



January 16, 2015

Doug Pope
City Engineer, City of North Vancouver
141 West 14th Street
North Vancouver, BC V7M 1H9

Cc: Dragana Mitic, Manager Transportation
Monty Hurd, Project Manager Low Level Road
Daniel Watson, Transportation Planner
Ian Galsworthy, Manager Trade Areas, Port Metro Vancouver
Mayor and Council, City of North Vancouver

Low Level Road Project Cycling Facilities

Dear Mr. Pope,

HUB is a charitable organization that encourages cycling for all ages and abilities in Metro Vancouver to improve the quality of our communities and local economies, our health and the environment. Our mission is to make cycling an attractive choice for everyone.

We are writing to provide feedback and improvement suggestions for the cycling facilities built in conjunction with the Low Level Road project. The east-west connection via Low Level Road/Spirit Trail is a high use and critical connection in North Vancouver's cycling network. It connects Lower Lonsdale and the SeaBus with the future Lower Lynn Town Centre, the Ironworkers Memorial Bridge and the eastern half of North Vancouver.

On the positive side, we note several improvements over the old roadway:

- The wider bike lanes on the Low Level Road are an improvement over the old narrow lanes.
- The rumble strips on Low Level Road will help prevent vehicles from entering the bike lanes.
- The new Spirit Trail overpass at 3rd Street will allow pedestrians and cyclists to safely cross 3rd Street.
- A westbound bike lane has been added on Cotton Road from west of Gladstone to 3rd Street instead of the narrow path shared with pedestrians.
- Drainage has been improved at several locations.

Riders have reported several hazards that should be addressed to reduce the potential for harm. As well, we note opportunities to improve the new infrastructure to make it more attractive and safer to potential new users. Both sets of recommendations are listed below from west to east.



A Improvement Recommendations - Serious Hazards

1. Remove bollards along Spirit Trail

We noticed a high number of bollards on the Spirit Trail near Esplanade, including several bollards well away from street intersections. Steel bollards represent a significant crash and injury hazard to cyclists. Bollards and street furniture contributed to the high cyclist injury risk and injury severity found on multi-use paths in Vancouver and Toronto¹². These studies showed that multi-use paths had the highest crash and injury rates of all route types, except major roads without any cycling infrastructure.



Figure 1: Unnecessary and hazardous bollard on Spirit Trail at Esplanade

Bollards should be avoided on paths used by cyclists whenever possible. Design guidelines from other jurisdictions are clear about the hazards posed by bollards. For example, the Washington State DOT manual for shared use paths recommends³:

“Install bollards at entrances to shared-use paths to discourage motor vehicles from entering. Do not use bollards to divert or slow path traffic.

A preferred method of restricting entry of motor vehicles is to split the entry way into two sections separated by low landscaping, thereby splitting a path into two channels at roadway intersections. This method essentially creates an island in the middle of the path rather than installing a bollard.”

We recommend the removal of all bollards on the Spirit Trail. At intersections with streets, the path should be clearly marked for walking/cycling only.

Only if motor vehicles regularly drive or park on the Spirit Trail should a physical barrier be considered. Instead of steel bollards, flexible plastic posts should be considered to reduce injury potential.

¹ <http://www.biomedcentral.com/content/pdf/1471-2458-14-1205.pdf>

² <http://bmjopen.bmj.com/content/5/1/e006654.full.pdf+html>

³ <http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1515.pdf>



“Flexible bollards and posts are designed to give way on impact with automobiles and can be used instead of steel or solid posts. These bollards are typically made of plastic that is bolted to the roadway and bend and return to their original position when hit. They are intended to deter access, but allow vehicles through in an emergency.”⁴

2. Mark any remaining bollards for better visibility

The City’s black bollards with a single white reflector at the top are very difficult to see against the dark pavement, especially in low light or at night. The design may be suitable for walking paths, but not for multi-use paths used by cyclists.

Ideally all bollards should be removed or replaced with a safer way to keep motor vehicles out of the Spirit Trail. If any bollards remain on the path, they need to be made more visible by adding two white reflector bands in the middle and bottom of the bollard, and by marking the pavement around the bollard.

- *“When locating such installations, stripe an envelope around the bollards and paint and reflectorize them to be visible to path users both day and night.*
- *Use a contrasting striping pattern on the post.*
- *Use reflective materials on the post, such as a band at the top and at the base.”⁵*

Below is a bollard with striped envelope installed by the District of West Vancouver on the Spirit Trail in Ambleside. Note how difficult it is to see the bollard if it wasn’t for the striped envelope.



