

## **Potential Intersection Alteration - Danforth Avenue and Main Street - Supplementary Report**

**Date:** July 19, 2022

**To:** City Council

**From:** Director, Project Design & Management, Transportation Services

**Wards:** Ward 19, Beaches-East York

### **SUMMARY**

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As Toronto Transit Commission (TTC) operates transit service along Danforth Avenue, City Council approval of this report is required.

At its meeting of June 29, 2022, Toronto and East York Community Council forwarded to City Council without recommendations Item TE34.230 "Potential Intersection Alteration - Danforth Avenue and Main Street" regarding the potential intersection alteration at Danforth Avenue and Main Street to include an eastbound right-turn lane on Danforth Avenue.

Following submission of the report to Community Council, additional comments on this matter (referred to as Design A in this report) were received from the TTC, and a subsequent revised design of the intersection (referred to as Design B in this report) was also considered and are included in this report.

Transportation Services staff reviewed the intersection and very strongly do not support the revised design, or subsequent revised design that include an eastbound right-turn lane. Further, TTC staff do not support either revised design.

Every effort was made to achieve the objectives requested and mitigate risks to all road users. Transportation Services does not support the potential alteration of the Danforth Avenue and Main Street intersection outlined in this report as it would be expected to increase the risk of head on collisions and side swipe collisions, and is therefore deemed unsafe.

Based on site observations the addition of an eastbound right-turn lane would have a limited or no effect on mitigating traffic delay at the Danforth Avenue and Main Street and likely not provide any improvement to the overall travel time along the Danforth Avenue corridor.

## RECOMMENDATIONS

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The Director, Project Design and Management, Transportation Services recommends that:

1. City Council not authorize the alteration of the Danforth Avenue and Main Street intersection to include an eastbound right-turn lane on Danforth Avenue as shown on "Eastbound Right Turn Danforth Ave and Main St Design B, dated July 2022" attached to the "Potential Intersection Alteration - Danforth Avenue and Main Street - Supplementary Report" report from the Director, Project Design and Management, Transportation Services.

## FINANCIAL IMPACT

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If City Council amends the recommendations in this report and authorizes the alteration of the Danforth Avenue and Main Street intersection to include an eastbound right-turn lane on Danforth Avenue, the estimated cost associated with the amendment is \$20,000. Funding would be subject to availability and competing priorities within the Transportation Services 2022 Capital Budget.

## DECISION HISTORY

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Toronto and East York Community Council, at its meeting on June 29, 2022, forwarded item TE34.230 to City Council without recommendations.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2022.TE34.230>

Toronto City Council, at its meeting on December 15, 2021, adopted item IE26.10, which approved the ActiveTO Cycling Network Expansion projects installed in 2020 currently in place as permanent bikeways, and in doing so, authorized the necessary by-law amendments, to retain them as permanent installations, including Danforth Avenue (cycle tracks from Broadview Avenue to Dawes Road), along with an extension of Victoria Park Avenue to be installed in 2022.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.IE26.10>

## COMMENTS

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In response to TTC comments and Autoturn analysis on the potential design presented in the report "[Potential Intersection Alteration - Danforth Avenue and Main Street](#)" ("Design A"), Transportation Services have provided further information on Design A summarized below.

### TTC Design Review - Design A

TTC reviewed Design A and had concerns with the potential intersection alterations at Danforth Avenue and Main Street. TTC understands the concerns about localized traffic Potential Intersection Alteration Danforth Avenue and Main Street - Supplementary Report

delay at this intersection, however they do not feel that the potential safety concerns from the significant lane shifts and substandard lane widths are appropriate trade-offs for a potentially improved traffic flow. TTC's main concerns have been summarized below:

- Reduction of lane widths to below standard as well as the lane shifts through the intersections could cause potential safety impacts on bus operations including side swipe collisions and head on collisions;
- The proposed lane shift will create conflicts between westbound right-turning buses (heading to Main Street subway station) and westbound through vehicles given the buses wide path required to make the right-turn and through vehicles need to shift lanes to enter the receiving lane; and
- The westbound through lane (west of Main Street) transition in the design does not accommodate bus operations (which needs to meet a 1:12 transition), as a result buses will encroach into oncoming traffic.

