



HIGHBURY AVENUE NORTH/HAMILTON ROAD INTERSECTION IMPROVEMENTS MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Environmental Study Report (Final)

Main Text

Project No. 14-1203

June 2018





Highbury Avenue/Hamilton Road Intersection Improvements Environmental Assessment Study



Notice of Completion

The City of London has completed a Municipal Class Environmental Assessment (EA) study for improvements to the Highbury Avenue/Hamilton Road intersection. The study was completed in accordance with the planning and design process for a Schedule C project, as outlined in the Municipal Class EA (October 2000, as amended in 2007, 2011 and 2015).

The preferred intersection design includes the following key recommendations:

- Additional northbound and southbound through lanes along Highbury Avenue North;
- Eastbound channelized right turn lane;
- Westbound dual left turn lanes;
- Northbound channelized right turn lane;
- Eastbound and westbound bike lanes on Hamilton Road;
- Access management; and,
- Landscaping and urban design elements.

The Class EA process included public and agency consultation, a comparative evaluation of design options, assessment of potential impacts, and identification of mitigation measures. As part of the consultation program, two Public Information Centers were held (May 14, 2015 & March 9, 2016) to provide information on the project and to receive comments. Major businesses affected by the access management changes and property owners potentially affected by the full acquisition of their properties were also contacted to discuss the recommended plan.

An Environmental Study Report (ESR) has been prepared to document the decision-making process leading to the selection of the preferred design. This notice places the ESR on the public record for a **thirty (30) calendar day** public review period starting on **July 13, 2018** to be reviewed by members of the public and/or any other interested party at the following locations until **August 12, 2018**:

City Hall	London Public Library	Project Website
Clerk's Office, 3rd Floor or Transportation Div., 8th Floor 300 Dufferin Avenue, London Mon – Fri 8:30 a.m. to 4:30 p.m. Sat/Sun: Closed	Crouch Branch Library 550 Hamilton Road, London Tues – Thurs 9 a.m. to 9 p.m. Fri – 9a.m. to 6 p.m. Sat – 9 a.m. to 5 p.m. Sun/Mon: Closed	http://www.london.ca/residents/ Environment/EAs/Pages/Highb ury-Avenue-and-Hamilton- Road-Intersection.aspx

If you have any comments, questions or concerns regarding the information provided in the ESR, please contact one of the following team members no later than **August 12, 2018**:

Brian Huston, P.Eng.
Project Manager
Dillon Consulting Limited
Tel: 519-438-1288 ext. 1227
Fax: 519-672-8209
E-mail: hamiltonhighbury@dillon.ca

Maged Elmadhoon, M.Eng., P.Eng.
Project Manager
City of London
Tel : 519-661-2489 ext. 4934
Fax : 519-661-4734
E-mail: melmadho@london.ca

Interested persons are encouraged to review the document and provide comments to the City of London by **August 12, 2018**. If, after consulting with the City of London staff, you have outstanding environmental issues that have not been addressed through the Municipal Class EA process, you can request the Minister of the Environment, Conservation and Parks (MECP) to issue a Part II Order (i.e. “bump up”) for this project, changing the status of the project to a full Individual Environmental Assessment. Any Part II Order request must be submitted to MECP by **August 12, 2018**, using a standard form developed by MECP. The standard Part II Order request form is available on the Ontario government Forms Repository website (<http://www.forms.ssb.gov.on.ca/>) and you can find it by searching “Part II Order” on the Repository’s main page. A copy of the completed form and any supporting information must also be sent to the Director of Environmental Assessment and Permissions Branch and City Clerk. If no Part II Order requests are received by **August 12, 2018**, the project will be considered to have met the requirements of the Municipal Class EA and may proceed.

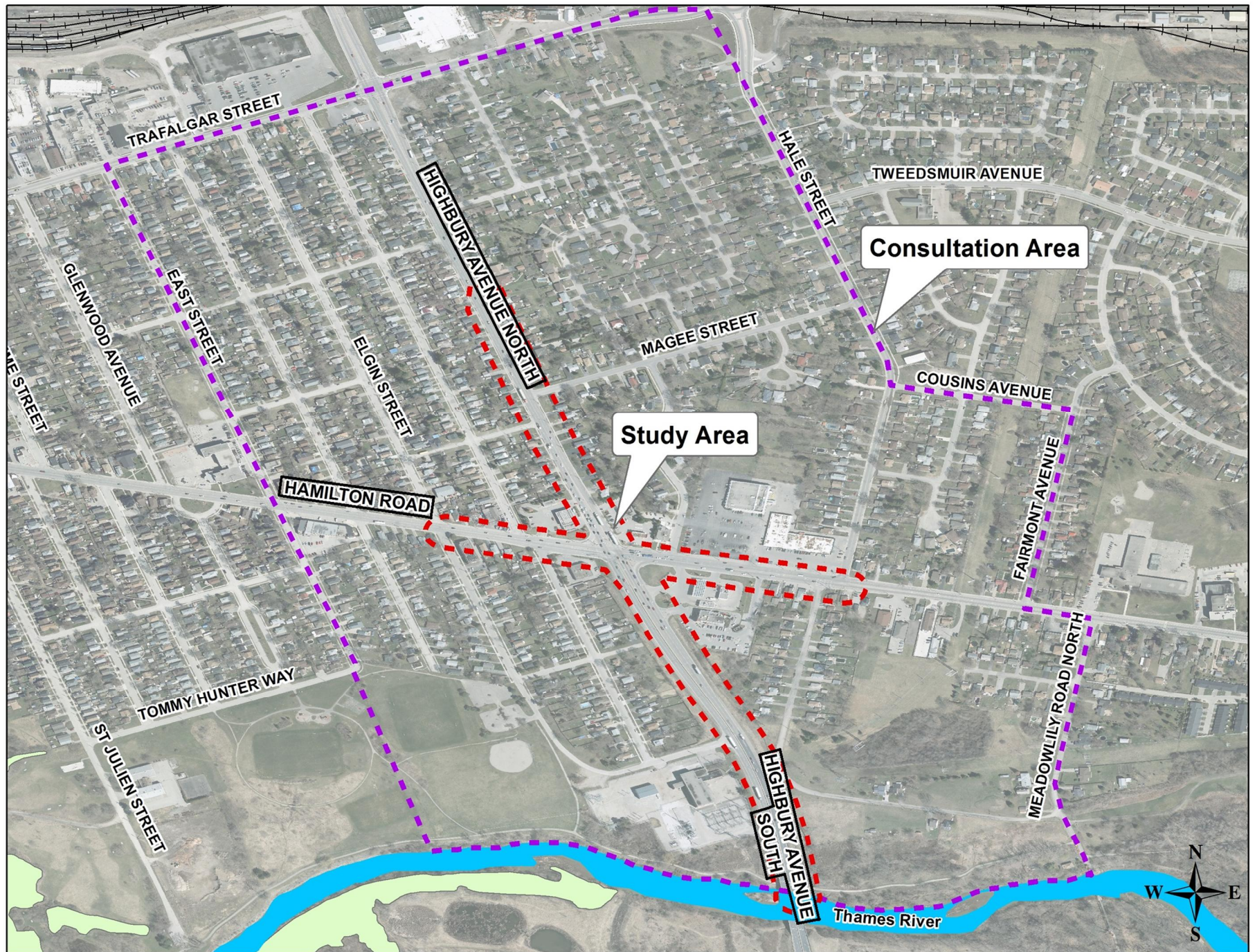
**Minister
Ministry of the Environment,
Conservation and Parks
77 Wellesley Street West
11th Floor
Toronto, ON M7A 2T5**

**Director, Environmental
Assessment and Permissions
Branch
Ministry of the Environment,
Conservation and Parks
135 St. Clair Avenue West
1st Floor
Toronto, ON M4V 1P5**

**City of London
Office of the City Clerk
3rd Floor
300 Dufferin Avenue
London, ON N6A 4L9**

If no request for a Part II Order is received, the project will proceed to design and construction as outlined in the planning documentation.

This notice issued on July 13, 2018.





London
CANADA

P.O. Box 5035
300 Dufferin Avenue
London, ON
N6A 4L9

June 13, 2018

K. Scherr
Managing Director, Environmental & Engineering Services and City Engineer

I hereby certify that the Municipal Council, at its meeting held on June 12, 2018 resolved:

That, on the recommendation of the Managing Director, Environmental & Engineering Services and City Engineer, the following actions be taken with respect to the Hamilton Road and Highbury Avenue Intersection Improvements Environmental Assessment:

- a) the Hamilton Road and Highbury Avenue Intersection Improvements Municipal Class Environmental Study Report BE ACCEPTED;
- b) a Notice of Completion for the project BE FILED with the Municipal Clerk;
- c) the Hamilton Road and Highbury Avenue Intersection Improvements Environmental Study Report BE PLACED on public record for a 30-day review period; and,
- d) the implementation timing of the improvements for the Hamilton Road and Highbury Avenue intersection BE REFERRED to the 2019 Development Charges Bylaw development. (2018-E05) (2.3/9/CWC)

C. Saunders
City Clerk
/kmm

cc: C. Saunders, City Clerk
E. Soldo, Director - Roads and Transportation
D. MacRae, Division Manager, Transportation Planning & Design
P. McClennan, Executive Administration Assistant- Managing Director and City Engineer

