

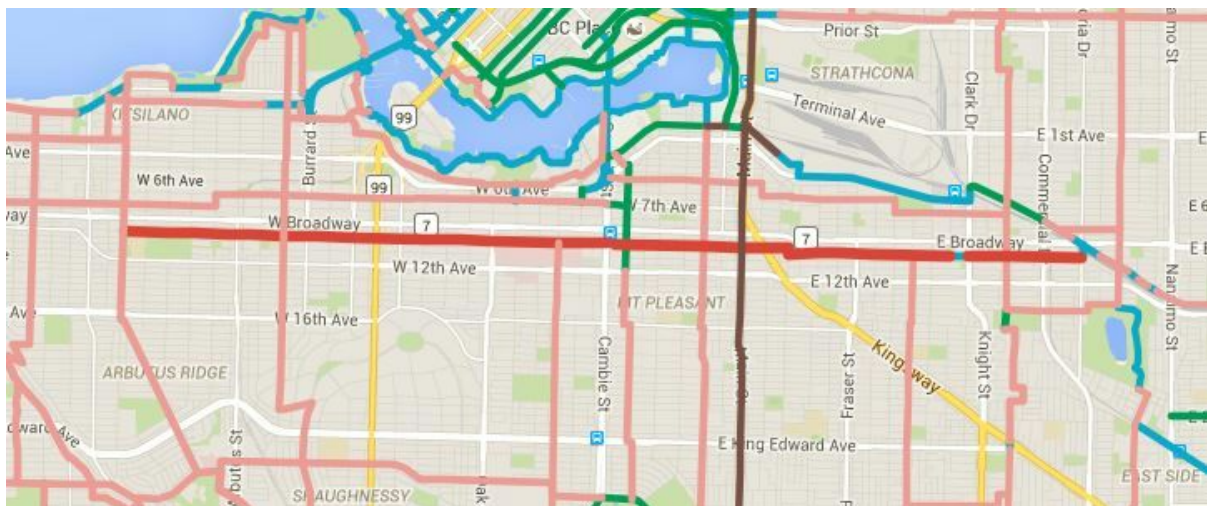


## 10th Avenue Bikeway Recommendations

Prepared by the Vancouver UBC Committee of HUB Cycling

### Project Vision

The creation of an All Ages and Abilities (AAA) Bike Route running east-west through Vancouver, from Victoria Drive to Trafalgar Street



**March 11, 2016**

**Hub Cycling Vancouver/UBC Committee**

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## **Why Is This Important?**

The 10th Ave. corridor constitutes the busiest east-west bike route in this part of Vancouver. The route provides a link to one of the largest transportation destinations in the region: the Health Precinct around Vancouver General Hospital. The route serves an area with relatively little AAA cycling infrastructure. This is reflected in the current observed mix of riders, with disproportionately fewer female riders, and few children and senior riders. There is an opportunity to significantly increase mixed ridership, given there are three schools, a childcare centre and major Community Centre (Kitsilano) located along the route.

In this report we urge the City of Vancouver to upgrade the 10th Avenue Bikeway to All Ages and Ability (AAA) infrastructure, over its complete length from Victoria Drive to Trafalgar St. (as shown in Figure 1) This is fully aligned with current City plans and policy and it would be a missed opportunity not to ensure that the entire route is improved at this time. Design work is currently underway on the Health Precinct portion (extending from Cambie to Oak, and including Vancouver General Hospital and many related facilities), with public consultation and stakeholder meetings. Given the progress in this area, this report concentrates less on the Health Precinct portion. However, it is important to ensure that improvements are made to the complete length of the 10th Avenue bikeway. This route was identified as a priority in the Transportation 2040 Plan, and in the recent 5 year update to Transportation 2040.

As can be seen in Figure 1, there are existing bike routes connecting to the east, from the Central Valley Bikeway and Lakewood Bike Route in East Vancouver. To the west, the 10th Avenue Bikeway connects to routes towards UBC, and north into Kitsilano. Travelling north and south, there are connections at the Mosaic, Windsor, Main, Ontario, Yukon, Heather, Cypress, and Trafalgar bike routes. While some users travel the length of the 10th Ave Bikeway, many utilize a portion of the route as part of their daily commute, or to access shops and services along Broadway.

