

**Yonge Street / Highway 401 Interchange –  
Transportation Infrastructure Planning Study**

<b>Date:</b>	September 19, 2013
<b>To:</b>	Public Works and Infrastructure Committee
<b>From:</b>	General Manager, Transportation Services
<b>Wards:</b>	Ward 16 (Eglinton-Lawrence) Ward 23 (Willowdale) Ward 25 (Don Valley West)
<b>Reference Number:</b>	P:\2013\ClusterB\TRA\TIM\pw13013tim

**SUMMARY**

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Several transportation studies undertaken by both the City and the Province have identified the need for improvements to the Yonge Street / Highway 401 interchange to address traffic congestion and improve traffic operations at this location, particularly in light of the growth in development along the Yonge Street corridor to the north. Most recently, in 2010, the "Yonge Street Traffic Management Study" identified four major problems or constraints in the area: operational / capacity restraints, missing pedestrian paths / cycle routes, collision trends, and limited transportation network capability to accommodate projected traffic generated from approved, planned, and proposed developments. This study introduced, among other things, the concept of replacing the left turn from southbound Yonge Street to eastbound Highway 401 with a new direct southbound-to-eastbound "flyover" ramp connection to alleviate the significant delays and queues currently experienced during peak periods.

The implementation of such a major high-level ramp connection (estimated to cost in the order of \$25 M) would first require an Environmental Assessment (EA) Study. Before embarking on an EA study, City staff, with the support of the Ministry of Transportation of Ontario (MTO), has first undertaken a Transportation Infrastructure Planning Study to determine the technical feasibility of various alternative ways (including the flyover ramp) of resolving the problem of getting from Yonge Street to eastbound Highway 401.

The purpose of this report is to outline the results of the Transportation Infrastructure Planning Study and to proceed with the Municipal Class Environmental (EA) study of several technically feasible alternatives in order to determine a preferred solution for the Yonge Street / Highway 401 interchange that most effectively addresses the current operational problems. As with the Transportation Infrastructure Planning Study, the City is currently seeking confirmation from the Province of their agreement to contribute to the funding of the EA study. Should it be

demonstrated during the EA Study that the preferred alternative improves MTO operations (i.e. Highway 401 ramps), the City will seek further funding for the implementation of the final recommendation.

## **RECOMMENDATIONS**

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### **The General Manager, Transportation Services recommends that:**

1. City Council direct the General Manager of Transportation Services to secure a commitment from the Province of Ontario for the cost-sharing of a Municipal Class EA Study of the Yonge Street/Highway 401 interchange.

### **Financial Impact**

The EA study will require retention of a consultant team and is expected to cost in the order of \$250,000.00 - \$300,000.00. The final figure will be generated through the competitive Request for Proposals process. Currently, sufficient funds are provided for the study in the Engineering Studies account included in the Transportation Services proposed 2014 Capital Budget and 2014-2023 Capital Plan.

The Transportation Infrastructure Planning Study was co-funded by the MTO and the City at approximately a 50/50 split. MTO contributed \$100,000.00 toward the total study cost of \$199,927.75 + HST. Based on the results of the Transportation Infrastructure Planning Study, which demonstrated a benefit to Provincial highway operations with some of the alternatives to be considered in the EA study, City staff have requested the Province to contribute to the funding for the EA Study. Furthermore, the City is required to fulfill certain MTO requirements (i.e. MTO Class EA, Ministry traffic modelling specifications), thereby increasing the cost of the EA Study. At this time, no commitment to the cost-sharing of the EA study has been provided by the Province.

The estimated costs of the alternatives recommended to be carried forward for consideration in the EA study range from \$0.2 million to \$23 million. It should be noted these figures are preliminary and will be refined during the course of the EA study. Cost will be one factor in the evaluation of alternatives. Once the City retains a consultant, the EA Study is anticipated to take approximately 18 months to complete. Council will be required to review and approve any subsequent capital investments for implementing any of the components of the recommended EA plan. Provincial cost-sharing for the associated capital costs may be sought at that time.

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

## **DECISION HISTORY**

The North York Centre Secondary Plan provides the urban planning objectives for redevelopment in the North York Centre urban growth centre area with a focus on transit-based employment and residential growth. The Yonge Street / Highway 401 interchange is located along the southern boundary of the North York Secondary Plan area.

The segment of Yonge Street immediately north and south of the Highway 401 underpass was the subject of the “North York Centre / 401 Gateway”. The design concept contained in this study included improvements to the boulevard and median at this interchange.

Proposed improvements to the Yonge Street / Highway 401 interchange have also been identified in previous studies undertaken by the City and MTO including:

- North York Service Road EA and Interchange Options (City, 1993 – 1998)
- Highway 401 / Yonge Street Interchange Operational Study (MTO, 2005)
- Yonge Street Traffic Management Study (City, 2010)

Both the Highway 401 / Yonge Street Interchange Operational Study and the City's Yonge Street Traffic Management Study recommended a new direct ramp from southbound Yonge Street to eastbound Highway 401 to improve traffic operations at this location. The Yonge Street Traffic Management Study included a preliminary cost estimate of \$25 M for this ramp, but also identified several constraints on its constructability and effectiveness.

Relevant documents are available at:

[http://www.toronto.ca/planning/official\\_plan/pdf\\_secondary/8\\_north\\_york\\_centre/8\\_north\\_york\\_centre\\_dec2010.pdf](http://www.toronto.ca/planning/official_plan/pdf_secondary/8_north_york_centre/8_north_york_centre_dec2010.pdf)

[http://www.toronto.ca/planning/urbdesign/pdf/gateway\\_north\\_finalreport\\_web.pdf](http://www.toronto.ca/planning/urbdesign/pdf/gateway_north_finalreport_web.pdf)

<http://www.toronto.ca/civic-engagement/2009/yonge-street-traffic-sheppard-hwy401-january.htm>

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2010.NY35.53>

## **ISSUE BACKGROUND**

Yonge Street is a major six-lane north-south arterial road that forms the spine of the North York Centre north of Highway 401. Yonge Street has a full-move interchange with Highway 401, however due to topographic constraints in the southwest quadrant the southbound to eastbound move is accommodated by way of a left turn at Lord Seaton Road with a slip ramp to eastbound Highway 401.

Highway 401 and the interchange ramps and structures are owned and operated by the MTO. The traffic signals within the interchange area are owned by MTO but are operated and maintained by the City of Toronto. Yonge Street is under the jurisdiction of the City of Toronto.

The Yonge Street Traffic Management Study identified four major problems or constraints in the area: operational / capacity restraints, missing pedestrian paths / cycle routes, collision trends, and limited transportation network capability to accommodate projected traffic generated from approved, planned, and proposed developments.

