

FINAL REPORT: QUALITY AND SAFETY OF BIKE ROUTES IN VANCOUVER

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April 3rd, 2018

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## **EXECUTIVE SUMMARY**

The report “Accessible Bike Routes in Vancouver” is based on a study conducted by students at the University of British Columbia’s School of Kinesiology to determine the effectiveness of specific bike routes that will be further indicated. Visitation to three bike routes indicated areas that required further research and provided the information required to develop questions to include in this study. Data was collected at the following bike routes: W10th between Cambie and Yukon, the Science World Seawall and the Lions Gate Bridge. The data was collected at different times due to constraints in having an adequate number of researchers present per route at given times.

Throughout our data collection and research our group determined that overall the city of Vancouver has done a fairly good job on the bike routes we currently have, however there is generally an element one route has that another is missing. Ideally, all of the routes would follow the rules and guidelines set out by the Transportation Design Guidelines, providing a level of consistency. We are aware that no bike route can be exactly the same due to the structural layout of the area the route is on, but there should be all of the same safety requirements and amount of accessibility on the cycling routes for its users.

Furthermore the changes we saw fit for each route are as listed below. For the Lions Gate Bridge there should be a separation of some kind to show which areas are designated for cyclists and which are for pedestrians/walkers. For W10th between Cambie and Yukon concrete barriers should separate bikers from motor vehicles to increase safety and help the cyclists feel more at ease. Finally for the Science World Seawall, barriers would help this route in terms of safety by providing separations from pedestrians, as well as barriers separating cyclists from the water.

Overall, each route possessed difficulties in collecting the data due to the time of day chosen. Times chosen consisted of mostly mid-afternoon or low traffic times. Weather was also a minor factor that may have potentially deterred cyclists from using the bike routes. Our group believes that results could change in the summer season of Vancouver, as well as if the sample size was larger. A larger sample size will be easier to access when the weather improves and would have been easier to attain if our group’s schedules coincided to result in the ability to collect more data together, at multiple occasions.

## **INTRODUCTION & LITERATURE REVIEW**

For the past decade, biking routes have provided many environmental and social benefits that contribute toward a healthier lifestyle. Not only are accessible bike routes in metropolitan areas like Vancouver beneficial to the environment, they also allow individuals to benefit economically. This economical benefits is achieved by providing a cheaper transportation option as compared to motor vehicles, all the while promoting a more fit lifestyle (Zhang et al., 2015). According to research, an abundance of social marketing strategies or health promotion campaigns have effectively raised awareness in the rise of environmental concerns (Kim et al., 2016). This has encouraged individuals to be more active through cycling as a means of transportation, rather than driving vehicles (Kim et al., 2016). In addition, there has been a substantial increase in the number of cars within metropolitan areas, which ultimately causes congestion within cities. Unnecessary traffic and environmental degradation can be prevented by encouraging more people to start cycling to work, which can also benefit an individual's social well-being (Kim et al., 2016).

Recently, the focus has been on creating biking systems such as the public biking system (PBS) or "bike-sharing systems"(Zhang et al., 2015). Cities that have congested roads are overusing their motor vehicles for transportation which has resulted in increased travel times and excessive carbon emissions. The increased development of bike-share systems aims to achieve sustainable mobility within urban areas. Sustainable mobility is defined as "seeking an effective way to integrate both product innovation and innovation on the level of the production & consumption system within which the product is placed and which satisfies a demand for transportation" (Zhang et al., 2015 p. 124).

Regarding the article "Cycling in Vancouver" (2017), cycling is a clean, energy efficient form of transportation and the rate of people cycling increases each year. In the article "Protected Bike Lanes" (2018) by the City of Vancouver, it states that the city is working progressively towards building the shift of cycling transportation to be safer and protected in key city streets. Furthermore, a general initiative that the City of Vancouver aims to achieve, is the expansion of bike route networks as a strategic plan in reducing traffic congestion in urban areas. Additionally, there are five main initiatives that the City of Vancouver focuses on. First, the expansion and upgrade of bike route networks encourages alternative transportation and for people to bike more. As well, there is a network of public shared bicycles called Mobi, that has been launched to further encourage cycling. Regarding health and social well-being, health promotion campaigns and school-based programs educate and promote the message of cycling and walking as an essential aspect of improving health. Another initiative that is important, is the

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accessibility of more parking spaces for bikes on business properties. Lastly, the City of Vancouver encourages bike friendly events to promote cycling by providing bike valet parking and promoting public transit options at events (Vancouver, C.O., 2017).

The main purpose of our study is to analyze aspects of Vancouver bike routes, specifically looking at the Lion's Gate Bridge, West 10th (between Cambie and Yukon) and the Science World Seawall, in order to determine areas that work well and those that require improvement. As a team, we aim to determine the strengths of each bike route examined, as well as where the city of Vancouver can improve the bike routes for safety, convenience and accessibility. All of our chosen routes are in different communities of the city and have completely different layouts and structural elements which should yield a variety of results. Through this research we hope to identify options to improve these bike routes to allow for maximal usage by the citizens of Vancouver and aid in preventing future motor-vehicle congestion within our city.