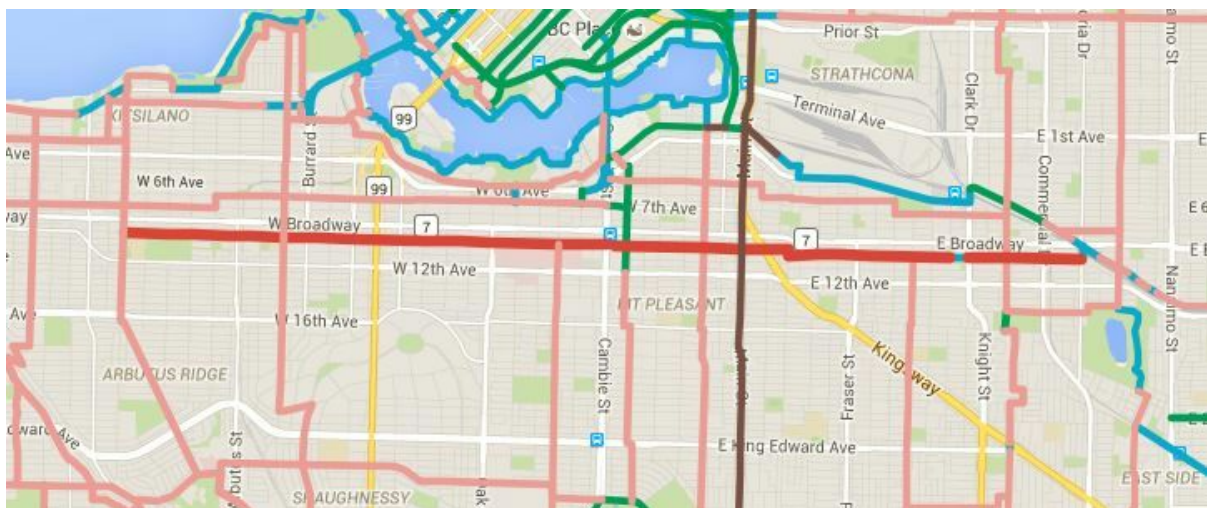


Figure 1

## **The Transportation 2040 Plan**

The Transportation 2040 Plan was adopted by Vancouver City Council on October 31, 2012. The plan makes specific reference to improving the 10th Avenue Bikeway to AAA standards as a priority.

The Transportation 2040 Plan states that the direction for cycling is to make cycling safe, comfortable, convenient, and fun for people of all ages and abilities.

The relevant policies within the plan include:

### **C1     Cycling Network**

- 1.1. Build cycling routes that feel comfortable for people of all ages and abilities
- 1.2. Upgrade and expand the cycling network to efficiently connect people to destinations
- 1.3. Maintain bikeways in a state of good repair
- 1.4. Make the cycling network easy to navigate

### **C2     Parking and End-of-Trip Facilities**

- 2.1. Provide abundant and convenient bicycle parking and end-of-trip facilities

### **C3     Multi-Modal Integration**

- 3.1. Make it easy to combine cycling with other forms of transportation
- 3.2. Provide a public bicycle system

The recommendations contained in this report are fully aligned with the cycling policies contained in Transportation 2040. Note also that the recently announced Public Bike Share system will include the Health Precinct in the initial launch area, so users will be able to take advantage of any improvements put in place along much of the 10th Avenue Bikeway.

## What is the potential of this AAA Route?

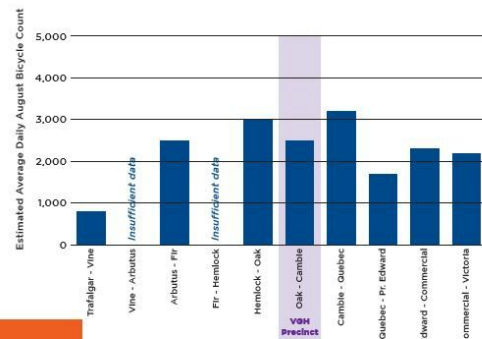
Current bicycle volumes along this route are reaching between 2,500 and 3,900 riders per day in the summertime (reference City of Vancouver, Figure 2). With upcoming improvements to the 10th Ave Bikeway, and the planned July 2016 launch of a new public bike share system, significant growth can be expected along this route. Considering the 16% cycling growth last year in the City, and applying a straight line projection, the bikeway design should consider an expected 8,000 riders per day within 5 years. This volume can be expected along the length of the bikeway, from Victoria to at least Arbutus.