Table of Contents

	Executive Summary	vii
1.0	Introduction	1
1.1	Purpose of Report	1
1.2	Municipal Class EA Process	2
2.0	Existing and Future Conditions	3
2.1	Introduction	3
2.2	Transportation Planning and Traffic Operations.....	3
2.2.1	Highbury Avenue North/Hamilton Road Intersection	3
2.2.2	Traffic Analysis.....	4
2.2.3	Traffic Safety.....	13
2.2.4	Access Management.....	14
2.3	Municipal Services and Utilities	15
2.3.1	Watermains.....	16
2.3.2	Storm Sewers, Sanitary Sewers and SSOs	16
2.3.3	Utility Companies	17
2.4	Geotechnical	17
2.5	Transit	17
2.6	Cycling and Pedestrian Infrastructure	18
2.7	Natural Environment	18
2.8	Land Uses and Socio-Economic Environment	19
2.8.1	Existing Land Uses and Official Plan Policies	19
2.8.2	Noise Policies.....	20
2.8.3	Current Development Activity.....	20
2.9	Cultural Resources.....	21
3.0	Phases 1 and 2 Review and Update	22
3.1	Introduction	22
3.2	Phase 1, Problem/Opportunity Statement	22
3.3	Phase 2, Alternative Solutions, Review and Update	23
3.3.1	2030 Transportation Master Plan (TMP)	23
3.3.2	Access Management Changes.....	24
3.3.3	“Do Nothing” Alternative	25
3.3.4	Alternative Design Components.....	27

4.0	Phase 3 Design Options	35
4.1	Introduction	35
4.2	Design Options	35
4.3	Traffic Analysis	37
4.4	Comparative Evaluation of Design Options	45
4.4.1	Similar Impacts	46
4.4.2	Significant Differences in Impacts	47
4.5	Preferred Design	61
5.0	Public and Agency Consultation	62
5.1	Introduction	62
5.2	Contact List	63
5.3	Notice of Study Commencement	63
5.4	Consultation with First Nations	65
5.5	Public Information Centre 1	66
5.5.1	Distribution of PIC 1 Notice	66
5.5.2	Format and Displays	66
5.5.3	Attendance	67
5.5.4	Key Issues and Written Submissions	67
5.5.5	PIC 1 Follow-up	69
5.6	Public Information Centre 2	69
5.6.1	Distribution of PIC 2 Notice	69
5.6.2	Format and Displays	69
5.6.3	Attendance	70
5.6.4	Key Issues and Written Submissions	70
5.6.5	PIC 2 Follow-up	71
5.7	Meetings with Local Businesses	71
5.8	Meetings with Residential Property Owners	72
5.9	Meeting with London Transit Commission	73
5.10	Notice of Completion	73
6.0	Preferred Design	74
6.1	Introduction	74
6.2	Preferred Design	74
6.2.1	Roadway Improvements	74
6.2.2	Landscape and Urban Design	76

6.2.3	Watermains.....	77
6.2.4	Storm Sewers, Sanitary Sewers and CSOs.....	77
6.2.5	Utilities.....	77
6.2.6	Illumination.....	77
6.2.7	Traffic Signals.....	78
6.3	Traffic Management during Construction.....	78
6.4	Traffic Operations.....	78
6.5	Benefits, Impacts and Mitigating Measures.....	81
6.5.1	Benefits.....	81
6.5.2	Impacts and Mitigation.....	82
6.6	Preliminary Construction Cost Estimates.....	88
6.7	Property Requirements.....	88
6.8	Approvals.....	89
6.9	Future Project Phases.....	89

Tables

Table ES1: Lane Configuration of Design Options.....	x
Table ES2: Preliminary Construction Cost Estimate.....	xvii
Table 1: Existing Intersection Operations - 2015.....	9
Table 2: Future “Do Nothing” Intersection Operations - 2025.....	12
Table 3: Alternative Design Components.....	29
Table 4: Lane Configuration for Design Options.....	37
Table 5: 2025 Volume-To-Capacity (V/C) Ratios.....	39
Table 6: 2025 Average Vehicle Delay (S/Veh).....	40
Table 7: 2025 Level of Service.....	41
Table 8: 2025 95th Percentile Queues.....	42
Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4.....	49
Table 10: Summary of Similar Impacts for Design Options 1, 2, 3 and 4.....	57
Table 11: Summary of Significant Differences in Impacts of Design Options 1 to 4.....	59
Table 12: Key Points of Public and Agency Contact.....	62
Table 13: Short-Term Effects on Volume-To-Capacity (V/C) Ratios, Highbury Avenue North at Hamilton Road.....	79
Table 14: Short-Term Effects on Average Vehicle Delay (S/Veh), Highbury Avenue North at Hamilton Road.....	79
Table 15: Short-Term Effects on Level of Service, Highbury Avenue North at Hamilton Road.....	80

Table 16: Short-Term Effects on 95th Percentile Queues, Highbury Avenue North at Hamilton Road.....	80
Table 17: Benefits, Impacts and Mitigation Measures	85
Table 18: Preliminary Construction Cost Estimate	88

Figures

Figure ES1: Preferred Design	follows page xiv
Figure ES2: Preferred Design, Lane Configuration and Traffic Control Measures	xv
Figure ES3: Preferred Design, Highbury Avenue North Cross-Section, North of Hamilton Road	xv
Figure ES4: Preferred Design, Highbury Avenue North Cross-Section, South of Hamilton Road	xv
Figure ES5: Preferred Design, Hamilton Road Cross-Section, East of Highbury Avenue North.....	xvi
Figure ES6: Preferred Design, Hamilton Road Cross-Section, West of Highbury Avenue North	xvi
Figure 1: Study Area.....	1
Figure 2: Preferred Design	follows page 2
Figure 3: Existing Lane Configurations and Traffic Control Measures	7
Figure 4: Existing (2015) Traffic Volumes (Intersections)	8
Figure 5: Existing (2015) Traffic Volumes (Driveways).....	8
Figure 6: Future (2025) Traffic Volumes (Intersections)	11
Figure 7: Future (2025) Traffic Volumes (Driveways)	11
Figure 8: Existing Municipal Services and Utilities Composite Plan.....	follows page 16
Figure 9: Socio-Economic Environment	follows page 18
Figure 10: Recommended Access Management Changes	follows page 26
Figure 11: Examples of Alternative Design Components.....	27
Figure 12: Design Option 1	follows page 36
Figure 13: Design Option 2	follows page 36
Figure 14: Design Option 3	follows page 36
Figure 15: Design Option 4	follows page 36
Figure 16: Preferred Design, Lane Configuration and Traffic Control Measures	75
Figure 17: Preferred Design, Highbury Avenue North Cross-Section, North of Hamilton Road	75
Figure 18: Preferred Design, Highbury Avenue North Cross-Section, South of Hamilton Road	75
Figure 19: Preferred Design, Hamilton Road Cross-Section, East of Highbury Avenue North.....	76
Figure 20: Preferred Design, Hamilton Road Cross-Section, West of Highbury Avenue North	76
Figure 21: Right-Turn Channelization, “Smart Channel” Example Configuration	82
Figure 22: Proposed Property Requirements.....	follows page 84

Appendices

- A Traffic Analysis Memo
- B Tree Inventory
- C Public and Agency Consultation

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Executive Summary

Introduction

The City of London retained Dillon Consulting Limited to complete an Environmental Assessment (EA) Study for improvements to the Highbury Avenue North/Hamilton Road intersection following the requirements of the *Municipal Class EA* (October 2000, as amended in 2007, 2011, and 2015) for a Schedule 'C' project. Building on the recommendations of the City's *2030 Smart Moves Transportation Master Plan (TMP)*, the EA Study assessed the need for additional through and turning lanes at the intersection, improvements to the median on Hamilton Road and pedestrian and cyclist friendly design features.

The study followed Phases 1 to 4 of the Class EA process. Phases 1 and 2 of the process were covered by the City's TMP and reviewed and updated as part of this Class EA.

Phase 1 Review and Update, Problem/Opportunity Identification

The following Problem/Opportunity Statement was developed as part of the review and update of Phase 1 of the Class EA process. The statement is based on an overview of planning, engineering and environmental conditions potentially affected by the proposed intersection improvements.

Improvements to the intersection are required to address:

- Existing Traffic Volumes (2013 data projected to 2015, using 1.5% annual growth rate):
 - Heavy northbound and southbound straight through traffic volumes, northbound and westbound left turn volumes and eastbound right-turn volumes during morning/afternoon rush hours
 - The intersection currently operates at Level of Service (LOS) 'D' in the morning (AM) peak hour and LOS 'F' in the afternoon (PM) peak hour
- Future Traffic Volumes (projected to 2025):
 - Up to 2.5 minutes of delay and 270 metres of vehicle back-ups during weekday morning rush hour
 - More than 9 minutes of delay and up to 390 metres of vehicle back-ups during weekday afternoon rush hour
 - By 2025, with no improvements, the intersection is expected to operate at LOS 'E' in the morning (AM) peak hour and LOS 'F' in the afternoon (PM) peak hour

- Intersection Safety:
 - o According to the City of London's 2014 Network Screening, the intersection ranks in the top 50 most collision-prone intersections in London. Between 2010 and 2014 there were:
 - § One hundred and ten reported collisions with 40% consisting of rear end collisions
 - § Twenty-Four reported collisions along Highbury Avenue North between Hamilton Road and Calvin Street, with 67% consisting of rear end collisions
- Access Management Issues:
 - o Commercial and residential entrances in close proximity to the intersection contribute to the existing queuing and collision issues
- Pedestrian and cyclist needs.

Phase 2 Review and Update, Alternative Solutions

The *2030 Smart Moves Transportation Master Plan* recommended that the Highbury Avenue North/Hamilton Road intersection be improved within 10 years. As part of the Phase 2 review and update, the intersection improvements recommended by the Master Plan were refined. The following work was completed for Phase 2:

- Overview of existing planning, engineering and environmental conditions potentially affected by improvements to the intersection
- The “Do Nothing” alternative (maintaining the intersection “as is” with no improvements) was dismissed from further consideration since it does not address existing and future capacity, queuing and collision issues, access management issues and pedestrian and cyclist needs
- Options were identified and evaluated for improving access management at the intersection. Preferred access management options incorporated into the Design Options included restricting some access points to right-in/right-out access using medians to physically restrict left-turn movements and closing or consolidating entrances close to the intersection
- Alternative design components were evaluated to address issues associated with the major traffic movements at the intersection. Examples of the components developed include increase green time for traffic signals, increase capacity by adding straight-through lanes, provide separate or longer turn lanes and increase the storage length for turns. The most effective components were carried forward and incorporated into the Design Options developed for the intersection improvements.