### **METHODS**

For our study, we chose three brief survey questions that were developed in accordance to the factors that we assessed as requiring analyzation and/or further possible improvals. Each question was written on a medium-sized sign following an introduction sign which notified the cyclists to put a thumbs up for yes or a thumbs down for no. Informed consent was not gathered for this study through a form due to the nature of response collection. It was deemed too dangerous, time-consuming and difficult to be flagging cyclists on the bike routes to get a full form filled out. Alternatively, we created an information sheet that contains the study information, contact information, withdrawal eligibility (at any time), and further resources for the study. This sheet was handed out to a total of 30 individuals. The form can be found on page 22 in the Appendices section.

#### **Route 1: Lions Gate Bridge**

The first bike route we chose to analyze was the Lions Gate Bridge, which is a connector suspension bridge from downtown Vancouver to the North Shore of Vancouver. Three factors were chosen that we felt would impact the safety of cyclists: barriers, a smooth/paved path and adequate space. These factors were considered based on the All Ages and Abilities (AAA) Cycling Routes from the Transportation Design Guidelines (Vancouver, C.O., 2018). It is important to consider these factors for their impact on the safety of the cyclists, as well as for the individuals driving and walking over the bridge.

The first factor was determining whether there are appropriate barriers to separate the cyclists from the motor-vehicles on the bridge. Currently, there are concrete barriers in place.

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Cyclists on both sides of the bridge are separated from moving traffic, which helps eliminate some safety concerns. This should ensure the cyclists and motor-vehicle drivers are at ease. This factor was based on a few of the rules in the Transportation Design Guidelines (Vancouver, C.O., 2018).

The second factor is rule #8 from the transportation guidelines and looks at the smoothness of the paved surface (Vancouver, C.O., 2018). This rule aims to prevent injuries due to falls from uneven ground and/or non concrete surfaces. While the bridge path is concrete, rough winters have caused an uneven surface bearing cracks that could cause a potential hazard to those who cycle across the bridge. In our study, we will look for the opinion of the cyclists, if the surface impacts how they feel in regards to taking this route. It will be measured by recording data from holding up posters to cyclists with thumbs up or down responses illustrated on them, allowing them a fast method of response.

The third factor we chose to address was assessing the space for the cyclists. We want to ensure the path has enough space for the cyclists, as well as pedestrians. Rule #7 of the AAA Cycling Routes is that there is separate space for the walkers and cyclists (Vancouver, C.O., 2018). Currently the Lions Gate Bridge does not meet that rule due to the lack of separation on the route for both cyclists and pedestrians, therefore in our study we will be asking cyclists how they feel about that. Additionally, we would like to note that in the fall and winter season this would be less of an issue, but in the spring and summer there's an influx of walkers and cyclists increases, which will be more of an issue.

In gathering our data, the methods that we will use for this bike route are quick questions that will be presented to the cyclists in the form of posters, on how they feel about the factors listed above and if improvements are needed. Data collection for all factors will be collected through responses to the questions on the posters. These responses will be in the form of a thumbs up/down from the cyclists. Data was collected on April 13th at 1:00 p.m. for this bike route. The response rate was low for this route but time constraints restricted us from revisiting the location for further data collection.

### Route 2: W10th between Cambie and Yukon

The protected bike route on W10th between Cambie and Yukon is a very high traffic area in the heart of the city, which provides access to healthcare and municipal services (Vancouver, C.O., 2018). This route is highly populated and is primarily used by cyclists travelling to work, school and the health care facilities in the area. The roads are shared by both motor vehicles and cyclists. The shared route has little to no separation between the motorists and cyclists. The only visible form of division consists of thin, concrete dividers on the ground to separate cyclist and motorists. This division is inadequate as it serves more as a soft curb rather than actual divider.

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The first factor that we would like to identify is how safe cyclists feel with little separation between them and motorists. This is crucial to understand because this area is heavily populated and is used by many motorists and cyclists throughout the day (Vancouver, C.O., 2018). With this bike route, there is a portion in which the road is divided into three sections right before the intersection of W10th and Cambie. The far left and right sections are intended for cyclists and the middle lane is for one-way motor vehicle traffic. The lack of signage on the lanes is troublesome and can lead to confusion for motorists and cyclists alike. With the data collected from this factor, we intend to understand how safe the cyclists feel with regards to the proximity to motorists, as well as with the signage that is currently in place.

The second factor we would like to consider is adequate spacing for cyclists. As stated earlier, this area is highly congested with both cyclists and motorists and there is very little space for multiple cyclists to be on the bike lane at the same time. This can be problematic for cyclist groups that use these lanes. By increasing the ability to accommodate large groups of cyclists, it will dramatically improve the chances of more cyclists using this bike lane.

The last factor we intend to analyze within this bike route is the signage present on the bike lanes. The area at which cyclist and motorists share the road has inadequate signage to direct both groups safely. The lack of proper signage can be very troublesome and can lead to confusion for motorists and cyclists alike. The present signage, directions and road markings are fading away and are difficult to comprehend. The feedback received can lead to more safe and efficient operations at this specific bike route.

To collect this data, we will use the same poster method as the Lions Gate Bridge. We will have short questions prepared on individual signs that cyclists can read and give quick answers to with a thumbs up or down. With regards to this bike lane, we decided that 8:30 am on a weekday is when the data collection will begin. At this time, there are a lot more cyclist that are heading to work or school, which would provide us with a bigger sample group. Due to issues with class schedules, we were unable to get data at 8:30 a.m. on a weekday. The data that was collected was from April 14th at 11:45 a.m.