At the Yonge Street / Lord Seaton Road intersection, motorists making the southbound left turn experience significant delays and congestion during the peak periods. Left-turning queues often extend northerly to Avondale Avenue during peak periods, affecting southbound through traffic capacity and placing constraints on the westbound off-ramp from Highway 401. To address these concerns, the concept of replacing the left turn with a new direct "flyover" ramp from southbound Yonge Street to eastbound Highway 401 was proposed in the Yonge Street Traffic Management Study. The study noted that, "The introduction of the flyover on-ramp may require re-grading, potentially affecting properties northwest of the interchange. The flyover itself may result in impacts such as noise and visual obstruction that may require design consideration and mitigation. This will require a more detailed preliminary design in addition to environmental assessment approval. The potential development of a flyover will require an engineering study, in addition to an urban design study and considerable planning. This improvement will also require consultation and funding from the MTO." The cost of the flyover was estimated at \$25 M.

In order to fully assess the potential development of a flyover as well as the potential for other alternatives for the southbound to eastbound move (including less costly solutions), a separate and more comprehensive study of the interchange is required. Accordingly, the Transportation Infrastructure Planning Study expands on the recommendations of the Yonge Street Traffic Management Study.

## **Study Area**

The study area is comprised of Yonge Street from Sheppard Avenue to York Mills Road, Lord Seaton Road from Yonge Street to the eastbound Highway 401 on-ramp, and Highway 401 from Avenue Road to Bayview Avenue. The study area is illustrated in **Appendix 1**.

North of Highway 401, Yonge Street is a mix of residential and office / commercial. South of Highway 401, the Lord Seaton Community is located in the southeast quadrant of the Yonge Street / Highway 401 interchange. The Don Valley Golf Course is located in the southwest quadrant. Access to Yonge Street south of Highway 401 within the study area is restricted to the Lord Seaton Road and William Carson Crescent intersections. North of Highway 401 access to Yonge Street is permitted via individual driveways for several commercial developments.

## **COMMENTS**

A full copy of the Transportation Infrastructure Planning Study is on file with the Clerk and is available in digital form. The main components of the Study are briefly summarized below.

### **Purpose and Objective**

The focus of this study was to identify a set of feasible transportation improvements to improve the southbound Yonge Street to eastbound Highway 401 movement. Options that were not technically feasible or determined to be prohibitively costly would not be carried forward for consideration in the subsequent EA study.

## Summary of Transportation Issues

### Traffic Operations

Along the Yonge Street study corridor, several intersections are operating with capacity constraints. These operational deficiencies will intensify with the traffic growth associated with approved, proposed and designated future developments. The intersections with existing capacity constraints along Yonge Street are Sheppard Avenue, Poyntz Avenue, Johnston Avenue-Glendoria Avenue, Florence Avenue-Avondale Road, Lord Seaton Road and Wilson Avenue-York Mills Road. Westbound traffic from the Lord Seaton community currently experience significant delays at the Lord Seaton Road / Highway 401 eastbound on-ramp. The westbound yield control right turn at the north ramp terminal also experiences capacity constraints under existing conditions during the weekday AM peak.

There is a need to provide additional vehicular capacity within the Yonge Street corridor across Highway 401. Capacity is needed to accommodate north-south through traffic and access to Highway 401 eastbound in order to manage delays, queuing and related access and circulation requirements.

### Pedestrian Infrastructure

The pedestrian infrastructure through the Yonge / 401 interchange is discontinuous and circuitous, which discourages walking and contributes to pedestrian-vehicle conflicts. Pedestrian infrastructure at the interchange is limited to a 1.5 m wide sidewalk on the west side of Yonge Street which has an uncontrolled crossing at the free-flow on-ramp from southbound Yonge Street to westbound Highway 401, and a 2 m wide pedestrian way along the eastbound off-ramp to northbound Yonge Street that has limited presence and visibility. There is no sidewalk on the east side of Yonge Street itself under Highway 401. There is a grade separated pedestrian crossing of Yonge Street south of Highway 401.

Although pedestrian demand through the interchange is expected to remain low, based on the location of current and planned developments predominantly north of Highway 401, any reconfiguration of the interchange would have to take into consideration the need to improve the pedestrian infrastructure and environment.

### Cycling Infrastructure

There are no existing cycling connections within the study area. Although the City of Toronto Bike Plan does not identify future cycling corridors within the study area, City staff are currently considering opportunities for new cycling connections. At the Yonge Street / Highway 401 interchange, some cyclists use Yonge Street to cross the highway corridor while others use the pedestrian facility along the eastbound to northbound off-ramp on the east side of Yonge Street to avoid travelling on the busy arterial road.

Cycling demand is anticipated to increase within the study area with further growth in the North York Centre. The Yonge Street crossing of Highway 401 represents the primary link between the North York Centre and cycling destinations to the south. Therefore, changes to the

interchange would have to accommodate north-south cycling crossing the Highway 401 corridor in order to encourage growth in cycling demand in this area.

## **Problem and Opportunity Statement**

The following problem and opportunity statement for the Transportation Infrastructure Planning Study was developed by the project team, reflecting City needs and Provincial direction:

*“Given the recent and planned development in the North York Centre, there is a need to investigate a solution to the long-term vehicular capacity needs for Yonge Street at the Highway 401 interchange, with particular reference to access to Highway 401 eastbound. Furthermore the solution must include improvements for pedestrian and cyclist movements along Yonge Street between Avondale Avenue and Lord Seaton Road.”*

This statement is intended to form the basis for the subsequent EA study.

## **Alternative Solutions**

A total of ten alternative solutions, plus the baseline "do nothing" alternative, were developed to address the traffic operational problems at this location:

- 1 – Improved Signal Operations
- 2 – Dual Southbound Left
- 3A – Roundabout at Yonge Street / Lord Seaton Road
- 3B – Roundabout at EB On Ramp / Lord Seaton Road
- 3C – Roundabout at Yonge Street / WB Off Ramp
- 4A – Diverging Diamond Concept A
- 4B – Diverging Diamond Concept B
- 5A – Southbound to Eastbound Loop Ramp Concept A
- 5B – Southbound to Eastbound Loop Ramp Concept B
- 6 – Southbound to Eastbound "Flyover"

The alternatives, which are illustrated in **Appendix 2**, were evaluated to determine their effectiveness in addressing the problem. While the Transportation Infrastructure Planning Study serves to screen out some of the options, others may emerge over the course of the subsequent EA study, and the final recommendation may be some combination or variation thereof.

