

STAFF REPORT ACTION REQUIRED

Bikeway Network – 2011 Update

Date:	June 9, 2011
То:	Public Works and Infrastructure Committee
From:	Acting General Manager, Transportation Services
Wards:	All Wards
Reference Number:	P:\2011\ClusterB\TRA\TIM\pw11004tim

SUMMARY

This report responds to a request by the Public Works and Infrastructure Committee, at its meeting of April 26, 2011, that the Acting General Manager, Transportation Services report on:

- the development and implementation of the Mayor's Bike Plan during the current term of Council;
- the development and implementation of a continuous Separated Bike Lane Network in the downtown during the current term of Council;
- the status of the Bloor-Danforth Environmental Assessment Study; and
- any other outstanding matters relating to bike lanes.

The Mayor's Bike Plan consists of two main components – a 100 km network of off-street bike trails and completion of critical on-street bike lane connections where the community supports them and where they do not impede traffic flow. A preliminary plan for designing and constructing the major bikeway trails over the next several years has been developed. A multi-year Bikeway Trails Implementation Plan, designed to achieve the 100 km network of off-street trails, will be submitted to the Public Works and Infrastructure Committee in the Fall 2011. Staff are continuing to assess the feasibility and impacts of implementing the critical on-street bike lane connections.

In addition, a preliminary assessment of 14 km of separated bicycle lanes in the downtown area has been completed and the results are presented in this report. Based on the findings of this preliminary assessment, it is recommended that separated bike lanes be implemented

across the Bloor Viaduct in 2011 by utilizing the existing designated bike lane alignment from Sherbourne Street to Broadview Avenue. This route was selected as the first location for the installation of separated bike lanes because it does not require the removal of any traffic lanes or parking.

It is important to understand, however, that the implementation of other separated bicycle lanes will, in most instances, result in a reduction of vehicle traffic or parking capacity. It is with this understanding that this report seeks authority to undertake further in-depth assessment, including a comprehensive consultation and design process, to evaluate the different design options for this separated bicycle lane network, and to identify impacts and recommend potential mitigating measures. Subject to the findings of this additional assessment and consultation, it is recommended that separated bike lanes be implemented on Sherbourne Street and Wellesley Street in 2012. Furthermore, it is recommended that a transportation operations study be undertaken to assess, among other things, the feasibility and impact of separated bike lanes on Richmond and/or Adelaide Streets, between Bathurst and Sherbourne Streets, and north-south bike lanes in the corridor from Peter to Simcoe Streets. It is recommended in order to achieve and focus on implementation of the elements addressed in this bike plan that the work on the Bloor-Danforth Bikeway Environmental Assessment previously authorized by City Council, not proceed further at this time and the currently available resources be directed toward delivering the cycling facilities set out in this report.

This report also recommends approval of a new bike lane on Dawes Road and minor modifications to the existing bike lane on Dupont Street. Staff also seek Council direction on requests from local Councillors to rescind approvals for bicycle lanes that have not yet been implemented on Bloor Street West and to remove bike lanes that have already been implemented on Pharmacy Avenue and Birchmount Road. An update of the operation and impacts of the Jarvis Street bike lanes that were installed in 2010 is also provided.

RECOMMENDATIONS

The Acting General Manager, Transportation Services recommends that City Council:

- 1. Endorse the direction and implementation of the Mayor's Bike Plan comprising a 100 km network of off-street bike trails and completion of critical on-street bike lane connections where the community supports them and where they do not impede traffic flow, including a separated bike lane network downtown; and direct the Acting General Manager, Transportation Services accordingly on the following specific measures leading to achievement of the Plan:
 - a. Report back to the Public Works and Infrastructure Committee in the Fall 2011 on specific links and installation priorities of a multi-year Bikeway Trails Implementation Plan;

- b. Proceed with the installation of separated bike lanes on Bloor Street East, from Sherbourne Street to Broadview Avenue, in 2011;
- c. Proceed with the detailed design and consultation process for developing separated bicycle lanes on Sherbourne Street with the goal of implementing them in 2012 in conjunction with the planned capital work on Sherbourne Street;
- d. Proceed with the detailed design and consultation process for developing separated bicycle lanes on Wellesley Street with the goal of implementing them in 2012;
- e. Direct the Acting General Manager, Transportation Services to assess the feasibility of separated bike lanes on Adelaide Street and/or Richmond Street, from Bathurst Street to Sherbourne Street, and separated north-south bicycle lanes in the most suitable route within the corridor from Peter to Simcoe Streets, connecting the existing Beverley Street bicycle lanes to the Waterfront, as part of a larger overall transportation operations study of this area and report to the September 2011 meeting of the Public Works and Infrastructure Committee on Terms of Reference for the study; and
- f. Not proceed further at this time on work on the Bloor-Danforth Bikeway Environmental Assessment and direct that staff refocus the current available resources on achieving the elements outlined in this recommendation.
- 2. Approve the installation of bicycle lanes on Dawes Road, from Danforth Avenue to Victoria Park Avenue.
- 3. Approve modifications to the bicycle lanes on Dupont Street at the approach to the intersection with Lansdowne Avenue, to move the beginning of bicycle lanes from a point 30 metres east of Lansdowne Avenue to a point 70 metres west of Lansdowne Avenue.
- 4. Provide direction regarding the installation of approved bicycle lanes on Bloor Street West, from Mill Road to Beamish Drive.
- 5. Provide direction regarding the possible removal of existing bicycle lanes on Pharmacy Avenue, from Denton Avenue to Alvinston Road.
- 6. Provide direction regarding the possible removal of existing bicycle lanes on Birchmount Road, from Kingston Road to St. Clair Avenue East.

Financial Impact

A total of \$42.7 million is planned for cycling infrastructure (on-street bikeways, bikeway trails and bike parking) within the Transportation Services Approved 5-Year Capital Plan

for the years 2011-2015. Adoption of this report will have no impact on the Transportation Services Capital Plan.

The installation of separated bike lanes will incur increased winter maintenance costs. It is expected that the additional winter maintenance costs associated with each of these separated bike facilities would be in the order of \$20,000 per km annually. These additional costs have not been included in Transportation Services approved 2011 Operating Budget or proposed 2012 Operating Budget submission.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

On April 26, 2011 the Public Works and Infrastructure Committee in considering Item PW3.15, requested the Acting General Manager, Transportation Services, to report to the June 23, 2011 meeting of the Public Works and Infrastructure Committee on:

- the development and implementation of the Mayor's Bike Plan during the current term of Council;
- the development and implementation of a continuous Separated Bike Lane Network in the downtown during the current term of Council;
- the status of the Bloor-Danforth Environmental Assessment Study; and
- any other outstanding matters relating to bike lanes.

Item PW3.15, contained an April 10, 2011 letter from Councillor Minnan-Wong, Chair of the Committee, forwarding a number of communications from local Councillors, residents associations, cycling advocates and other interested stakeholders on various aspects and issues related to the bicycle network and other cycling matters.

ISSUE BACKGROUND

The Toronto Bike Plan was adopted by City Council in July, 2001 "as the strategic plan for implementing cycling policies, programs and infrastructure improvements over the 10 year period, 2002-2011." The Toronto Bike Plan's 49 recommendations for improving cycling conditions and encouraging cycling are organized by the following six program areas:

- Bicycle Friendly Streets
- Bikeway Network
- Bicycle Safety
- Promoting Cycling

- Bicycle Parking
- Cycling and Transit

Since the Bike Plan's adoption, progress has been made in implementing the Plan's recommendations in all six program areas. The bikeway network grew from 166 km to 430 km in the first nine years of the Plan, from 2002 to 2010. Most of the downtown bikeway network has been completed; however there are still significant gaps in the network, both in the downtown and the suburban districts.

COMMENTS

1. Development and Implementation of the Mayor's Bike Plan

Mayor Ford's transportation plan includes a section entitled "A Sensible Plan for Bike and Walking Trails." This bike plan focuses on the bikeway network and is summarized as follows:

- Build 100 km of bikeway trails along rail, hydro corridors, ravines and valleys to serve as the backbone for bicycle transportation across Toronto, at a cost of \$50 million over four years; and
- Implement on-street bicycle lanes and complete some critical connections in the City's current bikeway network, where the community supports them and where they do not impede traffic flow, at a cost of \$5 million over four years.

1.1 Bikeway Trails

In 2009, funding for all Bike Plan-related trails was consolidated within the Transportation Services capital budget, to enhance coordination for the planning, design and construction of bikeway trail projects. Since that time increased resources have been dedicated to completing the bikeway trail sections of the City's bikeway network. The increased focus on trails over the last two years is consistent with Mayor Ford's stated policy supporting rapid expansion of the City's bikeway trails.

Seven new bikeway trail projects are currently being constructed this year as part of the Recreational Infrastructure Canada (RInC) program and Ontario Recreation (Ontario REC) program. The construction of these trail projects located in four major corridors (Finch Hydro Corridor, Gatineau Hydro Corridor, CN Leaside Rail Corridor and Scarborough Pit Spur Rail Corridor) will result in approximately 30 km of new trails and 4 km of upgraded trails across the North York and Scarborough Districts. In addition, several kilometres of new on-street bikeways will also be installed to provide continuity between trail sections where there is no short-term off-road trail connection. These new trails and on-street connecting routes will open to the public in summer 2011.