### Route 3: Science World Seawall

The seawall bike route at Science World is very scenic and beautiful. It is primarily used for leisure bike rides but still has its share of commuter cyclists. Unlike the bike route on West 10th Avenue, this bike route is not as populated on weekdays and sees very few cyclists.

A factor we would like to consider is the proximity of the bike routes to the body of water nearby. Along the route, there is no divide between the bike route and the body of water. This

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raises some safety concerns and we wanted to see how safe the cyclists felt about it. Barriers may instill a sense of safety in route users and encourage individuals to ride with one less worry.

For the majority of the bike route, there is adequate space for many cyclists to ride freely, without being concerned about the amount of space that they have. However, these areas are meant for both pedestrians and cyclists. When the amount of cyclists and pedestrians start to increase there is more of a concern with regards to safety. For this factor, we would like to determine the level of safety cyclists and pedestrians feel within these shared bike routes. The lack of barriers can pose potential risks to both parties.

A specific issue that we have seen at the Science World Seawall stems off our previous factor regarding pedestrian and cyclists sharing the area. The pedestrians seem to use the bike lanes as walkways and this can cause confusion for both pedestrians and cyclists. This leads us to our last factor of adequate signage at the protected bike route. We want to understand if the signage and directions can be improved to facilitate better separation between the two groups, ultimately providing a greater level of safety and accessibility to individuals of all ages and abilities.

Similar to the data collection for the other two routes, we will be utilize a poster-method for our survey questions. The data was collected on April 15th at 12:00 p.m. and April 17th at 12:00 p.m. We decided to collect our data on both a weekend and weekday to allow for the largest possible sample group to collect data from. The first day we collected data, we were hoping that we would be able to get all 15 of our participant responses. Despite, the aim of 15 participants, the first day yielded 4 responses for the hour that we were there. Ideally, we hoped to have the data collected at this one time but decided upon leaving the location that we would try a weekend to ensure we got enough responses.

Each of the three bike routes we have chosen to analyze have factors that differ but also have some factors that overlap. One big theme we saw across all three of the bike routes was in regard to spacing. This theme emerged in all three of the bike routes, though the difference was what the spacing was in regards to. For the bridge route, the issue of spacing was displayed in the aspects of cyclists versus pedestrians, other cyclists and motor vehicles. The Science World route lacked the motor vehicle aspect and the W10th route lacked the pedestrians aspect.

### RESULTS/FINDINGS

#### Route 1: Lions Gate Bridge

For this route, results were limited to 5 responses per question due to the lack of cyclists on the bridge. The first factor was to determine whether there were appropriate barriers to separate cyclists from motor-vehicles on the bridge, and it yielded results that were almost split. Results indicated a yes-response of 60% and a no-response of 40%. From this data, we concluded that the barriers currently in place are sufficient but may require minor adjustments. To add on, the data illustrated that those who use this bike route frequently to go to work or just for recreational purposes, are mostly satisfied with the safeness of the routes. Although not many cyclists were seen on this bike route, it could indicate that it doesn't feel safe enough for cyclists to travel across. As well, the data can suggest that not enough bikers use this route to make a reasonable judgment that this route is safe or not. For the second factor, the smoothness of the paved surface was investigated. Results indicated that 60% of cyclists believed the surface needed to be fixed, and 40% indicated there was no need for adjustments to the riding surface. The third factor assessed the spacing between pedestrians and cyclists, particularly to determine if the addition of a separate area for pedestrians was needed. Results weighed heavily in favour of a separate area for pedestrians (80%) indicating that this would be the biggest potential issue on the Lions Gate Bridge bike route. We compared the findings to our own observations and it was clear that the sidewalk and bike lanes were quite close to each other. Therefore, the results received for this factor, was quite reasonable and provided valid evidence that more spacing needs to be installed. Overall, the Lions Gate Bridge is considered safe to bike on, but most of the cyclists do suggest that there be a change to the spacing between the sidewalk and the bike route. Visual representations of results can be found in the "Appendices" section on pages 19-20.

The findings indicate that cyclists have more of an issue with the spacing between pedestrians and the sidewalk, rather than sharing the road with motor vehicles. This is important as it may result in safety issues for not only the cyclists, but also pedestrians and motor vehicles.

#### Route 2: W10th between Cambie and Yukon

This route provided a greater amount of data collection, allowing the results to be better generalized to the population than the Lions Gate Bridge route. The first factor is to determine how safe cyclists feel with minimal separation between them and motorists, more specifically if the addition of concrete barriers would provide a greater feeling of safety. The results for this factor were very one-sided with 80% indicating that they would feel safer if concrete barriers were added to the route. The results can suggest that if concrete barriers were installed, then

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more cyclists would use this route since it would be deemed safer. The second factor looks at adequate spacing for cyclists in relation to other cyclists. Results indicated that 60% of cyclists were content with the space they currently had through this bike route. Thus, there doesn't need to be any significant changes to this bike route since most people are satisfied with it. However, this route is quite busy during the day, it could be beneficial in the future if there were two lanes installed to reduce traffic and promote more safety. The third factor pertained to the signage and lane markings in the bike route and whether they were easily understood. Results for this route indicated that only 40% of cyclists understand the lane markings and signage present in this area. Our findings suggest that although this route is considered safe in terms of space, there needs to be improvement on the signs to be more visible to cyclists to prevent any accidents that could occur. In addition, the concrete barriers would be a great addition to enhance safety, but could be provide a negative impact by reducing the biking space for cyclists. Visual representations of results can be found in the "Appendices" section on pages 15-16.