City of Vancouver information from public open house events. Bicycle volumes are estimated for August 2015 based on manual counts.

### Estimated Average Bicycle Volumes

Today, between 2,500 and 3,900 people cycle on 10<sup>th</sup> Avenue daily in the summertime. With an annual total of over 500,000 people cycling, 10<sup>th</sup> Avenue is one of the busiest east-west bikeways in the city.

City of Vancouver staff estimated the average August 2015 bicycle volumes based on several 12-hour and 6-hour manual counts conducted during the spring, summer, and fall since 2014. The counts were normalized for the season and time of day based on 24-hour bicycle count data from a permanent counter located at Clark Dr. and E 10<sup>th</sup> Ave.



### Collisions Involving Bicycles

The Cycling Safety Study, presented to City Council in spring 2015, shows that the 10<sup>th</sup> Avenue bikeway has a high number of reported cycling collisions relative to other corridors, with approximately 38 cycling collisions (5 per km) reported each year.

Approximately half of these collisions occur at intersections. "Dooring" accounts for about 1 in 4 collisions.

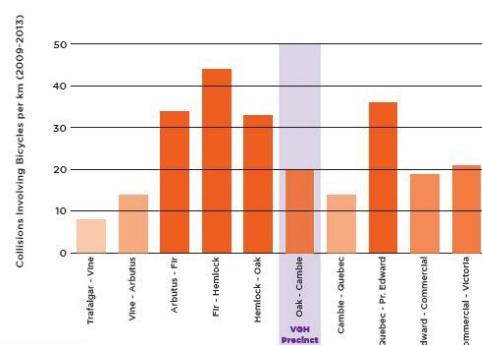


Figure 2

## **General Issues**

We noted that there are three distinct zones along the 10th Avenue Bikeway route:

1. There are busy arterials that require improved crossings (Commercial, Fraser, Main, Cambie, Oak, Granville, Arbutus). We observed significantly more motor vehicle traffic in the short zones extending 1-2 blocks on each side of these arterials. In addition to improved crossings, these zones require traffic diversion which could consist of a combination of limiting access (eg right turns out only from 10th, with no entering motor vehicle traffic, and/or no through motor vehicle traffic, except emergency vehicles) and one way motor vehicle restrictions. At the busiest crossings, physical separation of the bicycle lane in the blocks immediately adjoining the arterial, and protected intersections with phased turning movements, are recommended to be implemented. The three sites that most require physical separation on either side of the arterial, based on the number of motor vehicles, are Victoria to Commercial, Kingsway and Main, Cambie, Oak, Granville, and Arbutus. Other arterials could likely be calmed sufficiently with traffic diversions.
2. There are quieter sections in between the main arterials. Motor vehicle traffic volumes here do depend on the time of day. With reductions in motor vehicle traffic achieved through diversions and one way sections where applicable, these zones can in many cases be made appropriate for shared use. In some cases there are issues with parked vehicles. This could best be addressed by allowing parking on only one side of the street. In other areas there are issues with poor pavement quality, particularly near Arbutus.
3. The Health Precinct is very busy. The 10th Ave Bikeway is currently under development with City efforts focused on balancing access for all transportation modes, and maintaining critical emergency vehicle access. Due to the volume of motor vehicles through this zone, implementing an All Ages and Ability (AAA) cycling facility will require physically separated bike lanes, and the limited road width will result in one way motor vehicle traffic in specific sections. Of particular note are the passenger unloading areas at specific buildings, particularly since passengers are often sight or mobility impaired (eg the Eye Care centre, the Spinal Cord Centre, and the Arthritis Centre).

While there are different zones that will require different treatments along 10th, we urge the City of Vancouver to use a consistent approach at each of the busy arterials, and also along the quieter sections between arterials. Rider safety, as well as the user experience, will be much improved by utilizing a uniform approach, giving the 10th Avenue bikeway a consistent feel over its length. Improved safety will result from the route being more intuitive for users, including those on bikes, on foot and driving motor vehicles.

Signage is required for wayfinding, with directions provided to adjoining bicycle routes and points of interest.

The notes that informed this submission, from two recent HUB Cycling assessment rides, are included in Appendix 2.