Phase 3, Design Options

Design Options

Opportunities to expand the existing intersection are limited due to the surrounding commercial and residential development and the cost of property acquisitions. Based on the Phases 1 and 2 review and update, four Design Options were developed and evaluated. In addition to the preferred access management changes, all options included the following improvements:

- Median islands on Hamilton Road
- Additional southbound through lane
- Eastbound and westbound bike lanes on Hamilton Road
- Designated eastbound left turn with median island to No Frills/Fairmont Plaza
- Designated westbound left turn with median island into McDonald's
- Raised median and two-way left turn lane between Magee Street and the end of the southbound median island, north of Hamilton Road
- Bus bays to minimize interference with traffic
- Landscaping and urban design elements.

In addition to these improvements, Design Options 1 to 4 included the following improvements:

- Design Option 1 – Additional northbound and southbound through lanes along Highbury Avenue North
- Design Option 2 – Additional southbound through lane and eastbound channelized right turn lane
- Design Option 3 – Additional northbound and southbound through lanes, eastbound channelized right turn, westbound dual left turn (requires an eastbound slotted left) and northbound channelized right turn lane
- Design Option 4 – Additional northbound and southbound through lanes, westbound dual left turn (requires an eastbound slotted left), northbound dual left turn (requires a southbound slotted left) and northbound channelized right turn lane.

The lane configuration of the four Design Options developed for the intersection improvements, along with the existing layout, are summarized in Table ES1.

Table ES1: Lane Configuration of Design Options

	Existing	Option 1	Option 2	Option 3	Option 4
Hamilton Road Eastbound					
Through lanes	2	2	2	2	2
Left turn lane	Single*	Single	Single	Single	Single
Right turn lane	Yes	Yes	Yes**	Yes**	Yes
Bike lanes	No	Yes	Yes	Yes	Yes
Hamilton Road Westbound					
Through lanes	2	2	2	2	2
Left turn lane	Single*	Single	Single	Dual	Dual
Right turn lane	No	No	No	No	No
Bike lanes	No	Yes	Yes	Yes	Yes
Highbury Avenue North Northbound					
Through lanes	2	3	2	3	3
Left turn lane	Single	Single	Single	Single	Dual
Right turn lane	Yes**	Yes**	Yes**	Yes**	Yes**
Bike lanes	No	No	No	No	No
Highbury Avenue North Southbound					
Through lanes	2	3	3	3	3
Left turn lane	Single	Single	Single	Single	Single
Right turn lane	No**	No**	No**	No**	No**
Bike lanes	No	No	No	No	No

*No curbed median present

**With channelized island.

Comparative Evaluation of Design Options

A comparative evaluation of Design Options 1 to 4 was completed to determine the preferred option. Reflecting existing and future conditions potentially affected by the options, the evaluation factors covered transportation planning and operations, road design, construction, land uses/socio-economic environment and relative costs. For this project, the most important evaluation criteria are future Level of Service, especially future overall intersection delays, residential and commercial property impacts and total cost.

Based on the comparative evaluation, Design Option 3 was selected as the preferred option. In summary, the results of the comparative evaluation showed that:

- Design Options 1 and 2 do not provide a significant improvement to the overall average delays to traffic
- With the exception of the southbound movement and the northbound through movement, Design Option 3 improves vehicle delays for all movements
- Although Design Option 4 results in the highest reduction in vehicle delays, it has more significant property impacts than Design Option 3
- All design options have significant impacts on the residential properties at the intersection
 - o Design Options 1, 2 and 3 remove 8 houses, while Design Option 4 removes 11 houses
 - o All options require minor property acquisitions from almost all of the residential and commercial properties within the project limits
- Design Option 2 has the fewest impacts on the Esso/Tim Horton's site, while Design Option 1 and 3 cause moderate impacts on the site. Design Option 4 has significant impacts on the site and would likely require an internal reconfiguration of the site or acquisition of the property.

Design Option 3 improves overall future intersection traffic operations while minimizing impacts on the surrounding residential and commercial properties, compared to the other options. In total, 8 houses are removed and property is required from 31 residential and 9 commercial properties, for a total of 48 properties impacted.

Public and Agency Consultation

A Notice of Study Commencement for the project was issued in January 2015. The City received a total of 143 completed comment forms, with 45 residents providing comments. Comments, questions and concerns included property and access impacts, timing and duration of construction, pedestrian and cyclist safety, high traffic volumes and the speed of traffic on Highbury Avenue North, cut-through traffic and high traffic speeds on side streets, including Giles, Hale, Elgin and Magee Streets and poor air quality caused by idling vehicles. High collision rates at the intersection were also noted as a concern.

Residents also suggested several improvements, including bus bays, access and parking restrictions on side streets, improved access management to local streets and businesses, advanced green lights and turning lanes at the intersection and redirecting truck traffic to Veterans Memorial Parkway. The improvements should also consider traffic impacts on nearby intersections, such as the Hamilton Road/Hale Street intersection and Trafalgar Street/Highbury Avenue North intersection.

Public Information Centre (PIC) 1 was held on May 14, 2015, at the Fairmont United Church. The purpose of PIC 1 was to obtain public and agency input on existing engineering and environmental conditions, the Problem/Opportunity Statement and alternative design solutions for the intersection improvements. A total of 32 local residents attended the PIC, along with a representative of the Upper Thames River Conservation Authority.

In general, most of the PIC 1 attendees agreed that intersection improvements are required to relieve traffic congestion, improve traffic, pedestrian and cyclist safety and reduce traffic cutting through local neighbourhoods to avoid the intersection. Concerns were similar to those received in response to the Notice of Study Commencement. Sixteen written submissions were received following the PIC. Residents made many suggestions for improvements, similar to those made in response to the Notice of Study Commencement.

PIC 2 was held on March 9, 2016, at the BMO Centre. The purpose of the second PIC was to present the alternative designs developed for the intersection improvements, comparative evaluation of the alternatives and the preferred design. Design Option 3 was identified as the preferred design. A total of 36 individuals signed the Record of Attendance, including the Ward 1 Councillor and a representative of the Middlesex-London Health Unit.

Most of the PIC attendees agreed with the proposed intersection improvements and the selection of Design Option 3 as the preferred design. Concerns included impacts on the houses along Highbury Avenue North, pedestrian and cyclist safety, traffic safety, including the speed of traffic and visibility problems at the intersection and the difficulty of making left turns onto Giles and Elgin Streets.

Major businesses affected by the access management changes were also contacted to discuss the proposed changes. Meetings have been held with representatives of the Petro-Canada, Esso and Shell stations located at the intersection. To date, no other businesses have responded to Dillon's requests for a meeting.

Preferred Design

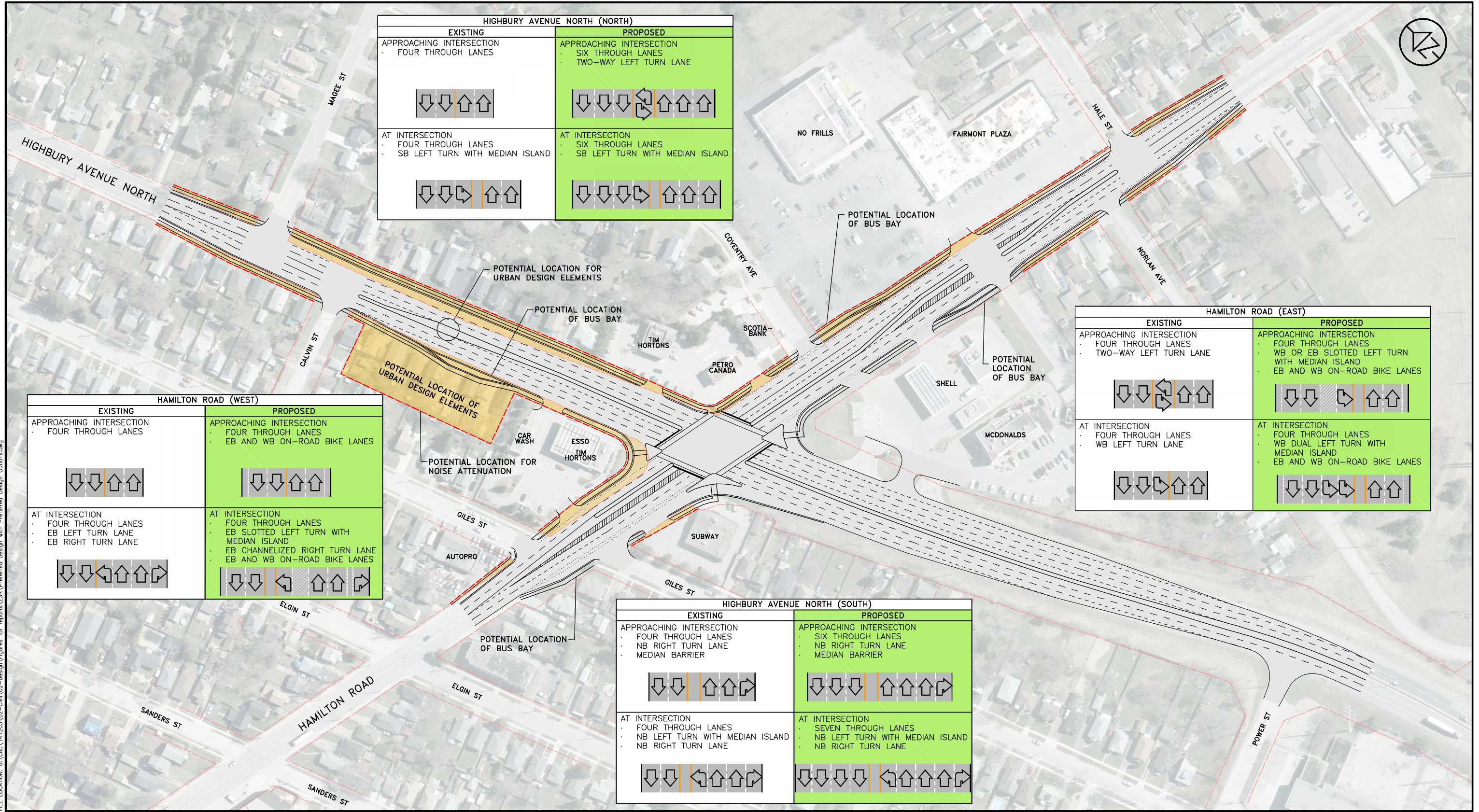
In summary, Design Option 3 was chosen as the preferred design because it provides a balance between improvements in overall traffic operations, property impacts and cost. As shown on Figures ES1 to ES6, the preferred design includes additional northbound and southbound through lanes, an eastbound channelized right turn, a westbound dual left turn (requires an eastbound slotted left) and a northbound channelized right turn lane. Other design features include:

