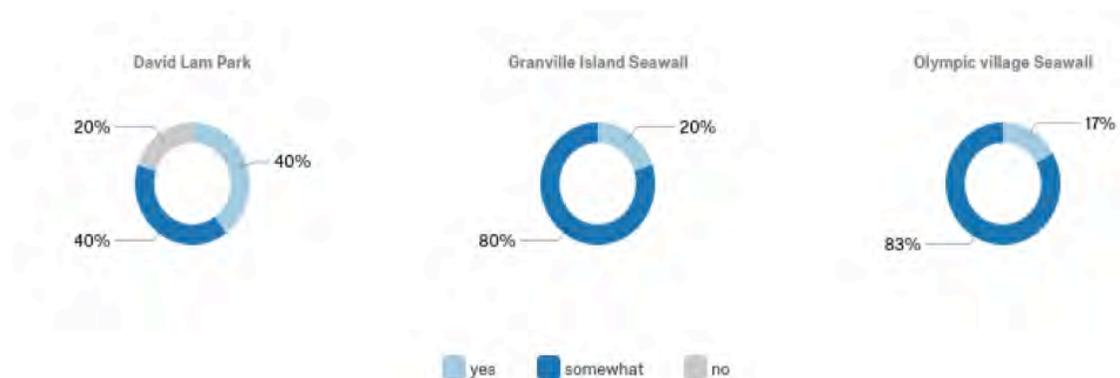


Figure 2. Responses to “Do you feel the bike route is an adequate width for all cyclists?”

Location	Overall opinion
David Lam Park Seawall	Mixed; between somewhat and yes
Granville Island Seawall	Somewhat
Olympic Village Seawall	Somewhat

Table 2. Overall opinion of bike route width

The one factor to which there was near universal consensus was the perceived safety of the surface of the bike routes, even in the rain. All respondents at both David Lam Park and the Olympic Village location responded with a thumbs up. At the Granville Island location, a majority felt the surface was safe, and a smaller group said that it was somewhat safe. No respondents at any location felt that the surfaces were unsafe in the rain (Figure 3).

- “Do you feel the bike route surface is safe when it’s raining?”

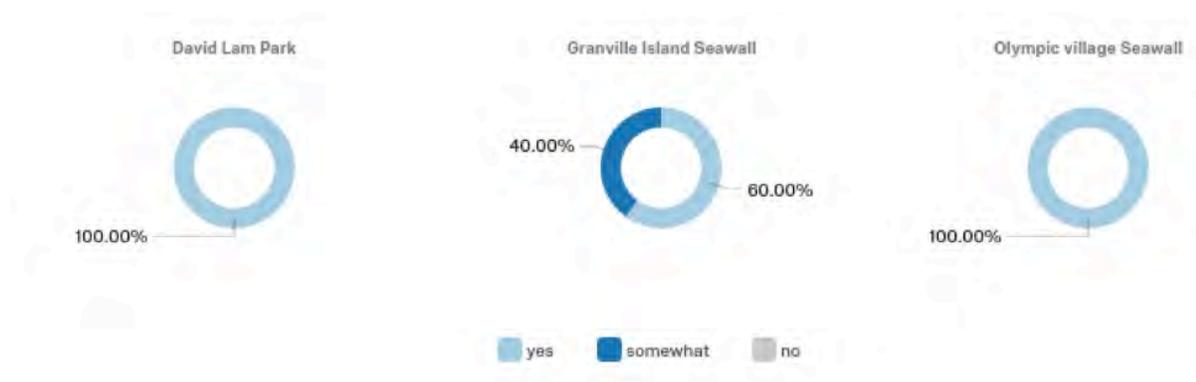


Figure 3. Responses to “Do you feel the bike route surface is safe when it’s raining?”

Location	Overall opinion
David Lam Park Seawall	Yes
Granville Island Seawall	Yes
Olympic Village Seawall	Yes

Table 3. Overall opinion of bike route surface safety

Looking at each route individually, there are some identifiable ways that change could be implemented to increase cyclist comfort and safety. For both David Lam Park and Olympic Village, the pedestrian and cyclist cohesion should be addressed. For Granville Island, the route width should be addressed. The factor that has currently been addressed well at all three locations is the perceived surface safety, even in the rain.

### Qualitative Data

There were seven respondents for our online survey. As with the quantitative data, these survey responses were organized in a site-specific manner (Appendix D). There are a few themes seen in our qualitative data, which provide further insight into the quantitative data collected.