A detailed multi-year plan for the continued expansion of Bikeway Trails is being developed that would increase this total to 100 km. Feasibility and detailed design studies

are underway on some of the trails described in Appendix 1 to develop pre-engineering estimates and construction schedules. In addition, the multi-year trails plan will include an annual State of Good Repair (SOGR) Program to upgrade and repair some of the older trails, including the Eglinton West Trail between the East Mall and Renforth Drive, various sections of the Waterfront Trail, Don Trail and Taylor Creek Trail. There are also a number of smaller park trail connections that will need to be constructed and upgraded to provide critical connections in the trail network. Some trails, such as the West Toronto Rail Path and the Scarborough Waterfront Trail require other major capital works projects to be completed before construction can begin on the bikeway trails.

The preliminary Bikeway Trail Network is illustrated in Appendix 1. A more detailed description of the four corridors currently under construction and a table of future "Bikeway Trail Construction Priorities" are also included in this appendix.

1.2 Bicycle Lanes

The other element of the Mayor's cycling plan is on-street bicycle lanes where the community supports them and where they do not impede traffic flow.

One of the most common critiques of the City's on-street of bicycle lanes and routes is that they are neither continuous nor connected. The lack of continuity is largely due to the need to balance competing demands on Toronto's narrow streets, including transit service and commercial parking and loading. It must be emphasized and understood that Toronto's roads are markedly narrower than other jurisdictions in North America that are often cited as providing efficient on-street dedicated bike networks. In most cases bicycle lanes in Toronto can only be accommodated within the roadway by reducing the number of traffic lanes and/or the space dedicated to curb-side parking.

There are currently 117 km of roadways with bicycle lanes: 60 km bicycle lanes have been accommodated either by narrowing but maintaining the existing lanes, widening the roadway during planned reconstruction or reducing on-street parking; for the other 57 km of roadway, the bicycle lanes have been achieved by reducing the number of traffic lanes, most frequently reduced from four lanes to two lanes. For most of these roadways the traffic volumes were generally low enough to be accommodated within the reduced traffic capacity.

There are few remaining opportunities to accommodate bicycle lanes on Toronto roadways without reducing traffic capacity. Over the past several years, Transportation Services has recommended several bicycle lanes that have not been adopted by City Council because they would have reduced motor vehicle capacity and/or parking to accommodate these bicycle lanes. It is clear that Transportation Services must re-evaluate the bikeway network recommended in the Toronto Bike Plan and develop a new network strategy.

The new strategy would apply different design concepts for creating safer, connected routes for cyclists in the downtown and suburban districts. In the downtown area the focus could include separated bicycle lanes (as discussed further in the next section), coloured bicycle

lanes, sharrows (where the pavement width is not sufficient for dedicated bicycle lanes) and bike boxes. In the suburban districts other design options could include bicycle paths in the boulevard, signed routes on quiet local streets, in addition to the bikeway trails described above and in Appendix 1.

Transportation Services staff will continue to work with Ward Councillors and communities to identify and develop alternate cycling routes that provide critical links with existing cycling infrastructure where there is community support. The priority will continue to be to close the gaps and upgrade the existing cycling infrastructure downtown, to support the highest bicycle traffic areas and to support the BIXI Toronto public bike program, currently serving the area bounded by Spadina Avenue to Jarvis Street and from Bloor Street to Queens Quay.

2. Downtown Separated Bikeway Network

2.1 The Evolution of Separated Bicycle Lanes

Velo Quebec's Technical Handbook of Bikeway Design, first published in 1992 (and updated twice since then) was the first North American guideline to provide guidance on the design of separated bicycle lanes. The City of Montreal is unique in North America in that they have two decades of experience implementing separated bicycle lanes. Since the adoption of the Toronto Bike Plan in 2001, there has been a growing acceptance of the advantages of separating bicycle traffic from motor vehicle traffic. Over the past few years many more cities across North America have implemented separated bicycle lanes, including New York City, Vancouver, and Portland. The City of Ottawa is implementing their first separated bicycle lanes this summer as a two-year pilot project on Laurier Avenue West. The Urban Bikeway Design Guide, published by the National Association of City Transportation Officials (NACTO) in April 2011, presents the current best practice based on recent installations in U.S. cities.

In a peer review of the City of Ottawa's Segregated Bicycle Lane Project, dated October 2010, the Velo Quebec Association, describes a hierarchy of bicycle lane types that offer different degrees of separation, which in turn affect the comfort of cyclists. For example, the following types of bicycle lanes are listed in increasing order of comfort:

- 1. Bicycle lane between parked cars and traffic lanes;
- 2. Bicycle lane between curb and traffic lanes;
- 3. Bicycle lane with coloured surfacing between the curb and traffic lanes;
- 4. Raised bicycle lane (also called a cycle track) either at the sidewalk level or mid-point between the roadway and sidewalk levels; and
- 5. Segregated on-street bicycle path, separated from other traffic lanes by a physical barrier such as a median or parked cars.

The City of Toronto's bicycle lanes consist of the first and second design type described above. It is a natural progression for the City to begin upgrading some of the existing bicycle lanes as well as installing new separated bicycle lanes. However, both the NACTO and Velo Quebec guidelines acknowledge that separated bike lanes are most appropriate where they provide the greatest benefit to cyclists; some streets are already relatively comfortable for cycling. Physical separation provides the most benefit on streets with higher traffic speeds and volumes, high percentage of truck traffic and/or where there is a high frequency of illegal stopping or parking in bicycle lanes. It is also critical that there is enough space available to include the design features that create the separation.

2.2 Design Options for Separated Bicycle Lanes

Attachments contained in Item PW3.15 proposed streets to be considered as candidates for the implementation of separated bike lanes. These candidate streets are illustrated and listed in Appendix 2. All of the proposed separated bicycle lanes currently have bicycle lanes, with the exception of John Street, Richmond Street and Adelaide Street. In addition, Transportation Services staff have included consideration of separated bicycle lanes on Peter Street, as a possible alternative to John Street, and across the Bloor Viaduct, between Sherbourne Street and Broadview Avenue, for the introduction of a low-cost option for physical separation.

The evaluation of the proposed separated bicycle lanes was guided primarily by the two technical design guides described above: the Velo Quebec guide and the NACTO guide. In addition, staff have reviewed several examples of separated bicycle lanes installed in the past few years in Montreal, Vancouver and New York City, as well as the separated bicycle lanes that are being installed in Ottawa this year.

There are two general design options for separated bicycle lanes. For simplicity these design options will be referred to as "uni-directional" and "bi-directional" throughout this report. Uni-directional lanes are one-way bicycle lanes provided on both sides of the street and operate in the same direction as the adjacent traffic; bi-directional bicycle lanes operate as a two-way bicycle facility on only one side of the street.

In the above mentioned peer review, Velo Quebec describes the differences between unidirectional and bi-directional bicycle lanes as follows:

"The uni-directional configuration is functionally similar to bicycle lanes. Uni-directional paths can also be combined with advanced stop lines or "bike boxes" at intersections to facilitate left turns. Furthermore, it is simpler to interconnect uni-directional separated paths with conventional bicycle lanes or shared traffic lanes at either end of the segregated portion of the route.

The main advantage of the bi-directional configuration over the unidirectional configuration is that its footprint can be narrower, as cyclists can use the counter directional lane for passing. The minimum recommended width for a bi-directional path is 3.0 m (1.5 m per lane). In the uni-directional configuration, each lane needs to be made wide enough to allow passing within its limits; a minimum lane width of 1.5 m is acceptable but a width of 2.0 m is recommended in order to allow passing and to facilitate, maintenance operations, such as street cleaning and snow removal. With a 2.0 m width per lane, a two-way bicycle facility would require at least 4.0 m of the street right-of-way. However, bi-directional paths have significant disadvantages with respect to uni-directional paths: they are more prone to conflicts at intersections; they are incompatible with bike boxes; and they are more complex to interconnect with conventional bicycle lanes or shared traffic lanes at either end of the segregated portion of the route."

The selection of a bi-directional or uni-directional design depends on a variety of factors, including: one-way versus two-way operation of the street; the available pavement width; and connections with other bikeways in the network. Appendix 2 includes a table that identifies some of the characteristics of North American streets where separated bicycle lanes have been or will be installed. A variety of separated bicycle lane designs have been successfully implemented in various jurisdictions. The most effective design for Toronto must reflect local conditions and constraints.

There are also a variety of options for providing separation, ranging from a painted "buffer zone" plus delineator posts, to concrete barrier curbs. Montreal has examples of both kinds of separation, however, barrier curbs are the preferred design because they are more compatible with winter maintenance operations; delineator posts will be damaged by snow ploughs and are generally not suitable for bicycle lanes which are maintained through the winter season. Accordingly, the preliminary feasibility assessment is based on the use of concrete barrier curbs as the physical barrier between the bicycle lane and adjacent traffic or parking lane. The recommended width of the barrier curb ranges from a minimum of 0.5 metres adjacent to a traffic lane to 0.9 metres or greater when it is adjacent to parallel parking.

Notwithstanding that barrier curbs are the preferred design for the physical separation, Transportation Services proposes to convert the existing bicycle lanes across the Bloor Viaduct, from Sherbourne Street to Broadview Avenue, to a separated bike lane using a low-cost design option comprising painted buffers and delineator posts. This route was selected for the initial installation of separated bike lanes because it can be implemented with minimal impact on parking and traffic capacity. The evaluation of this installation would be conducted in consultation with the cycling community using this route. The posts will be removed during the winter season.