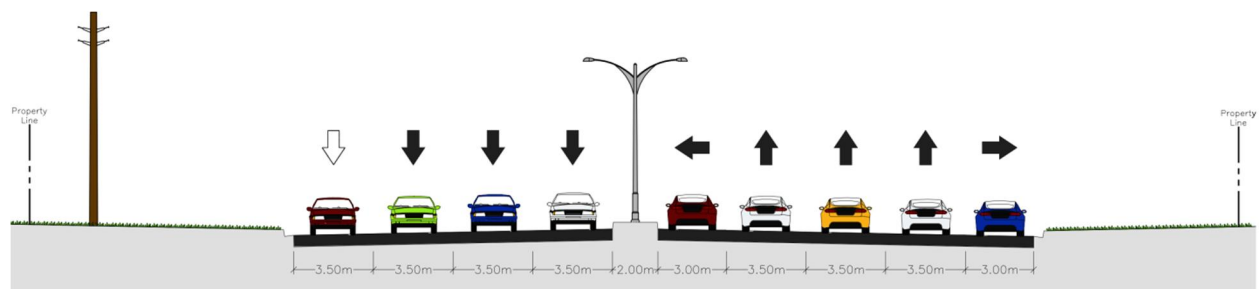
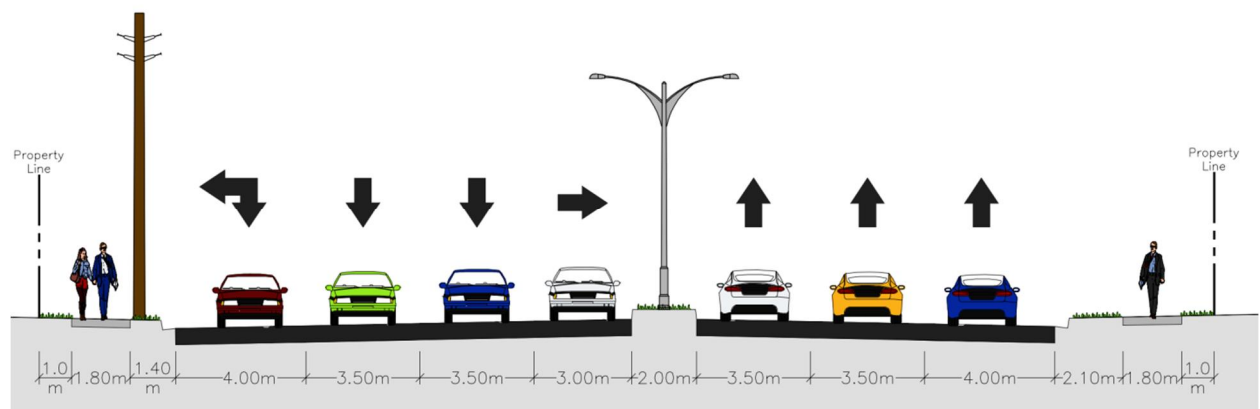
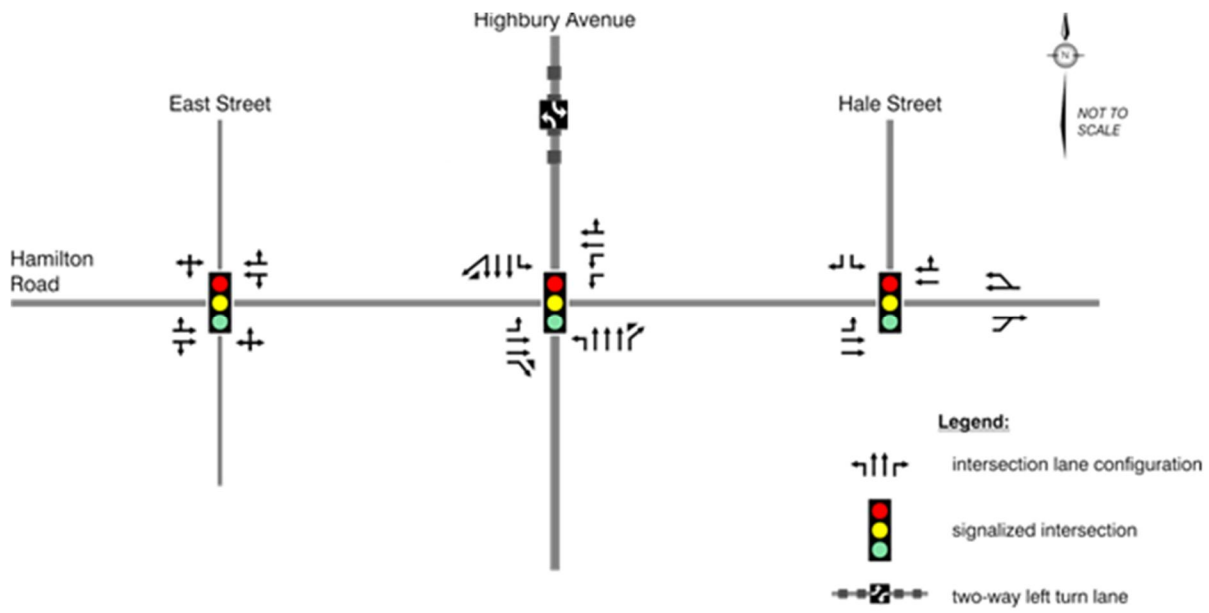
- Turning restrictions and closures for some residential and commercial entrances (access management changes)
- Median islands on Hamilton Road east of the intersection to Hale Street and west of the intersection to Giles Street
- Eastbound and westbound bike lanes on Hamilton Road
- Eastbound left turn lane into No Frills/Fairmont Plaza and westbound left turn lane into McDonald's
- Centered two-way left turn lane on Highbury Avenue North between Magee Street and the end of the southbound median island, north of the intersection.

Bus bays and provisions for landscaped areas have also been incorporated into the preferred design.

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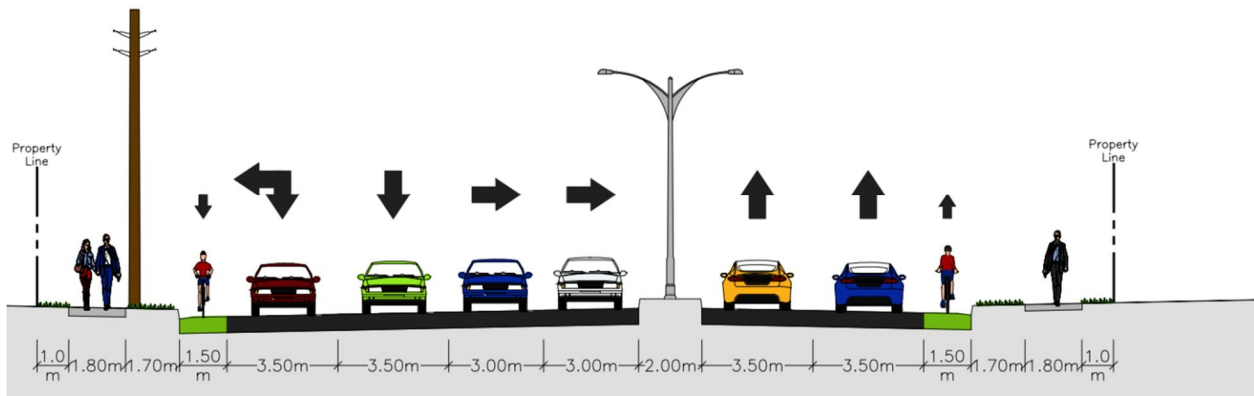


Figure ES5: Preferred Design, Hamilton Road Cross-Section, East of Highbury Avenue North

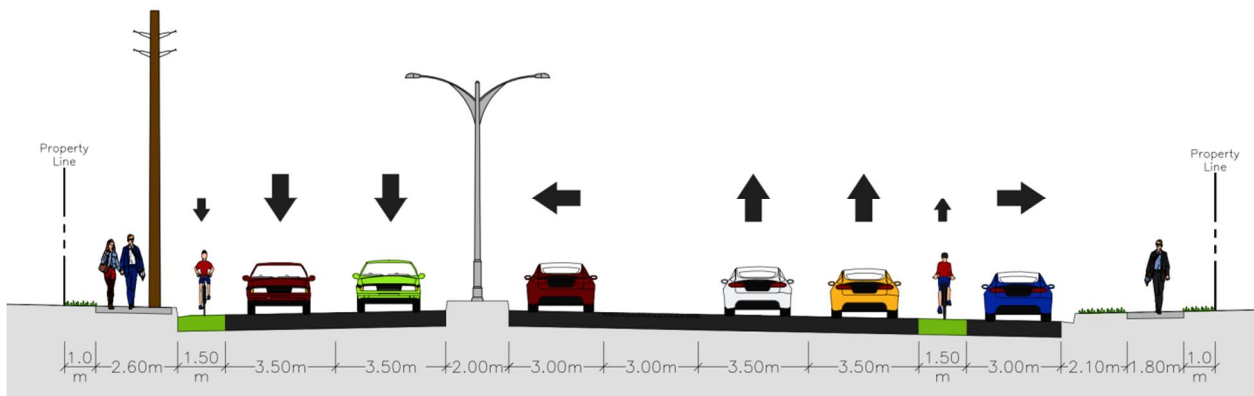


Figure ES6: Preferred Design, Hamilton Road Cross-Section, West of Highbury Avenue North

Construction Timing and Traffic Management During Construction

The proposed schedule for intersection improvements is under review and subject to budget availability, completion of Detailed Design and receipt of all required approvals. Utility relocations, property acquisitions and tree clearing will be completed prior to construction.