- **Theme:** Type of respondents (Appendix D, Figure 3)  
All respondents were either using cycling for leisure, transportation, or other reasons.
- **Theme:** Impactful changes (Appendix D, Figure 4)  
No one said to change the surfaces of the bike routes, all respondents said to modify either the width of the route, or the traffic flow.
- **Theme:** Reason for change (Appendix D, Figure 5)  
An overarching theme that cyclists do not yield to pedestrians, either from lack of knowledge or disregard is apparent. Cyclists also feel there needs to be not only more space, but more cyclist- defined space to alleviate the worry of collisions. One respondent commented that “... I have seen cyclists ignore people waiting and keep on riding” (Appendix D, Figure 5).

## DISCUSSION

### David Lam Park

Primary opportunity: Pedestrian and cyclist traffic.

There is a lot of foot traffic in this area all along the route; it is already a high density area of the city, but additional people are drawn in by attractions like restaurants, parks, and False Creek. For nearly the entire length of the path, it is as if cyclists have to ride in the middle of pedestrian walkways on either side - on the southwest side there's a pedestrian lane, and the northeast side has a park which is also a source of pedestrian traffic (Appendix E). This may be the reason that cyclists experience frustration on this bike route. One respondent said "some parts have restaurants and people on patios drinking; it becomes unsafe and hard to bike in those areas" (Appendix D, Figure 5). While there are marked crosswalks in some places, the fact that pedestrians can appear, without warning, from either side of the cycling lane can pose problems. For instance, pedestrians may not always use designated areas to cross, which is not only unsafe but could cause riders to feel frustrated and train them to ignore waiting for those who are trying to cross properly. One respondent touched on this issue saying "cyclists don't know when to yield for pedestrians, and I have seen cyclists ignore people waiting" (Appendix D, Figure 5). This issue requires collaboration and understanding between both types of traffic. Signs that indicate yielding to pedestrians, and more crosswalks may alleviate conflict.

Now, evidently, there are also problems that exist between cyclists. The same respondent also shared that "some even become angry and frustrated with me when I ride slower" (Appendix D, Figure 5). This is likely the result of there being a lot of people with a variety of skill levels sharing the bike route. This is not necessarily something that can be resolved easily, as it would be contrary to our goals to discourage any person from riding their bike. Painting symbols or lines in the middle of the bike route to help facilitate bidirectional riding is one solution that is already in place in some locations (Appendix D). Another potential change that may make a difference is creating signs that encourage cyclists to indicate that they are passing, like a "yell or bell" sign.

Secondary opportunity: Lane width

Cyclists may feel that the width of this route needs to be increased for a few reasons. The first has to do with the amount of foot traffic in the area; as previously discussed, many people visit and enjoy the area. The other reason may be how the pedestrian and cyclist lanes are divided. Mertens et. al (2014) discovered that having posts divide sections of a path (e.g. bike traffic from foot traffic) can actually reduce the perception of safety for cyclists. Cyclists may feel as though if they have to spontaneously swerve to avoid a collision that there is a physical barrier they could crash into, potentially causing injury.

However, respondents may have considered more than just their own comfort when answering, as the question asked whether or not the route was an adequate width for all cyclists. This route services several different user groups. In addition to standard recreational cyclists and commuters, these include families with young children who either ride on their own or in an attachment on the back of a parent's bike. There also may be people who have a disability and

use adapted methods of cycling. Undoubtedly, the route could become very difficult for these people to navigate when there is high traffic, sharp corners, and a lot of other people to travel around. Simply having to share the space of the route with families or people using other forms of cycling that take up more space may have influenced riders' perception of the width as well. This is an even more difficult change to make in locations where the infrastructure already exists. Going forward, a wider lane standard may need to be established.

Success: surface safety

The entire path is paved very nicely (Appendix E). All respondents agreed that the surface felt safe to ride on in all common weather conditions (Figure 3).

### Granville Island

Primary opportunity: Lane width

Four of five respondents ranked the route width as somewhat adequate (Appendix D2, Table 1); though it was not measured, it did look to be slightly more narrow than the other two locations. There are many different types of riders that visit the island, and in this case the paths in the area may need to be wider than other locations to accommodate high traffic in a small space. One respondent said "there is not enough space for families with kids to ride along with more intense cyclists"(Appendix D2, Figure 5). Similarly to David Lam Park, the route could become very difficult for these people to navigate when there is high traffic.

