What Makes a Neighbourhood Bikeable

Reporting on the Results of Focus Group Sessions
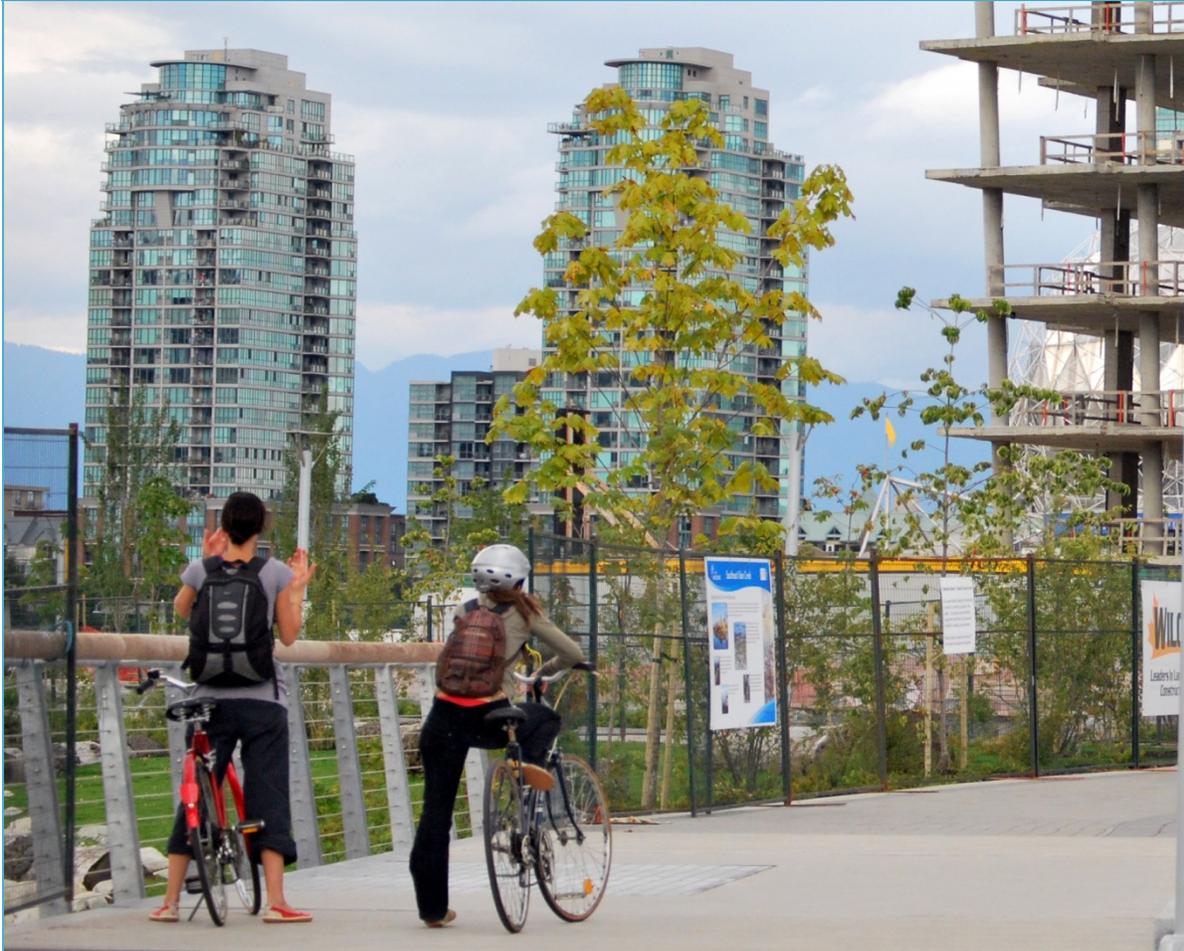
Prepared by:
Meghan Winters , PhD Candidate, School of Population and Public Health, UBC
Adam Cooper, M.A. Candidate, School of Community and Regional Planning, UBC
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NOTES TO THE READER

The reader is reminded that while qualitative research provides a rich source of information in clarifying existing theories, creating hypotheses, and giving direction to future research, the intention in qualitative research is to uncover and explore people's motivations, perceptions, attitudes, beliefs and feelings, not to count the number of people who demonstrate a particular attribute. Although the participants in this study were drawn from the group(s) in the population from whom we seek answers, they were not chosen on any statistical basis. The findings presented in this report must therefore be considered directional in nature. No statistical inferences should be drawn from the research results.

Participant responses included in this report are quoted verbatim. Because they are verbatim quotes, they have not been edited for content or grammar. Respondents' names have not been included in this report, in order to protect their anonymity and the confidentiality of their contributions.

EXECUTIVE SUMMARY

This report details the results of four focus group sessions conducted by TransLink in partnership with the Cycling in Cities study from the University of British Columbia. The focus groups were conducted in order to gain a deeper understanding of what makes a neighbourhood bikeable. Participants for one session were recruited from the Vancouver Area Cycling Coalition (VACC), while the other three groups were recruited from a pool of survey respondents from a previous Cycling in Cities survey who agreed to be contacted again. Participants in the latter three groups were stratified based on cycling ability; regular cyclists (who cycle at least once a week for transport purposes), occasional cyclists (who cycle less than once a week) and potential cyclists (who have not cycled for transportation purposes in the last year, but were willing to consider cycling in the futre). The results of these sessions will be used to inform other components of the Cycling in Cities Study, a bikeability index, as well as well as all long range cycle planning in Metro Vancouver.

During the four sessions, participants were asked to fill out a questionnaire that asked how eight different factors would increase or decrease their likelihood of cycling for a utilitarian trip. Following this, the moderator discussed these eight factors with them for approximately 45 minutes. Finally, the moderator asked the participants to prioritize the eight factors, by choosing the top three that would influence their decision to cycle. The results of the prioritization exercise were calculated by awarding 3 points to priority # 1, 2 points to priority # 2 and 1 point to priority # 3, giving a total of pool of 135 point to be distributed to the 8 factors.

The results of the prioritization exercise (Table 1) matched well with what was heard in the talk aloud sessions, with a few minor discrepancies. The first two factors - bike routes and traffic - account for 75 points or 55% of the total points that could be awarded during the exercise, suggesting that these two factors have a major influence on how bikeable a neighbourhood is perceived to be. The VACC group did not complete the prioritization exercise, as one member suggested these factors could not be disaggregated. However, the discussion and results of the questionnaire help to illustrate what about the 8 factors are important to cyclists.