During construction:

- Temporary lane reductions will be required on Highbury Avenue Road North and Hamilton Road
- Access to residential properties and businesses will be maintained
- Temporary traffic signals will be in operation at the intersection.

Preliminary Construction Cost Estimate

As shown in Table ES2, the preliminary construction cost estimate for the proposed intersection improvements, including the City's share of utility relocations, is \$11.82 million.

Table ES2: Preliminary Construction Cost Estimate

Item	Estimated Cost
Intersection Improvements Investments	
Roadworks and Earthworks	\$ 2,714,000
Storm Sewers and Appurtenances	\$ 495,000
Traffic Signals and Illumination	\$ 750,000
Miscellaneous	\$ 205,000
Utility Relocations	\$ 700,000
Sub-total	\$ 4,864,000
Contingency (15%)	\$ 729,600
Engineering and Consulting (15%)	\$ 729,600
Property Acquisition	\$ 4,157,900
Intersection Improvements Sub-total	\$ 10,481,100
Lifecycle Renewal Investments	
Sanitary Sewers and Appurtenances	\$ 436,300
Watermains and Appurtenances	\$ 597,400
Sub-total	\$ 1,033,700
Contingency (15%)	\$ 155,055
Engineering and Consulting (15%)	\$ 155,055
Lifecycle Renewal Sub-total	\$ 1,343,810
TOTAL PRELIMINARY COST ESTIMATE	\$ 11,824,910

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1.0 Introduction

1.1 Purpose of Report

The City of London retained Dillon Consulting Limited to complete an Environmental Assessment (EA) Study for improvements to the Highbury Avenue North/Hamilton Road intersection. Building on the recommendations of the City's 2030 *Smart Moves Transportation Master Plan* (TMP), the EA Study assessed the need for additional through and turning lanes on Highbury Avenue North, improvements to the median on Hamilton Road and pedestrian and cyclist friendly design features. Changes in access management were also assessed. The Study Area for the project is shown on Figure 1.

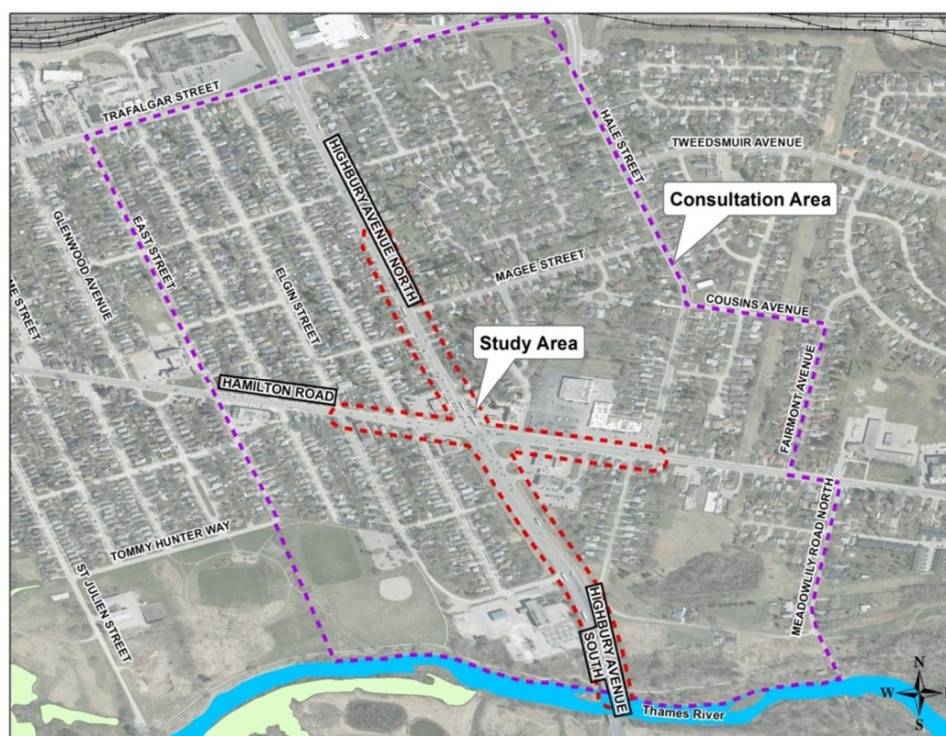


Figure 1: Study Area

This Environmental Study Report (ESR) documents the decision-making process leading to the selection of the preferred design for the intersection improvements. As shown on Figure 2, the preferred design includes additional northbound and southbound through lanes along Highbury Avenue North, an eastbound channelized right turn lane with a receiving lane on Highbury Avenue North, westbound dual left turn lanes with an eastbound slotted left turn lane and a northbound channelized right turn lane. Other design features are described in Section 6.2 of this report.

1.2 Municipal Class EA Process

The Municipal Engineers Association (MEA), *Municipal Class Environmental Assessment* (October 2000, as amended in 2007, 2011 and 2015) provides a decision-making process to ensure that all relevant environmental features and technical aspects are considered in the planning and design of municipal infrastructure. Projects completed following the Municipal Class EA are considered approved under the Ontario *Environmental Assessment Act*. The process requires public and agency involvement at a number of points throughout the project.

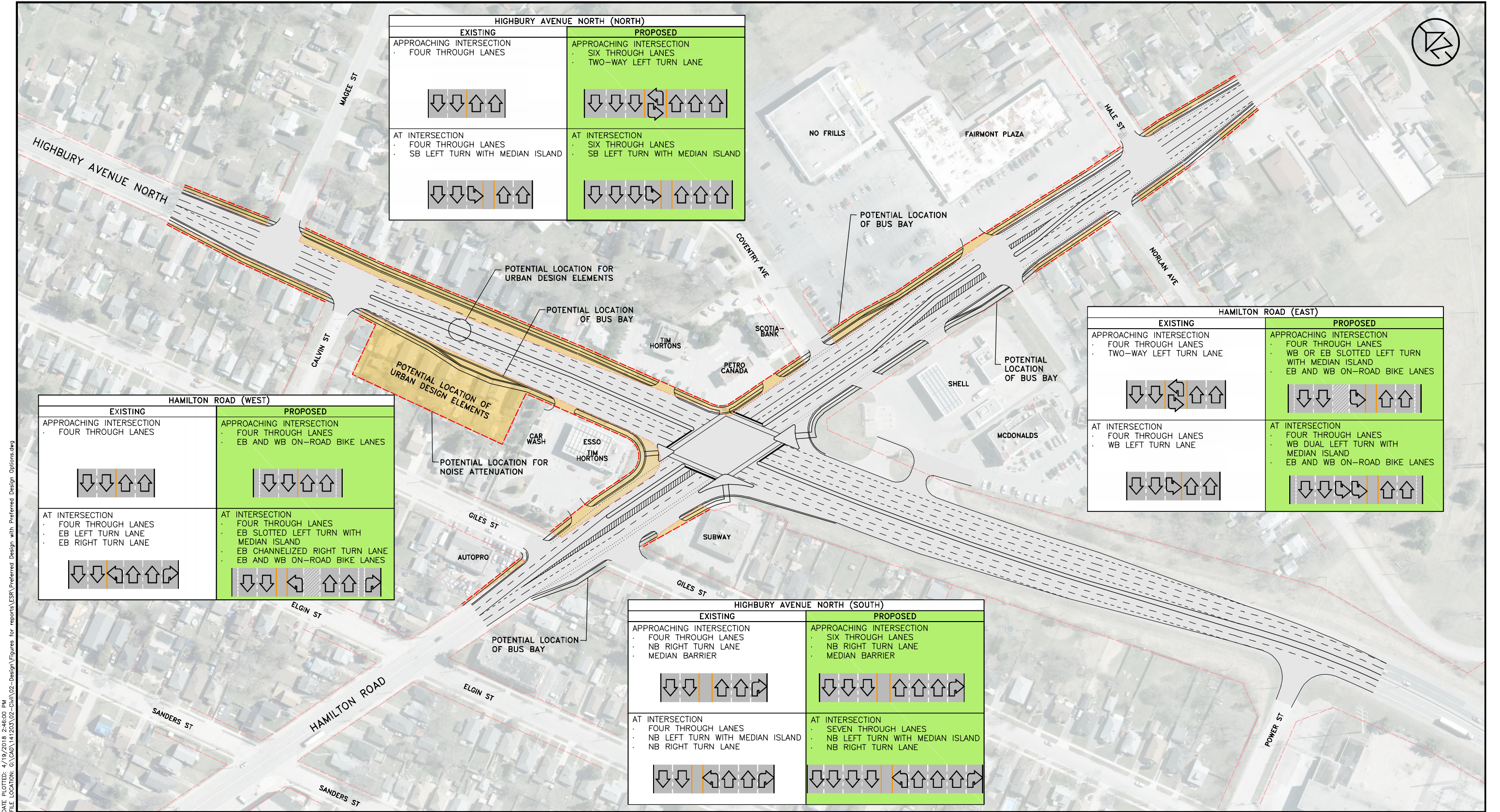
The Class EA applies to municipal infrastructure projects, including roads, water and wastewater projects. Since projects undertaken by municipalities can vary in environmental impact, the Class EA identifies a number of project schedules. The proposed improvements to the Highbury Avenue North/Hamilton Road intersection are identified as the following type of Schedule C project:

Reconstruction or widening where the reconstructed road... will not be for the same purpose, use, capacity or at the same location as the facility being reconstructed (e.g., additional lanes, continuous centre lane)” costing more than \$2.4 Million.