Secondary opportunity: pedestrian and cyclists traffic flow

Granville Island experiences similar constraints to David Lam Park because it is also a busy destination. The specific site of our data collection was at a corner with a park and entrance to Granville Island on one side, and residential buildings on the other (Appendix E). Again, pedestrians may cross the path at many given points, leaving cyclists feeling that they need to constantly be on alert for wandering pedestrians. One respondent comments that "there should be more places for people to cross the bike side safely, and more signs so there is less interference" (Appendix D2, Figure 5).

Biggest success: surface safety

Three of the five respondents agreed that the surface was safe, and the other two respondents ranked the surface as somewhat safe (Appendix D2, Table 1). While the path we surveyed on was fairly even (Appendix E), there are places with uneven surfaces from roots under the concrete, and unpaved stones; respondents may have been considering these factors when responding.

### Olympic Village

Primary opportunity: pedestrian and cyclist traffic flow

Arguably the busiest of all three locations, there are many things to do and see along this route. Again, pedestrians are able to cross the bike route from all sides, and there are relatively

few marked intersections considering the amount of foot traffic in the area (Appendix E). All respondents ranked the intersection of traffic types as somewhat safe, so there is room for improvement here. This will require a better understanding of traffic flow for both types of users, because currently “pedestrians sometimes walk into the bike lanes, and it’s dangerous when you’re sharing a path.” (Appendix D, Figure 5) Similar strategies, like signage to indicate the proper yielding procedures, and more crosswalks, would help alleviate this problem.

Secondary opportunity: Lane width

The amount of people who, even on a low traffic day, believe that the bike route is not wide enough indicates that this area needs improvement. On busier days where the route is full of cyclists of a variety of user types and skill levels, it can certainly feel as though the lane is not wide enough. The previously mentioned research by Mertens et al. (2014) is again relevant here, as there are large stones used to divide the pedestrian and cyclist lanes (Appendix E) which can change people’s perceptions of how wide, and accordingly how safe, a route truly is.

Biggest success: surface safety

The surface along this route is well kept and well paved (Appendix E). All respondents agreed that the surface felt safe to use (Figure 3).

#### Future Focus

The main change that would be made to this project were it to be rerun is easily in the data collection process. Specifically, collecting data on different days of the week, during peak traffic hours, and in better weather. It would be very interesting to see the changes in responses and different perceptions under different circumstances. We postulate that there would be more recommendations for change and more thumbs down responses during busier periods, like commute times and on weekends. On the other hand, given the same situation, weather may play a role in creating more positive perceptions and responses since people’s opinions and feelings can be circumstantial to a degree. Different themes in qualitative data would likely be seen as well. Therefore, a more controlled data collection process should be developed for any future research.

However, the current data does provide insight to what it may take to get different user groups and skill levels to begin using active transportation, and what it may take to increase current user usage. This insight has been consolidated into our recommendations section.

### RECOMMENDATIONS

Recommended provisions for bicycle traffic includes:

1. Signage and coloured conflict zone markings

Cyclists often do not yield to pedestrians consistently, even if they know they should be yielding. From our field observations, we found that many pedestrian and cyclist intersection at separated bicycle and pedestrian pathways significantly lack signage. In order to ensure smooth traffic flow and alleviate conflicts between the two modes at the pedestrian and cyclist intersections:

- a. Coloured conflict zone markings at pedestrian and cyclist intersections or pedestrian crosswalks should be painted on the cyclist pathways.
- b. Traffic control signs requiring the cyclists to “stop” or “yield to pedestrian” should be placed near major pedestrian and cyclist intersections at separated bicycle and pedestrian pathways. “Yell or bell” signs could also be used periodically along the route on the cyclist side to ensure safe pedestrian passing.

## 2. Bike lane width

From the qualitative data, we found cyclists do not feel as though there is adequate width around all of the bike routes, especially in areas where there are things like restaurants and other attractions that draw a lot of people. In order to create a safe space where cyclists do not have to worry about pedestrians walking into their paths:

- a. Curb extensions could be installed, where possible.
- b. Paths could be widened in tight corners, or near restaurants and other attractions that draw considerable foot traffic.
- c. Lane lines should be painted at the border of the cyclist path in these high traffic areas, similar to coloured conflict zones at intersections, to draw attention to the border of the route.

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Appendices

Appendix B: Questions to Moving Riders

**Do you feel pedestrian and cyclist traffic seamlessly coexist on this bike route?**

Thumbs up for yes, thumbs down for no, thumbs in the middle for somewhat.

