Attachment 6 – Analysis Methodology and Enhancements

Category	Description	Enhancements
Current cycling demand	Based on road network routing of origin and destination data from the 2016 Transportation Tomorrow Survey (TTS) using current cycling trips.	-More recent data (2016 instead of 2011 TTS). -Finer granularity of trip data – geographic area approximately 5 times finer (Statistics Canada Dissemination Area level, average 0.17km^2 instead of TTS zones, average 1 km^2). -Trip modelling to produce results at the street level rather than zone level.
Potential cycling demand	Based on network routing of origin and destination data from the 2016 TTS using 66% of short motorized and transit trips (5 km and under) and long walking trips over 1 km. Only a proportion of these trips are used in order to account for the 33% of the population estimated to never cycle regardless of cycling conditions[1].	-More recent data (2016 instead of 2011 TTS). -Finer granularity of trip data (Statistics Canada DA level rather than TTS zone level). -Trip modelling for street level results (instead of zone level results). -Inclusion of long walking trips (those over 1 km). -Removal of a proportion of the population (33%) based on studies estimating the percentage of people who will never cycle regardless of cycling conditions[1].
Trip generators	Based on density of destinations (libraries, community and recreation centres, schools, hospitals, health care centres, grocery stores, daycares); counting those within a 250 m buffer of proposed routes.	-Expanded list of trip generators, including more trip generators that serve daily needs (instead of only focusing on transit, secondary and post-secondary institutions).
Transit access	Based on the streets modelled to carry the highest number of commuters from their home to the closest public transit station within a cycleable catchment (2 km for TTC, 3 km for GO), specifically in Context Area 2.	-Extracted transit from trip generator analysis. -Using estimated population data at the building-level (weighted by building density), modelled people's routes to the closest GO and TTC stations to find which streets serve as the most popular routes within a cycleable distance from the station (2km for TTC and 3km for GO). -Includes future TTC and GO stations where construction has been initiated.

[1] Geller, R. (2006). Four Types of Cyclists, Portland Bureau of Transportation, Portland, OR. http://www.portlandoregon.gov/transportation/article/264746

Connectivity	Based on number of new links that connect with existing cycling facilities (that extend facilities or bridge gaps).	-Includes routes that intersect with any section of an existing route, rather than only a terminus of an existing route. -Updated with most recent bikeway installations.
Network coverage	Based on proximity to existing facilities, using a 250 m buffer around existing facilities in Context Area 1, and 500 m buffer for Context Area 2. (Higher score for projects outside of these buffered areas).	-Consistent with original method, updated with most recent bikeway installations.
Barrier crossings	Based on number of crossings through barriers to cycling. Barriers include existing and planned rail lines, railways, freeways, and watercourses.	-Consistent with original method, updated with most recent rail / transit lines, including those where construction has been initiated (e.g. Eglinton LRT).
Safety	Based on the number of cycling collision sites (2012 – 2017) along which the project passes, with three variations of analysis: absolute collisions; collisions normalized by cycling volume estimates (current cycling demand modelling); and absolute collisions excluding cycling infrastructure routes*.	-Expanded from one type of analysis (absolute collision numbers) to three variations (viewing results with and without normalization). -Finer granularity of results, detailing midblock vs intersection locations and ranking into quartiles. - Includes "dooring" data. (Since 2013, doorings have not been collected in collision reports but separately by Toronto Police, the data set for which is included in this analysis). In the 2016 Plan, doorings beyond 2013 were not included.
Equity	Based on street segments with key access destinations abutting them, as identified by Neighbourhood Planning Tables, within Neighbourhood Improvement Areas.	-New analysis category, not previously included.

*As part of the Renew program, a safety analysis of collisions along existing cycling routes will also be undertaken.

Analysis by Context Area

Context 1 – High existing cycling mode share, high density of population, employment, and destinations; built-out environment with a tighter grid network and narrow street rights-of-way.

Context 2 – Lower existing cycling mode share, and – in most but not all locations - low density of population, employment, and destinations; more boulevard space.

This delineation is illustrated in the maps of Attachment 7.

For most analysis categories, Context 1 and Context 2 Areas have different thresholds and ranges applied to their respective Areas for like-comparisons and to support geographic equity.

Benefits of enabling cycling access to regional and light rail stations

"Rail transport is the strategic sector, on which the success of the efforts to shift the balance [from private to public modes] will depend”[2]. In other words, rail holds the key potential to encourage people to shift from private motor vehicles to more sustainable forms of transport, helping achieve environmental and health objectives. However, rail on its own suffers from weaknesses in providing a convenient and flexible door-to-door connection that cycling is able to overcome (Figure 1). In combination, bicycle-rail integration provides a competitive rival to substitute car journeys of comparable distances.