The following sections examine the prioritized factors in greater detail, outlining the percentage of participants that indicated on the questionnaire a given aspect of a particular factor would make them more or less likely to cycle for a utilitarian trip, with notes on key points from all discussions. Please note that these percentages are not statistically significant for Metro Vancouver and are meant to demonstrate preferences among the 31 participants. For a detailed examination of each group please see the following sections which outline each group's questionnaire results, prioritization results and discussion.

Prioritization	1	2	3	4	5	6	7	8
Factor	There are bike routes	Traffic	The Street Network	The Topography	The Environment En-route	The Distance	Neighbourhood Land Use	The Population Density
Points (135 Total) Priority 1 = 3 points Priority 2= 2 points Priority 3 = 3 points	50	25	17	16	12	9	4	2

Factor # 1: There are Bike Routes …

Characteristics of bike routes that make people *more likely* to cycle

- Lead to my destination: 94%
- Connect with each other: 94%
- Have a barrier separating bikes from traffic: 90%
- Have bike symbols marked on the pavement: 71%
- Along major roads: 52%

Bike routes were of critical importance to all groups, although VACC members were more likely to cycle in places where bike routes were not present. Comments made during the sessions suggest that people feel much safer when cycling on a designated route. This is not true for parts of the region where a route is designated on a map, but no facilities have actually been installed. Participants defined a safe route as a place that; has a physical barrier separating them from traffic, is away from parked cars, is on a street with low traffic volume and away from large rucks and buses. Additionally many participants placed a high value on the aesthetics of the route.

Factor # 2: Traffic …

Characteristics of traffic that make people *less likely* to cycle

- Has many trucks: 87%
- Is fast moving: 77%
- Has many buses: 74%

Traffic was a major deterrent for cyclists of all skill levels and served as a barrier to entry for potential cyclists who typically had limited experience riding on the road. Many cyclists commented on their fear of having a door open onto them while riding next to parked vehicles and expressed a dislike for routes that sandwiched them between moving and stationary vehicles. The effect of traffic was magnified when riding on hills, as this made cyclist speed even lower compared to vehicles. Only the VACC group had participants that indicated they would be very likely to cycle in heavy traffic conditions.

Factor # 3: The Street Network …

Characteristics of the street network that make people **more likely** to cycle

- Is on a grid mainly with long blocks (well connected): 67%
- Is on a grid mainly with short blocks (well connected): 61%
- Characteristics of the street network that make people **less likely** to cycle
- Has tunnels: 65%
- Has highways running through it: 61%

The street network was important to cyclists as it dictated their ability to maintain momentum during their trip. A common theme across all of the groups was that start and stop situations should be avoided or that cyclist activated intersections should be in higher use. Maintaining momentum was especially important in a commuting or utilitarian trip. Surprisingly, many participants felt that cul-de-sacs offered a safe and direct route, if they offered pedestrian and cyclist linkages. The presence of highways, bridges and tunnels was also important in the decision to cycle. Most cyclists felt they should be avoided if possible. If not possible, cyclists would like to have a route that is wide, physically separated and with a low grade, as this would help them navigate these obstacles with confidence. This is especially true for cyclists with less experience, although as experience is gained these factors become more neutral in the decision to cycle.

Factor # 4: The Topography …

Characteristics of topography that make people **more likely** to cycle

- Is totally flat: 81%
- Is moderately hilly: 52%
- Characteristics of topography that make people **less likely** to cycle
- Is very hilly: 58%

Topography was most important to cyclists taking trip for commuting purposes, not because of the extra effort required (some even viewed climbs as a personal challenge) but because it meant their trip took longer to complete. Cyclists riding for recreational purposes also suggested that topography provided a physical challenge. Several individuals mentioned that if they could not manage the hill on bicycle, they would walk and push their bicycle up the hill, or that they could use transit. Topography was especially important when put in the context of other factors. Topography combined with traffic, pollution or noise, made it less bearable to the cyclists. Additionally, very steep terrain was a deterrent for cyclists with physical limitations and those who did not have end of trip facilities (e.g., showers and change rooms) at their destination.

Factor # 5: The Environment En-route …

Characteristics of the environment en-route that make people **less likely** to cycle

- Has heavy air pollution: 77%

- Is very noisy: 58%

Although all of the groups had one or two participants who said they would ride in noisy or polluted situations, it was not the preference of any participant. Being exposed to air pollution was a very serious deterrent to cycling. Some indicated that they would go substantially out of their way to avoid heavily polluted roadways, especially frequent commuters and those with health impairments. Noise was less critical as a stand alone factor. However, the combination of noise, air pollution and heavy traffic would create an environment where some cyclists would be overloaded by the number of stimuli they had to pay attention to, making them more likely to make mistakes or have an accident.

Factor # 6: The Distance

Characteristics of the distance that make people *more likely* to cycle

- Is between 3 - 5 km: 74%
- Is between 1 - 3 km: 71%
- Is under 1 km: 58%
- Is over 5 km: 48%

The discussion regarding distances that people were willing to cycle yielded some very interesting and surprising information. In almost every case it was not distance that was important to cyclists, but the time it took to complete a trip. The time quoted most often as being appropriate was approximately 30 minutes of cycling.

Factor # 7: Neighbourhood Land Use …

Characteristics of neighbourhood land use that make people *more likely* to cycle

- Is mainly parks: 84%
- Is mainly residential: 77%
- Is a mix of the above uses (parks, stores, industrial, residential): 55%
- Characteristics of neighbourhood land use that make people *less likely* to cycle
- Is mainly industrial: 45%

The discussion around neighbourhood land use captured the participants desire to cycle in an area that was safe, calm and aesthetically pleasing. For experienced riders land use was not important; getting to their destination safe and quickly was the priority. For inexperienced cyclists, residential neighbourhoods offered an increased perception of safety as they believed traffic to move slower in these areas.

Factor # 8: The Population Density …

Characteristics of the population density that make people *more likely* to cycle

- In the area is low (i.e., single family dwellings, large lots): 58%
- Characteristics of population density that are neutral in the decision to cycle
- In the area is moderate (i.e., 1 - 3 storey apartments and shared homes): 68%
- In the area is very high (i.e., mainly high-rise apartments): 61%

The discussions around population density failed to generate much interest within the groups. It was the factors that people associate with increased population density, such as increased traffic (pedestrian, cyclist and vehicle)

that people were more concerned about. In general the built form of the area was not important to any of the participants.