### Route 3: Science World Seawall

As previously indicated, for this route we were able to visit the location at two separate times to maximize the efficiency of our results. During the weekday, our findings indicated that we had a lower rate of cyclists active on the route, compared to the cyclists on the weekend. The first factor compared the proximity of water to those using the bike route. The specific analysis of this factor was to determine whether barriers to block cyclists from the water would be a safe and helpful addition to the route. Results were in complete favour of adding barriers in to protect cyclists from possibly falling into the water. Our findings illustrated that of all the cyclists that responded to our question, there were 100% thumbs up responses and 0% thumbs down responses. This question yielded surprising results since it was anticipated that some cyclists may interpret barriers as blocking the scenic view in the area. Based off our findings, there should be some sort of safety barrier constructed at the seawall, such as a small fence, to prevent the factors of falling into the water. The second factor addressed the issue of a lack of separation between cyclists and pedestrians. The question posed to cyclists proposed a barrier to assist in the separation of cyclists and pedestrians. Results indicated that 80% of cyclists gave a thumbs up response and felt a barrier would be helpful in ensuring pedestrians do not get in the way of cyclists. The other 20% of thumbs down responses, could suggest that a barrier between the bike route and sidewalk would just be a waste of space. Like the second factor, the third factor looks more specifically to the directions that the signage provides. This factor posed a question to determine whether an increase in quality and quantity of signage would help to better direct pedestrians and cyclists towards their designated paths. Responses indicated that 60% felt the addition of signage would be beneficial. Therefore, our findings of this specific bike route, can suggest that barriers and better signage would be influential factors that can help improve the

bike route for cyclists. Visual representations of results can be found in the “Appendices” section on pages 17-18.

### Comparing Our Findings

After gathering all the data and organizing our findings, we have concluded there were a lot of similarities and differences between each specific bike route. It was surprising to find that most cyclists agreed that more barriers should be installed to improve the safety of cyclists on the roads. This finding was significant to all three bike routes and is perhaps the most important similarity among our findings. In terms of spacing between cyclists, pedestrians and motor-vehicles, cyclists for all three routes strongly agreed that there should be better spacing to prevent the possibility of any accidents occurring. This was the second major finding that was deemed similar among all three of the bike routes and should be taken into greater consideration. The tight spacing between the road, cyclists and motor-vehicles can be dangerous for everybody who shares the road, and the input of barriers or creating a wider space can help change this problem. Although there were not any specific issues regarding the pavement of the road, it was surprising to find the lack of cyclists on the Lions Gate Bridge. If there were more cyclists active during our time of observation, our results would be more accurate compared to our other findings. Furthermore, for the second and third bike routes, visible signage was an important factor for cyclists as it contributed towards their own safety. The difference between these two routes however, is the fact that cyclists had trouble viewing the signage for the W10th route, and there wasn't enough signage for viewing at the Science World Seawall route. Thus, signs that alert cyclists of any hazards should be more visible and abundant in the streets that have higher occupancy, to ensure the safety of cyclists, drivers and pedestrians. Lastly, we were surprised by the fact that more cyclists were active on weekends than weekdays for the Science World Seawall route. This could have happened because, this route is more of a tourist attraction to most people, unless you live in that area. When compared to the other routes, more cyclists would be seen active during weekdays, because those routes have higher occupancy and are busier routes in which people take to go to work. All in all, our general findings and results can suggest there should be improvements in the spacing and addition of barriers for the routes, to promote a safer environment for everyone.

### DISCUSSION

The findings of our study are very relative to our overall goal. The goal or purpose of this study was to analyze the safety and quality of three bike routes in order to determine those areas that work well or alternatively, require improvements. The findings provided us with at least one

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major area of improvement per route. The overall findings support the implementation of barriers. These barriers differed in what they are separating (ie. pedestrians, cyclists, and dangerous areas) but all aim to encourage a safer bike route. The results suggest that we should take special care in refining our bike routes, with a deeper look into the separation of cyclists from areas or other transportation vehicles. The results also indicate that cyclists need more space which is not surprising as it ties into the barrier proposal we have put forth.

The project design allowed for appropriate access to the target population. The downside to the way that we posed our questions to the cyclists is that it allows the cyclist to create their own understandings of the questions that are being asked and that the cyclists cannot stop in most cases to clarify what is being asked. If we were to adjust our project design, we would gather information from more participants and we would ideally ask questions to cyclists who have stopped at intersections, in order to allow that the answers are thought out and understood.

Trying to get feedback or input on bike routes from cyclists poses many challenges. One of the challenges is a safety concern for ourselves and the cyclists. For ourselves, we must be sure that when we are on the bike routes, there are no potential factors that can cause harm to us or those using the routes. Since we are in a public setting and attempting to gather data from individuals using the bike lanes we must be aware of not bumping into any cyclists or getting too close to motor-vehicles. Some individuals may be trying to get to work or school and may be in a rush, therefore they may be riding at high speeds. By them riding at a high speed, it can be hard for them to avoid crashing into us as we are conducting a survey. Our goal is to collect data while also respecting the space of the cyclists. Through this example we want to ensure that we remain on one side of the bike route and minimally move around while cyclists are passing.