## Specific Issues

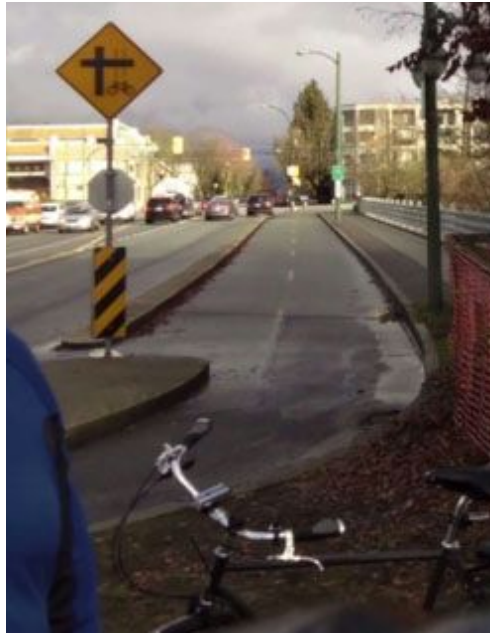


Figure 3



Figure 4

The separated bikeway on Victoria (Figure 3) requires signage at the north end so that riders travelling on the Central Valley Greenway are aware of it. At the south end, cross bike improvements are required to access 10th Ave from the separated bikeway. Along 10th towards Commercial (Figure 4), this section has parking on only one side and so can be made appropriate for shared use, with traffic diversions to control motor vehicle volumes.



Figure 5



Figure 6

Construction currently underway at Commercial results in all motor vehicle traffic on this section of 10th accessing solely from Victoria. Improvements to the construction barricades have resulted in improved cycling conditions (Figure 5). Across Commercial, 10th Ave has a one way diversion that we observed being ignored (Figure 6). Note that there is significant pedestrian volume in this area due to the Skytrain station.





Figure 7



Figure 8

The traffic diversion located immediately west of Commercial results in a one way section of 10th. Note the same vehicle that drove the wrong way through the diversion returning eastbound (Figure 8). We noted varied compliance with existing traffic diversions along the route.





Figure 9



Figure 10

The Clark Drive intersection has been improved with marked cross bikes. Immediately west of Clark, a bike path is used to continue along 10th. This is efficient at reducing motor vehicle traffic volumes. Note the curb cut to the bike path is not wide enough on the right side, and there is a dangerous bollard in the centre of the path (Figure 9). There are many traffic circles/roundabouts along the 10th Ave bikeway. Many were found to be unsafe. The one shown in Figure 10 has low-mounted traffic signs and low vegetation, so that visibility sightlines are maintained. This was the safest roundabout encountered.





Figure 11



Figure 12

Roundabouts varied greatly in terms of sightlines. Those with trees and tall signs were considered the most dangerous due to reduced sightlines (Figure 11). Even without trees, tall signs tended to block sightlines of approaching traffic (Figure 12).





Figure 13



Figure 14

The portions of the 10th Ave Bikeway with parking permitted on both sides are considered to be unsafe. In Figure 13, a motor vehicle attempted to overtake the group of cyclists despite the narrow lanes, and so riders moved to the centre of the lane. The specific vehicle is shown in Figure 14, illustrating the lack of appropriate space for two way cycling with even a single direction motor vehicle. The bicycle rider shown in Figure 14 was waiting for the vehicle to clear the zone, while the vehicle stopped to converse with a pedestrian.





Figure 15



Figure 16

While often not considered a major arterial, the intersection at Fraser Street (Figure 15) was observed to be very busy with cross traffic, turning vehicles, and buses. The bus stop increases pedestrian volumes as well. Continuing along 10th, parking on both sides of the street results in insufficient space for oncoming vehicles and bicycles to pass (Figure 16).





Figure 17



Figure 18

Approaching Prince Edward Street, motor vehicle volumes rose. With parking on both sides of 10th, motor vehicles were unable to pass people on bicycles. Some vehicles attempted to do so, creating unsafe conditions. Others waited for cyclists to pass. (Figures 17 and 18)





Figure 19



Figure 20

Motor vehicle volumes were observed to be higher, with more faster moving motor vehicle traffic, from Prince Edward through to Quebec. The intersection at Prince Edward was busy with vehicles using the lane as a thoroughfare (Figure 19), and traffic accessing the shopping mall at Kingsway. This section requires physically separated bicycle lanes, and improvements to the intersection at Prince Edward to reduce traffic cutting through the neighbourhood . At Quebec, the diversion is not aligned with bicycle movements along 10th and so the bicycle cut was observed to not be widely used (Figure 20).