Across Group Comparison

Upon comparing the attribute ratings in the written exercise, a number of "directional" differences emerged between the focus group segments. While these differences are not statistically significant and cannot be generalized upon the segments at large, they are noteworthy of comment.

In the focus groups:

- A very hilly topography had a stronger negative influence on the propensity to cycle potential cyclists than for Regular cyclists.

- Shorter travel distances (under 5km) were more appealing to Potential Cyclists.

- Air pollution had a negative influence on the propensity to cycle for all group segments, but in particular, Potential cyclists.

- A very noisy environment had a negative influence on all segments, but was slightly more negative to Regular cyclists.

- A grid street network with long blocks was slightly more appealing to VACC and Regular cyclists (whose desire was to maintain speed and momentum), while a grid network with short blocks was slightly more appealing to Potential cyclists.

- Bridges were a negative influence on cycling for most segments, with the exception of Occasional cyclists, who rated this as slightly positively. This may relate to the emphasis on trips for recreational purposes among Occasional cyclists.

- Industrial neighbourhood land use had a more negative impact on Potential cyclists than Occasional cyclists. This may relate to fears by potential cyclists that industrial areas are empty spaces where they could be put in harms way.

Other Important Factors

Safe Storage and End of Trip Facilities: Many of the comments received on the questionnaire were focused on providing safe/secure places to store bicycles at destinations. Additionally, end of trip facilities at work places seem to be critically important in attracting more people to cycle for commuting purposes.

Aesthetic Appeal: Having an attractive route was a major incentive to cycling more. Riders liked park like settings, places with good views or places that made them feel connected to nature in some way.

Road Condition: Multiple participants commented that the shoulders of roads need to be better maintained to encourage greater cycling uptake. The participants felt that currently bicycle lanes have too many potholes, as well as too much garbage and gravel littering the route.

Driver and Cyclist Education: Many participants commented that drivers and cyclists each did not have a clear understanding of the rules of the road. A greater understanding by each group of the actions of the other would make cyclists feel safer on the road.

Wayfinding: Improved signage would ensure cyclists do not get lost when attempting to navigate the bicycle routes. A common complaint was that cyclists wanted to ride and attempted to do so, but ended up lost.

Conclusions

There are many actions that TransLink can take in conjunction with the regional municipalities to encourage higher levels of cycling across Metro Vancouver. Some of these actions are only feasible in the long run and will require significant planning and investment. However, in the near term the results of this focus group study will be used to inform the weighting of factors in a bikeability index under construction as part of the Cycling in Cities study.

Results of the focus groups suggest that improving the quality of designated cycling routes and building new routes should be the highest priority for improving cycling mode share across the region. However, there are other actions that can be taken in the near term to move towards a more cycling friendly region. Cyclist and motorist education, improved wayfinding and the provisions of secure storage areas are actions that can be taken now to help encourage the population to cycle more.

BACKGROUND AND PURPOSE

TransLink and the University of British Columbia require research on cyclists' perceptions and preferences to better understand what objective factors (i.e., observable information, such as the prevalence of hills, nature of street network , population density, land-use mix, prevalence of bike routes, air and noise pollution) make neighbourhoods more cycling friendly.

This research will complement a number of past and ongoing studies on the topic, and will serve to fill in a number of informational gaps, as well as to "validate" earlier findings by examining these issues from a qualitative perspective.

In the 2006 Cycling in Cities survey, 73 factors and 16 route types were rated on the extent to which they increased or decreased respondents likelihood of cycling. Factors that more strongly encouraged cycling included: cycling routes away from traffic noise and air pollution; cycling routes separated from traffic; cycling routes on flat terrain; and shorter distances to key destinations. Factors that strongly discouraged cycling included: bridges along the route where cyclists must share a narrow sidewalk; routes with on street parking; and routes with long steep sections. Although the 2006 Cycling in Cities survey included a fairly comprehensive list of factors and routes, several key objective factors were not included such as density and land use, as they are more complex topics difficult to address in a self administered survey.

The focus groups will serve to more qualitatively determine if all key aspects of the built environment that influence cycling choices have been captured, and to investigate in greater depth what aspects of these factors influence the bikeability of Metro Vancouver.

An important outcome of this research will be the development of a bikeability index , which will evaluate the capacity of neighbourhoods to achieve increased cycling mode shares. The bikeability index will allow for the funding of cycling improvements to b allocated across the region in a more systematic manner.

Feedback was sought from three types of cyclists (regular; who cycle at least once per week for transportation, occasional; who cycle at less than once a week and potential; who have not cycled in the last year for transportation purposes) that were identified in the 2006 Cycling in Cities survey, as well as from selected members of the Vancouver Area Cycling Coalition, a local cycling advocacy group.

RESEARCH OBJECTIVES

The objectives of the research are as follows;

> To better understand what objective factors make neighbourhoods more conducive to cycling;
> To use this information to validate results obtained from objective sources and aid in the development of a bikeability index;
> To determine If any key objective measures have been missed between the cycling segments.

The emphasis of the research will be on cycling for utilitarian or non-recreation purposes, but may touch upon aspects of recreation cycling, where useful and relevant. During the groups, participants will be asked to complete a brief questionnaire rating the influence of various objective factors on their decision to cycle, and then discuss their ratings in a group discussion led by a professional moderator. For more information please see the moderators guide and bikeability index questionnaire, (Appendix 1).

METHOD

The focus group sessions were designed to encourage dialogue and interaction, which is useful for uncovering perceptions and issues on which cyclists may hold a range of opinions. Four group sessions were conducted, with ten individuals recruited to each, in order to achieve groups composed of 6-8 individuals with similar cycling habits.

Group participants were recruited by UBC, and provided with a 24 hour recall. Non-VACC participants were recruited from a database of approximately 600 respondents from the 2006 Cycling in Cities survey who indicated they were willing to participate in future research. All participants signed consent forms and were verbally informed that they would be sound and video recorded for review purposes after the completion of the session. UBC and TransLink provide all participants with a $75 incentive upon completion of the session.

The four 1½-hour focus groups were moderated by Adam Di Paula of NRG Research in Vancouver and were held on August 19th and 20th 2008. All sessions were held in NRG Research's Focus Group Facility, where they were video recorded for future academic purposes.