2.3 Overall Assessment of Impacts – Separated Bicycle Lanes

There appears to be a perception that converting existing bicycle lanes to separated bicycle lanes will have no impact on traffic or parking. However, adding the physical barrier between the bicycle lane and the adjacent traffic lane or parking requires more space, compared to painted bicycle lanes, and additional width is needed to allow faster cyclists to overtake slower cyclists within the cycling facility. In a painted bicycle lane faster cyclists can use the adjacent traffic lane to overtake slower cyclists. Most of the proposed routes already have lanes that are at or close to minimum width; the additional space for the barrier must be re-allocated either from the existing parking, traffic or bicycle lanes. The preliminary analysis indicates there will be impacts on traffic capacity and/or parking on most of the proposed routes; the impacts vary depending on the design chosen. Based on the Velo Quebec and the NACTO guidelines, typical cross-sections have been developed for both mid-block and intersection locations to illustrate the space requirements for both unidirectional and bi-directional bicycle lanes. Drawings illustrating the additional space required to convert a street with painted bicycle lanes to separated bicycle lanes are included in Appendix 3.

The potential impacts will be more fully analyzed during the consultation and design process for the individual projects if Council provides direction to proceed with the proposed separated bicycle lanes as discussed in this report. For example, the City of Ottawa is currently constructing separated bicycle lanes along Laurier Avenue from Bronson Avenue to Elgin Street as a two year pilot project. The approved design is the result of a comprehensive technical study initiated in January 2010, and included extensive consultation with numerous stakeholders and the public. An Advisory Committee was formed, with representatives from community associations, BIA's, cycling groups, institutions, and public-at-large. Multiple public open houses were held, as the study progressed though several stages of selection criteria. Transportation Services recommends that a comparable consultation and design process be initiated to evaluate, develop and implement separated bicycle lanes in Toronto.

The impacts, which would be assessed in a comprehensive consultation process with stakeholders, including City agencies, residential and business communities along the proposed routes, cycling organizations and the general public, include the following:

- TTC Service potential service delay and changes required to transit stops
- Emergency Services (EMS, Fire Services and Police Services)
- Traffic Operations (impact on traffic capacity, removal of turn lanes, additional traffic signal hardware and signal phases)
- Travel Time (possible additional travel delays for all users, including cyclists)
- Roadway Maintenance (winter maintenance and street sweeping)
- Parking and Loading
- Curb-side Garbage and Recycling Collection
- Property Access frequency of driveways and laneway

The assessment will also review in detail the benefits and potential disbenefits of physical separation for cyclists. A bi-directional separated bicycle lane will need to operate on its own traffic signal phase to mitigate turning conflicts with motor vehicles. As a result cyclists will receive less "green time" than they currently do operating on the same traffic signal phase as drivers. The increased delay to cyclists must be weighed against the safety and comfort benefits for each of the candidate routes.

The frequency of driveways and laneways along the route will also have an impact on cyclist safety. Conflicts are most common at intersections; every driveway and laneway is

an intersection. Motor vehicles exiting driveways and laneways at midblock locations will periodically block the separated bicycle lanes as they wait to enter gaps in the adjacent traffic lanes, potentially resulting in additional conflicts with cyclists. These issues will be addressed in the design and consultation process for each individual route.

A more detailed description of these potential impacts is included in Appendix 4.

2.4 Preliminary Analysis of the Proposed Routes

At this stage, the preliminary analysis undertaken by Transportation Services involves the evaluation of the physical envelope required to accommodate the different separated bicycle lane design options and the identification of the potential impacts they would have on traffic operations and parking. It is important to acknowledge and accept that implementing separated bicycle lanes will impact traffic capacity along all of the proposed routes. Without this acceptance, it would be inadvisable to dedicate resources to the in-depth consultation and design process that are required to develop a successful design.

Appendix 5 presents the preliminary assessment of traffic and parking impacts, the existing cross-sections and the potential cross-sections for the separated bicycle lane design options assessed.

Based on the preliminary assessment, bi-directional bicycle lanes appear to be the most practical design option for the streets proposed for separated bicycle lanes. Uni-directional bicycle lanes are the preferred design from a cycling and traffic operations perspective; however, they would require significantly more space and would have greater impacts on traffic capacity and parking.

Accordingly, Transportation Services recommends that bi-directional bicycle lanes be implemented in 2012 on Sherbourne Street, in conjunction with the rehabilitation of this road as part of the proposed 2012 capital works program. Broader public consultation and detailed design will be completed by the fall 2011 and can serve as a model for future proposed separated bike lanes. Following the completion of this design and consultation process, a similar process will be initiated for Wellesley Street with a view to completing the design process and implementing separated bicycle lanes in 2012.

Bi-directional bicycle lanes are also being considered within the Peter Street to Simcoe Street corridor and within the Richmond-Adelaide corridor, pending completion of a comprehensive design and consultation process. From a bikeway network perspective, implementing separated bicycle lanes in the Richmond-Adelaide corridor would provide the greatest benefit for cyclists but would also likely have the greatest impact on traffic operations. In addition to providing a vital bikeway link through the downtown core it could provide a critical link between the Simcoe Street bicycle lanes connecting south to the Waterfront and the Beverley-St. George bicycle lanes connecting north to the University of Toronto. Transportation Services recommends that separated bicycle lanes not be considered for Harbord Street/Hoskin Avenue and St. George/Beverley at this time. Transportation Services invested in significant improvements along the Harbord-Hoskin bicycle lanes in 2010 including the repaving of the bicycle lanes, and installing new intersection markings and bike boxes. St. George Street was narrowed from 14.0 metres to approximately 9.5 metres in 1997, from Bloor Street West to College Street. As a result, there isn't sufficient space for a 3.0 metre wide bi-directional bicycle lane - the minimum recommended for a street with high levels of bicycle traffic. Further, St. George is a relatively comfortable street for cyclists; providing separated bicycle lanes would provide minimal benefit. On Beverley Street, south of College Street, uni-directional separated bicycle lanes on St. George Street north of College Street. However, accommodating uni-directional separated bicycle lanes on Beverley Street would require the removal of the left turn lanes at signalized intersection and all of the on-street parking. Beverley Street is a residential street and the residents rely on the on-street parking.

John Street was also identified as a potential candidate for separated bicycle lanes in the attachments to PW3.15. City Council, at its meeting of September 30 and October 1, 2009, in considering the King-Spadina East Precinct Built Form Study adopted a recommendation identifying John Street as a Cultural Corridor, from the Art Gallery of Ontario to the Waterfront. Given the corridor's importance in linking many of the City's recognizable cultural landmarks, an Environmental Assessment study is currently underway to evaluate opportunities to enhance the cultural significance along this route and improve pedestrian facilities between Stephanie Street and Front Street West. It is recommended that the most suitable north-south route for separated bike lanes in the corridor from Peter Street to Simcoe Street be identified and evaluated as part of a broader transportation operations study to link the Beverley/St. George bike lanes and the Waterfront, as discussed below. This will include assessing appropriate crossing protection at the east-west arterial streets (Queen Street, Richmond Street, etc.).

There are several potential improvements and modifications to the configuration and operation of streets in this area, such as the conversion of Simcoe Street, Richmond Street and/or Adelaide Street to two-way operations, the reconfiguration of Wellington Street and Front Street (abutting Union Station). There is also interest in assessing measures that may improve movement in the downtown area. Therefore, it is proposed that the consideration of separated bike lanes in the Peter Street to Simcoe Street corridor, as well as Richmond and Adelaide Streets, be considered as part of a larger overall study of transportation operations and management in this area. The study, in addition providing a comprehensive view of the various initiatives noted would also look at elements like parking, accommodation of courier and goods movement, and taxi. The Terms of Reference for this study would be submitted to the Public Works and Infrastructure Committee in September 2011.

3. Status of the Bloor-Danforth Bikeway Environmental Assessment Study

In October 2007, City Council adopted the report entitled Sustainable Transportation Initiatives - Short Term Proposals (Item PW9.2), which directed the General Manager, Transportation Services "to report on the feasibility of establishing a bikeway on Bloor Street and Danforth Avenue, from Royal York Road to Victoria Park Avenue." In 2009, Transportation Services completed a preliminary evaluation of existing parking and traffic conditions and potential bikeway design options for the Bloor-Danforth corridor. The preliminary evaluation concluded that a consistent bikeway design could not be provided along the corridor without impacting the existing parking supply and traffic capacity. The parking demand and the width of the roadway vary considerably from section to section, ranging from 12.2 metres to 16.5 metres. The preliminary evaluation also indicated that some of the wider roadway sections, particularly along Danforth Avenue which has a consistent 16.5 metre width, have the potential to accommodate bicycle lanes with minimal impacts on parking and traffic capacity. For example, in a 16.5 metre width separated bicycle lanes could be accommodated while also maintaining four traffic lanes and off-peak parking. This cross-section would, however, require the removal of the left turn lanes at signalized intersections which would have an impact on traffic flow along the Danforth Avenue and access to the adjacent neighbourhoods.

Consequently, Transportation Services submitted an information report entitled, Toronto Bike Plan – New Strategic Directions (Item PW25.22), to the Public Works and Infrastructure Committee in June 2009 which, among other things, set out the process for a comprehensive transportation study of bikeway design options and their impact on traffic and parking needs along the corridor. Funds for the Bloor-Danforth Bikeway Environmental Assessment Study were approved as part of the Transportation Services 2010 Capital Budget. A request for proposals was issued and a consultant team, led by IBI Group Ltd., was retained in summer 2010 to undertake the study. The Environmental Assessment study was to develop an innovative design and implementation plan for developing a bikeway along the Bloor-Danforth corridor, and identify short and long-term design options, including evaluating the feasibility of physically separated bicycle lanes. A comprehensive traffic and parking analysis would be undertaken to evaluate the impacts of implementing the bikeway design options. In addition, the study would include a major effort to engage the business and residential communities along the corridor. An economic analysis would be undertaken to evaluate the impact of any proposals on the businesses along the corridor.