## AutoTurn Analysis - Design A

AutoTurn analysis was conducted on Design A to determine the path of truck and bus southbound right-turns and northbound left-turns onto Danforth Avenue (Figure 1). The AutoTurn analysis showed that WB20 (Tractor-Semitrailer with standard 53 foot trailer) vehicles would likely need to enter the eastbound left-turn lane and a portion of the eastbound through lane in order to navigate a southbound right-turn from Main Street to Danforth Avenue. This could lead to increased risks of head-on collisions and trucks getting stuck in the intersection.

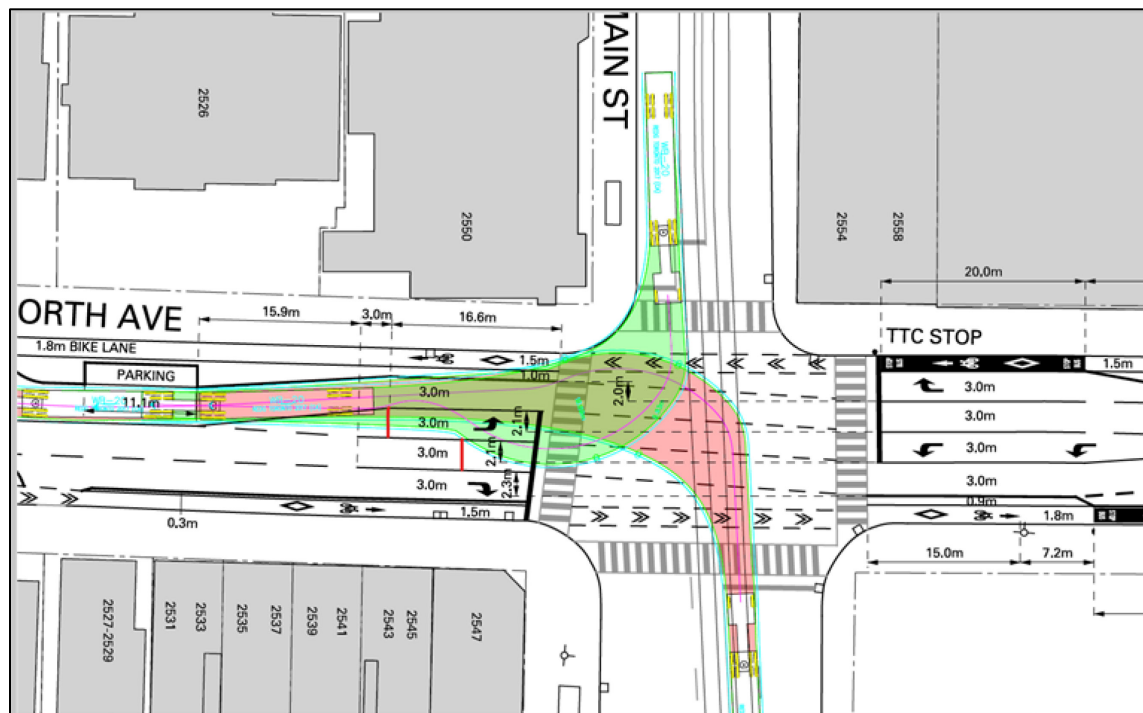


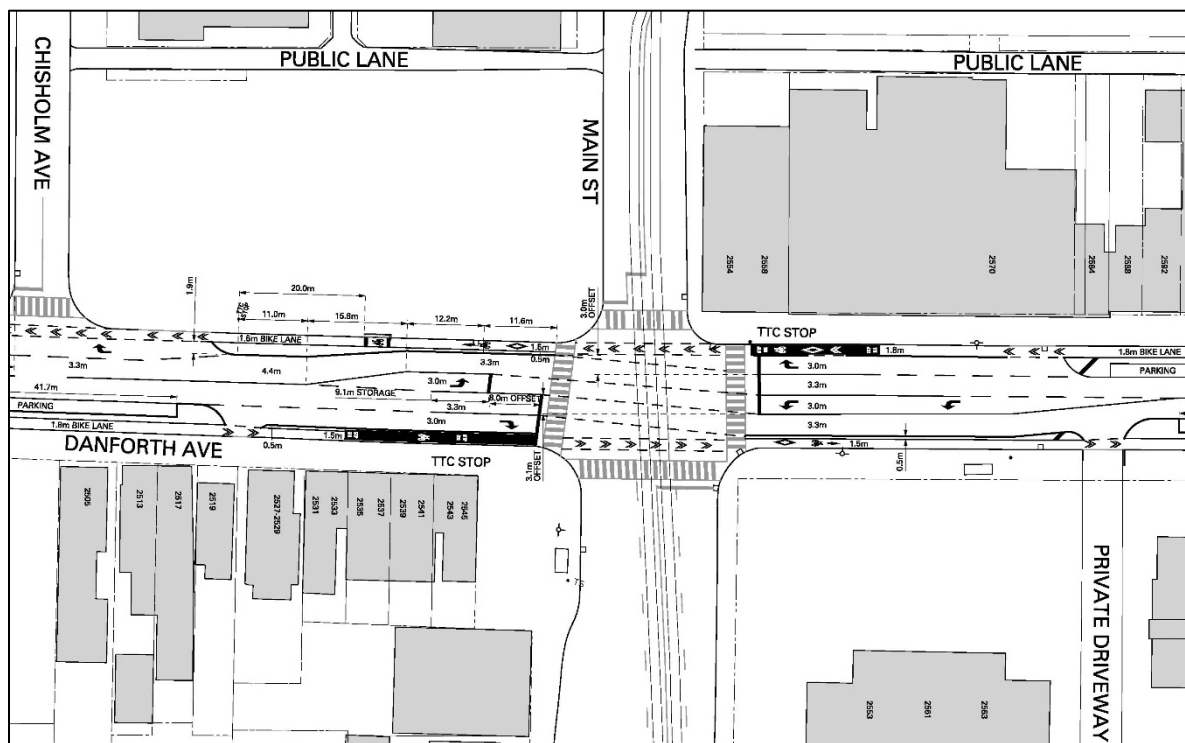
Figure 1: AutoTurn Diagram Indicating Truck/Bus Turn Movements and Requirements

## Revised Design - Design B

City Staff reviewed the request to add a right-turn lane in the eastbound direction on Danforth Avenue at Main Street along with the Autoturn analysis and TTC comments to produce a revised design - Design B. The major design considerations include:

- Minimize safety risks to all road users, to the greatest extent possible;
- Accommodate operation of TTC buses; and
- Maintain accessible boarding/de-boarding area on the north side of Danforth Avenue approximately 40 metres (m) west of Main Street (in front of 2526 Danforth Avenue).

While Transportation Services strongly does not recommend the below lane configuration on Danforth Avenue (Design B) due to significant outstanding safety concerns and geometric issues that are discussed in more detail later in this report; a design was prepared and is included in Attachment 1 and is shown in Figure 2.