All of the alternatives, except #1, involve some level of geometric changes to the existing road network. All alternatives are restricted to the interchange and are therefore not expected to increase capacities of intersections north of Highway 401 and south of Lord Seaton Road.

## Evaluation of Alternatives

The alternatives were assessed using forecasted future traffic volumes in 2031, which consists of existing trips, site trips from planned developments (short term growth) within the study area, background traffic (medium to long term) along Yonge Street, and regional traffic growth in Highway 401 volumes.

The complete multi-factor evaluation matrix can be found in the Transportation Infrastructure Planning Study document. A high level capital cost estimate was developed for each alternative and is shown in **Appendix 3**. Estimated costs include new structures, road resurfacing and grading, demolition and removal, work related to utilities, and other miscellaneous costs. The cost estimates provided should be considered as order of magnitude estimates to allow comparison among alternatives. Greater accuracy will be obtained during the subsequent EA study.

## Conclusions of Transportation Infrastructure Planning Study

Based on the evaluation of the alternative solutions, including an assessment of the extent to which pedestrians and cyclists are accommodated, the following alternatives are recommended for further analysis in the subsequent EA study:

- 2 – Dual Southbound Left at Yonge Street / Lord Seaton Road intersection
- 3B – Roundabout at the Lord Seaton Road / Highway 401 EB on-ramp intersection
- 3C – Roundabout at the Yonge Street / WB off-ramp intersection;
- 4A – Diverging Diamond Concept A
- 4B – Diverging Diamond Concept B
- 6 – Southbound to Eastbound Flyover Ramp

Alternative #1 (signal improvements) was not seen as a viable standalone solution, since the signals on Yonge Street are already under the City's adaptive traffic control system, SCOOT, and the opportunity to optimize signal timings is limited.

The roundabout at Yonge Street / Lord Seaton Road (Alternative #3A) and the loop ramp alternatives (Alternatives #5A and #5B) were not carried forward due to the impact on the existing environment and the very high cost estimated for construction of these alternatives. Their incremental benefits, if any, do not warrant the dramatically higher costs compared to other feasible alternatives. Alternative #3A would also require major physical modifications to the existing MTO structures and would not adequately accommodate pedestrians and cyclists.

## Consultation Process During the EA

The EA study will follow the process of the Municipal Class EA and be designed to comply with the requirements of the MTO Class EA ('Group B' project) as well. Although the EA process specifies certain mandatory points of contact, additional effort will respond to the complexity of the alternatives being considered and the level of interest shown. The involvement of community residents, Yonge Street / Highway 401 users, stakeholders and those who may be potentially affected will be an integral part of the EA process.

A Technical Advisory Committee will be established to provide input at key milestones during the EA process. MTO staff will participate on the Technical Advisory Committee. A web-based portal will be established in the EA study and will enable online consultation throughout the EA. The web portal will include relevant study materials and public notices as they are developed. A “one-window” point of contact for the project established during the EA study, with dedicated phone/fax/ email communications links.

## **Proposed EA Scope of Work**

The EA study will be a comprehensive process of developing and assessing the alternatives carried forward from the Transportation Infrastructure Planning Study, determining the impact of the recommended plan on all aspects of the environment (social, economic, natural, etc.), defining commitments to impact mitigation and subsequent process, and engaging the full range of interested parties. The end result of the EA is a report which documents the study process and outlines the recommended plan to a level of detail adequate to determine its impacts, mitigation, and costs.

When the Yonge Street / Highway 401 Interchange Environmental Study Report (ESR) is completed, staff will issue a Notice of Study Completion and file the ESR in the public record for 30 days in accordance with the requirements of the Municipal Class Environmental Assessment. The report will also contain the requirements of a Transportation Environmental Study Report (TESR), as mandated by the MTO Class EA, and will be presented to MTO Central Region executive for endorsement prior to filing. Once the City retains a consultant, the EA Study is anticipated to take approximately 18 months to complete.

## **Schedule and Next Steps**

Based on the level of effort applied in studies of similar scope, duration, complexity, and EA process and on an overview-level assessment of the Yonge Street / Highway 401 interchange scope of work, staff estimate that once a consultant is retained, the EA study will take approximately 18 months and entail costs (primarily consulting expertise) in the order of \$250,000.00 - \$300,000.00. The study cost estimate will be refined prior to issuing an RFP, and will be finalized upon receipt of proposals.

The City is currently seeking confirmation that the Province is willing to contribute to the funding for the EA and that MTO staff will continue to be available to participate in the study process. Discussions are being held with MTO and MOE regarding the City's obligations in fulfilling the requirements of the MTO Class EA.



Implementation of any of the EA study recommendations will be the subject of separate future processes of budgeting, design, and construction, and are subject to Council approval and guidance at each step.