In late summer 2010 the consultant team began work on the study, including several meetings with City agencies and other internal stakeholders to finalize the study design, develop the consultation strategy, and assemble some of the necessary background data. However, it was decided to put the study on hold pending direction from the new Council following the 2010 Municipal election.

Although a bikeway along the Bloor-Danforth corridor would be a significant addition to the City's bikeway network it would lead to severe impacts on traffic and parking. It is recommended that work on this Environmental Assessment Study not proceed further at this time and the resources allocated to this study be refocused on the other cycling initiatives set out in this report.

4. Other Bicycle Lane Matters

4.1 Bloor Street West (Wards 3 and 5)

In June 2010, City Council approved bicycle lanes on Bloor Street West, between Mill Road and Beamish Drive, however the bicycle lanes have not been installed. It should be noted that at its meeting of December 11, 12, and 13, 2007, City Council also approved the installation of dedicated bicycle lanes on Bloor Street West, from Beamish Drive to Resurrection Road, as recommended in The Six Points Interchange Environmental Assessment Study.

The bicycle lane design approved by Council (for Bloor Street West, west of Beamish Drive) could be accommodated within the existing pavement width, however, east of Poplar Avenue the left turn lanes would have to be removed. Between Poplar Avenue and Beamish Drive, two traffic lanes can be maintained in each direction, which is consistent with the approved Six Points Interchange Reconfiguration Class Environmental Assessment Study. West of Poplar Avenue the traffic lanes would be reduced to one lane in each direction and a two-way centre left-turn lane. The existing parking bay west of Botfield Avenue would be retained, with No Stopping restrictions introduced elsewhere throughout the route. The traffic lane reduction would result in some additional vehicular delays during the peak hours.

Recently, the Ontario Ministry of Transportation (MTO) completed the Preliminary Design for improvement along the Highway 427 corridor and resulting upgrades at the intersections of The East Mall and The West Mall at both Burnhamthorpe Road and Bloor Street West which MTO had indicated they will be funding entirely. The MTO, however, has raised concerns regarding the approved lane reductions along Bloor Street West, and the ability to accommodate future traffic growth, as a result of the implementation of the bike lanes. Consequently, the MTO has indicated that they would not be prepared to fully fund the improvements to the municipal streets outlined in the Preliminary Design Report.

As a result of MTO's concerns and the implications on the funding of the improvements to the municipal streets, Transportation Services deferred the installation of the bicycle lanes. Subsequently, staff have been requested by the local Ward Councillors, in part due to the comments by the MTO, that these bicycle lane approvals on Bloor Street West be rescinded.

If Council decides to not proceed with the installation of the bicycle lanes previously approved for Bloor Street West, from Mill Road and Beamish Drive, staff will submit the necessary bills to Council rescinding the previous approval.

4.2 Pharmacy Avenue - Denton Avenue to Alvinston Road (Ward 35)

In June 2008, City Council approved the installation of bicycle lanes on Pharmacy Avenue between Denton Avenue and Alvinston Road. In order to provide bicycle lanes on this section of Pharmacy Avenue, traffic lanes were reduced from two lanes to one lane in each direction. Given the extremely low demand for on-street parking, the parking on both sides of Pharmacy Avenue was eliminated for the entire route in favour of providing a centre left turn lane for accessing the numerous intersecting driveways. The changes to Pharmacy Avenue to install the bicycle lanes were implemented in November 2008. The former Ward Councillor supported the bicycle lanes, however, following the 2010 municipal election staff have been requested by the current Ward Councillor to remove the bicycle lanes and re-instate Pharmacy Avenue to four traffic lanes. The cost estimate to remove the bicycle lanes and re-instate four traffic lanes is approximately \$120,000.

Transportation staff have observed the operation of the bike lanes and have concluded that they do not have a significant adverse effect on the traffic operations and parking situation on Pharmacy Avenue. In any event, staff are seeking direction from City Council on whether to remove or retain these bicycle lanes.

4.3 Birchmount Road - Kingston Road to St. Clair Avenue East (Wards 35 and 36)

In July 2008, City Council approved the installation of bicycle lanes on Birchmount Road between Kingston Road and St. Clair Avenue East. For the section of Birchmount Road from Kingston Road to Danforth Avenue, bicycle lanes were accommodated within the existing pavement width and allowed for the existing two-lane cross-section to be maintained.

For the section of Birchmount Road between Danforth Avenue and St. Clair Avenue East, traffic lanes were reduced from two lanes to one lane in each direction in order to accommodate the bike lanes. Given the extremely low demand for on-street parking, the parking on both sides of this section of Birchmount Road was eliminated in favour of providing a centre left turn lane for accessing the numerous intersecting driveways. The changes to Birchmount Road to provide bicycle lanes were implemented in September 2008. Again, the former Ward Councillors supported the installation of the bicycle lanes. However, staff have been requested by the current Ward Councillors to remove the bicycle lanes and re-instate Birchmount Road to four traffic lanes. The preliminary cost estimate for removing the bicycle lanes and re-instating four traffic lanes is approximately \$90,000.

Transportation staff have reviewed the operation of these bike lanes and have concluded that they do not have a significant adverse effect on the traffic operations and parking situation on Birchmount Avenue. Staff are also seeking direction from City Council on whether to remove or retain these bicycle lanes.

4.4 Dawes Road – Danforth Avenue to Victoria Park Avenue (Ward 31)

Staff from Transportation Services, Technical Services, City Planning and Cultural Services have been working together with the local Ward Councillor and the local community to coordinate a number of pedestrian, cycling and public realm improvements as part of the Dawes Road Revitalization Project. Two public consultation meetings were conducted, as well as separate meetings with local business owners. Staff made presentations and provided detailed designs. The consultations demonstrated community support for the project.

Dawes Road between Danforth Avenue and Victoria Park Avenue is a two-way minor arterial roadway, which operates with one very wide travel lane in each direction and has a speed limit of 50 km/h. During the morning peak period, stopping is prohibited in the southbound direction and during the afternoon peak period, stopping is prohibited in the northbound direction. Generally, parking is not permitted on either side of Dawes Road, except on the east side in the blocks between Coleman Avenue and Dentonia Park Avenue, Goodwood Park Court and Crescent Town Road, Park Vista and Halsey Avenue, and Gower Street and Beth Street. On the west side of Dawes Road, one hour parking is permitted north and south of Gower Street in front of the commercial establishments. The T.T.C. operates the 23-Dawes and 404-East York bus routes on this section of Dawes Road.

Bicycle lanes can be readily accommodated within the existing pavement width by narrowing the existing lanes; the two-lane cross-section will be maintained, as illustrated in Appendix 6. The existing northbound right turn lane and southbound left turn lane at Crescent Town Road will be eliminated to accommodate bicycle lanes through the intersection, however, this will not have a significant impact on traffic operations. In March 2011 Council approved the installation of parking lay-bys to provide parking for the commercial establishments on the west side of Dawes Road north and south of Gower Street. The construction of the parking lay-bys will enable the installation of bicycle lanes through the commercial area without impacting parking. Parking will be prohibited along the rest of Dawes Road when the bicycle lanes are installed; parking surveys have shown a very low demand for parking. Implementation of the bicycle lanes, if approved, will be co-ordinated with the scheduled improvements at the Dawes Road and Victoria Park Avenue intersection and the construction of the parking lay-bys later this year.

4.5 Modifications to the Dupont Street Bicycle Lanes at Lansdowne Avenue (Ward 18)

Dupont Street, from Dundas Street West to Lansdowne Avenue, is a two-way arterial roadway, which operates with one traffic lane and a bicycle lane in each direction. East of Lansdowne Avenue, Dupont Street operates with two traffic lanes per direction. The T.T.C. operates the 26-Dupont bus route on the street. The transition from four lanes to two lanes occurs approximately 30 metres east of Lansdowne Avenue and has resulted in significant delay to motor vehicle traffic on Dupont Street. Transportation staff have worked with the Ward Councillor to review options for improving eastbound and westbound traffic flow at the Dupont Street/Lansdowne Avenue intersection. Based on a review of the intersection operation, Transportation staff have concluded the traffic flow could be improved by maintaining two westbound and two eastbound traffic lanes approaching Lansdowne Avenue and making the transition to a single lane plus bicycle lane west of the intersection. Accordingly, Transportation Services recommends that the bicycle lane design be modified so that the bicycle lane begins approximately 70 metres west of the intersection as illustrated in Appendix 7. With this change both the eastbound and westbound approaches to Lansdowne will operate with two traffic lanes in each direction, and the intersection will return to the configuration that predated the installation of the bicycle lanes. Following implementation of this change staff will continue to monitor the operation of Dupont Street

and the Lansdowne-Dupont intersection, in consultation with the Ward Councillor and the community.

4.6 Jarvis Street Bike Lanes

City Council, at its meeting on May 25, 26 and 27, 2009, amended and adopted the Jarvis Street Environmental Assessment Study and, in so doing, approved the installation of bicycle lanes on Jarvis Street, between Queen Street East and Charles Street East. The bicycle lanes, which necessitated the removal of the centre reversible traffic lane, were installed in July 2010. Since its installation, staff have monitored the operations of Jarvis Street along this section in terms of bicycle counts, motor vehicle traffic volumes and travel times.