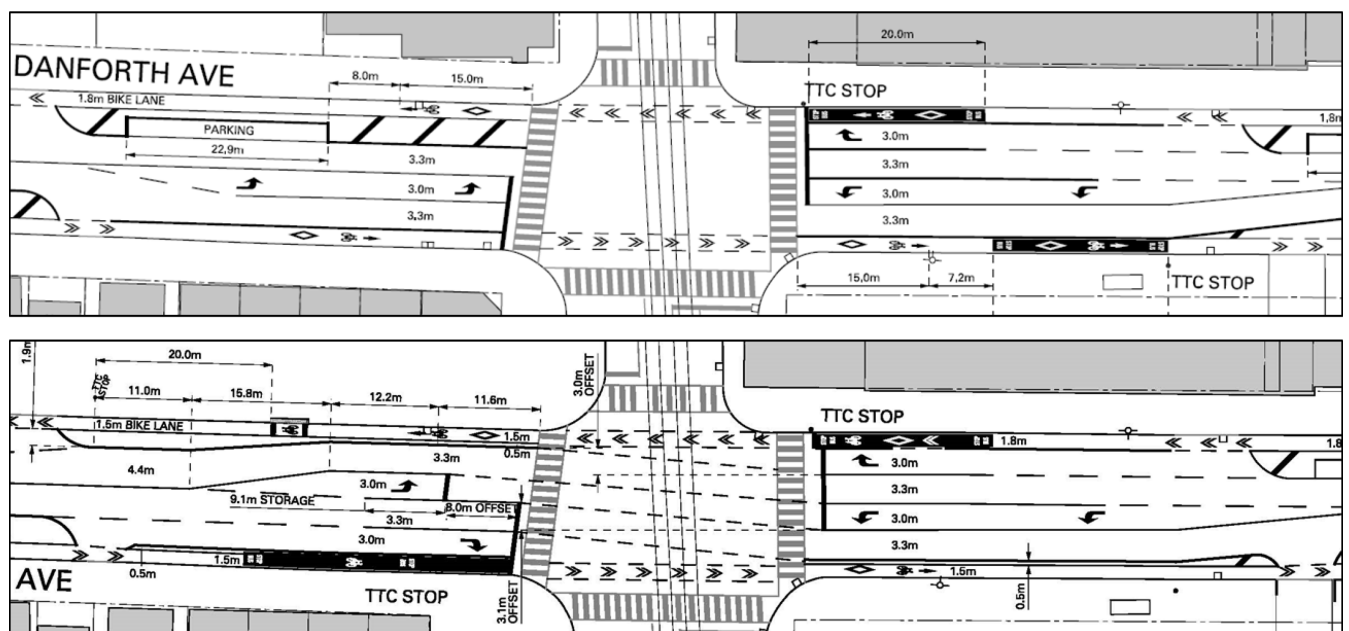


**Figure 2: Design for Addition of Eastbound Right-Turn Lane on Danforth Avenue at Main Street - Design B**

Design B includes a left-turn (3.0 m), right-turn (3.0 m) and through lane (3.3 m) in both the eastbound and westbound directions along Danforth Avenue. The following changes would be needed to accomplish Design B:

- Increase lane shifts/offsets through the intersection to 3.1 m. This is the overlap of opposing lanes. A through vehicle heading eastbound or westbound would need to shift 3.1 m within the intersection in order to not collide with a left-turning vehicle. The maximum allowable lane shift as per City Standards is 1.5 m;
- Move the eastbound left-turn lane stop-bar back (west), to provide more room for large vehicles to make the southbound right-turn movement. This will reduce eastbound left-turn storage. Although this movement is low volume, if multiple vehicles are present in this lane they may block the through lane;

- Remove parking on the north side of Danforth Avenue west of Main Street (approximately 30 m of parking);
- Relocate the existing Wheel Trans ramp east. Wheel Trans vehicles will need to pull directly to the curb (west of the ramp) and board/de-board passenger from the bike lane. When boarding/de-boarding passengers, cyclists will have to merge into the motor vehicle lane to pass; and
- Reduce bike lane widths at the intersection from 1.8 m to 1.5 m.