Figure 21



Figure 22

In sections along 10th with parking on only one side, the shared lane approach was found to work well, subject to an appropriate motor vehicle traffic volume (Figure 21). In contrast, with parking on both sides, motor vehicles were observed passing cyclists without slowing, creating dangerous situations (Figure 22).





Figure 23



Figure 24

On downhill sections, bicycle speeds increase and the narrow roadway with parking on two sides is even more of an issue (Figure 23). The intersection at Yukon and 10th is a frequent subject of letters to HUB Cycling. There are dangers associated with downhill motor vehicle and bicycle traffic, and people on bicycles crossing Yukon. Additional calming is recommended, with potentially a pedestrian curb bulge on the northeast corner to match the southeast corner, and painted cross bikes.





Figure 25



Figure 26

The two separated bicycle lanes on 10th approaching Cambie (Figure 24), with one way motor vehicle traffic, were felt to provide greater safety and to be a model for similar improvements elsewhere along this route, particularly in the Health Precinct. Note the public drinking fountain immediately before Cambie on the north side. This fountain is not accessible to cyclists due to the curb position. The intersection at Ash was found to be very busy with cross traffic and vehicle turning movements (Figure 26).





Figure 27



Figure 28

West of Oak, the restrictions to allow parking on only one side create a safer cycling route. However, the poor pavement quality creates a risk of crashes (Figures 27 and 28)





Figure 29

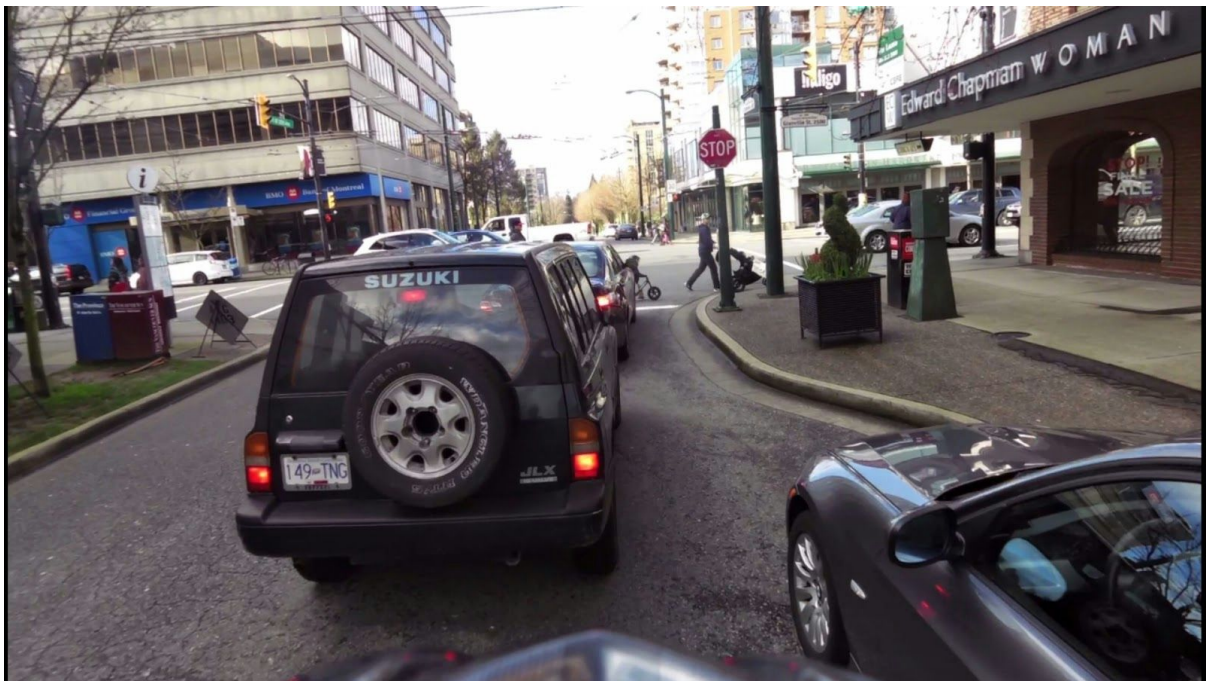


Figure 30

Approaching Granville Street, Hemlock is a very busy intersection (Figure 29). Hemlock and Fir have more traffic than other similar streets one block off of major arterials, due to the ramps to the Granville Street Bridge. At Granville, traffic congestion results in cyclists being unable to access the push button to cross Granville (Figure 30). This intersection requires diversions, separated cycling lanes, and protection through the intersection with controlled vehicle turns and signal phasing.