The results of the monitoring are summarized below:

- Prior to the installation of bicycle lanes on Jarvis Street, the volume of cyclists in both directions averaged approximately 290 in total during the peak eight hours on a weekday.
- Following the installation of the bicycle lanes, the eight hour volume of cyclists increased to approximately 890 on average, an increase in volume of over three times.
- Vehicle traffic counts on Jarvis Street prior to the installation of bike lanes in both directions averaged approximately 13,000 vehicles in total during the same eight hour period.
- Following the installation of bike lanes, the vehicle volumes remained approximately the same, averaging over 13,000 vehicles in both directions during this eight hour period.
- Vehicle travel times between Charles Street East and Queen Street East, prior to the installation of the bike lanes, averaged between six and eight minutes.
- Travel times increased by approximately two minutes in both directions following the installation of the bike lanes in the a.m. peak hour and by three to five minutes in both directions in the p.m. peak hour.
- Much of the increased travel time could be attributed to the delays and queues experienced at the Jarvis Street/Gerrard Street East intersection, particularly in the northbound direction during the p.m. peak period.
- The introduction of an advanced left turn phase in the northbound direction at this intersection, scheduled this summer, will reduce the delays at this intersection and the overall travel times between Queen Street East and Charles Street East.

The increase in the volume of cyclists exhibited by the most recent counts in June 2011 may be due, in part, to the recent launch of the BIXI Toronto bike sharing program. There are eight BIXI terminals located on or within one block of Jarvis Street between Bloor Street East and The Esplanade.

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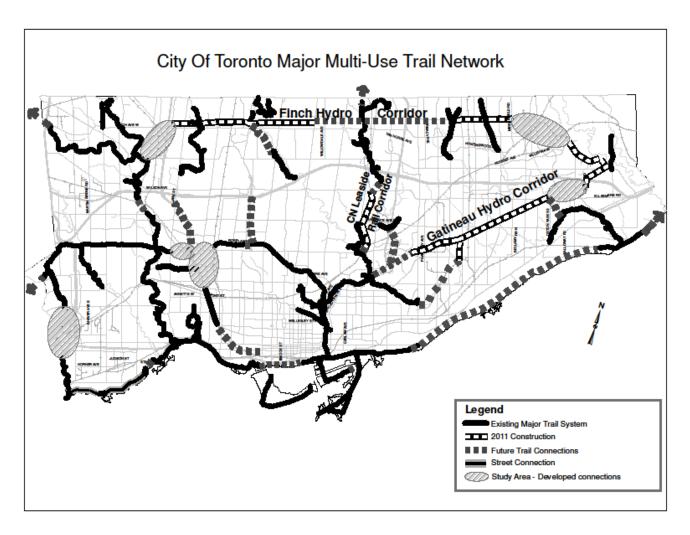
ATTACHMENTS

- Appendix 1 Bikeway Trails
- Appendix 2 Separated Bike Lanes
- Appendix 3 Additional Space Requirements for Separated Bicycle Lane
- Appendix 4 Impacts of Separated Bike Lanes
- Appendix 5 Preliminary Assessment of the Candidate Separated Lanes
- Appendix 6 Dawes Road Bicycle Lanes Danforth Avenue to Victoria Park Avenue
- Appendix 7 Modifications to the Dupont Street Bike Lanes at Lansdowne Avenue

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Appendix 1 - Bikeway Trails



1. Under Construction

Approximately 30 km of bikeway trails are currently under construction in four corridors, as described below:

- The Gatineau Hydro Corridor Trail extends across Scarborough from Victoria Park Avenue(just north of Eglinton Avenue East) north-east to the Orton Park-Ellesmere Avenue intersection and from Conlins Road, south of Hwy. 401, to the Meadowvale Avenue-Sheppard Avenue East (Wards 37, 38 and 43). Construction of the section from Orton Park/Ellesmere to Conlins Road is dependent on other capital work being completed in the area.
- The trail in the Finch Hydro Corridor comprises two sections: the North York section runs from Norfinch Drive to Yonge Street (Wards 8, 10 and 23); the Scarborough

section runs from Kennedy Road, connecting the existing trail system in L'Amoreaux Park to Middlefield Road (Wards 39 and 41).

- The Scarborough Pit Spur Rail Corridor Trail runs along the east side of Morningside Avenue in the abandoned rail corridor in Ward 42. This new trail will connect with the existing trail north of Sewells Road and run southeast to the Gatineau Hydro Corridor Trail and the existing Sheppard Avenue East bike lanes.
- The CN Leaside Rail Corridor Trail runs north-south from north of Eglinton Avenue East to York Mills Road (Ward 25). This new trail will provide an important connection from Wilket Creek Park to the Betty Sutherland Trail along the Don Trail System.

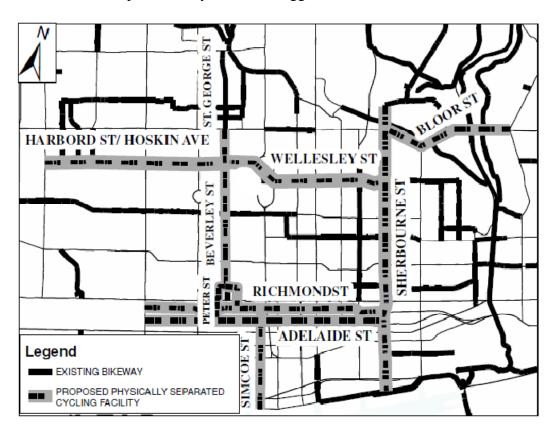
2. Future Construction Priorities

The Transportation Services Division, Parks, Forestry and Recreation Division and the Toronto Region Conservation Authority are working in partnership to develop a new multiyear trails plan and to design and construct the major bikeway trails across the city. The preliminary draft plan identifies the following facilities that will be implemented over the next several years.

Trail Name/Corridor	Wards	Description		
Finch Hydro	24, 39	Linking existing Finch Hydro Corridor trail		
Corridor		west of Yonge to east of Birchmount to		
		provide continuous bikeway trail across North		
		York and Scarborough		
CN Leaside	25	Linking the new CN Leaside Trail to the		
connections		Central Don Trail to provide a continuous		
		route between Lake Ontario and the planned		
		York Region trail system which will ultimately		
		connect to Lake Simcoe		
Humber Trail Gaps 1, 2, 4 Closing the gaps in t		Closing the gaps in the Humber Trail at		
		Weston and Claireville Conservation Area to		
		provide a continuous bikeway trail between		
		Lake Ontario and Steeles Avenue		
West Toronto Rail	18,19, 20	Linking the existing Rail Path north of Dundas		
Path		Street West south and east to Strachan Avenue		
		and the Waterfront Trail		
East Don	26, 34	Linking the Don Trail and Taylor Creek to		
		Moccasin Trail and potentially the Gatineau		
		Hydro Corridor Trail		
Highland Creek	43	Linking Highland Creek Trail to the new		
		Gatineau Trail near U of T Scarborough		
		Campus		

Trail Name/Corridor	Wards	Description	
Scarborough	35	Linking new Gatineau Hydro Corridor trail	
Connector		extension at Kennedy subway station to Taylor	
		Creek and Don Trail system via rail and hydro	
		corridor and St. Clair Ravine Park	
Scarborough	32, 36, 43,	Water's edge trail - depends on completion of	
Waterfront Trail	44	shoreline protection by TRCA	
West Don Trail	10, 23	Providing connection between the G. Ross	
		Lord Park Trail and Earl Bales Park Trail	
		along the West Don system	
Allen Greenway	15	Trail connection alongside the Allen Road	
		from the existing Belt Line Trail north to the	
		Lawrence Allen neighbourhood	
Black Creek Trail	13	New trail along Black Creek from Weston Rd	
		to south of Hwy 401	

A detailed multi-year Bikeway Trails Plan will be completed by Fall 2011 which will identify priorities and implementation phasing.



Appendix 2 - Separated Bike Lanes

1. Downtown Separated Bicycle Lanes Suggested and/or Under Consideration

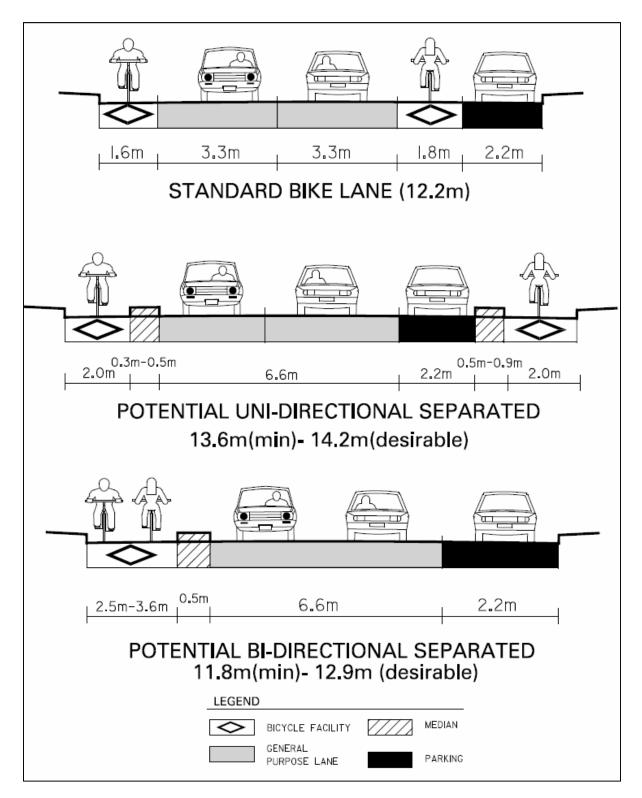
Street	Location	Length (km)	Width (m)
Sherbourne Street	Queen's Quay East to Elm Avenue	3.2	12.2 – 14.6
Wellesley Street	Queen's Park Crescent East to	1.5	10.0 - 12.2
	Sherbourne Street		
Harbord Street and	Ossington Avenue to Queen's Park	2.5	12.9 – 14.0
Hoskin Avenue	Crescent West		
St. George and	Queen Street West to Bloor Street	2.0	9.4 - 12.2
Beverley Street	West		
Richmond Street /	Bathurst Street to Sherbourne Street	3.0 each	9.6 – 14.4
Adelaide Street			
John Street	Queen Street West to Front Street	0.6	11.0 - 13.0
	West		
Simcoe Street	Queen's Quay West to Richmond	0.9	10.4 – 18.2
	Street West		
Peter Street	Adelaide or Richmond to Queen	0.2	14.0
	Street West		
Total		13.9 km	