Another challenge is figuring out how the cyclists are going to answer our questions. We know for a fact that it is going to be hard for them to stop in their tracts and answer questions if they are in a hurry to get to work or school. Therefore we wanted to find a way that would not inconvenience the cyclists and where we could retain an appropriate amount of data to fill the requirements of this project. We are presented with the challenge on figuring out how we are going to ask the questions pertaining to overall safety, adequate space for both cyclists and pedestrians, visibility of signage and directions, and surface quality. It will also be hard to hear the cyclist's responses if they reply or yell while biking by us due to their speed, as well as noise from motor-vehicles. We decided to use non-verbal tools of communication to get responses from our participants. All questions are answerable by either thumbs up, or thumbs down.

The weather and environmental factors can also pose several challenges for us as well living in a fairly unpredictable climate. Considering that it is spring in Vancouver and the lower mainland, it tends to rain a lot during the months of February and March. The bike paths we have

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chosen are the Lions Gate bridge, Science World Seawall and W 10th between Cambie and Yukon. For the Lions Gate Bridge and the Seawall, there will be less cyclists when it rains possibly making it harder to collect data due to a lack of cyclists on the routes during times when the weather is bad. Before deciding dates to conduct our research, we checked local weather reports to ensure we arrive during optimal and safe weather conditions. As for an environmental risk, the seawall route is close to water and there could be a risk of someone falling into False Creek if we are in too close of proximity with the cyclists. It will be important we stay alert and keep our distance from cyclists. Also, the W10<sup>th</sup> route between Cambie and Yukon is a fairly high traffic area, we have come to conclude that a present risk is getting hit with a car while conducting our survey. All routes will have some risks in based on their different environments, therefore a careful assessment before data collection is important.

The best way we decided to avoid getting in the way of cyclists or putting ourselves at risk, is making a big sign that alerts on coming cyclists that we will be conducting a survey based out of the University of British Columbia and that we are kinesiology students. This initial sign on the route of the cyclists will allow them to look ahead for where we are positioned, so that we do not startle anyone by obstructing their path. Another solution we came up with was holding a big sign with the question on it and then asking the cyclists to either put a thumb up or down. The later solution seemed to be the safer of the two as it would allow the cyclists to still have control over their bike and be able to avoid any unnecessary accidents or collision that may occur. Putting a thumbs up or down as a response became the basis of how we decided to collect our data. We decided to start the route with our intro sign to alert the cyclists than we had follow up signs with the actual research questions down their route, so they were prepared. Merging these two ideas together made us and so it seemed the cyclists feel safe as well.

## **RECOMMENDATIONS TO CLIENT**

### Recommendations for Lions Gate

The Lions Gate Bridge did pose a limitation due to the fact we only collected 5 total responses for every question. The biggest issue on this route would be the spacing, as cyclist share the same space with pedestrians. One way to fix this problem could be potentially separating the two sides that the cyclist and pedestrians use. Therefore make the left side of the bridge for cyclists only and the right side for pedestrians only, this also does have a potential risk as well for the cyclists. As the cyclist share one side, there will be traffic going both ways in one lane. This poses a risk for crashes that may occur if this solution is chosen. The best solution would be to expand the bridge, not only would this improve the space for cyclist and pedestrians but also improve the traffic for motor-vehicles as well. This would be the perfect opportunity to

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create a separate space for cyclists and pedestrians, as it would give them both enough space to get across on the bridge without any complications.

### Recommendations for W10th between Cambie and Yukon

For this route we ended up getting more data than the Lions Gate Bridge. The biggest issues and the quickest and easiest to fix is the barriers. Many of the cyclist felt that there was minimum to no separation between them and the motor-vehicles. By adding a concrete barrier cyclists will automatically feel safer and more prone to use this route more than before without having the fear of not feeling safe from traffic. The second biggest issue was the visible signage and lane markings. 60% of the cyclist on this route felt that the signs were not visible, and they were also unable to clearly see the lane marking on the road. If the lane markings are redone and painted again the cyclists will be able to see where the bike lane is and where the road is. If the signage is replaced with bigger signs, cyclist will be able to see it from further distances and will follow the instructions on the signs. With regards to the spacing question we posed, it seems that 60% of cyclist said there is sufficient space from them.

### Recommendations for Science World Seawall

This route had a lot of data collected which was excellent for our findings. The biggest issue was the lack of separation between cyclists and pedestrians, many felt that pedestrians got in the way of the cyclists. A quick and easy fix would be to install a small barrier that could separate the two groups. It does not have to be something big like on W10th, it could be a very small barrier that's about 2 to 3 feet tall. Also adding a barrier near the water would ensure more safety for cyclists and pedestrians. This would also ensure that no one would fall into the water and would also have the possibility of cyclists driving off the edge. Many of cyclists felt that the signs marked on the path were not followed by the pedestrians, so putting in more signs that are visible and enforcing the rules it would be better for all. By having the cyclist and pedestrians in their separate spaces would ensure that no unnecessary accidents can occur. This way cyclist can go at their own speed and avoid crashing into pedestrians