Figure 31



Figure 32

Approaching Arbutus, railway tracks create a crash risk. The very poor pavement quality makes the risk even higher (Figures 31 and 32).





Figure 33



Figure 34

At Arbutus, traffic congestion results in cyclists being unable to access the push button to cross Arbutus (Figure 33). At Trafalgar, the western terminus of the 10th Avenue Bikeway, poor sight lines from 10th result in a danger when crossing Trafalgar. Consideration should be given to realigning stop signs to Trafalgar, given the improved sightlines on this street. Additionally, the size of the intersection promotes high vehicle speeds, particularly turning onto 10th westbound (Figure 34).

## Appendix 1 - Motor Vehicle Traffic Volume

We note the very high volume of motor vehicles in the Health Precinct. This makes more significant changes to this section, with physically separated bicycle lanes, essential. We are pleased to see the progress the City of Vancouver is making on consultation and design work for this section.

At the major arterials, motor vehicle volumes are sufficiently high that separated bicycle lanes for the block on either side of the arterial, as well as implementing protected intersection designs with controlled turning movements, is required to achieve AAA status and promote much more use of this bikeway.

Along the quieter sections between arterials, reducing motor vehicle traffic to the 500 vehicle per day target for a shared local bikeway is achievable, through the use of diversions and restrictions to one way motor vehicle traffic.

City of Vancouver information from public open house events:

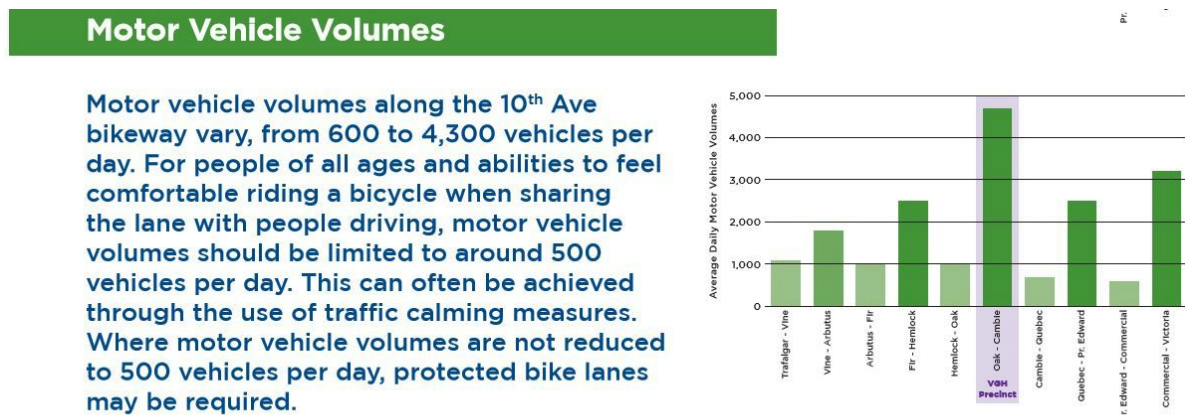


Figure 35



## **Appendix 2 - A Current Route Evaluation (proceeding east to west):**

Ride notes from a HUB Cycling assessment ride conducted on February 20, 2016, and an earlier ride focusing on school loading zone issues.

### **From Victoria Drive to Commercial Drive.**

There is a good physically separated connection from the Central Valley Bikeway, along Victoria, to 10th Ave. This route does require signage for people travelling east on the Central Valley Bikeway, as it is not obvious where the facility is and users were observed cycling south on Victoria Drive. A cross bike is also required from the Victoria Drive bikeway to the 10th Ave Bikeway. From Victoria Drive to Commercial Drive there is a supermarket on the north side, with a high volume of motor vehicle traffic entering from Victoria. 10th is currently closed to motor vehicle traffic immediately east of Commercial for construction, and so this forced all motor vehicle traffic to a single entry point. At this point, the construction facilities allowed safe cycling with clear signage. There are high pedestrian volumes associated with the Skytrain station. Traffic diversion at the intersection is recommended to reduce traffic on the blocks on either side of Commercial Drive.