2. Separated Bicycle Lanes, North American Cities

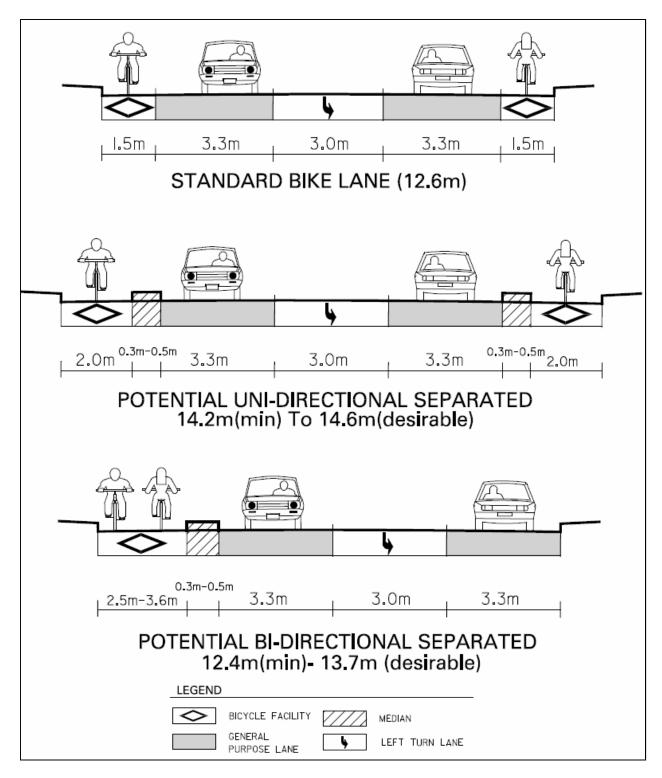
Street	Street Direction	Width (m)	Type of Physical Separation	On-street Parking
Carrall Street	Two-way	12.7	Uni-directional	one side
Vancouver			both sides	
Hornby Street	One-way	12.1 – 12.8	Bi-directional	one side, no
Vancouver				parking for
				12.1 m section
Laurier Avenue	Two-way	12.0 - 14.0	Uni-directional	one side, no
Ottawa			both sides	parking for
				12.0 m section
Boulevard de	One-way	13.0*	Bi-directional	one side
Maisonneuve East				
Montreal				
Rue Berri	Two-way	17.0 - 21.0*	Bi-directional	Some sections,
Montreal				both sides
8 th Avenue	One-way	21.3	Uni-directional	one side
New York	_		one side	
Columbus Avenue	One-way	18.3	Uni-directional	both sides
New York	-		(buffered) one side	

* Approximate widths

Appendix 3 Additional Space Requirements for Separated Bicycle Lane Mid-block Cross-Sections



Appendix 3 Additional Space Requirements for Separated Bicycle Lane Intersection Cross-Sections



Appendix 4 Impacts of Separated Bike Lanes

The following describes some of the impacts that would be assessed in a comprehensive consultation process with stakeholders, including City agencies, residential and business communities along the proposed routes, cycling organizations and the general public.

T.T.C. Service:

Currently transit buses stop adjacent to the curb to allow patron boarding and alighting the vehicle. With separated bicycle lanes the transit vehicles will stop next to the bicycle lanes - T.T.C. patrons will need to cross the bicycle lanes to access transit vehicles resulting in potential conflicts between cyclists and transit passengers. Design options to mitigate these conflicts will be developed during the detailed design phase.

Emergency Services:

Introducing curbs/barriers to separate the bicycle lane from traffic lanes effectively narrows the roadway available for drivers to pull over to make way for emergency service vehicles. The impacts on EMS and Fire vehicles will be reviewed during detailed design, in consultation with EMS and Fire.

Traffic Operations:

Many of Toronto's streets are narrow with traffic and bicycle lanes having minimum dimensions. To minimize impacts on T.T.C. service along some routes the bicycle lanes have been stopped on the approach and sharrows have been provided in a wide curb lane in order to maintain the left turn lanes at the intersection (e.g. at the Wellesley-Yonge Street intersection). Because of the additional space requirements, the introduction of separated bicycle lanes will result in the removal of left turn lanes, in some locations, along a number of routes.

Bi-directional separated bicycle lanes require less width when than uni-directional separated bicycle lanes. However, with bi-directional facilities all traffic signals will need to be modified. Additional bicycle traffic signal heads are required for the "opposite direction" bicycle traffic. In addition, to mitigate conflicts with turning traffic, the bicycle lanes will need to operate on their own traffic signal phase, resulting in reduced green times for other movements. A detailed traffic analysis of the separated options would be undertaken, in consultation with TTC, EMS and Fire, to fully evaluate potential impacts on vehicular capacity and to identify mitigating measures.

Roadway Maintenance:

Currently, bicycle lanes are swept, salted and ploughed concurrently with the rest of the roadway. The introduction of a physical barrier will require a different model of service

delivery for these activities. For example, snow storage opportunities along the roadway will be reduced. Consequently, snow will need to be removed which will impact the winter maintenance operating budget. The impact on winter maintenance operations and operating budget pressure will be fully evaluated for each route during the detailed design and consultation process.

Parking and Loading:

Parking may need to be eliminated along some sections due to additional space requirements to provide the barrier curb separating the bicycle lanes from traffic lanes. During detailed design the impacts on parking would be analysed in consultation with the affected communities and businesses along the proposed routes.

Curb-side Garbage/Recycling Collection:

Separated bicycle lanes will create conflicts with curb-side garbage collection because garbage collectors will have to cross the bicycle lanes. One of the key factors influencing the selection of Laurier Avenue for the Ottawa pilot project was the absence of curb-side collection on Laurier Avenue. All of the proposed Toronto streets have curb-side collections. A review of curb-side collection practice and schedules would be reviewed with Solid Waste Management during the consultation process.

Property Access

The installation of separated bike lanes could affect vehicular access to abutting properties, the extent to which will be dependent on the design of the bike facility and whether there are other access opportunities for the affected properties. Careful consideration will also need to be given to the impact of vehicles exiting a site and the potential conflicts with cyclists. Vehicles could totally block the bike lanes as they wait to enter the abutting traffic streams.

Appendix 5 Preliminary Assessment of the Candidate Separated Bike Lanes

Appendix 5-1: Sherbourne Street

Sherbourne Street, from Queen's Quay East to Elm Avenue, is a two-way minor arterial roadway, which operates with one general-purpose traffic lane and a bicycle lane in each direction. Left turn lanes are typically provided at signalized intersections. Parking is generally provided on one side of the street. The T.T.C. operates the 75-Sherbourne bus route. The road width varies from 12.2 to 14.3 metres; however, the majority of the roadway is 12.2 metre wide. The 24 hour traffic volume on Sherbourne Street ranges from 9,300 to 14,800 vehicles.

Two design options were considered for separated bicycle lanes on Sherbourne Street; bidirectional separated bicycle lanes and uni-directional separated bicycle lanes:

Bi-directional Separated Bike Lanes – Summary of Impacts:

- Through lanes maintained
- Turn lanes maintained
- On-street parking maintained
- Additional new traffic signal heads required
- Separate traffic signal phase is required for cyclists additional delay for all modes

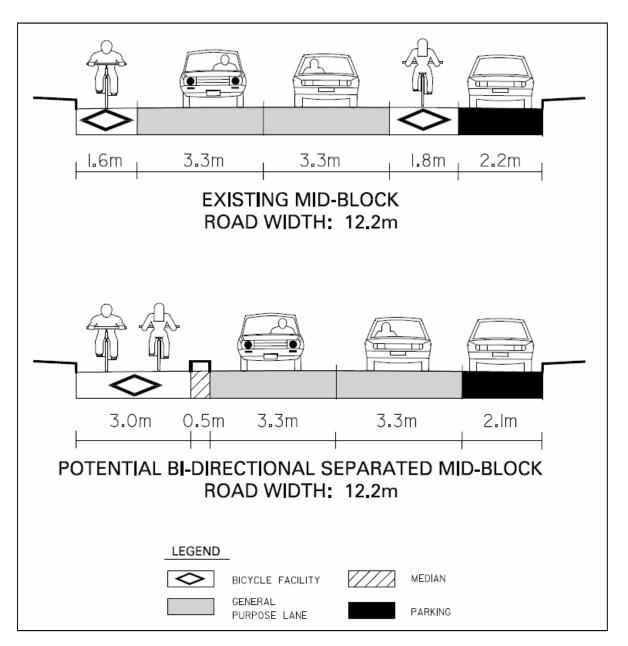
Uni-directional Separated Bicycle Lanes – Summary of Impacts:

- Through lanes maintained
- Loss of turn lanes at most intersections
- Loss of on-street parking along most sections

Based on the preliminary analysis, bi-directional separated bicycle lanes on Sherbourne Street would appear have the least impact on traffic capacity and parking. Capital Work is scheduled on Sherbourne Street in 2012; with road reconstruction from Lakeshore Boulevard to Front Street, and a road resurfacing from Front Street to King Street. Transportation Services has begun working with internal stakeholders to investigate the feasibility of providing separated bicycle lanes along the corridor. Broader consultation on the project will be required with the general public, BIA's, institutions and other stakeholders before a final design recommendation can be made.