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**APPENDICES**

Interview Questions for W10th between Cambie and Yukon

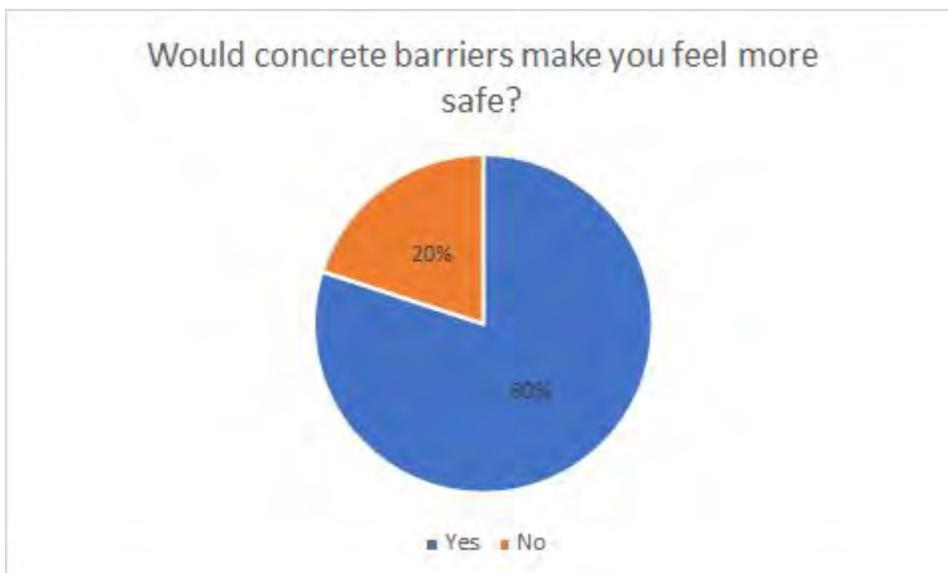


Factor #1 (Spacing-Motor Vehicles)

**“Would concrete barriers make you feel more safe?”**

\*Thumb up for YES; Thumb down for NO

Responses: Yes (12); No (3)



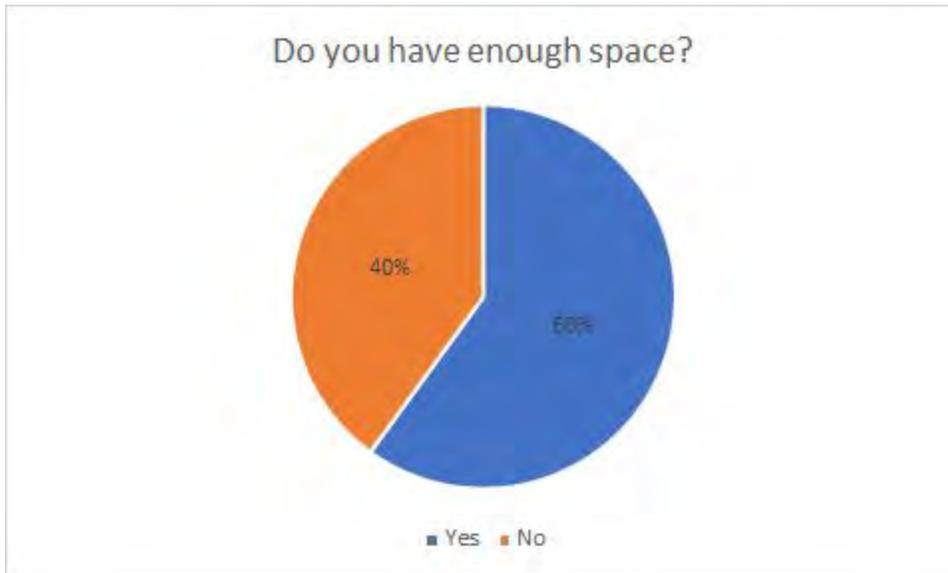
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Factor #2 (Spacing- Cyclists)

**“Do you have enough space?”**

\*Thumb up for YES; Thumb down for NO

Responses: Yes (9); No (6)



Factor #3 (Signage, Lane Markings)

**“Are the signs and lanes easy to understand?”**

\*Thumb up for YES; Thumb down for NO

Responses: Yes (6); No (9)



Interview Questions for Science World Seawall

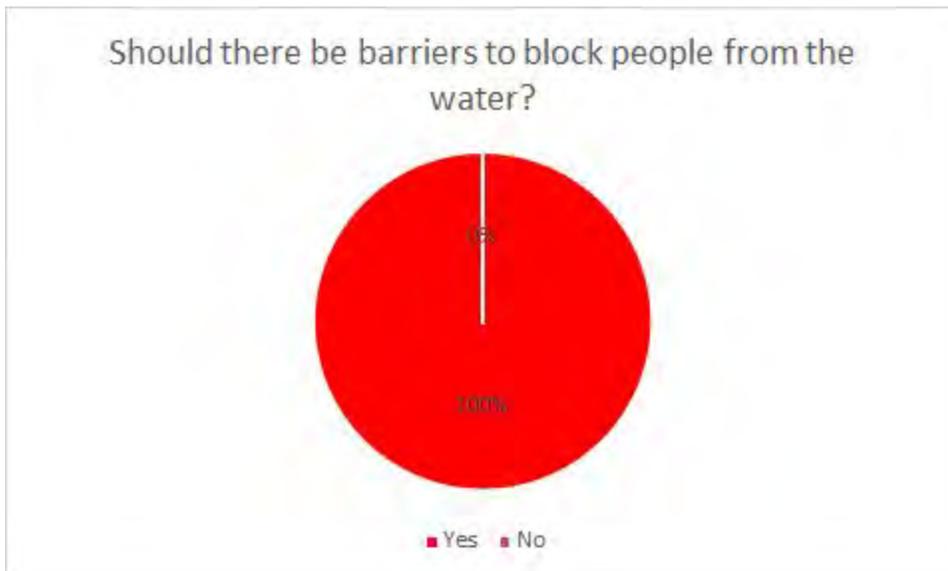


Factor #1 (Proximity to water)