Schedule C projects include major expansions to existing facilities and follow the full planning and design process, as outlined in the Class EA. For this project, the planning process covered Phases 1 to 4:

- Phase 1, Problem/Opportunity Identification, and Phase 2, Alternative Solutions, were covered by the City’s 2030 *Smart Moves Transportation Master Plan* (TMP). The TMP is a long-term transportation strategy to guide transportation and land use planning decisions to the year 2030 and beyond. Phases 1 and 2 were reviewed and updated as part of this EA Study
- Building on the findings of the TMP, Phase 3, Design Options, consisted of the identification and evaluation of design options to implement the preferred solution
- Phase 4, Environmental Study Report (ESR), including filing the report on the public record for the required 30-day public review period.

Phase 5 of the Class EA process, Implementation, can proceed following the end of the 30-day review period and the resolution of any Part II Order requests. The implementation of the project includes fulfilling the environmental commitments outlined in this report.



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2.0

Existing and Future Conditions

2.1

Introduction

This section of the ESR is an overview of existing planning, engineering and environmental conditions potentially affected by the improvements to the Highbury Avenue North/Hamilton Road intersection. The information included in this section was used to review and update Phases 1 and 2 of the Class EA process and develop the Design Options during Phase 3.

2.2

Transportation Planning and Traffic Operations

2.2.1

Highbury Avenue North/Hamilton Road Intersection

Highbury Avenue North is a four-lane arterial road/expressway (classified as an Urban Thoroughfare in The London Plan, December 2016) providing a major north-south link between Highway 401 (5 km south of Hamilton Road) and northeast London. The existing Average Annual Daily Traffic (AADT) volume is 34,000 vehicles and 45,000 vehicles north and south of Hamilton Road, respectively. The Highbury Avenue/Hamilton Road signalized intersection forms a major transition point on Highbury Avenue. South of Power Street, Highbury Avenue North is a four-lane divided expressway with a posted speed limit of 100 km/h with full access control, transitioning to 50 km/hr arterial road north of Power Street. Grade separated interchanges are located at Commissioners Road, Bradley Avenue and Highway 401. From Power Street to just south of Hamilton Road, access is restricted by a centre median barrier.

North of Hamilton Road, Highbury Avenue North is a four-lane undivided arterial road (classified as an Urban Thoroughfare in The London Plan, December 2016) with a posted speed limit of 50 km/h, local street access at regular intervals, direct property access to single detached residences and commercial uses with no dedicated left turn lanes, aside from signalized intersections. For motorists travelling northbound on Highbury Avenue, the transition from one operating environment to the next occurs over a 370 metre section immediately south of Hamilton Road.

In addition to the transition in operating environment, the intersection is the transition point in planning level road capacity between the higher-capacity expressway section to the south and the lower capacity arterial section to the north. The capacity of the Highbury Avenue North/Hamilton Road intersection governs the rate of traffic flow that can continue further north.

Hamilton Road is a major east-west arterial road (classified as a Civic Boulevard in The London Plan, May 2016) with local streets at approximately 100 metre intervals with unrestricted property access. Hamilton Road is a four-lane cross-section west of the intersection at Highbury Avenue North with an existing AADT of 24,500 vehicles and 19,500 vehicles, east and west of Highbury Avenue North, respectively. East of the intersection, it has a five-lane cross-section (including a centered two-way left turn lane) for 250 metres narrowing to three lanes immediately east of Hale Street. Numerous commercial driveways are located along this section of Hamilton Road, all with full access and no turning restrictions. A stop-controlled local street “T” intersection (Coventry Avenue) is located approximately 50 metres east of Highbury Avenue North.

The Highbury Avenue North/Hamilton Road intersection operates under signal control, with advance left turn phases on all but the eastbound approach. There are exclusive left turn lanes on all approaches and exclusive right turn lanes on the northbound and eastbound approaches. The northbound and southbound right turn movements are channelized due to the skew angle between the two roadways. Centre raised median islands exist on the north and south legs, limiting entrances to right-in/right-out access.

Both Highbury Avenue North and Hamilton Road are designated truck routes, with Highbury Avenue North currently listed as a 24-hour route.

2.2.2 Traffic Analysis

Appendix A includes a copy of the Traffic Analysis Memo prepared for the project.

Stantec Consulting Ltd. completed a review of traffic operations at the intersection in 2008 (*Highbury Avenue and Hamilton Road Traffic Study*, February 27, 2008). According to the study, the afternoon (PM) peak hour was found to be operating at a poorer level of service than the morning (AM) peak hour. In 2006 during the afternoon (PM) peak hour, the intersection was operating with some movements at or above capacity, including the eastbound through, westbound left, northbound left and southbound through movements, all operating at Level of Service E. The Traffic Study concluded that:

- Long queues (over 100 metres) and very long queues (over 150 metres) were observed at the intersection for the southbound through movement (238 metres) and the northbound through movement (161 metres)
- Traffic experiences long delays turning left from the side streets onto Highbury Avenue North, north of Hamilton Road

- Based on reportable collisions from 2000 to 2005, more rear-end, side-swipe and turning collisions occurred than were expected. Contributing factors are congestion, queuing and two movements (eastbound and southbound through movements) which are operating at capacity. The speed of northbound through traffic on Highbury Avenue North approaching Hamilton Road is also likely a contributing factor.

The 2008 Traffic Study included year 2016 traffic projections based on the City's 2004 *Transportation Master Plan*. The study developed several alternatives to accommodate existing and projected traffic volumes and address existing and projected capacity, queuing and collision issues. Based on an evaluation, the following improvements were recommended for the intersection:

- A centre, two-way, left-turn lane on Highbury Avenue North from just north of Hamilton Road to just north of Calvin/Magee Streets to improve safety
- A centre median island on Hamilton Road from Highbury Avenue North to Coventry Lane, limiting access at three commercial properties
- To add traffic capacity, the study recommended that an additional through traffic lane be considered southbound on Highbury Avenue North
- Modify the southbound and northbound channelized right-turn lanes on Highbury Avenue North to provide better operations, visibility and slower operating speeds.

As part of this study, Dillon completed a Traffic Analysis covering the following:

- Existing (2015) conditions, including traffic volumes, roadway geometry and signal timings
- Future “do nothing” conditions at a 10-year (2025) horizon to determine future traffic demand on the existing road network
- Future (2025) conditions with the design options developed for the intersection improvements
- Existing (2015) conditions, incorporating the improvements of the preferred design option.

Analyses were completed for the weekday morning (AM) and afternoon (PM) peak hours to reflect the peak flow of traffic on the road network. In addition to the intersection, the analyses also extended along Hamilton Road westerly to East Street and easterly to Hale Street. Intersection operational Level of Service (LOS) analyses were completed using Trafficware’s Synchro Software version 6.0, which uses the methodologies of the Highway Capacity Manual (HCM), 2000 edition. Results are expressed in terms of volume-to-capacity ratio (v/c) and delay-based LOS.

In terms of performance thresholds, the City of London’s *Transportation Impact Assessment Guidelines* indicate that an intersection is a candidate for improvements when:

- The volume/capacity ratios for overall operations or an individual through turning movement (in an exclusive or shared lane) reach or exceed 0.90
- The LOS for the intersection or an individual or through turning movement reaches LOS E or worse
- The 95th percentile queues for an individual turning movement are protected to exceed the available storage length.

The City’s *2030 Transportation Master Plan* (TMP) recommends that a roadway be identified as a candidate for widening when link or screenline volumes reach or exceed their planning level capacity (i.e., a planning level v/c ratio of 1.00).

2.2.2.1

Existing Traffic Volumes

The existing traffic control measures within the Study Area are shown in Figure 3.