Each focus group session followed a similar format; an introduction session lasting ~15min, discussion of the various factors which affect the decision to cycle (topography, distance, the environment en route, traffic, the street network, bike routes, land uses and population density) for ~ 45 minutes, followed by a discussion of any missing factors ~15 minutes and ending with a prioritization of the factors ~15 minutes.

REGULAR CYCLISTS

The Regular Cyclist group represents cyclists in Metro Vancouver who have a high level of confidence cycling in this region. They are commuters, utilitarian cyclists, bicycle racers and recreational cyclists as well. They take at least one trip per week, typically for commuting purposes, although some ride much more frequently than this.

GROUP SUMMARY

Using a scoring system from 1 to 3 - with 1 being the highest - participants were asked to rank the top 3 factors that would influence their decision to cycle trip for a non-recreational purpose. In order to calculate the most important factors across the group, scores of 1 were given 3 points, scores of 2 were given 2 points and scores of 3 were given 1 point. The results of the prioritization exercise are shown below. For a better understanding of the sub-components of the prioritization chart read the sections; likely to cycle factors, unlikely to cycle factors and factors affecting the decision to ride.

Factor Prioritization			
Group	1	2	3
Regular Cyclists	There are bike routes (20 points)	Traffic (10 points)	The environment en-route (9 points)

The number next to the factor indicates the number of participants who indicated that the factor would make them unlikely to bicycle. Only those factors that 50% of the group agreed on have been included.

UNLIKELY TO CYCLE FACTORS

Traffic has many trucks (8/8)
Traffic has many buses (8/8)
Traffic is fast moving (7/8)
The street network has highways running through it (7/8)
The street network has tunnels (7/8)
The environment en-route has heavy air pollution (6/8)
The environment en-route is very noisy (6/8)
The street network has many cul-de-sacs (disconnected) (5/8)
The street network has bridges (5/8)
The topography is very hilly (5/8

LIKELY TO CYCLE FACTORS

There are bike routes that lead to my destination (8/8)
There are bike routes that connect with each other (8/8)
Neighbourhood land use is mainly residential (8/8)

Neighbourhood land use is mainly parks (7/8)

There are bike routes that have bike symbols marked on the pavement (7/8)

There are bike routes that have a barrier separating bikes from traffic (7/8)

The topography is totally flat (6/8)

The distance is between 1 - 3 km (6/8)

The distance is between 3 - 5 km (6/8)

The street network is on a grid with mainly long blocks (well connected) (6/8)

Neighbourhood land use is a mix of uses (6/8)

The population density in the area is low (6/8)

The distance is under 1 km (5/8)

The street network is on a grid with mainly short blocks (very connected) (5/8)

There are bike routes along major roads (5/8)

The topography is moderately hilly (4/8)

The distance is over 5 km (4/8)

Neighbourhood land use is mainly stores (4/8)

FOCUS GROUP DISCUSSION ON THE FACTORS AFFECTING THE DECISION TO RIDE

Topography: "If it's a really hilly one, you might think twice." Topography does affect decisions to cycle and routing for regular riders. On the questionnaire, five participants indicated that very hilly topography would make them less likely to cycle. In discussion, they said they plan their routes (using bike maps) to avoid the steepest areas of Metro Vancouver. However, if presented with hills once en-route, regular cyclists would do their best to tackle them. **"If its too steep then just push it,"** commented one participant. Alternatively, one regular cyclist in this group, commented, **"I like the hills…. they are not a consideration."**

Distance: "Time is more important." Echoing the views of the VACC group, the regular cyclists thought about this issue in terms of time, rather than distance. Several participants identified 30 minutes of riding as an appropriate amount of time. One participant indicated that the decision to purchase a new home was based on a 30 minute commute time to work by bicycle.

The Environment: "When I can smell that diesel or gas fumes, I avoid it" In the discussion around air and noise pollution the regular cyclists were more concerned about the conditions responsible for generating high level of pollution (large trucks, high volumes of traffic and the presence of diesel buses) rather than the pollution itself. Some commented they would choose a route that was more aesthetically pleasing, or a route with less traffic, and that they would consider the traffic at the time of day when picking a route. Questionnaire results indicated that the noise and air pollution were extremely important to this group, 6 participants indicated that both of these would affect their route choice.

Traffic: "In Langley you get on the sidewalk, or you get run over." Traffic was a very important issue for regular cyclists. The presence of trucks and buses on the route was a major deterrent to riding in traffic. Some riders would avoid traffic by taking residential streets to their destination, even if this meant taking a route that required more travel time. This is an important trade off to note, as travel time is more important to riders than distance. Others participants would avoid high traffic situations, unless they were provided with a designated bike lane on the street.

Network: "With curvilinear you're almost always going to be headed in a direction you don't want to go." The consensus reached by the regular cyclists was that a grid network is typically easier to ride on than a curvilinear pattern, unless the latter is marked as a designated bike route. One participant noted that in certain areas of

Richmond the city has made an effort to connect cul-de-sacs, which can provide a direct route to destinations away from heavy traffic flow. The preference of this group was for long blocks, allowing the rider to maintain speed. Highway crossings on the route were a deterrent, as participants did not feel confident judging the speeds of cars travelling at 90 - 100 km/hr.

Bridges & Tunnels: **"If there is an appropriate lane, I don't mind crossing bridges."** The regular cyclists had mixed views about travelling on bridges in Metro Vancouver. They agreed that some bridges were well designed for cyclists, while others such as the Burrard Bridge and the Second Narrows Bridge were not comfortable. For this group of cyclists to feel safe on a bridge, the grade must not be too steep and there must be adequate space to make them feel comfortable. When asked what about the Burrard Bridge made them feel uncomfortable, one participant commented that **"it is theoretically divided between pedestrians and bikes, but it is too narrow for either of them."**

Bike Routes: "**One thing that I find awkward is where I have a designated area on a road, where I've got parked cars and a lane of traffic and I'm sandwiched between the two, I find that very unsafe.**" Bike facilities were a major issue for this group. While some said they would not ride on anything other designated as a bike route, a few mentioned they felt safer riding as another vehicle in traffic. Several individuals were very concerned with speed- they wanted a very fast route where they did not have to lose momentum down at lights, traffic diverters or paths. All were concerned about the safety of bike routes- mentioning downtown routes- the preference was not to be riding next to parked cars, for fear of drivers pulling out, or opening doors. This group also wanted bicycle specific roads, where only local traffic would be allowed to travel. This group was suggested better facilities and signage was needed on bike routes in the suburbs.