**Do you feel the bike route is an adequate width for all cyclists?**

Thumbs up for yes, thumbs down for no, thumbs in the middle for somewhat.

**Do you feel the bike route surface is safe when it's raining?**

Thumbs up for yes, thumbs down for no, thumbs in the middle for somewhat.

### Appendix C: Online Survey For Cyclists

**Students:** Cierrah, Jae- Sung, Jason, Jessica, and Nikita

**The purpose of the class project:** To gather knowledge and expertise from community members on active transportation.

**Study Procedures:** We are asking you to participate in a survey. We will collect your survey and with the information gathered, we will critically examine how individuals engage in health promoting activities or initiatives (in this case, engagement in active transport).

**Three criteria assessed:**

- a) Do you feel pedestrian and cyclist traffic seamlessly co-exist on this bike route?
- b) Do you feel the bike route is an adequate width for all cyclists?
- c) Do you feel the bike route surface is safe when it's raining?

**Project outcomes:** The information gathered will be part of a written report for a Kinesiology course at the University of British Columbia (KIN 464). The written report will be shared with the community partners involved with the project. The report may also be posted on the following website

<http://www.citystudiovancouver.com/projects/>

***No personal information/information that could identify participants will be included in these reports.***

**Benefits and risks:** There are no explicit benefits to you by taking part in this survey. However, participating will provide you with the opportunity to voice your opinion on your experiences with health promoting activities and will provide the students with an opportunity to learn from your experiences. The risks associated with participating in this research are minimal. There are no known physical, economic, or social risks associated with participation in this study. You should know that your participation is completely voluntary and ***you are free to not complete the survey*** and there will not be negative impacts related to your withdrawal.

**Contact for information about the study:**

If you have any questions about this class project, you can contact Dr. Andrea Bundon (course instructor) by email at [andrea.bundon@ubc.ca](mailto:andrea.bundon@ubc.ca)

**Consent:**

Your participation in this study is entirely voluntary and you may refuse to participate by simply not completing the survey. You will receive a copy of this consent form for your own records. By answering and submitting survey questions you are giving your consent for your response to be used for the report.

**1. Consent**

- a) I consent, begin the survey
- b) I do not consent, I do not wish to participate

**2. Which locations were you contacted at?**

- a) David Lam Park
- b) Olympic Village Seawall
- c) Granville Island Seawall

**3. What is your main reason for cycling? E.g.: leisure, social, utilitarian (solely for exercise or transportation).**

**3. With regards to the criteria we are assessing today (ie: traffic flow, lane width, and surface safety) what would be the most impactful change to this route for you?**