## **CONTACT**

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## **SIGNATURE**

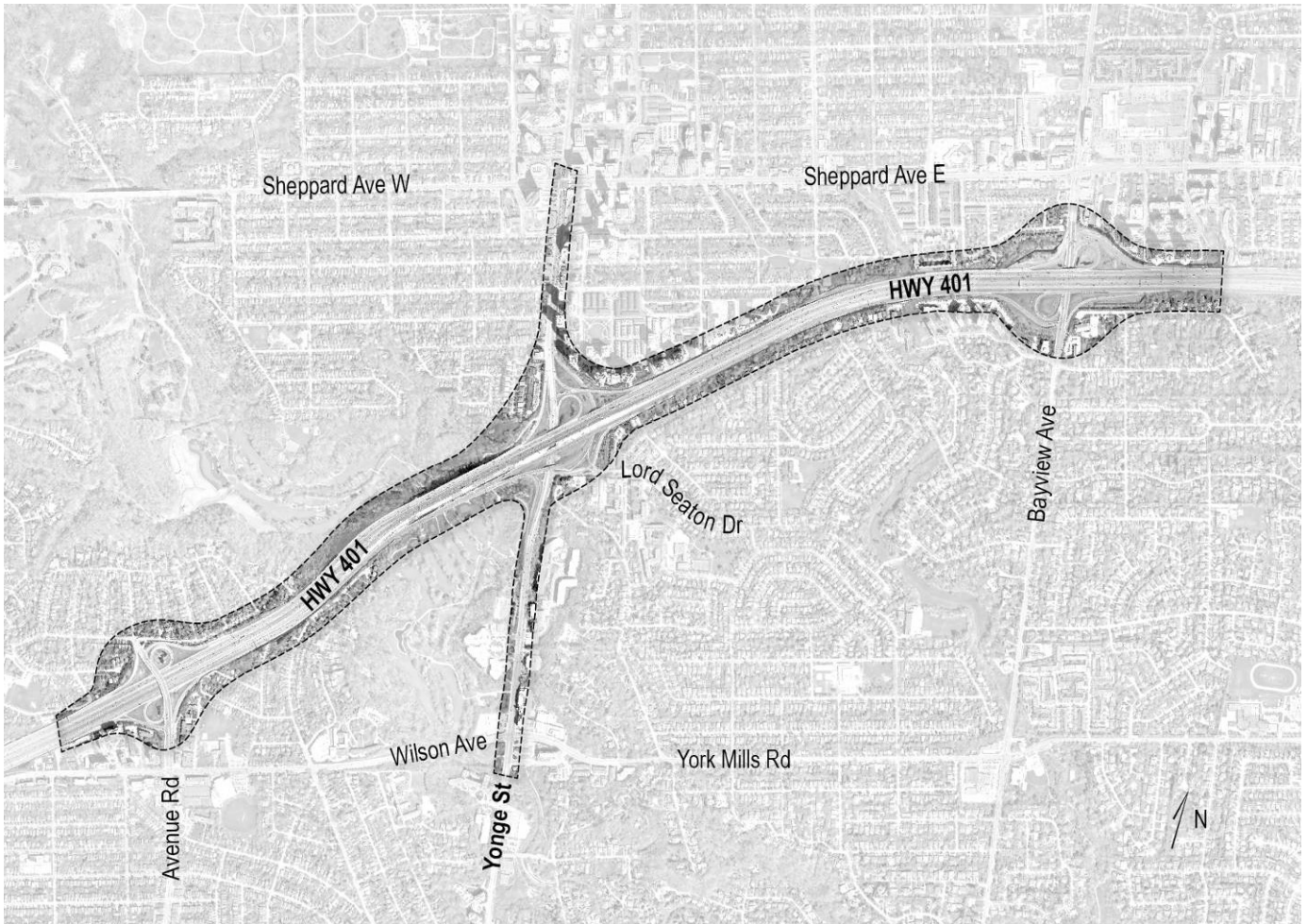
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Stephen Buckley  
General Manager, Transportation Services

## **ATTACHMENTS**

Appendix 1: Study Area  
Appendix 2: Alternative Solutions  
Appendix 3: Cost Estimate of Alternative Solutions

## Appendix 1: Study Area



## Appendix 2: Alternative Solutions

A total of ten alternative solutions were developed to address the traffic operational problems in the Yonge Street / Highway 401 interchange area. The following figures show conceptually the alternative configurations (with the exception of Alternative #1 – Improved Signal Operations which does not require any road reconfiguration or modifications).