Land Use: **"I don't find the suburbs set up for bicycles. Its not easy to do your everyday chores because of the distances."** The regular cyclists were mixed on their opinions about land use. They prefer to ride in areas with trees to screen them from nearby smog or near parks. However, they also wish to minimize the amount of time it takes them to reach their destination. The more confident riders (a former road racer and a tri-athlete) has less concerns about land use. **"To me neighbourhood land use is not important."** If the traffic is not bad, and the pavement is good they will ride through. Other riders wanted to ride through calmer, residential areas, although they still had concerns about visibility through intersections in these areas.

Residential Density: The density of a neighbourhood does not appear to be a factor for regular cyclists. Only one participant indicated that a high density residential area might make them less likely to cycle there. One participant recognized that high density living is often associated with less parking and suggested that **"If I couldn't park my car, I'd be more likely to on a bicycle."**

OTHER FACTORS

Safety: The main theme that came out of this session was that regular cyclists will ride in many conditions regardless of how safe it is. This does not mean they do not want improved facilities. Safety was a critical factor to this group and was defined in a number of ways. Safety meant improved facilities to store their bicycles, dedicated bicycle lanes, better lighting at night and improved road surfaces.

Bikes on Transit: The commuter cyclists within the group suggested that they would like to have more access to transit with their bicycles, specifically the Sky Train. Several participants wanted to see a dedicated car on the train for cyclists.

Road Condition: Riders who spent time commuting along major streets were upset at the amount of garbage and gravel present at the edge of the bike lane. They felt this made them less safe riding in these spaces, as a portion of their lane was now full of garbage, pushing them closer to cars. Additionally, the regulars were concerned about pot holes, drains and other disturbances to the bike lane that were not designed with cyclists in mind.

OCCASIONAL CYCLISTS

Sex: 4 male, 3 female

Places of Residence: Burnaby, North Vancouver, Port Moody, Coquitlam, Vancouver

Age Range and Number of Participants: 25-34 (1) 35-44 (1) 45-54 (3) 65 or older (2)

The occasional cyclists were Metro Vancouver residents who are comfortable riding their bicycles, although they tend to do so in fair weather conditions and for recreational rather than utilitarian purposes (6 of 7 self identified as recreational). Collectively they have many years of cycling experience for recreational, utilitarian and sport purposes. Riders in this group expressed a desire to cycle more frequently, but were held back by barriers to be discussed in more detail.

GROUP SUMMARY

Using a scoring system from 1 to 3 - with 1 being the highest - participants were asked to rank the top 3 factors that would influence their decision to cycle trip for a non-recreational purpose. In order to calculate the most important factors across the group, scores of 1 were given 3 points, scores of 2 were given 2 points and scores of 3 were given 1 point. The results of the prioritization exercise are shown below. For a better understanding of the sub-components of the prioritization chart read the sections; likely to cycle factors, unlikely to cycle factors and factors affecting the decision to ride.

Factor Prioritization			
Group	1	2	3
Occasional Cyclists	There are bike routes (14 points)	Traffic (7 points)	The street network (4 points)

The number next to the factor indicates the number of participants who indicated that the factor would make them unlikely to bicycle. Only those factors that 50% of the group agreed on have been included.

UNLIKELY TO CYCLE FACTORS

Traffic has many trucks (6/7)
Traffic is fast moving (5/7)
Traffic has many buses (5/7)
The street network has highways running through it (5/7)
The street network has tunnels (5/7)
The environment en-route has heavy air pollution (5/7)
The environment en-route is very noisy (4/7)

Neighbourhood land use is mainly industrial (4/7)

LIKELY TO CYCLE FACTORS

There are bike routes that have a barrier separating bikes from traffic (7/7)

The distance is between 3 - 5 km (7/7)

Neighbourhood land use is mainly parks (7/7)

Neighbourhood land use is a mix of uses (7/7)

The distance is between 1 - 3 km (6/7)

There are bike routes that lead to my destination (6/7)

There are bike routes that connect with each other (6/7)

There are bike routes that have symbols marked on the pavement (6/7)

The topography is totally flat (5/8)

The distance is under 1 km (5/8)

The street network is on a grid mainly with short blocks (very connected) (5/8)

The street network is on a grid mainly with long blocks (well connected) (5/8)

Neighbourhood land use is mainly residential (5/8)

The distance is over 5 km (4/8)

The street network has bridges (4/8)

There are bike routes along major roads (4/8)

FOCUS GROUP DISCUSSION ON THE FACTORS AFFECTING THE DECISION TO RIDE

Topography: **"If I were to ride to work I would prefer a sort of flat or mildly hilly terrain. I don't want to kill myself before I get to work."** The varied level of cycling experience was evident in this group during the discussion on topography. Some riders found the hills challenging and fun, especially when riding for recreational purposes. When they considered topography from a utilitarian standpoint, there was consensus that having detours around hills or minimizing the impact of topography would be critical for attracting new riders into commuting. They also mentioned the importance of this factor for people with health problems or low energy levels after a day at work.

Distance: **"Its time more than distance." "If I could ride to work from home in a half hour, I wouldn't think twice about it."** The occasional cyclists commented that a half an hour trip time on a bicycle was a reasonable limit for utilitarian purposes. In the discussion time and distance did not seem to be as important to this group as to the VACC and Regular cyclist groups. Interestingly, the questionnaire revealed that distance was more important in the decision to cycle than the previous two groups. Particularly, distances over 5km, which three of seven participants indicated would negatively influence their decision to ride.

The Environment: **"I remember going for bike rides in Tokyo and commuting around there and I would come home and there was black gunk in my nose because I had been riding, and we don't have that, and that's a wonderful thing to not have that."** Pollution as a factor in the decision to cycle for the occasional cyclists, did not ignite as much conversation as it did with the VACC and Regular cyclist groups. Comments were made that when riding next to traffic it was bothersome, but they didn't find pollution in Vancouver very irritating. Some mentioned this is because much of their time cycling was for recreation.