**4. Why do you feel like that change would be the most impactful?**

Appendix D: Results

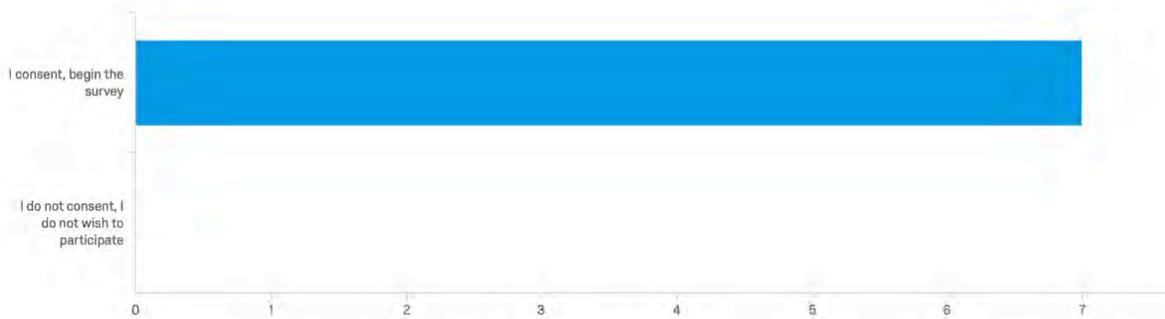
1. Quantitative

Table 1. Quantitative Data Table

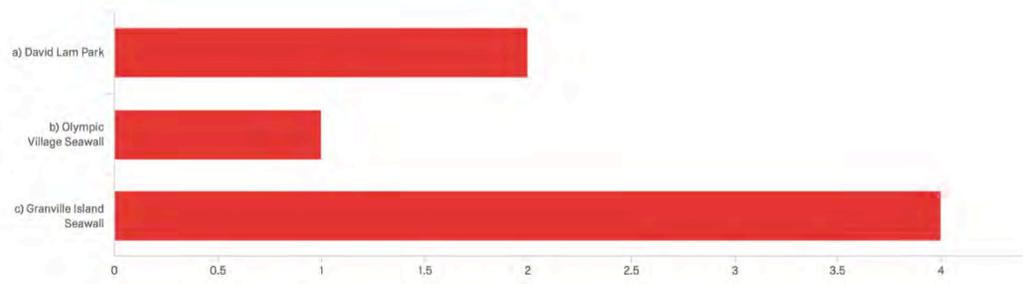
		Which location were you contacted at?			Total
		David Lam Park	Granville Island Seawall	Olympic village Seawall	
a) Do you feel the bike route is an adequate width for all cyclists?	yes	2	1	1	4
	somewhat	2	4	5	11
	no	1	0	0	1
	Total	5	5	6	16
b) Do you feel the bike route surface is safe when it's raining?	yes	5	3	6	14
	somewhat	0	2	0	2
	no	0	0	0	0
	Total	5	5	6	16
c) Do you feel pedestrian and cyclist traffic seamlessly co-exist on this bike route?	yes	1	0	0	1
	somewhat	2	3	6	11
	no	2	2	0	4
	Total	5	5	6	16

2. Qualitative

Figure 1. Consent

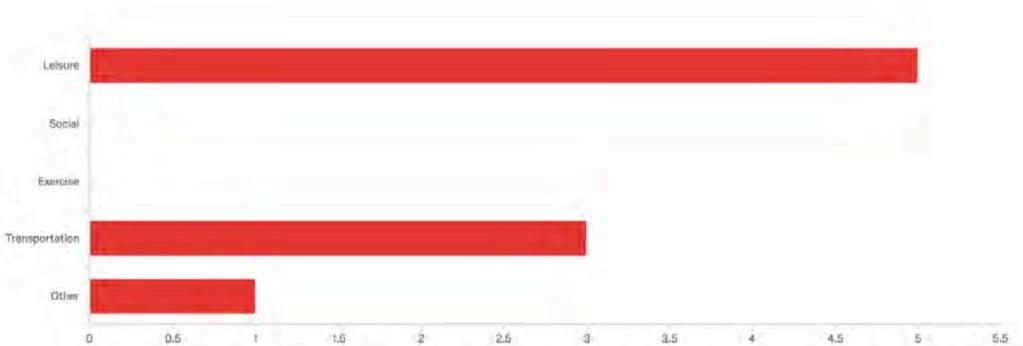


**Figure 2. Which location were you contacted at?**



#	Field	Choice Count
1	a) David Lam Park	28.57% 2
2	b) Olympic Village Seawall	14.29% 1
3	c) Granville Island Seawall	57.14% 4
		7

**Figure 3. What is your main reason for cycling? (can select multiple answers)**



#	Field	Choice Count
1	Leisure	55.56% 5
2	Social	0.00% 0
3	Exercise	0.00% 0
4	Transportation	33.33% 3
5	Other	11.11% 1
		9

**Figure 4. With regards to the criteria we are assessing today (i.e.: traffic flow, lane width, and surface safety) what would be the most impactful change to this route for you?**

With regards to the criteria we are assessing today (i.e. traffic flow, lan...

Traffic Flow

lane width

Width

Traffic

Width

Traffic flow

Traffic flow

**Figure 5. Why do you feel like that change would be the most impactful?**

Why do you feel like that change would be the most impactful?

Many problems happen with cyclists weaving in and out. Almost like there is a middle lane for passing and it is unsafe. Cyclists don't know when to yield for pedestrians, and I have seen cyclists ignore people waiting and keep on riding. Some even become angry and frustrated with me when I ride slower.

Most of the route is ok, could be wider though. Some parts have restaurants and people on patios drinking, it becomes unsafe and hard to bike in those areas.

there is not enough space for families with kids to ride along with more intense cyclists who go fast and weave in and out of the lane. It would be nice to feel more comfortable riding with a family

Many people at parks walking around not paying attention. There should be more places for people to cross the bike side safely, and more signs so there is less interference

The path is narrow in some places and is a problem around tight corners especially because it can create blind spots and crashes

Pedestrians sometimes walk into the bike lanes, and it's dangerous when you're sharing the path. Not all cyclists know when to stop for pedestrians, that can be dangerous too.

Pedestrians would feel safer and cycleists wouldn't be worried about pedestrians

Appendix E: Photos of Data Collection



David Lam Park



Granville Island



Olympic Village