Figure 2: Bollard with striped envelope on Spirit Trail at 13th St in West Vancouver

⁴ https://www.crd.bc.ca/docs/default-source/regional-planning-pdf/Pedestrian-Cycling-Master-Plan/pcmp_design_guidelines_lowres.pdf?sfvrsn=2

⁵ <http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1515.pdf>



3. Change signal phasing at Spirit Trail crossing Esplanade at St. Andrews Aven

Cars turning left from St. Andrews across the Spirit Trail crossing on Esplanade get a green light at the same time as pedestrians and cyclists get the walk signal on the Spirit Trail. Separate the left turning cars from pedestrians/cyclists crossing Esplanade. Many drivers will not see or expect faster moving cyclists. The current signal phasing is also dangerous for pedestrians.

4. Eliminate curb on Spirit Trail at St. Andrews Ave to eastbound Esplanade bike lane or build curb let down

The curb at the end of the Spirit Trail on Esplanade, where it crosses to the north side of Esplanade, prevents cyclists from easily and safely connecting to the eastbound bike lane to Low Level Road. A curb at this location is unexpected and riders may fall down the curb. Eliminate the curb or build a wide curb let down for cyclists travelling straight to Low Level Road and to prevent injury. Do not install a bollard which would again increase injury risk.



Figure 3: Hazardous curb on Spirit Trail at Esplanade

5. Enforce no parking/stopping in bike lane in front of Esplanade businesses

It is rare that the bike lane in front of the businesses on Esplanade is not blocked by double-parked cars or delivery vehicles (see photos below).

No parking or stopping in the bike lane needs to be enforced. We recommend that the City work with businesses to direct their customers and delivery drivers away from the bike lane.



Figure 4: Car and truck in Esplanade bike lane

6. Fence steep embankment on entire length of Spirit Trail in Moodyville Park

The Spirit Trail through Moodyville Park is being fenced. The entire length along the steep embankment should be fenced so cyclists who fall do not end up on Low Level Road. The removal of trees has made the embankment more open and a person could fall all the way down to the road.

7. Add signal to intersection of eastbound Low Level Road and 3rd St bike lane

Coming down 3rd St., cyclists see two new bike signals at the intersection with Cotton Dr. The bike lane also crosses Low Level Road without a signal. The crossing was very hazardous before the new road was built and it has been improved by providing a refuge for cyclists at the intersection of 3rd St and Low Level Road.

This crossing remains risky however, mainly due to poor sight lines. People who are not familiar with the road network at this location may not realize that the two bike signals do not control the crossing of Low Level Road. When riding down 3rd Street, Low Level Road is not even visible because of the new noise barrier. The angle of the bike lane and the narrow space in the refuge make it difficult to see approaching traffic on Low Level Road.

A signal should be added for bikes crossing Low Level Road. It is not clear to us why a signal was not included in the design since it would only be actuated when a cyclist wants to cross, similar to the current situation, where cars stop for crossing cyclists. The only difference would be that the controlled crossing



would be much safer for all road users.

8. Add westbound bike lane on Cotton Drive where missing west of Gladstone Ave

The Low Level Road Project has left a new gap in the Main/Cotton bike route. Port Metro Vancouver's images of the road published in 2012 appear to show a bike lane between Gladstone and Kennard.

A bike lane needs to be added between Gladstone and the start of the new bike lane east of Kennard. At the right turn lane from Gladstone the bike lane should be marked green for greater visibility.

B Improvement Recommendations - Opportunities

To improve the route's appeal and make it safer for new users, we suggest the following measures.

9. Mark door buffer between Esplanade bike lanes and parked cars

The new bike lanes on Esplanade are wider than before, but the risk of 'dooring' and subsequent collision with moving traffic remains where parked cars are next to the bike lane. To reduce the risk we recommend striping a buffer in the bike lane next to the parked cars. A 2014 Transportation Research Board report found that buffers were effective⁶:

"Evidence suggests that providing a buffer space between the parking lane and the bicycle lane is desirable. When a buffer was provided between a bike lane and a parking lane, bicyclists positioned themselves further away from the door zone of parked vehicles, and as a result, a higher percentage of bicyclists were within the effective bike lane compared to when no buffer space was provided. The recommended buffer space is at least 1.5- to 2-ft wide and preferably marked with white diagonal cross hatching or chevron markings."



Figure 5: Bike lane with buffer to parked cars

⁶ http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_766.pdf



10. Install loop or camera detection to actuate signal at Spirit Trail crossing of Esplanade at St. Andrew's Ave

A push button has been installed at the Spirit Trail crossing on Esplanade instead of automatic detection of cyclists.



Figure 6: Push button at Spirit Trail crossing of Esplanade

In general, pedestrian push buttons are awkward to use when on a bike. It is also our understanding that in new construction the installation of detection loops is quite inexpensive.

The location of the push button at Esplanade is particularly unfortunate. Eastbound cyclists need to cross to the 'wrong' side of the path to push the button. This will lead to conflict with cyclists and pedestrians coming the other way as eastbound cyclists will try to either cross back from the push button to the other side of the path or ride on the wrong side. In both instances, there will likely be confusion in and around the crossing, increasing the potential for falls and collisions.

The push button is also some distance away from the crossing in a landscaped buffer and difficult to reach when on a bike.