**Figure 3: Existing Conditions (top) and Draft Design With Eastbound Right-Turn Lane (below)**

## Significant Safety Concerns with Sub-Standard Conditions

### *Lane Shift*

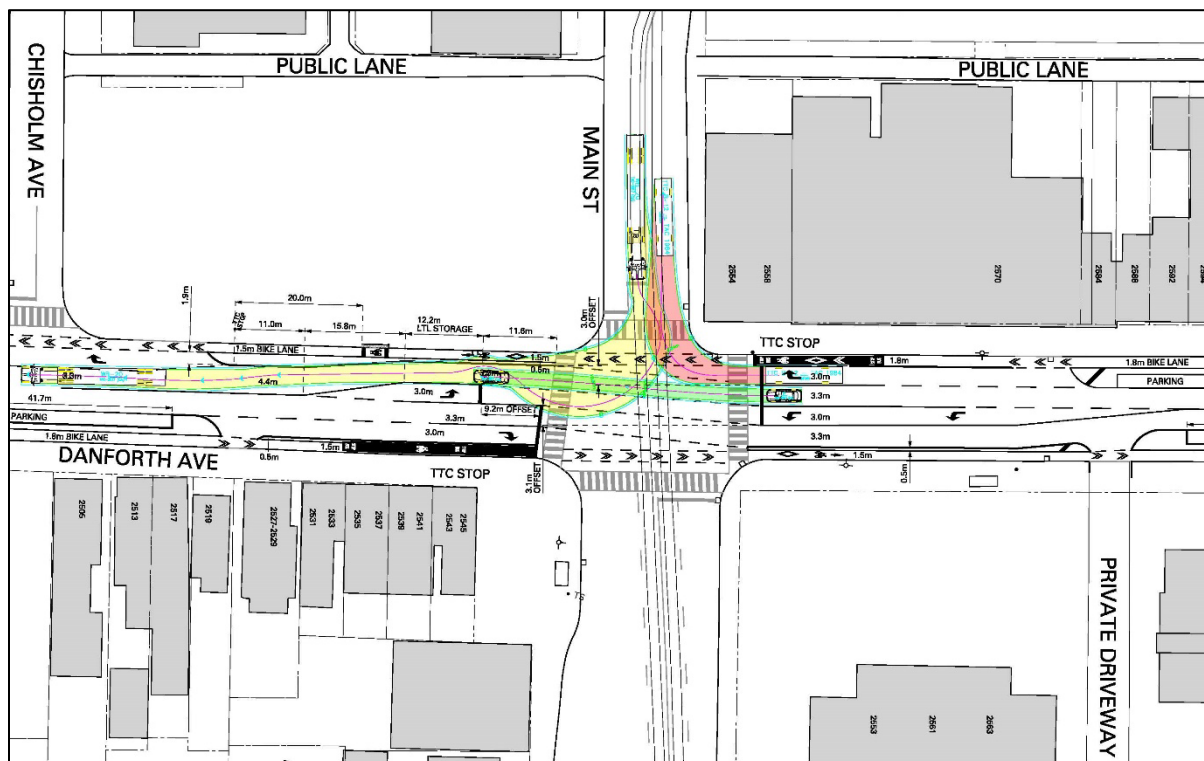
The existing conditions at Danforth Avenue and Main Street have no lane shift. The eastbound lanes do not conflict/overlap with the turn lanes. As per the City of Toronto Road Engineering Design Guidelines, Curb Extensions Guideline the maximum lane shift is 1.5 m (overlap between the eastbound and westbound lanes) for an intersection of this size (length). The potential design, Design B, not recommended by Transportation Services, would involve a lane shift of 3.1 m between the through lanes and the turn lanes in both the eastbound and westbound directions. Increasing the lane shift increases the risk of head-on collisions while traveling through the intersection. The lane shifts also increases the risk of side-swipe collisions between westbound right-turning TTC vehicles (turning into Main Subway Station) and westbound through vehicles as both vehicles need to occupy the same space to make their maneuvers.

### *Cycling Conflict*

The existing conditions at Danforth Avenue and Main Street currently include a separated bike lane. The potential design, Design B, would include a section of the bike lane that will be shared with Wheel Trans vehicles during pick up and drop off of passengers. During these times people cycling would be required to exit the bike lane and merge with westbound traffic to navigate around Wheel Trans vehicles before rejoining the bike lane. Additional lane width, 4.4 m, has been provided in this area to accommodate cyclists merging with westbound traffic, however there would be no barrier between vehicles and cyclists leading to increased safety risks for cyclists. In addition, the area in which cyclists are able to merge back into the bike lane would occur in front of a business driveway further increasing the safety risks for cyclists and decreasing the visibility of motorists sight line of merging cyclists when entering and exiting the driveway.

### *AutoTurn Analysis*

AutoTurn analysis was conducted on Design B to determine truck and bus southbound right-turns (Figure 4). The AutoTurn analysis shows that WB20 vehicles would clear the eastbound left-turn lane with the adjustment of the stop-bar being moved further back (west). This stop-bar movement would decrease the storage of the eastbound left-turn lane.



**Figure 4: AutoTurn Diagram Indicating Truck/Bus Turn Movements and Requirements (red lines on roadway indicate potential new location of stop-bars)**

The significant safety concerns outlined above are risks that cannot be adequately mitigated due to the constrained roadway width of Danforth Avenue at this location.

## **Conclusion**

Based on site observations the addition of an eastbound right-turn lane would have a limited or no effect on mitigating traffic delay at the Danforth Avenue and Main Street and likely not provide any improvement to the overall travel time along the Danforth Avenue corridor.

Further, Transportation Services does not recommend the potential design as it does not meet the minimum requirements of the City Road Engineering Design Guidelines for lane shifts. As a result, the changes are less safe than the existing condition and will lead to increased risk of collisions - a risk that cannot be adequately mitigated.

Transportation Services does not recommend the installation of the right-turn lane, based on both the findings from site observations, as well as significant safety concerns with the sub-standard conditions described in this report that the requested design would involve.

The Ward Councillor has been advised of the recommendation of this staff report.

## **CONTACT**

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## **SIGNATURE**

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Jacquelyn Hayward  
Director, Project Design & Management, Transportation Services

## **ATTACHMENTS**

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Attachment 1: Redesign - Eastbound Right Turn Danforth Ave and Main St Design B