**“Should there be barriers to block people from the water?”**

\*Thumb up for YES; Thumb down for NO

Response: Yes (15); No (0)

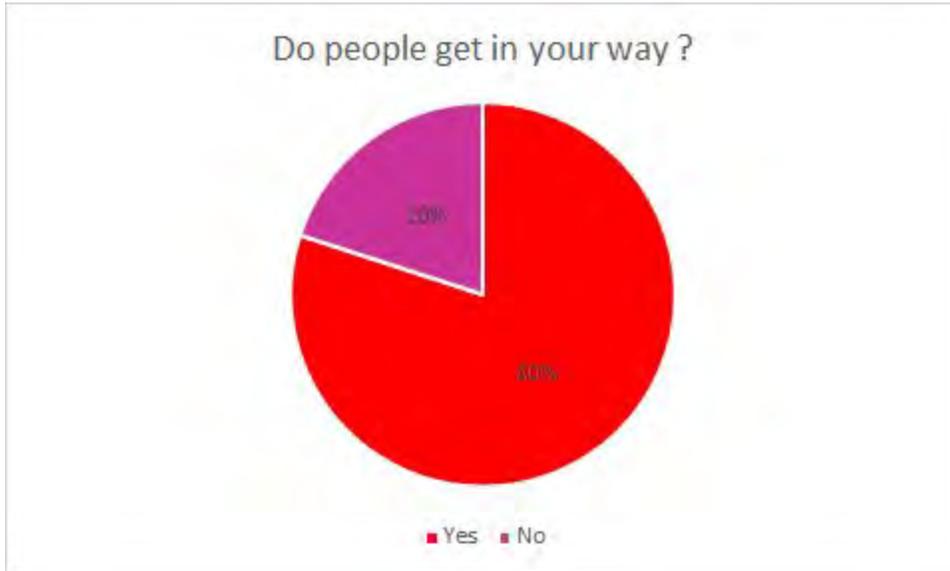


Factor #2 (Spacing- Pedestrians; Barriers)

**“Do you find there is a need for a barrier separating cyclists and pedestrians?”**

\*Thumb up for YES; Thumb down for NO

Response: Yes (12); No (3)

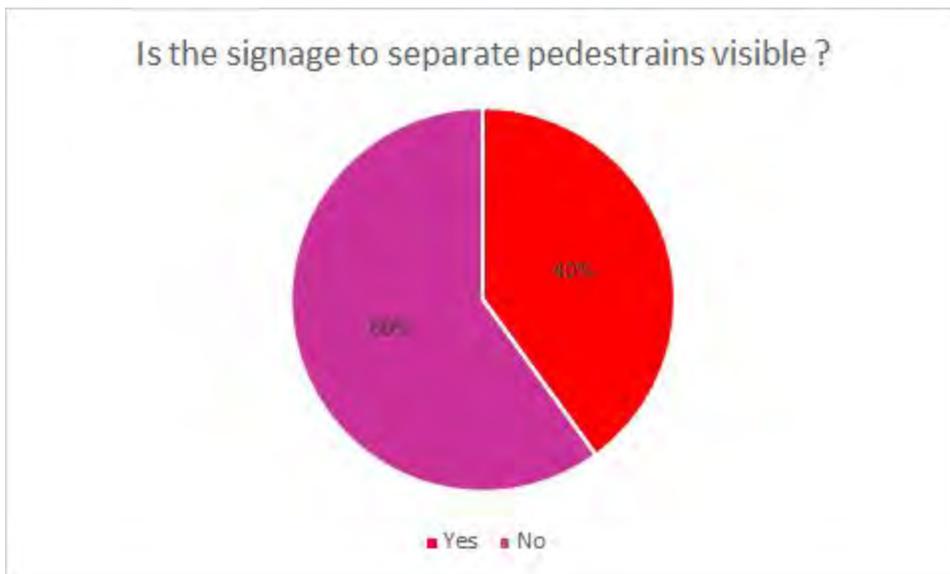


Factor #3 (Spacing- Pedestrians; Signage)

**“Do you think there is a need for better/more signage to better direct pedestrians and cyclists toward their designated path?”**

\*Thumb up for YES; Thumb down for NO

Response: Yes (6); No (9)



Interview Questions for the Lions Gate Bridge



Factor #1 (Barriers)

**“Do the barriers in place make you feel safe?”**

\*Thumbs Up for YES; Thumbs down for NO

Response: Yes (3); No (2)