**Figure 2.1 - Alternative #2: Dual Southbound Left**



Figure 2.2 - Alternative #3A: Roundabout at Yonge Street / Lord Seaton Road

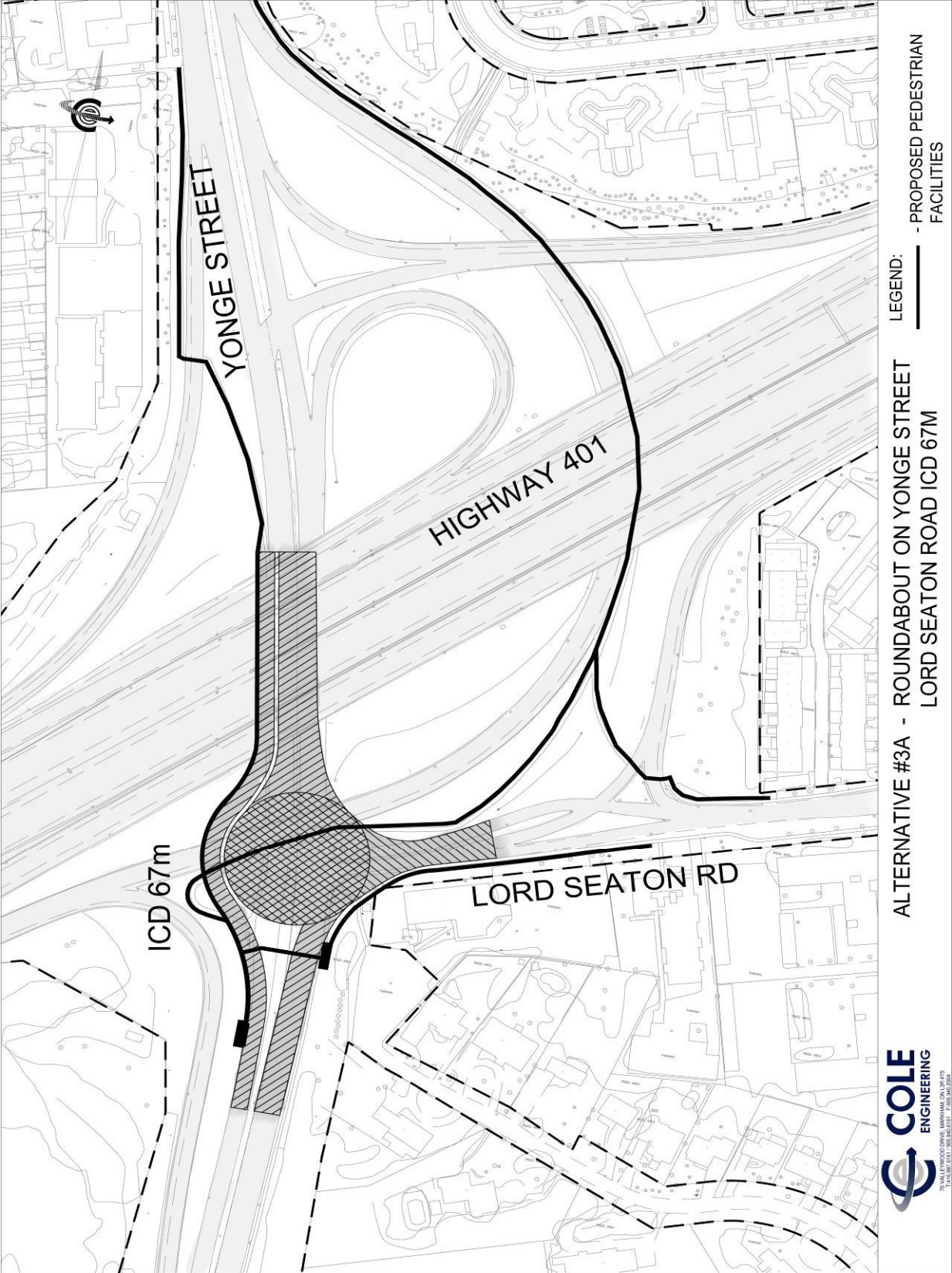


Figure 2.3 - Alternative #3B: Roundabout at EB On Ramp / Lord Seaton Road