### **From Commercial Drive to Clark Drive**

10th is relatively calm through this section. There is a traffic diversion immediately west of Commercial, although vehicles were observed ignoring it. There are a number of roundabouts with varying impacts on sightlines. The Mosaic bike route on Woodland Drive brings additional cycling volume. Where parking is restricted to one side of 10th, the route was comfortable with low traffic volumes at the time of the assessment ride. Where there was parking on two sides of 10th, the route was too narrow to be safe.

### **From Clark Drive to Fraser Street**

Through China Creek Park, the 10th Ave Bikeway is physically separated. 10th is relatively calm through this section. The Windsor bike route brings additional cycling volume. It was observed that motor vehicle traffic volumes increased as we approached Fraser Street. Traffic diversion at the intersection is recommended to reduce traffic on the blocks on either side of Fraser Street.

### **From Fraser Street to Prince Edward**

Higher motor vehicle volumes were noted in the one block next to Fraser Street. From Caroline Street to Prince Edward 10th Ave is relatively calm. There are more roundabouts along this section. Traffic diversion at each end of this section is recommended.

### **From Prince Edward to Main Street**

At Prince Edward, 10th jogs to the north. Prince Edward itself for this short section, and 10th from Prince Edward heading west, are both busy with motor vehicle traffic. This is related both to Kingsgate Mall customers, and to those circling the block around Kingsway and Main. Motor vehicle traffic was observed cutting through the lane immediately north of 10th, exiting onto Prince Edward. Traffic diversion, and/or physically separated bike lanes, are recommended through this zone along 10th Ave. The construction underway along this section resulted in poor sightlines and additional risks.

#### From Main Street to Cambie

Traffic diversion at the Main St intersection is recommended to reduce traffic in the one block of 10th from Main to Quebec. At Quebec Street, there is calming in place with an obstruction preventing westbound motor vehicle traffic. This diverter does not have a straight through access for cycling, resulting in people on bicycles often using the oncoming (eastbound) motor vehicle space. 10th is relatively calm over the next few blocks, until Yukon. At Yukon, there is a challenging crossing. Yukon and 10th are both bicycle routes. The stop signs are oriented to stop traffic on 10th. People on bicycles were observed having difficulty in crossing Yukon due to the volume of motor vehicle traffic. Improvements to this intersection are recommended. It is not obvious what the solution should be, but it was noted that this intersection is a source of frequent letters from HUB Cycling members. From Yukon to Cambie, a portion of 10th has been improved with physical separation and traffic diversion that prevents motor vehicles from entering 10th to the east of Cambie. The difference and improvement is obvious when riding this section, as the increased traffic observed at other arterials (Main, etc) is not evident when approaching Cambie. The traffic light on Cambie at 10th can often be not seen by those driving southbound because they are facing directly into the sun. People driving have been observed going through a red light probably without realizing it.

#### From Cambie to Oak

This comprises the Health Precinct. This section is being addressed by the City of Vancouver through open houses, workshops, and ongoing public consultations. Preliminary directions suggest the volume of motor vehicle traffic requires physical separation here, and this will be welcomed. Particular attention should be paid to the crossing at Ash Street, which had a high volume of motor vehicle traffic on a Saturday morning. Though this section, ride participants felt less safe, with some commenting that they usually avoided this section due to safety concerns.

#### From Oak to Granville

There is calming in place at the entry to 10th Ave, westbound from Oak. This results in a relatively calm section through towards Granville. The one block from Hemlock to Granville was busier, with motor vehicles cutting through. There is some poor quality pavement through this section.

#### From Granville to Arbutus

The one block stretch from Granville to Fir was very busy with motor vehicle traffic, much of it parking or circling the block. Physical separation is recommended here as with other busy sections. From Fir westward 10th Ave was relatively calm. The route crosses Pine, which while not an official bicycle route is often used to access 10th from points north due to its moderate grade. The Cypress bike route adds additional cycling volume. Approaching Arbutus, there are abandoned rail tracks in the roadway (one set still potentially in use, one set not in use). The abandoned set should be removed, and the pavement smoothed at the other set. UBC research showed that rail tracks pose a very high risk to cyclists in Vancouver, perhaps because they are rarely encountered. Note that the creation of the Arbutus Greenway here will increase bicycle volume along 10th.