Traffic: **"Rush hour is good because traffic is slower, the energy is lower"** On the issue of traffic, this group had less to say than the VACC or Regulars, possibly due to their typically recreational cycling allowing less exposure to traffic. The group felt it was a combination of elements rather than just traffic volume that was important to them, including motor vehicle traffic, signage, pedestrians and limited road space. With too many factors to worry about

they become anxious and this is when they make mistakes or have accidents. Interestingly, the questionnaire reveals that fast moving traffic or traffic with many trucks and buses is a major disincentive in the decision to cycle

Network: **"If I'm commuting I find this much easier (grid network), I feel I can progress through much faster" "If you are able to reduce your downtime by having long blocks, then it is attractive to me."** The occasional cyclists were very interested in the discussion of street networks, and had varied perceptions. Several participants liked he curvilinear pattern, as it reminded them of riding through a park area. Others believed that a curvilinear street pattern could be dangerous, as there is less 'eyes on the street', opportunities to get lost in cul-de-sacs and more traffic on these roads (as they are the only option for motorists). Additionally, some felt the grid pattern offered increased safety, as there would be a greater number of people on the street. For commuting purposes it was agreed that long blocks would be advantageous.

Bridges & Tunnels: **"Bridges are a nightmare.""If there's room it can be a comfortable experience." "I like the Burrard Bridge simply because it is very clear where bikes must be. Having said that, my wife dislikes it intensely because you are right next to traffic."** Except for one cyclist, the occasional cyclists had a limited amount of experience riding on bridges. The experience was highly variable to them and was very dependent on the presence of a pathway or barrier which made them feel comfortable and protected from traffic. Interestingly, only two participants indicated that bridges would make them less likely to cycle, while five participants felt tunnels would deter them.

Bike Routes: **"I've seen some bike lanes to Coquitlam Centre and I notice them there and I thought oh that's great. So I tried them out, but unfortunately the bike lane ended and then I found myself in traffic and I was uncomfortable."** There was strong consensus among the group that bike lanes were the preferred route choice when cycling, however they could use major improvements. Continuity, signage and surface quality were the most important factors. Outside of Vancouver proper, many of the participants felt they might get lost on the bike routes and suggested that signage between jurisdictions and at jog points be improved. **"I don't go enough to know the routes … I like to go on the ones that are well marked, well signed… safer, suited to riding and an attractive choices"**

Land Use: **"I don't like riding near stores because people are parking, the doors are opening, its scary!" "I would never consider riding downtown, just driving here was scary enough."** Land use was important to the occasional cyclists. They had a preference for places that were calm, aesthetically pleasing and more residential in character. The occasional cyclists also indicated on the questionnaire that industrial and commercial land uses would negatively affect their decision to cycle for a utilitarian trip, something not mentioned by the VACC and Regular cyclist groups.

Residential Density: **"I find it mostly neutral."** In the discussion there was group consensus that residential density was not a factor, nor the height of buildings as long as the route was safe at the ground level. Interestingly, three participants from the occasional cyclist group indicated on the questionnaire that a very high residential density would make them less likely to cycle in an area. This is in contrast to the two previous groups who would cycle in essentially any condition.

OTHER FACTORS

Safety: **"I think if were really going to try to see greater ridership we have to ensure that there is better accommodation so that its safe and people want to use them (bike facilities)."** The perception of safety was the primary barrier to cycling more of for the occasional cyclists. If this group of riders could be made to feel more safe

cycling, they would likely increase the amount they ride. Safety for this group seemed to mean safe routes, separated from traffic in safe areas of the city, with secure storage spaces at their destinations.

Safe Storage: In addition to having a safe route, this group was very concerned about safe storage spaces. The group perception was that theft of bicycles was high in Vancouver. Five of seven participants made written comments on their questionnaires related to theft and the provision of safe storage spaces, especially at transit hubs and workplaces.

POTENTIAL CYCLISTS

Sex: 3 male, 5 female

Places of Residence: North Vancouver, Coquitlam, Vancouver, University Endowment Lands

Age Range and Number of Participants: 25-34 (1) 35-44 (2) 45-54 (4) 55-64 (1)

Potential cyclists represent Metro Vancouver riders who cycle typically less than once a month to not at all in the last year. They may cycle more for recreation, and many mentioned they cycled for many years in the past. Members of this group would consider cycling more if the right conditions were in place. Health, family and job commitments are barriers to increased levels of cycling.

GROUP SUMMARY

Using a scoring system from 1 to 3 - with 1 being the highest - participants were asked to rank the top 3 factors that would influence their decision to cycle trip for a non-recreational purpose. In order to calculate the most important factors across the group, scores of 1 were given 3 points, scores of 2 were given 2 points and scores of 3 were given 1 point. The results of the prioritization exercise are shown below. For a better understanding of the sub-components of the prioritization chart read the sections; likely to cycle factors, unlikely to cycle factors and factors affecting the decision to ride.

Factor Prioritization				
Group	1	2	3	4
Potential Cyclists	There are Bike Routes (16 points)	The Street Network (13 points)	The Topography (9 points)	Traffic (8 points)

The number next to the factor indicates the number of participants who indicated that the factor would make them unlikely to bicycle. Only those factors that 50% of the group agreed on have been included.

UNLIKELY TO CYCLE FACTORS

Traffic has many trucks (7/8)
Traffic has many buses (7/8)
The environment en-route has heavy air pollution (7/8)
Neighbourhood land use is mainly industrial (7/8)
Traffic is fast moving (6/8)
The distance is over 5 km (6/8)

The topography is very hilly (5/8)

The street network has highways running through it (5/8)

The street network has bridges (5/8)

The street network has tunnels (5/8)

The environment en-route is very noisy (4/8)

LIKELY TO CYCLE FACTORS

There are bike routes that lead to my destination (8/8)

There are bike routes that connect with each other (8/8)

Neighbourhood land use is mainly parks (8/8)

The topography is totally flat (7/8)

There are bike routes that have a barrier separating bikes from traffic (7/8)

Neighbourhood land use is mainly residential (7/8)

There are bike routes that have bike symbols marked on the pavement (6/8)

The distance is under 1 km (5/8)

The distance is between 1 - 3 km (5/8)

The street network is on a mainly with short blocks (well connected) (5/8)

The topography is moderately hilly (4/8)

The distance is between 3 - 5 km (4/8)

The street network is on a grid mainly with long blocks (4/8)

There are bike routes along major roads (4/8)

The population density in the area is low (4/8)

FOCUS GROUP DISCUSSION ON THE FACTORS AFFECTING THE DECISION TO RIDE

Topography: "I will avoid going up a hill at any cost." "Hills are a big problem for me because I don't have the strength or endurance." Participants in the potential group were polarized in their views towards topography. Those with health impairments were very unlikely to cycle in hilly environment. Alternatively, participants who did not specifically state a health impairment and were in good physical shape commented that hills were not a factor, unless they commuting to work and needed to look professional. Five of the eight participants indicated that very hilly topography would make them unlikely to cycle.