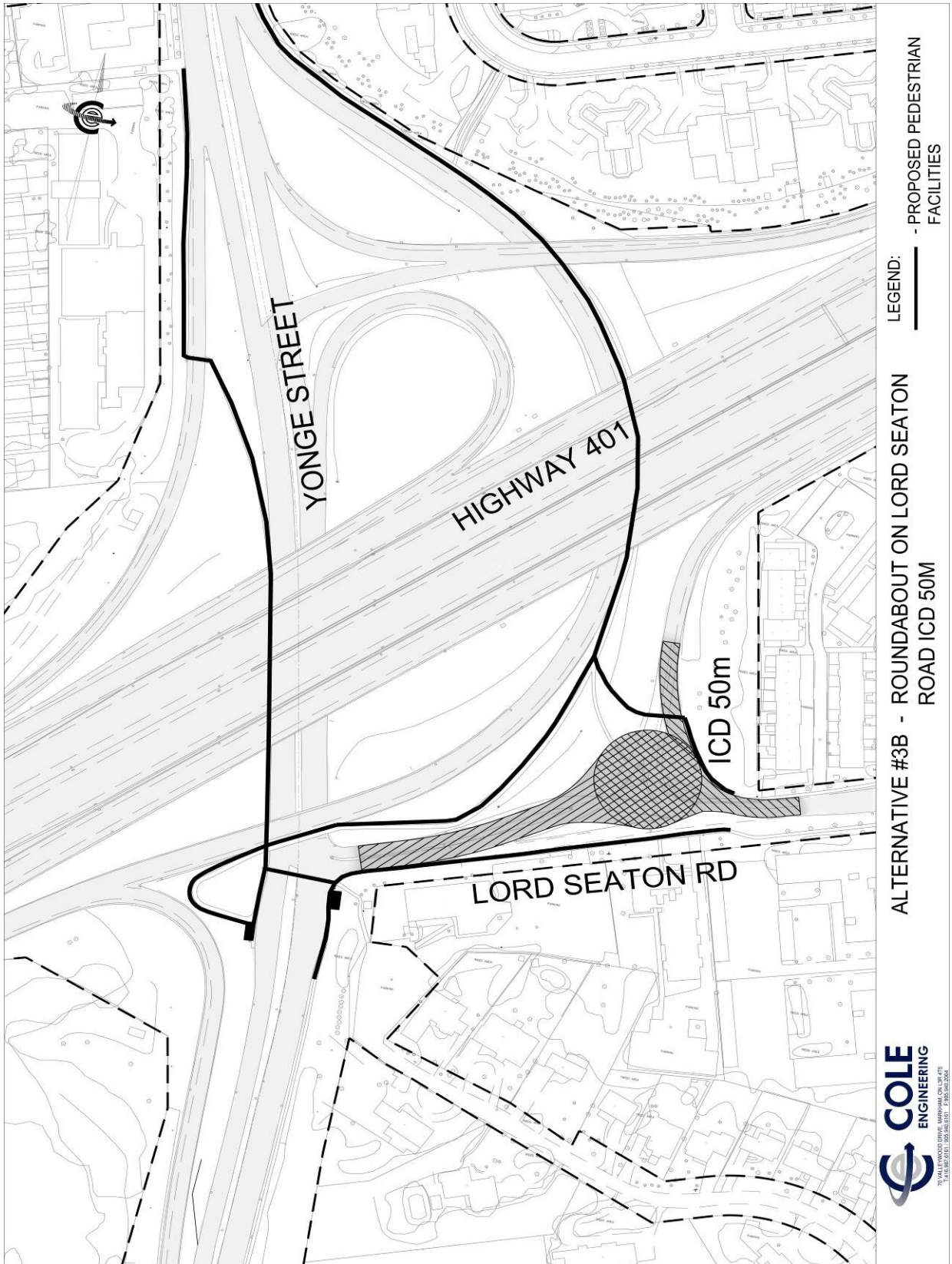


Figure 2.4 - Alternative #3C: Roundabout at Yonge Street / WB Off Ramp



Figure 2.5 - Alternative #4A: Diverging Diamond Concept A

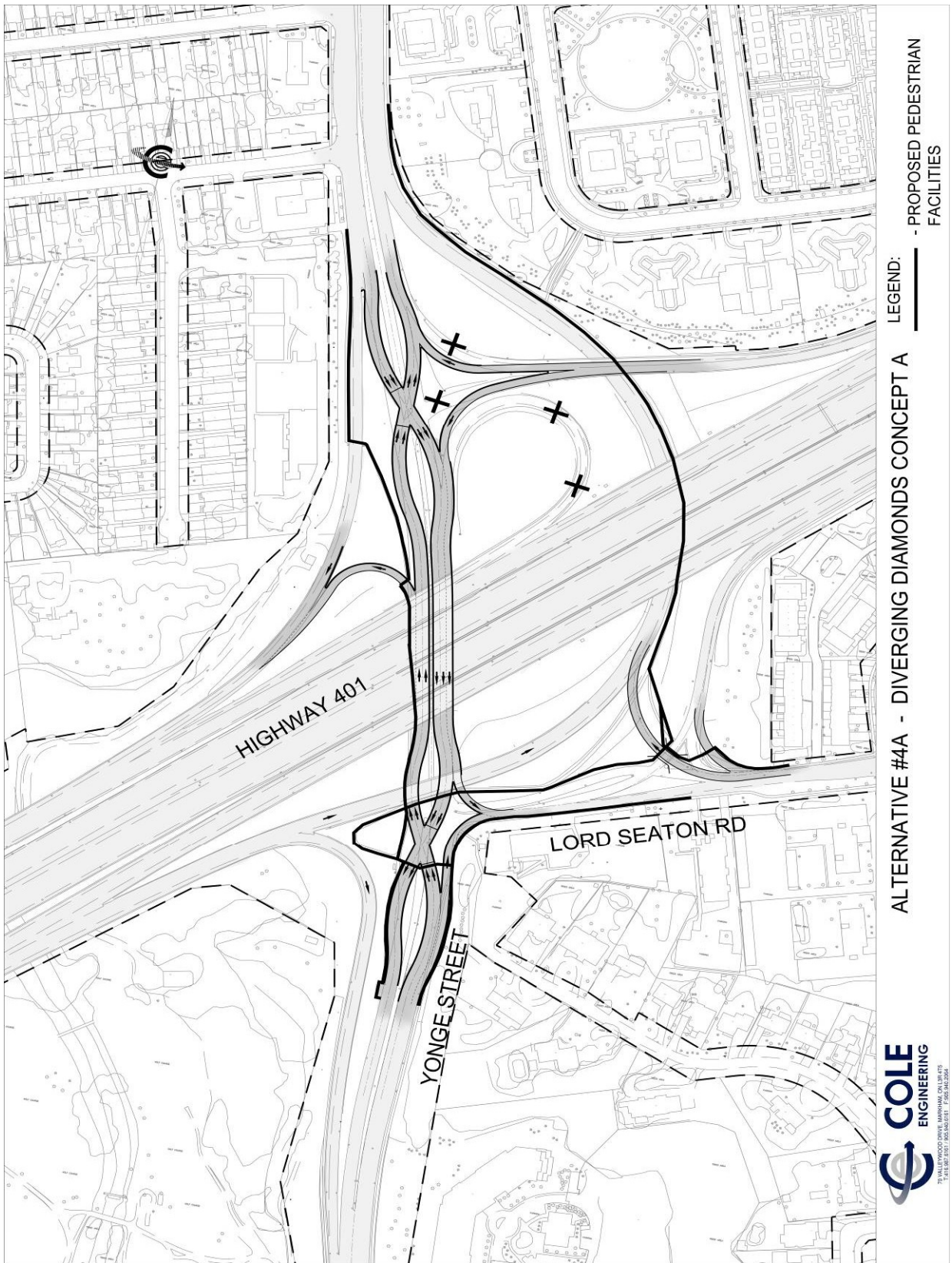
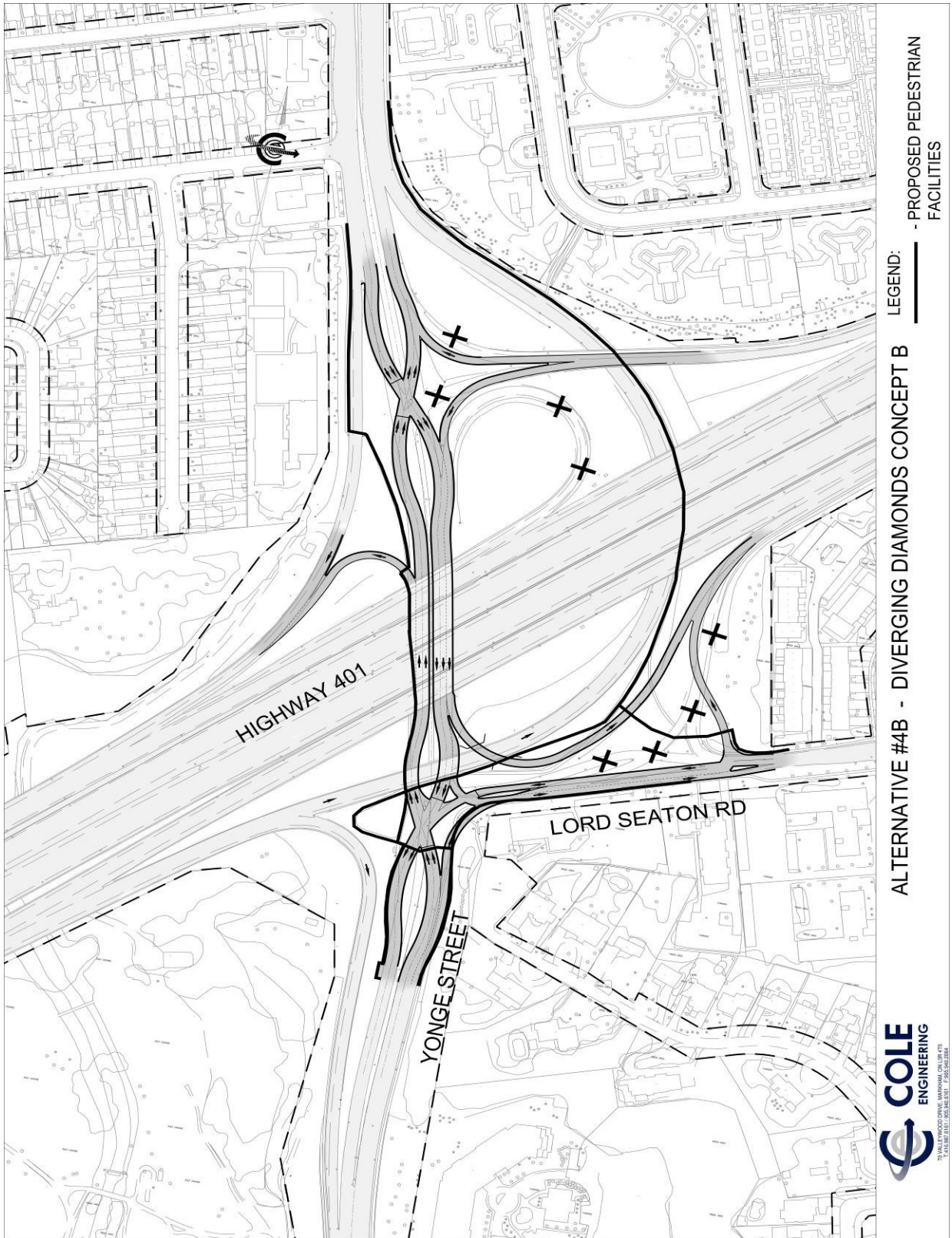