#### *From Arbutus to Trafalgar*

The one block stretch from Arbutus to Maple was busy with higher volumes of motor vehicles. The intersection at Arbutus should have traffic diversion, as with other arterials. The stretch to Trafalgar has poor quality pavement, with many spots creating a crash risk for cyclists. At Trafalgar, the 10th Ave Bikeway ends, with limited signage indicating how people can carry on westward. The intersection at Trafalgar is dangerous due to poor sight lines. An alternative may be to switch the stop signs to Trafalgar instead of 10th, as Trafalgar has better sight lines.

#### *Additional note on school drop off and pick up zones:*

As this assessment ride was conducted on a Saturday, school drop off and pick up zones were not in use. It was noted, however, that there are a high number of schools along this route, and several ride participants noted that these provide additional challenges on week days. It is recommended that attention be paid to school drop off and pick up zones along the 10th Ave Bikeway in the design and consultation phases.

In particular, HUB Cycling has received much feedback about the stretch of 10th Ave by the school zone between Arbutus and Vine Street. This is a high priority area for protected lanes due to the volume of school pickup and drop off traffic on 10th Ave.

There is a lack of comprehensive historical data on bicycle crashes on routes in Vancouver. ICBC does provide the Cyclist Crash Map, which includes bicycle collisions involving motor vehicles and claims made against ICBC insured drivers. What can be seen from the following map is that while some intersections are obvious conflict areas (Main Street), others are not as obvious (Pine Street, with 14 crashes). Crashes have been reported at practically every intersection along the 10th Ave. Bikeway. Also shown are the Bikemaps.org information for 10th Ave, and a chart from the recent City of Vancouver Cycling Safety Study (full details available on line with links provided on the Data Sources page)

BikeMaps.Org maps bicycle crashes and hazards. More details at [bikemaps.org](http://bikemaps.org), link below.



A chart from the City of Vancouver Cycling Safety Study. More details in the link below.

Corridor	Total Reported Cycling Collisions	Corridor Length (km)	Reported Cycling Collisions / Km	Reported Cycling Collisions / Km / year	Improvements Prior To Or During Cycling Safety Study
Burrard Street (West Hastings Street to Harwood Street)	102	1.5	68.9	11.5	Green Paint Added
Commercial Drive (Adanac Street to East 12 <sup>th</sup> Avenue)	84	2.2	38.0	6.3	
Clark Drive (Adanac Street to West 10 <sup>th</sup> Avenue)	58	1.8	32.0	5.3	Green Paint Added
Pacific Street (Hornby Street to Homer Street)	17	0.5	31.5	5.2	
Cypress Street (Cornwall Avenue to West 19 <sup>th</sup> Avenue)	60	2.0	29.9	5.0	Currently under improvement
10 <sup>th</sup> Avenue (Trafalgar Street to Victoria Drive)	213	7.2	29.6	4.9	
Main Street (Powell Street to West Kent Avenue)	206	8.3	24.8	4.1	Green Paint Added
Broadway (Highbury Street to Commercial Drive)	145	8.6	16.9	2.8	
7 <sup>th</sup> Avenue (Yew Street to Yukon Street)	45	3.1	14.6	2.4	
West 8 <sup>th</sup> Avenue (Highbury Street to Yew Street)	28	2.4	11.8	2.0	

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## **Data Sources**

All street and bike route photos taken by HUB Cycling on February 20, 2016

Vancouver traffic volumes extracted from Van Map

[http://vanmapp.vancouver.ca/pubvanmap\\_net/default.aspx](http://vanmapp.vancouver.ca/pubvanmap_net/default.aspx)

ICBC Collision Statistics extracted from

<http://www.icbc.com/about-icbc/newsroom/Pages/Lower-Mainland-Crash-Map.aspx>

ICBC Bicycle Collision Statistics extracted from

<http://www.icbc.com/about-icbc/newsroom/Pages/Cyclists.aspx>

Bike Map application utilizing ICBC Bicycle Collision Statistics

<https://bikemaps.org>

City of Vancouver Cycling Safety Study:

<http://vancouver.ca/files/cov/cycling-safety-study-final-report.pdf>

Vancouver Transportation 2040 Plan

[http://vancouver.ca/files/cov/Transportation\\_2040\\_Plan\\_as\\_adopted\\_by\\_Council.pdf](http://vancouver.ca/files/cov/Transportation_2040_Plan_as_adopted_by_Council.pdf)

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