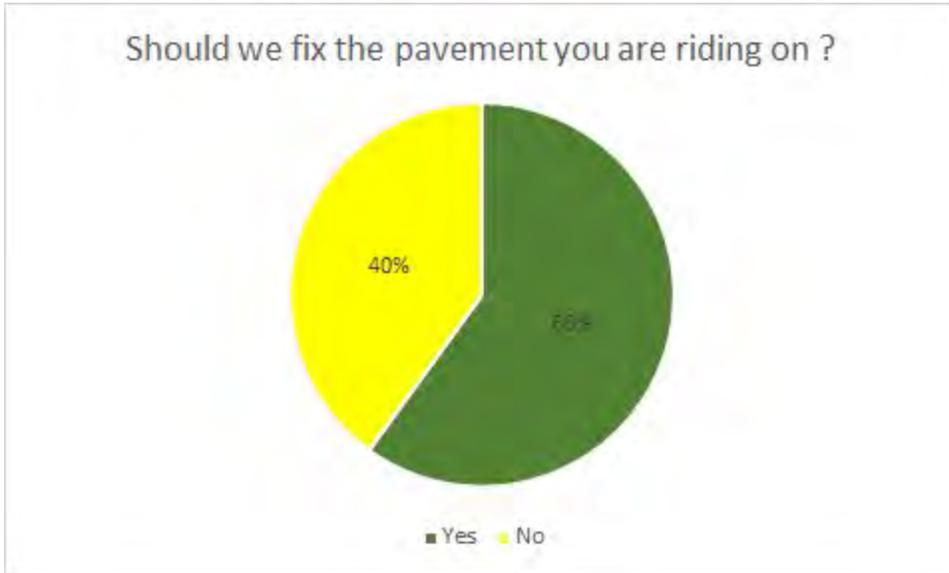
# BIKE ROUTES IN VANCOUVER

## Factor #2 (Surface Quality)

**“Should we fix the pavement you are riding on?”**

\*Thumbs Up for YES; Thumbs down for NO

Response: Yes (3); No (2)



## Factor #3 (Spacing)

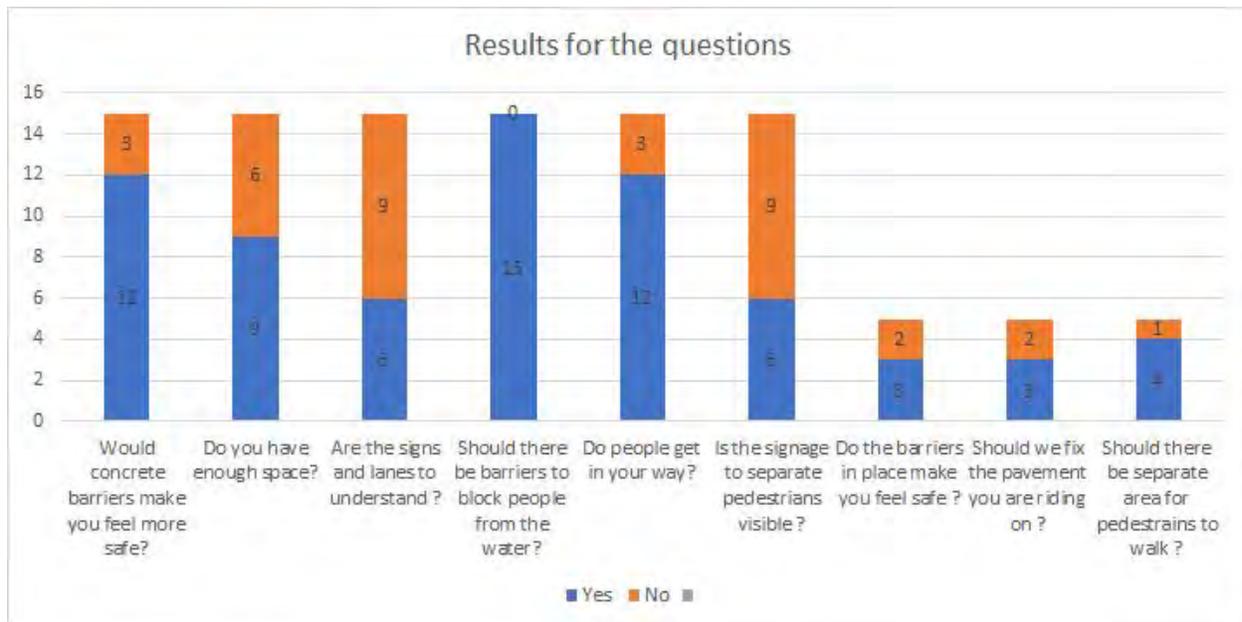
**“Should there be a separate area for pedestrians to walk?”**

\*Thumbs Up for YES; Thumbs down for NO

Response: Yes (4); No (1)



## BIKE ROUTES IN VANCOUVER



### UBC SURVEY INFORMATION

This survey is being conducted by Kinesiology students at U.B.C. for the purpose of carrying out a class project (KIN 464) that examines perceptions of bike paths in the city. We would like to assure you that no personal information is being collected and that only responses to the questions will be recorded. The final written report will be shared with the community partners involved with the project and summaries of findings may also be posted on the following websites:

UBC SEEDS Program Library:

<https://sustain.ubc.ca/courses-degrees/alternative-credit-options/seeds-sustainability-program/seeds-sustainability-library>

CityStudio Projects:

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

Your participation is completely voluntary, you are free to ***withdraw from the interview*** at any time, and there will not be negative impacts related to your withdrawal.

If you have any questions about this class project, you can contact Andrea Bundon by phone at 604-822-9168 or by email at [andrea.bundon@ubc.ca](mailto:andrea.bundon@ubc.ca)

Thank you for participating! :)