Figure 2.6 - Alternative #4B: Diverging Diamond Concept B





**Figure 2.7 - Alternative #5A: N-E Loop Ramp Concept A**

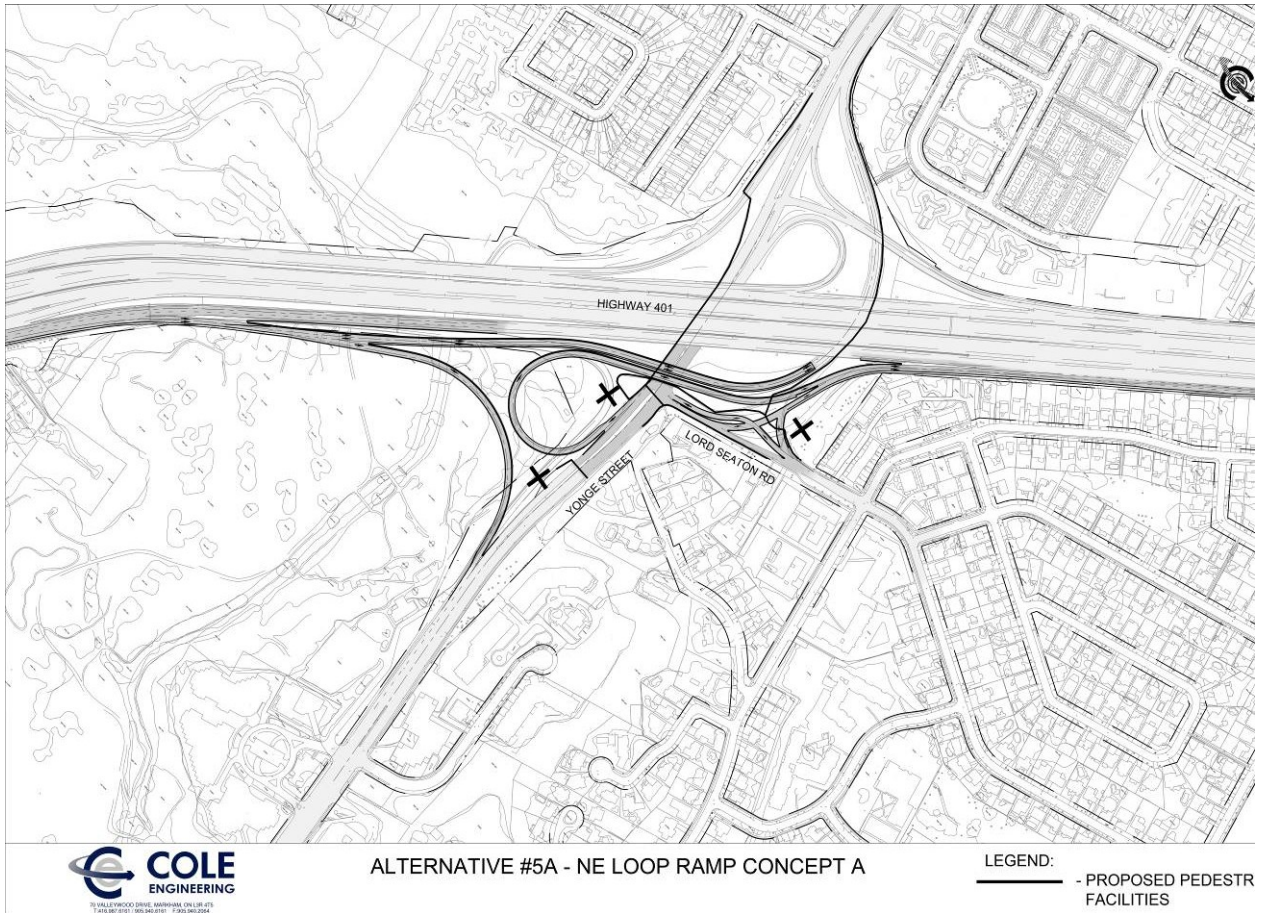
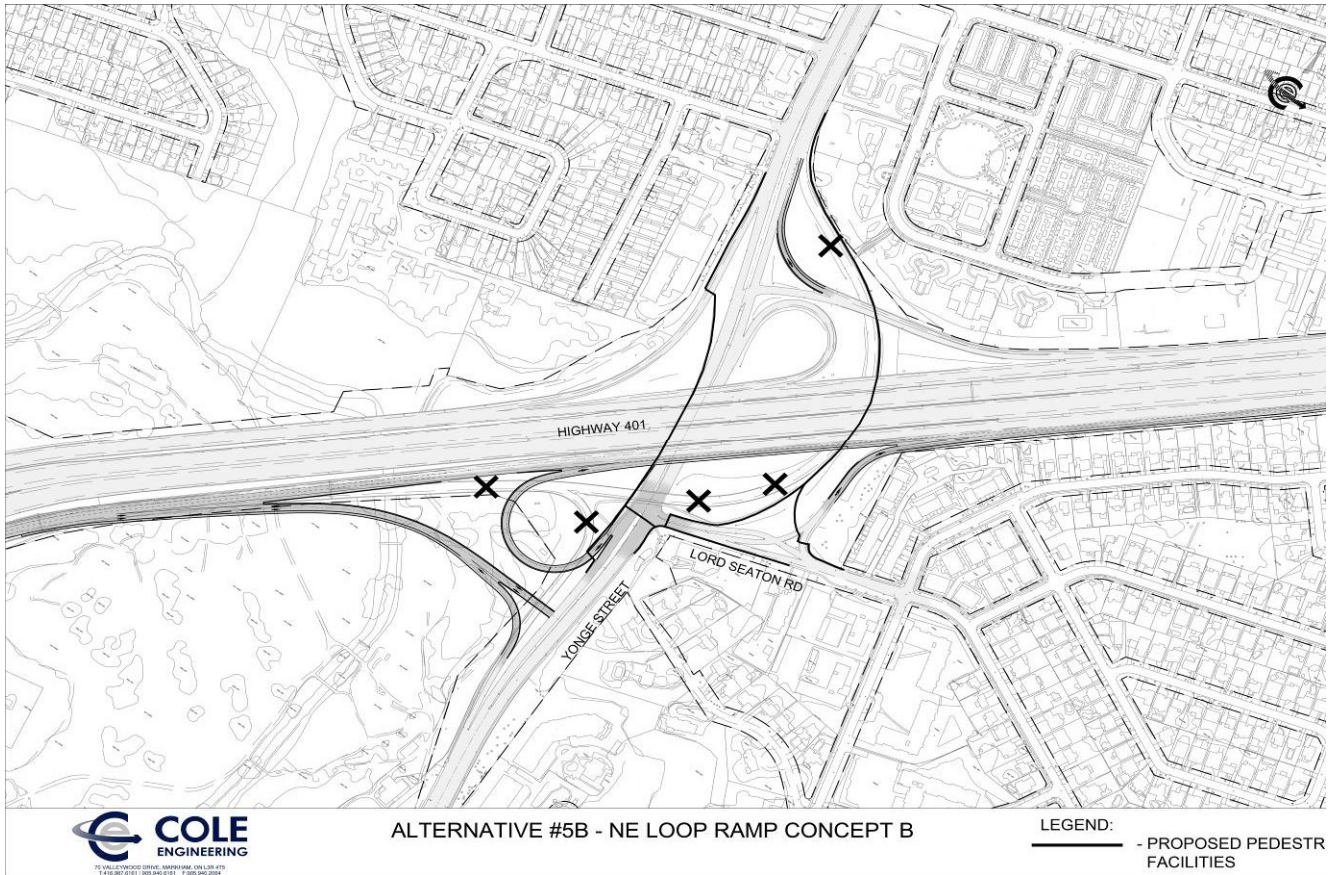
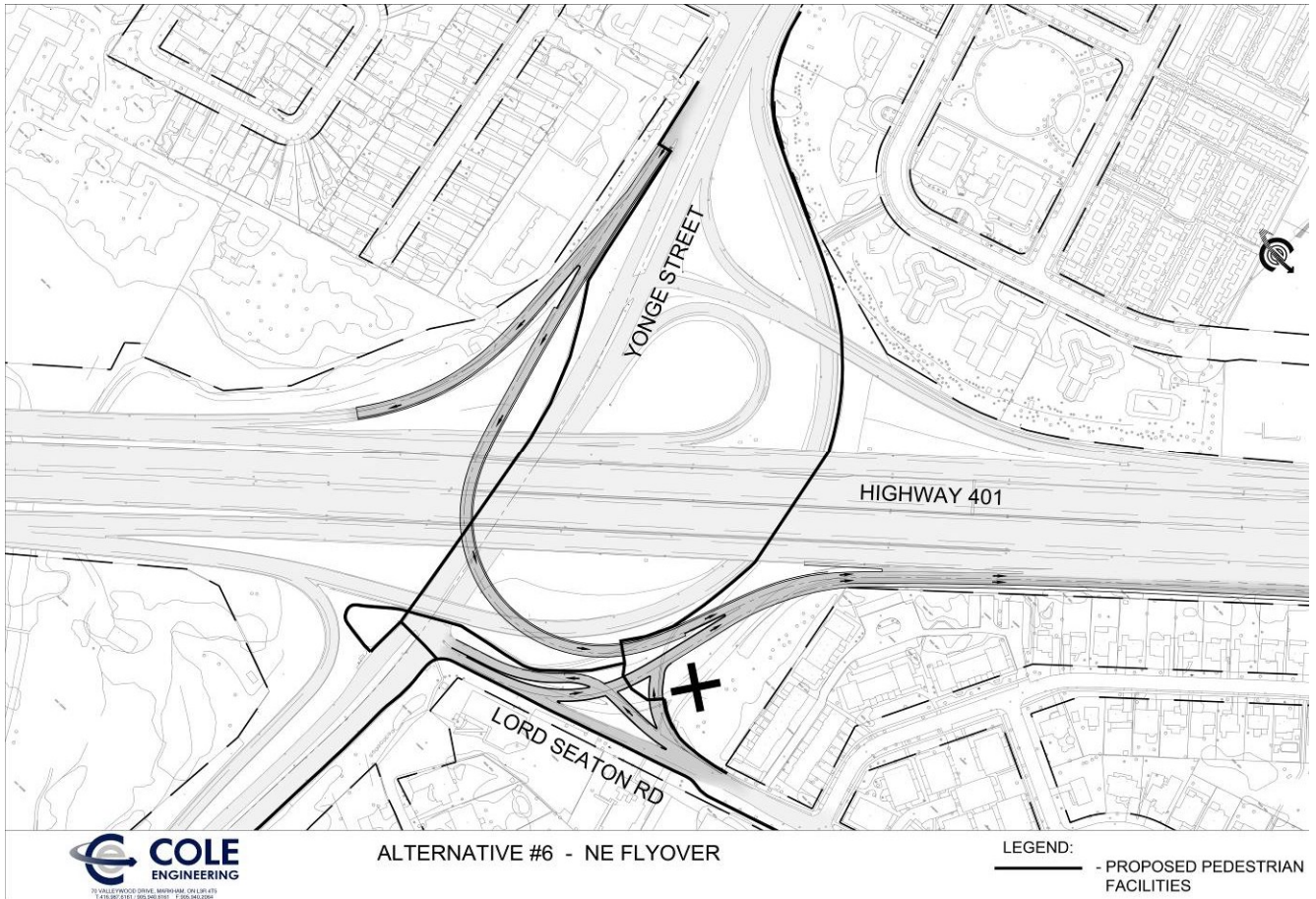