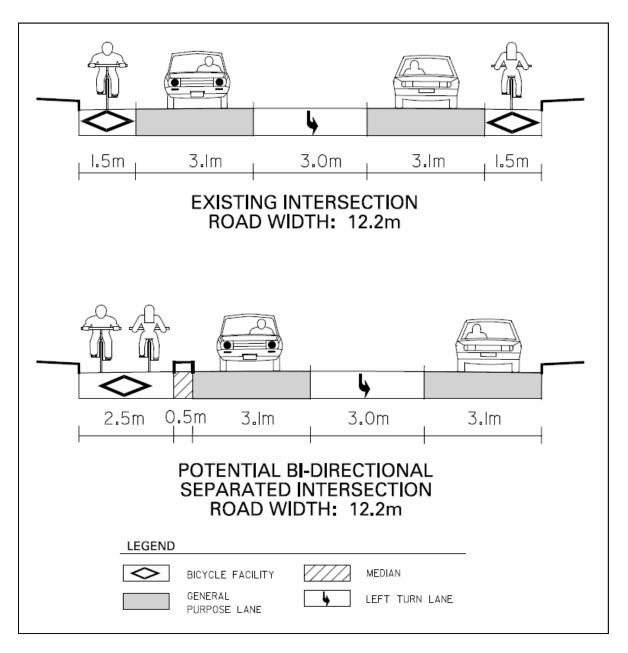
The following drawings illustrate typical existing cross-sections and alternative crosssections for separated bicycle lanes on Sherbourne Street.

Appendix 5-1 Preliminary Assessment of the Candidate Separated Bike Lanes



Sherbourne Street Mid-block Bicycle Lane Options

Appendix 5-1 Preliminary Assessment of the Candidate Separated Bike Lanes



Sherbourne Street Intersection Bicycle Lane Options

Appendix 5-2: Wellesley Street

Wellesley Street, from Queen's Park Crescent to Sherbourne Street, is a two-way minor arterial roadway, which operates with one traffic lane and a bicycle lane in each direction. Left turn lanes are provided at some signalized intersections. Parking is generally provided on one side of the street at mid-block locations. The T.T.C. operates the 94-Wellesley bus route along the road. The roadway varies from 10.0 to 14.2 metres wide. In some of the narrower sections sharrows were provided rather than continuous bicycle lanes in order to maintain left turn lanes at the intersections. The 24 hour traffic volume on Wellesley Street ranges from 16,700 to 22,800 vehicles.

Two design options were considered for separated bicycle lanes on Wellesley Street; bidirectional and uni-directional separated bicycle lanes.

Bi-directional Separated Bicycle Lanes – Summary of Impacts:

- Through lanes maintained
- Turn lanes maintained at most intersections
- On-street parking maintained
- Additional new traffic signal heads required
- Separate traffic signal phase is required for cyclists additional delay for all modes

Uni-directional Separated Bicycle Lanes – Summary of Impacts:

- Through lanes maintained
- Loss of turn lanes at all intersections
- Loss of on-street parking along most sections
- May not be feasible for some sections due to inadequate pavement width (e.g., Yonge Street to Jarvis Street)

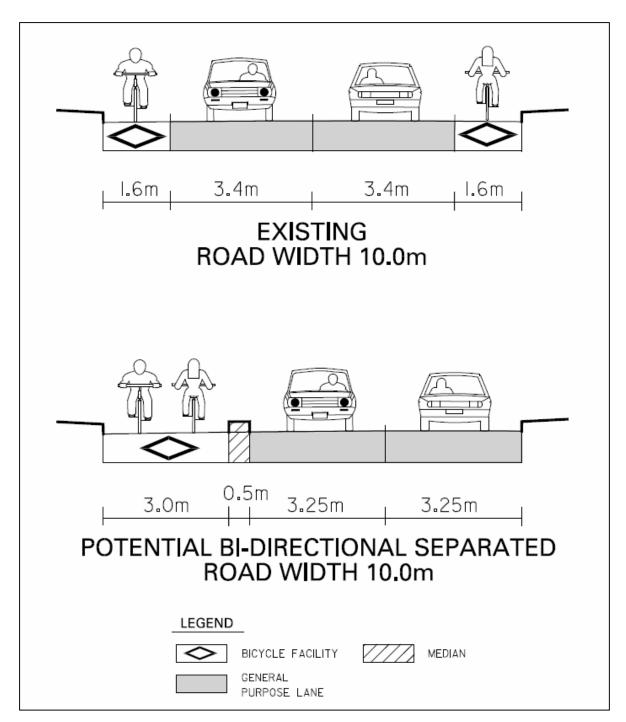
On the basis of the above, the introduction of bi-directional separated bicycle lanes to Wellesley Street is likely the most feasible option, in order to minimize impacts on other road users.

The following drawings illustrate typical existing cross-sections and alternative crosssections for separated bicycle lanes on Wellesley Street.

Broader consultation on the project will be required with the general public, BIA's, institutions and other stakeholders before a final recommendation can be made. In addition, in looking at separated bicycle lanes along Wellesley Street, the feasibility of connecting these bicycle lanes through Queen's Park, to Hoskin Avenue, will be investigated.

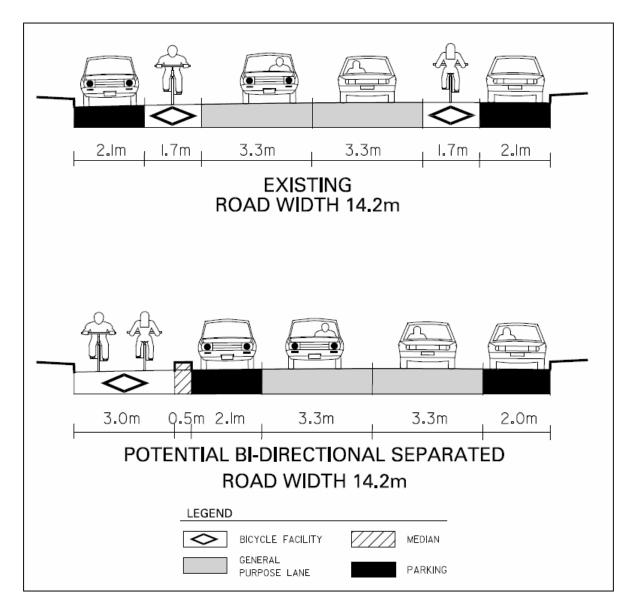
Appendix 5-2 Preliminary Assessment of the Candidate Separated Bike Lanes

Wellesley Street Bicycle Lane Options – Queen's Park Crescent E to Queen's Park Crescent W

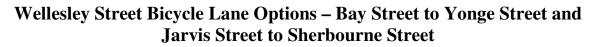


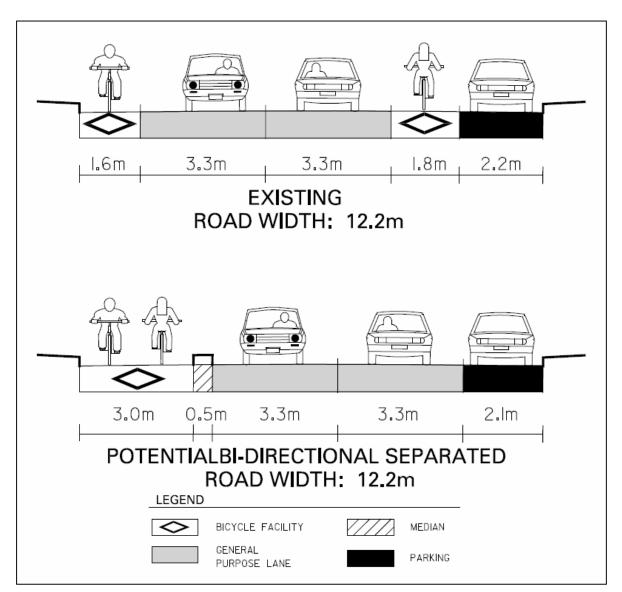
Appendix 5-2 Preliminary Assessment of the Candidate Separated Bike Lanes

Wellesley Street Bicycle Lane Options – Queen's Park Crescent E to Bay Street



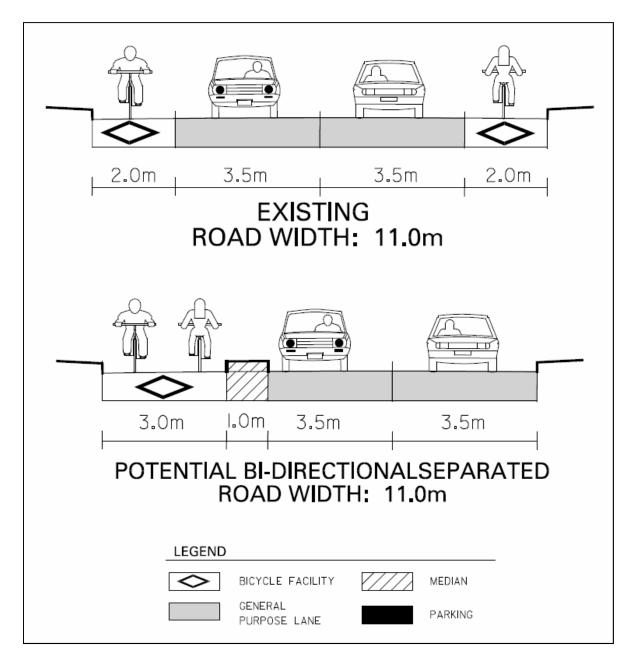
Appendix 5-2 Preliminary Assessment of the Candidate Separated Bike Lanes





Appendix 5-2 Preliminary Assessment of the Candidate Separated Bike Lanes

Wellesley Street Bicycle Lane Options – Yonge Street to Jarvis Street



Appendix 5-3: Harbord Street and Hoskin Avenue

Harbord Street and Hoskin Avenue, from Ossington Street to Queen's Park Crescent is a two-way minor arterial roadway which operates with one traffic lane and bicycle lane in each direction. Left turn lanes are provided at signalized intersections, and parking is generally provided on one side of the street. The T.T.C. operates the 94-Wellesley bus route along the road. The roadway varies from 12.9 to 14.1 metres wide. The 24 hour traffic volume on Harbord Street and Hoskin Avenue ranges from 17,800 to 19,000 vehicles. Between Borden Street and Spadina Avenue, a busy commercial strip, there is a gap in the bicycle lanes; parking and one traffic lane are provided in each direction. To provide a continuous bicycle lane along Harbord Street the parking would need to be removed from one side of the street in this section, similar to the rest of Harbord Street.