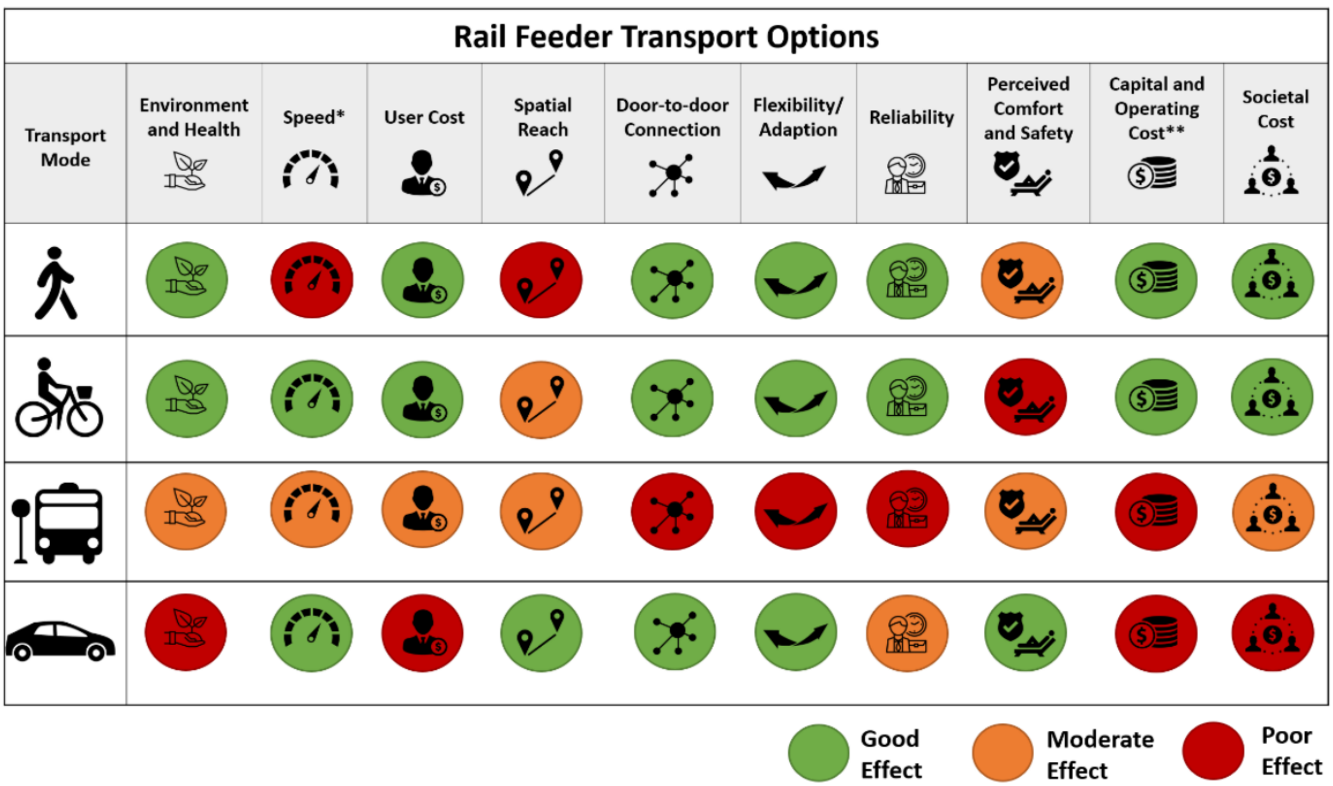

Figure 1: Conceptual comparison between the transport feeder modes of walking, cycling, local feeder transport and personal motor vehicle during peak commuting hours in an urban area.[3]
**Speed is based on an accesses distance of up to 5 km from the station*
***Costs are measured per passenger kilometre*

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[2] Commission of the European Communities (2001) White Paper - European transport policy for 2010: time to decide, Commission of the European Communities, COM(2001)370, Brussels. Retrieved 13 March 2018, from http://europa.eu.int/comm/off/white/ index_en.htm
[3] Sarper, S. (2018). Enabling cycling access to rail stations: Prioritizing and bridging unsafe connections.

The built form of the suburbs causes travel from homes to destinations to be pushed to high-speed arterial roads which have been designed to optimize vehicular flows, providing little space and accommodation for cyclists within the public realm. Most suburban rail stations are located adjacent to major arterials, creating a hazardous journey for connecting to the station on bike.

Since the majority of the population is traffic risk-intolerant, with only about 1% of the population comfortable riding in any road condition[4], the lack of safe cycling connectivity is predicted to be harming the GO rail's cycling access rates; currently only 1% of rail passengers access the GO rail network by bicycle[5]. The outcome of the analysis helps prioritize which corridors between people's homes and transit stations demonstrate the most potential of opening up cycling access, helping prioritize cycling infrastructure development.

Furthermore, with parking capacity at its peak at most GO rail stations, the rail agency, Metrolinx is unable to provide parking to keep pace with ridership growth. Thus, the rail agency gains from integrating bicycle-rail since growing cycling access essentially translates into increased ridership at low access-service cost.

[4] Geller, R. (2006). Four Types of Cyclists, Portland Bureau of Transportation, Portland, OR. http://www.portlandoregon.gov/transportation/article/264746
[5] Metrolinx. (2016b). GO rail access plan. http://www.metrolinx.com/en/regionalplanning/projectevaluation/studies/GO_Rail_Station_Access_Plan_EN.pdf