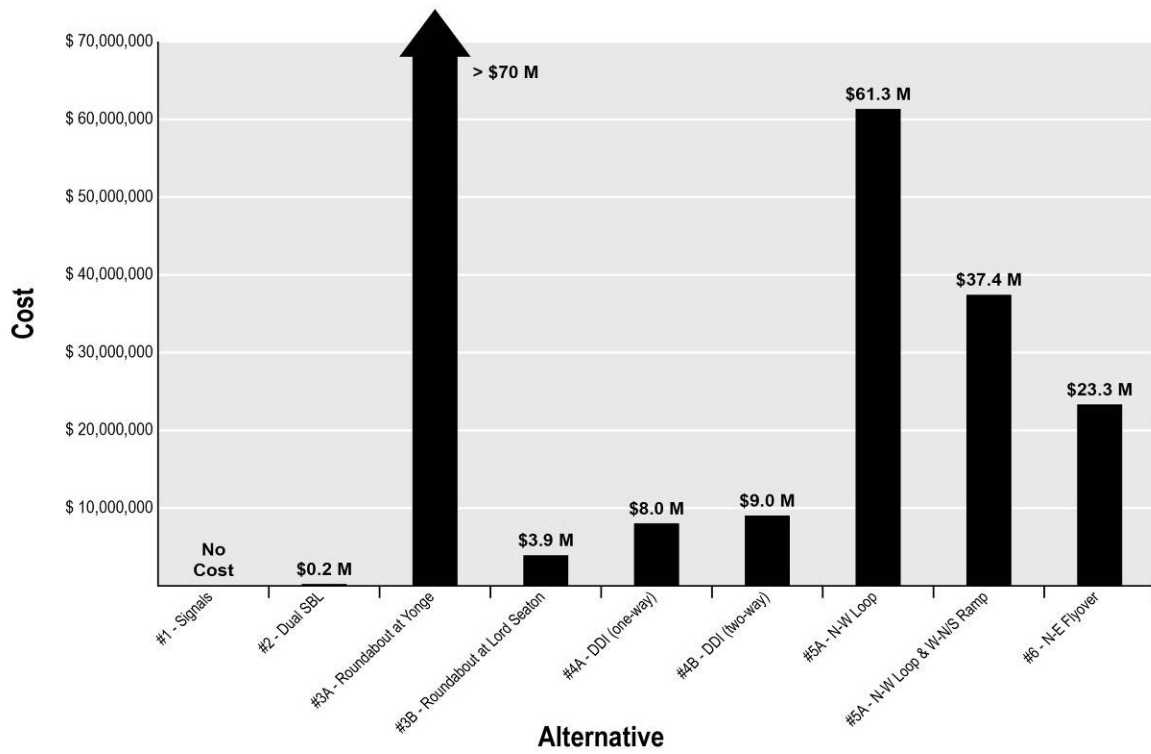
Figure 2.8 - Alternative #5B: N-E Loop Ramp Concept B



**Figure 2.9 - Alternative #6: N-E Flyover**



### Appendix 3: Cost Estimate of Alternative Solutions



Note – Alt. 3C not included; likely in the \$10M - \$20M range.