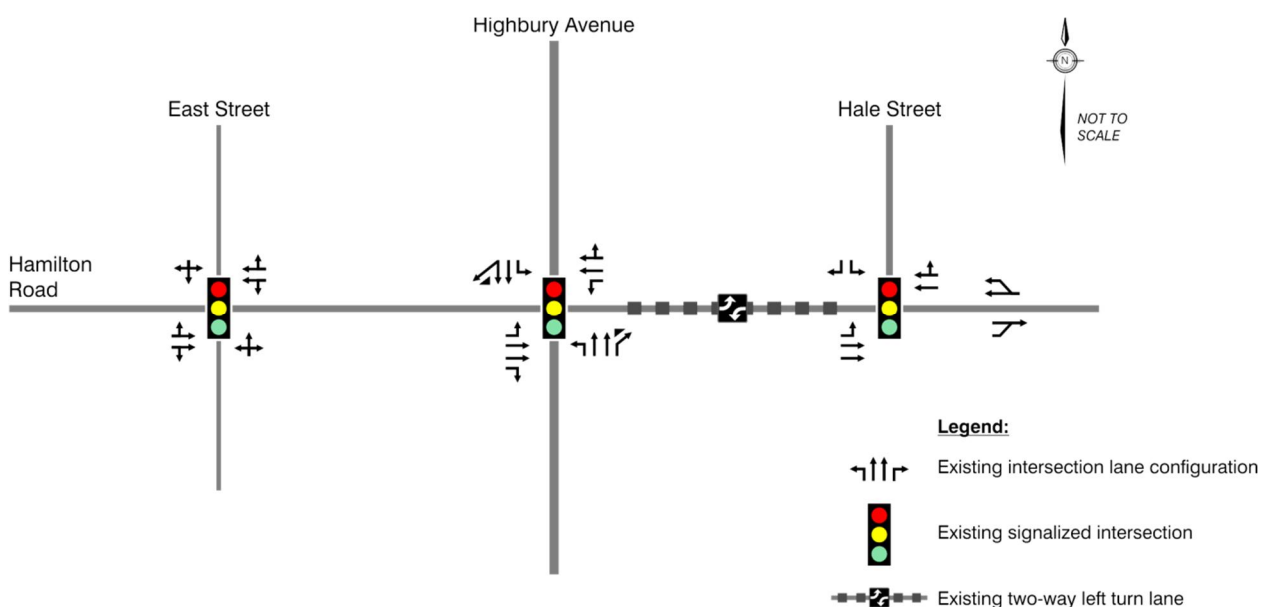


Figure 3: Existing Lane Configurations and Traffic Control Measures

The City of London provided turning movement counts for the intersection of Highbury Avenue North and Hamilton Road. Traffic counts at the various site accesses within the Study Area were obtained from the 2008 Traffic Study (except at the Subway access to Hamilton Road, which was surveyed for this project in 2015). Although both weekday and Saturday counts were reviewed, the weekday counts were determined to be sufficient to show the extent of the capacity constraints at the intersection. The existing weekday morning (AM) and afternoon (PM) peak hour intersection volumes are illustrated as follows:

- Figure 4 shows the existing signalized intersection volumes
- Figure 5 show existing commercial driveway volumes.

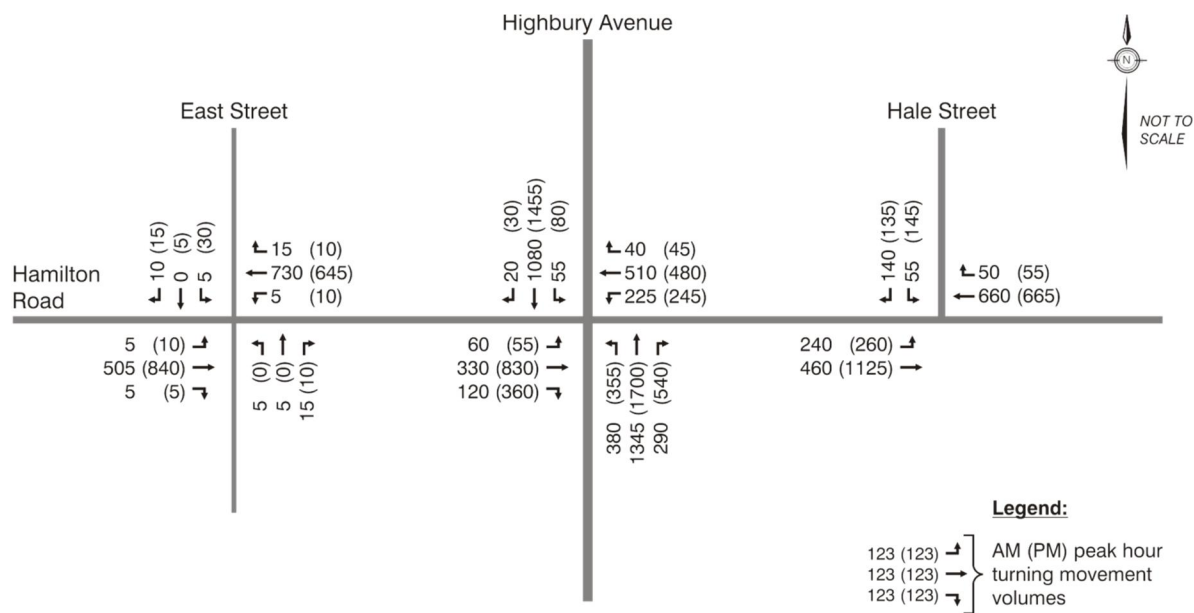


Figure 4: Existing (2015) Traffic Volumes (Intersections)

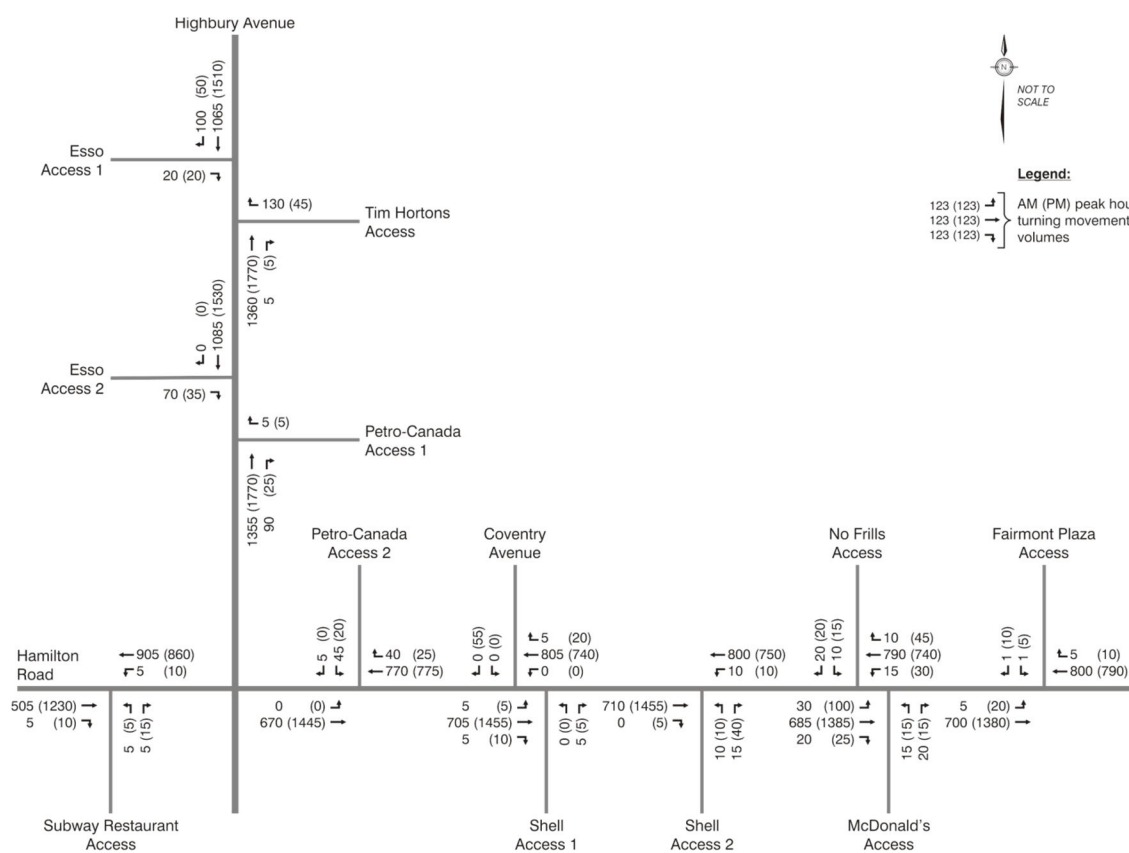


Figure 5: Existing (2015) Traffic Volumes (Driveways)

Table 1 summarizes existing (2015) traffic operations during the weekday morning (AM) and afternoon (PM) peak hours at the Study Area's signalized intersections. Critical movements are shown in red.

Table 1: Existing Intersection Operations - 2015

	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR	Overall
AM Peak Hour											
Hamilton Road at Highbury Avenue North											
v/c	0.38	0.50	0.36	0.76	0.50	1.02	0.78	0.34	0.43	0.94	—
Delay (s)	52.5	49.9	20.0	58.0	45.7	91.4	29.7	4.9	25.8	57.8	45.2
LOS	D	D	C	E	D	F	C	A	C	E	D
Queue (m)	25	52	25	100*	108	171*	200	24	13	213*	—
Hamilton Road at East Street											
v/c	0.20			0.28		0.08			0.06		—
Delay (s)	3.8			3.2		13.0			14.0		3.7
LOS	A			A		B			B		A
Queue (m)	31			41		5			4		—
Hamilton Road at Hale Street											
v/c	0.54	0.32	—	—	0.65	—	—	—	0.25	0.46	—
Delay (s)	17.1	3.1	—	—	15.7	—	—	—	28.9	9.8	12.3
LOS	B	A	—	—	B	—	—	—	C	A	B
Queue (m)	52	14	—	—	80*	—	—	—	16	14	—
PM Peak Hour											
Hamilton Road at Highbury Avenue North											
v/c	0.35	>1.00	0.97	>1.00	0.51	>1.00	0.94	0.58	0.64	0.94	—
Delay (s)	50.8	163	77.1	199	35.2	444	39.8	10.6	43.3	44.9	86.4
LOS	D	F	E	F	D	F	D	B	D	D	F
Queue (m)	27	204*	150*	122*	79	215*	286*	76	30*	271*	—
Hamilton Road at East Street											
v/c	0.34			0.27		0.05			0.17		—
Delay (s)	5.1			4.8		11.5			17.9		5.4
LOS	A			A		B			B		A
Queue (m)	55			43		3			9		—
Hamilton Road at Hale Street											
v/c	0.56	0.86	—	—	0.81	—	—	—	0.49	0.36	—
Delay (s)	13.2	37.0	—	—	27.1	—	—	—	30.4	7.2	29.3
LOS	B	D	—	—	C	—	—	—	C	A	C
Queue (m)	53	156	—	—	93*	—	—	—	33	12	—

Movements:

EBL = eastbound left turn

EBT = eastbound through

EBR = eastbound right turn

WBL = westbound left turn

WBTR = westbound through-right turn

NBL = northbound left turn

NBT = northbound through

NBR = northbound right turn

SBL = southbound left turn

SBTR = southbound through-right turn

* Under 95th percentile traffic volumes, volume exceeds capacity; queue represents two cycles under 95th percentile traffic demand.