In 2010, Transportation Services made a significant investment to upgrade the bicycle lanes along Harbord Street from Ossington Street to Queen's Park Crescent West. The bicycle lanes were resurfaced and new durable cold-plastic lines, bike symbols and sharrows were installed. In addition, the City's first bike boxes were installed at the Harbord Street/Spadina Avenue, Harbord Street/Hoskin Avenue/St. George Street, and Hoskin Avenue/Queen's Park Crescent West intersections. New bicycle lane markings were installed through all of the signalized intersections (a new design currently being evaluated) along the Harbord-Hoskin corridor. Pre-installation data was collected for the bike box pilot project in summer 2010 and the post-installation evaluation will be completed by fall 2011. In total, Transportations Services invested approximately \$342,000 to resurface the bicycle lanes, reinstall the bicycle lanes and install the new intersection design features.

Transportation Services recommends that separated bicycle lanes not be considered for Harbord Street/Hoskin Avenue at this time because of the significant investment made in 2010 to enhance this bikeway. The bike box pilot project evaluation will be completed later this year. Separated bicycle lanes on Harbord-Hoskin could be considered in a few years time once the other priority routes have been developed and implemented.

Appendix 5-4: Beverley Street and St. George Street

Beverley Street and St. George Street operate as two-way minor arterial roads; with one traffic lane and a bicycle lane in each direction. Left turn lanes are provided at signalized intersections and parking is provided on one side of the street at mid-block locations. Beverley Street, between College Street and Queen Street West is generally 12.2 metres wide and the 24 hour traffic volume ranges from 7,700 to 8,700 vehicles. Through the University of Toronto Campus, from Bloor Street West to College Street, the road was narrowed in 1997 from 14.0 metres to approximately 9.4 metres at a cost of \$6 million. The goal of the road narrowing was to enhance pedestrian amenities, beautify the street, and to increase safety by calming traffic and maintaining the bicycle lanes. Following the narrowing, the 24-hour traffic volumes decreased on St. George Street from approximately 17,000 to 11,000 vehicles. There is no T.T.C. service on St. George and Beverley Streets. Sections of St. George Street were reconstructed in 2006.

As a result of the road narrowing and associated revitalization, speeds on the roadway have reduced, traffic collisions have decreased, motor vehicle traffic has decreased and bicycle traffic has increased. Given the positive outcome of the St. George Street revitalization, Transportation Services recommends that separated bicycle lanes not be considered on Beverley and St. George Streets because they are already relatively comfortable streets for cycling. Alternatively, the existing bicycle lanes could be enhanced with the application of colour as recommended by the Velo Quebec and NACTO guidelines.

Nevertheless two design options were evaluated for Beverley Street and St. George Street; bi-directional and uni-directional separated bicycle lanes:

Bi-directional Separated Bicycle Lanes on Beverley Street – Summary of Impacts:

- Through lanes maintained
- On-street parking maintained
- Additional new traffic signal heads required
- Separate traffic signal phase is required for cyclists additional delay for all modes

Uni-directional Separated Bicycle Lanes on Beverley Street – Summary of Impacts:

- Through lanes maintained
- Loss of turn lanes at intersections
- Loss of on-street parking

Bi-directional Separated Bicycle Lanes on St. George Street – Summary of Impacts

- Narrow 2.5 m wide bi-directional bicycle lane could be provided on east side
- Localized resurfacing required in some sections in University of Toronto Campus
- Parking maintained in lay-bys on the west side
- One traffic lane maintained in each direction

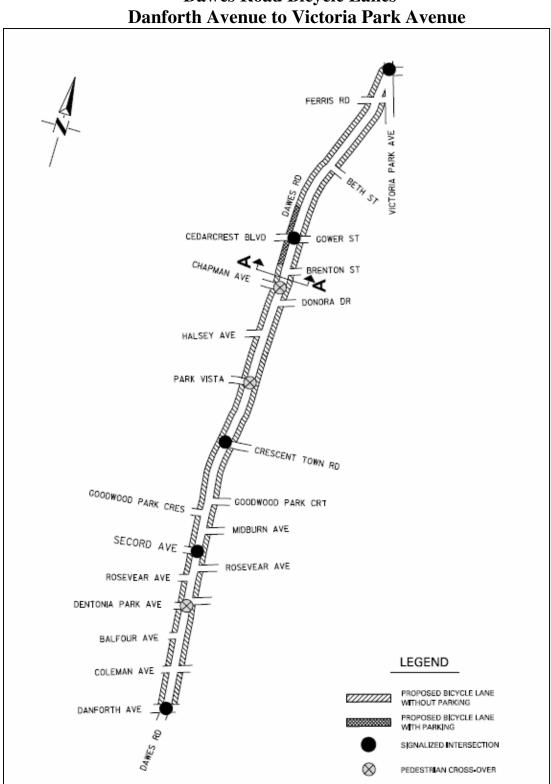
- Bike boxes eliminated at intersections
- Additional new traffic signal heads required
- Separate traffic signal phase is required for cyclists additional delay for all modes

Uni-directional Separated Bike Lanes on St. George Street – Summary of Impacts:

• Not feasible in current road width

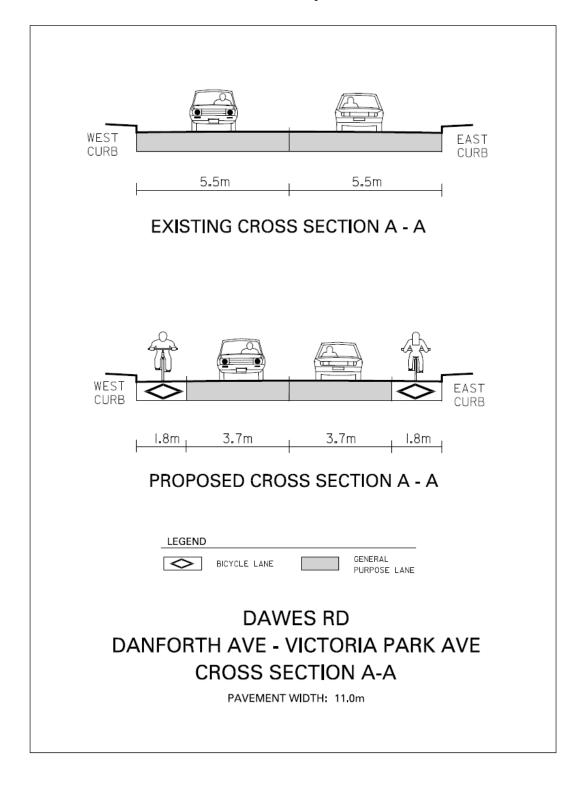
The preliminary analysis suggests that a narrow 2.5 metre wide bi-directional bicycle lane could be accommodated on the east side of St. George Street. Velo Quebec recommends a minimum width of 3.0 metres for bi-directional separated bicycle lanes; 1.5 metres per direction. There are examples of bi-directional bicycle lanes as narrow as 2.5 metres in other North American cities, however, given the high cycling volumes along this corridor, providing a narrow bi-directional bicycle lane would likely result in increased cyclist conflicts. In addition localized resurfacing would be required in some sections through the University of Toronto Campus where the traffic lanes are currently defined by the coloured pavers rather than painted lines. These sections, which were rehabilitated as recently as 2006 would need to be modified. These factors combined with the relatively comfortable cycling environment along St. George Street make it a poor candidate for separated bicycle lanes.

It may be feasible to introduce separated bicycle lanes on Beverley Street, south of College Street; however, uni-directional separated bicycle lanes would be required to seamlessly integrate the separated facility with traditional bicycle lanes on St. George Street north of College Street. Accommodating uni-directional separated bicycle lanes on Beverley Street would require the removal of the left turn lanes at signalized intersection and all of the on-street parking. Beverley Street is a residential street and the residents rely on the on-street parking. Transportation Services recommends that separated bicycle lanes not be considered for Beverley Street.



Appendix 6-1 Dawes Road Bicycle Lanes – Danforth Avenue to Victoria Park Avenu

Appendix 6-2 Dawes Road Bicycle Lanes



Appendix 7 Modifications to the Dupont Street Bike Lanes at Lansdowne Avenue