11. Straighten westbound bike lane alignment between St. Patrick's and St. Andrew's

The westbound Esplanade bike lane has a sharp wiggle between St. Patrick's and St. Andrew's (see image below). The striping should be repainted so the bike lane is a straight route.



Figure 7: Low Level Road and Spirit Trail between St. Andrews Ave and St. Patricks Ave

12. Let down curb from Spirit Trail to St. Patricks Ave

The Spirit Trail intersects with St. Patricks Ave, but there is no curb let down to allow access for people on bikes and other wheeled users. A wide curb letdown should be added on the Spirit Trail curb at St. Patricks (see image above).

13. Repave eastbound Low Level Road bike lane to remediate 'washboard' surface

The eastbound Low Level Road bike lane has an uneven washboard-type surface. The adjacent vehicle lane is smooth. Repave the bike lane to achieve the same smooth surface as in the vehicle lane.

14. Reduce the Low Level Road's speed limit to 50km/h

Higher motor vehicle speeds make cycling uncomfortable and stressful. Higher vehicle speeds significantly increase the risk of serious injury and death if a collision occurs with a cyclist. Reducing the speed limit is the simplest, cheapest and most effective way to increase cycling safety.

Low Level Road is approximately 1.5km long. At 60km/h it takes 1 minute and 30 seconds to drive 1.5km. At 50km/h it would take 1 minute and 48 seconds, only 18 seconds longer. Given the traffic delays and wait times at signals on the streets leading to and from Low Level Road it is safe to say that a 50km/h speed would have little or no effect on how fast vehicles travel through North Vancouver.

15. Mark a buffer to motor vehicles on Low Level Road bike lanes (within existing bike lane width)

The rumble strip in the painted line between motor vehicles and bikes will help prevent vehicles from crossing into the bike lane. However, the perceived distance to fast-moving vehicles is small. Large trucks often travel on the rumble strip as they seem to find it difficult staying within their lane. The Low



Level Road bike lanes would feel safer and perhaps appeal to more users if it had a marked buffer between cyclists and vehicles

Buffered bike lanes have the following benefits⁷:

- *“Provides greater shy distance between motor vehicles and bicyclists.*
- *Provides a greater space for bicycling without making the bike lane appear so wide that it might be mistaken for a travel lane or a parking lane.*
- *Appeals to a wider cross-section of bicycle users.*
- *Encourages bicycling by contributing to the perception of safety among users of the bicycle network.”*

Buffered bike lanes are recommended on “streets with high travel speeds, high travel volumes, and/or high amounts of truck traffic” according to the NACTO Urban Bikeway Design Guide.



Figure 8: Bike lane with buffer to moving traffic

16. Install lights on Spirit Trail in Moodyville Park

Except for a lamp at the 3rd Street overpass, the Spirit Trail through Moodyville Park is unlit. The lack of lighting creates several issues: increased risk of collision with pedestrians and dogs, lack of personal safety and as a consequence, limited usability of the only bike route separated from motor vehicles.

Lighting may be a concern for wildlife. A safe, lit bike route along Low Level Road would have been a better option for both people and wildlife. However, since the bike lanes along Low Level Road were not built separated from traffic and the Spirit Trail is the only alternative, the path through Moodyville Park needs to be lit.

⁷ <http://nacto.org/cities-for-cycling/design-guide/bike-lanes/buffered-bike-lanes/>



17. Pave and sign the original connection from Spirit Trail to eastbound 3rd Street bike lane

Travelling east, a connection is needed from the Spirit Trail to the bike lane on Cotton Road. Originally a paved access route connected the Spirit Trail with 3rd St. However, the pavement has been removed and we understand that the City does not want people to use this connection. Since there is no other convenient or safe route from the Spirit Trail to the eastbound Cotton Road bike lane, we ask that the access route is again paved and signed.

18. Install wayfinding signage using TransLink design guidelines

Some bike route signage has been installed on Esplanade, Low Level Road and Cotton Dr. We recommend adding wayfinding signage to destinations using the TransLink cycling wayfinding design guidelines. The Spirit Trail should also be signed using the TransLink guidelines. The font size on the Spirit Trail signs are too small to read when cycling, and the sign colours are non-standard for bike routes.

19. Sign all connections between Spirit Trail and intersecting bike routes

Install wayfinding signag at all intersections between the Spirit Trail and other bike routes, including the Low Level, St. Andrews and 3rd St routes.

We appreciate the City of North Vancouver’s commitment to creating an all ages and abilities (AAA) cycling network. The Spirit Trail is a wonderful new public resource that will encourage many people to bike. We look forward to continuing to work with city staff to ensure that new transportation projects encourage the use of bicycles for transportation while being safe for all users.

Sincerely,

Handwritten signature of Antje Wahl in blue ink.

Antje Wahl
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Handwritten signature of Heather Drugge in blue ink.

Heather Drugge
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