Distance: "It's how long it takes you to get there, more than distance." The potential cyclists achieved group consensus that travel time is more important than travel distance. Six of eight participants indicated on their questionnaire that they would be less likely to cycle for trips over 5km, very different than the results of the other three groups. The data all suggests that their trips are short and mainly for recreational purposes. Throughout the session these cyclists had a hard time imagining cycling for any purpose other than recreation.

The Environment: "I wouldn't want to cycle if it was dirty and smoggy." "I do check the pollution index. If you're asthmatic or if you have any lung conditions, biking is good for you, but not in certain times." Cyclists in this group did not have the same level of experience riding in pollution or noise as the other three groups. This group tends to ride for pleasure, suggesting that they may ride in areas away from environmental nuisances. The results of the prioritization exercise indicate that the environment is of low importance relative to the other seven factors. However, seven of the eight participants indicated that heavy air pollution would deter them from riding and four of the eight indicated that very noisy routes would make them less likely to cycle.

Traffic: **"It's kind of a fact of life, but in an ideal world it would be nice to get rid of it all."** In the decision to cycle, traffic is a major deterrent for potential cyclists. This includes not only moving traffic but parked cars as well. The type of traffic was very important to this group. Roads with heavier bus or truck traffic would make them less likely to cycle. Results from the questionnaire indicated that traffic was the fourth most important factor overall. All of the sub-components of traffic were very important to the group. Seven of the eight participants indicated that traffic with heavy trucks and many buses would make them less likely to cycle, while six of the eight participants indicated that fast moving traffic would make them less likely to cycle.

Network: **"Absolutely the (grid) street pattern would be my preference if I was going to work."** The potential cyclists raised some interesting concerns about street network that had not been mentioned by previous groups. Specifically, one participant drew attention to the fact that some utilitarian trips are made by families, so the network should be designed for the safety of families who may be travelling to school or extra curricular activities (i.e., cut-throughs, routes without alleys). Additionally the perception of safety on grid and curvilinear streets was extremely varied. Some felt safer on curvilinear because of the reduced traffic flow, while other disliked it because you could not see the traffic coming. Overall, the network was the second most important factor.

Bridges & Tunnels: **"I avoid the Burrard Street Bridge. I'll take it, but I try to avoid."** In the discussion of bridges and tunnels many of the group members agreed that bridges were a major deterrent to cycling. This group felt exposed to traffic on bridges and worried about conflicts with pedestrians; some would take the aqua bus or sea bus with their bikes in order to avoid having to cycle on a bridge. One bridge that potential cyclists liked was the Number 2 Road bridge in Richmond, which felt safe in this space thanks to the physical barrier. Questionnaire results showed that five of the eight participants would be less likely to if their route had bridges and tunnels.

Bike Routes: **"Love them." "The more you feel separated from traffic, the safer you feel."** The presence of safe bike routes, especially those that allow for continuous travel, is the most important factor for potential cyclists. Some cyclists within the potential group felt terrified at times and were not convinced of the safety of the existing bike lanes in Vancouver, especially when travelling with children. While riding potential cyclists are worried about conflicts with pedestrians and other cyclists. Some group members suggested that if their confidence level could be increased they would feel comfortable riding on the existing routes.

Land Use: **I grew up cycling all around my neighbourhood – I can't imagine letting my kids bike in our neighbourhood now – to nurture generations of cyclists we must focus on kids and safety.** Due to time constraints with the potential cyclists group, the moderator did not have an opportunity to discuss the issue of land use in any detail. However, questionnaire results indicated that industrial land uses would negatively influence six of eight potential cyclists likelihood of taking a trip by bicycle. Alternatively, land use that is residential or mainly parks would positively influence the decision to cycle for seven and eight of eight participants, respectively.

Residential Density: Due to time constraints residential density was not discussed by this group. However, questionnaire results are consistent with the other groups and indicate that potential cyclists regard residential density as a neutral factor. The group was split between those who would be likely to cycle under very high, moderate and low residential densities and those who identified it as not a factor in their decision.

OTHER FACTORS

Safety: For potential cyclists safety seemed to be perceived as having a wide separated lane, preferably with a physical barrier from traffic. This was mentioned over and over by participants as being extremely important to

them. This was especially true for one participant who wanted to ride an adult tricycle which is wider than a typical bicycle.

Secure Storage: **"I'd leave a bike in the city all the time, so I could ride in the city."** Secure storage again arose as a major factor. Potential cyclists were very worried about the safety of their bicycles, as their bikes represent a major investment to them. All eight participants mentioned the need for secure long term storage on the comments section of their questionnaire.

End of Trip Facilities: **"Shower facilities at work"** Potential cyclists made it clear that their current employers were not doing enough to promote cycling through the provision of appropriate shower and change facilities in the work place.

VANCOUVER AREA CYCLING COALITION

Sex: 6 male, 2 female

Places of Residence: Surrey, Burnaby, Port Moody, New Westminster, Richmond and Vancouver

Age Range and Number of Participants: 35-44(1) 45-54 (4) 55-64(1) 65 or older (2)

The VACC group represents cyclists in Metro Vancouver with a very high level of confidence cycling in this region. They are cycling advocates who participate in local cycling events (such as bike to work month and commuter cycling skills workshops). The participants in this group cycle daily for utilitarian purposes in most weather conditions.

GROUP SUMMARY

The VACC group failed to prioritize the 8 factors on the questionnaire during the session.

The number next to the factor indicates the number of participants who indicated that the factor would make them unlikely to bicycle. Only those factors that 50% of the group agreed on have been included.

UNLIKELY TO CYCLE FACTORS
    The topography is very hilly (6/8),
    The Environment en route has heavy air pollution (6/8)
    Traffic is fast moving (6/8),
    Traffic has many trucks (6/8),
    The environment en route is very noisy (4/8),

LIKELY TO CYCLE FACTORS
    To topography is totally flat (7/8)
    There are bike routes that lead to my destination (7/8)
    There are bike routes that connect with each other (7/8)
    There are bike routes that have a barrier separating bikes from traffic (7/8)
    The distance is between 3 - 5 km (6/8)
    The distance is over 5 km (6/8)
    The street network is on a grid - mainly with long blocks (well connected) (6/8)

The topography is moderately hilly (5/8)
The street network is on a grid - mainly with short blocks (very connected) (4/8)
Neighbourhood land use is mainly residential (4/8)
Neighbourhood land use is mainly parks (4/8)
Neighbourhood land use is a mix of uses (4/8)
The population density in the area is low (4/8)

FOCUS GROUP DISCUSSION ON THE FACTORS AFFECTING THE DECISION TO RIDE

Topography: **"I don't know anybody that likes to ride up hills, I try to keep my altitude level."** Although the group agreed topography was a consideration, there was consensus that other factors (pollution level, traffic level and facility type) play into the route choice. In discussion, it was clear that most people took longer routes to avoid the steepest hills. Concerns regarding steep topography included breathing extra exhaust fumes while climbing, the additional time required to climb hills and the decreased safety associated with travelling next to moving traffic. Topography was very clearly an important factor with several participants commenting they would travel out of their way to avoid the steepest terrain in Vancouver.

Distance: **"Time is more of a constraint than distance. Its not that its too far, its just going to take too long."** Distance between origin and destination did not seem to be of particular importance to VACC participants, although they did recognize that for new riders, the distances could be much more important. The focus on this factor shifted to the amount of time it took to get to a destination. Particularly related to distance was the amount of time it took to get prepared for a bike ride. **"It takes too long to get the biking gear ready, if its under 1 km I'm not going to bike, I will walk. Its not worth turning into a Martian to bike 1 km. You just go out with an umbrella."**

The Environment: **"I'll grit my teeth and put up with it (pollution). But I hate it and I find it an insult that there is such a disregard for our health generally."** Pollution was a major factor in the decision to ride for VACC members. Participants used strong words, such as hate, to describe how they felt about areas with high noise or air pollution. There was a consensus that if a less polluted route was within close proximity, they would detour to avoid being exposed to pollution. Noisy environments also raised strong negative feelings. **"I just hate it- all types of air and pollution- I would go a lot out of my way to avoid it"**

Traffic: **"The encroaching volume of traffic is rendering the bike lanes inadequate"** Traffic is an important issue. Pparticipants would definitely travel on alternative routes to avoid heavy traffic. The impact of traffic was dependant on the quality of bike facility- most VACC riders felt comfortable riding next to traffic, but did have concerns regarding the speed of the traffic relative to their own speed, the volume of traffic and the presence of parked cars along the side of the road were important considerations. Participants would definitely travel on alternative routes to avoid heavy traffic, even if that meant taking a steeper or more circuitous route.

Network: **"All gets back to this issue of encountering vehicles"** VACC participants realized that the design of the network impacts travel speed, and suggested a preference for the network type that best minimizes down time at intersections and bike-car interactions. Participants felt frustrated by constant starting/stopping at intersections, as this forced them to loose momentum and be exposed to air pollution from idling cars. One participant suggested that streets with cul-de-sacs could be faster than travelling on a grid pattern, especially in Surrey, where these dead end streets are connected for pedestrian and cyclist use only. **"The purpose of the trip dictates the importance of the network."**

Bridges & Tunnels: **"The bike lane is next to a drop (Burrard Bridge) and if your front wheel goes off that drop, you're toast!"** The issues regarding bridges were mainly about connectivity to bicycle facilities at either end and about perceived rider safety, both from cars and with pedestrians on shared facilities. There was consensus that the Burrard Bridge as it currently exists is not comfortable for cyclists and that it could be a deterrent to getting more people cycling in the region. Safety was the main concern around bridges, especially the rider perception of safety. There was consensus that the Burrard Bridge as it currently exists is not comfortable for cyclists and that it could be a deterrent to getting more people cycling in the region.

Bike Routes: **"The bike routes are really key for me. Without those bike routes I would not have been happy to start cycling" (for commuting purposes).** VACC members rely on bike routes for daily routing. In terms of improvements, standardization across the region was a main theme. It was noted that the bike route design south of the Fraser River differs from north of the Fraser. Another issue was signage, as it is possible to miss the connections between the existing bike routes, especially outside Vancouver. Traffic calming on bike routes was also of key, adding both traffic circles and diverters, and one participant suggested that bike routes should be fully closed to all non-local traffic.

Land Use: **"it doesn't matter (land use), safety is the paramount factor"** Land use (commercial, industrial or residential) was not a key factor for the VACC group when deciding whether to cycle or not and that speed and safety were more important than the type of area they were riding through. However, other said **"land use certainly enhances my enjoyment"** with many comments that routing is affected by aesthetics, given adequate time.

Residential Density: Due to the amount of time spent on other factors, residential density was not discussed by the VACC group. Examination of the questionnaire's completed by this group suggests residential density is not a deterrent in their decision to cycle, as all participants rated the various residential densities as "neutral (not a factor)" or "very likely to cycle".

OTHER FACTORS

In addition to the 8 factors on the questionnaire VACC members provided the following as additional factors in their decision to cycle. These comments were provided verbally or on in the space for additional comments in the questionnaire.

Safety: **"are there eyes on the street?"** Is it safe for a middle school child to ride? Can any age or skill level safely use this bike route, without being bothered by traffic?

Weather: **"There are a lot of things that could be done to minimize weather factors. Curbs could be painted yellow so that when there is fog out there, you can see the curb coming up."**

Bike Helmets: **"A disincentive for a large number of people for riding a bike is the compulsory helmet law, and I'm very much against it. Its amazing how many people will not ride to work because of that." "If the route is safe, we don't need one" (a helmet).**

Aesthetics: **"the beauty of the street makes a difference, even if I'm commuting somewhere, unless I really have to get there fast, I will choose a route that is more attractive. Being in Europe has reminded (me) that our roads are so ugly"**

Bike Parking: Many participants commented on their questionnaire that additional secure bike parking facilities are needed. A downfall of the current system is that they are not available for short term use.

Factor Prioritization: Members of this group failed to prioritize the various factors presented to them in the questionnaire. One participant suggested that it would be impossible to prioritize these factors as they are too inter-related. This comment caused the rest of the participants to decide that they too would not be able to prioritize the factors.

One participant commented that **"I think this unlikely to cycle and very likely to cycle might not affect us seasoned cyclists. I think it has a significant impact on the other 80% of the people in the world who are potential bike riders. I know my kids and my wife, there's no chance they're going to ride half the places I ride. These (factors) are important, just maybe not for us."**

APPENDIX