Highbury Avenue North at Hamilton Road

During the weekday morning (AM) peak hour, the primary constraints are the opposing northbound left turn and southbound through movements. The northbound left turn movement is operating above capacity and at LOS F with delays of over 90 seconds. The southbound through movement is approaching capacity ($v/c = 0.94$). The intersection overall is operating near capacity and at LOS D.

During the weekday afternoon (PM) peak hour, there are numerous individual movements that are operating at or above their practical capacity, particularly those oriented to and from the south leg of the intersection (northbound left/through; southbound through; westbound left; eastbound through/right). In particular, the northbound and westbound left turn and eastbound through movements are operating above capacity and at LOS F with average delays in the order of three minutes per vehicle or more. The intersection is failing during the afternoon (PM) peak hour, operating at LOS F overall. In addition, the queues on the northbound left turn, westbound left turn and eastbound right turn movement exceed the designated storage length, and the southbound queue extends beyond the first upstream intersection (Calvin Street); the queue spillover can affect the operation of the upstream intersections and driveways (particularly the westbound left turn, which extends into the two-way left turn lane for the No Frills plaza), and can also affect the capacity of adjacent through lanes.

Hamilton Road at East Street

The intersection of Hamilton Road and East Street is currently operating at a very good overall level of service, with no critical movements identified.

Hamilton Road at Hale Street

The intersection of Hamilton Road and Hale Street operates at a reasonable overall LOS during the morning (AM) and afternoon (PM) peak hours, with no critical movements identified.

2.2.2.2

Future Traffic Forecasts

Traffic volumes at the 10-year (2025) horizon were forecasted by applying an annual growth rate of 1.5% to existing volumes. In addition, commercial driveway traffic volumes were adjusted to reflect the access management changes recommended in Section 3 of this ESR. Future traffic volumes are illustrated as follows:

- Figure 6 show projected intersection volumes
- Figure 7 shows projected driveway volumes.

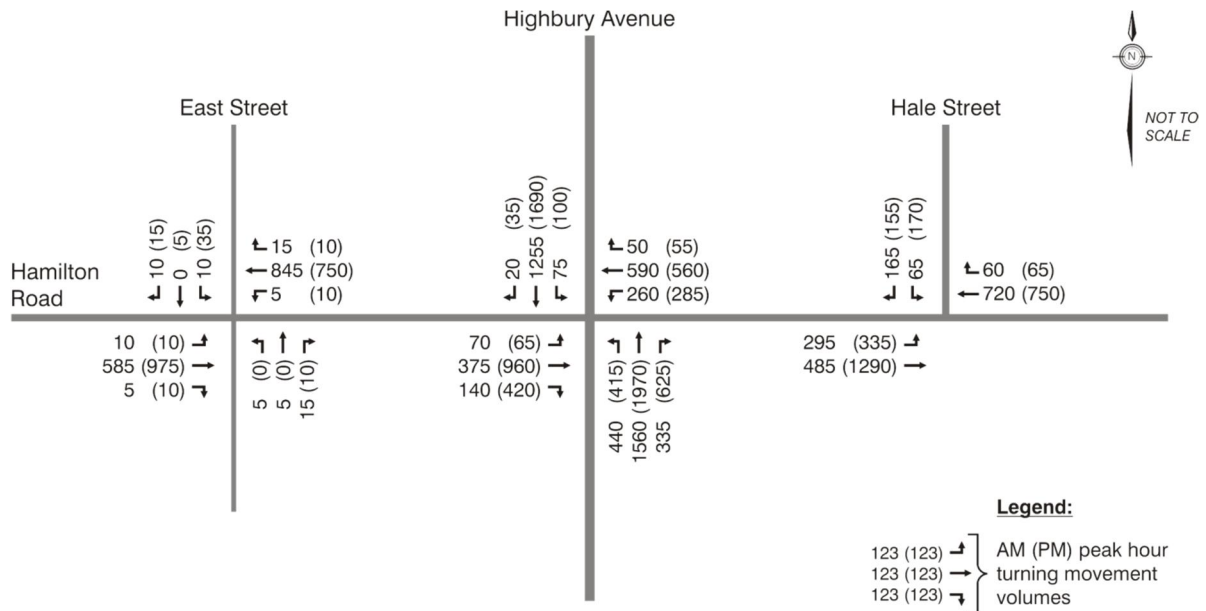


Figure 6: Future (2025) Traffic Volumes (Intersections)

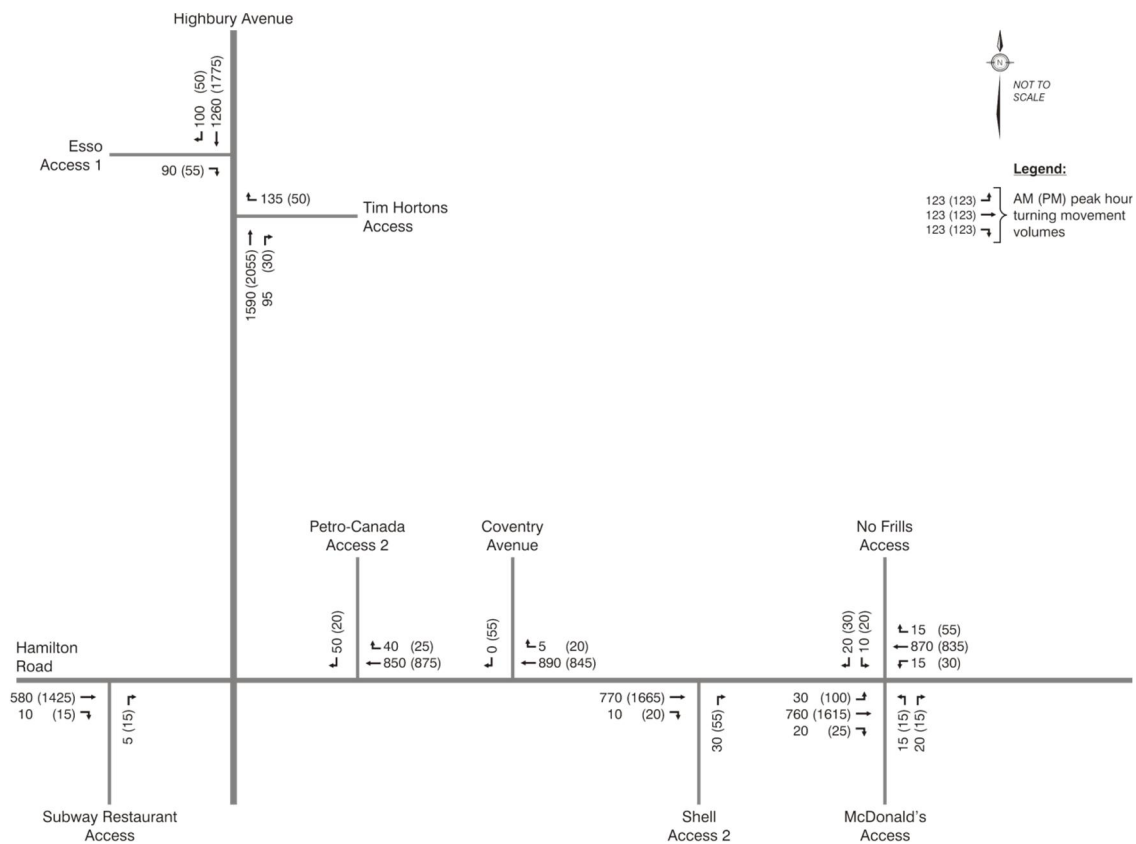


Figure 7: Future (2025) Traffic Volumes (Driveways)

2.2.2.3

Future “Do Nothing” Traffic Operations

The 2025 volumes were assessed with the existing geometric conditions to determine future “do nothing” conditions. Table 2 summarizes the future “do nothing” morning (AM) and afternoon (PM) peak hour traffic operations at the Study Area signalized intersections. Critical movements are shown in red.

Table 2: Future “Do Nothing” Intersection Operations - 2025

	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR	Overall
AM Peak Hour											
Hamilton Road at Highbury Avenue North											
v/c	0.52	0.58	0.41	0.94	0.59	1.18	0.93	0.40	0.64	1.10	—
Delay (s)	58.5	50.4	22.4	75.3	47.0	142	41.3	6.9	47.8	96.9	64.3
LOS	E	D	C	E	D	F	D	A	D	F	E
Queue (m)	26	53	28	115*	125	212*	268*	35	29*	272*	—
Hamilton Road at East Street											
v/c	0.23			0.33		0.09			0.07		—
Delay (s)	3.9			4.9		12.9			13.7		4.8
LOS	A			A		B			B		A
Queue (m)	36			66		5			4		—
Highbury Avenue at Hale Street											
v/c	0.62	0.37	—	—	0.83	—	—	—	0.28	0.49	—
Delay (s)	21.3	3.7	—	—	26.1	—	—	—	29.1	9.6	17.9
LOS	C	A	—	—	C	—	—	—	C	A	B
Queue (m)	71	16	—	—	102*	—	—	—	18	15	—
PM Peak Hour											
Hamilton Road at Highbury Avenue North											
v/c	0.51	1.43	1.13	1.51	0.59	2.19	1.09	0.68	0.83	1.09	—
Delay (s)	60.3	241	121	278	37.3	575	79.6	14.9	70.4	83.8	131.4
LOS	E	F	F	F	D	F	E	B	E	F	F
Queue (m)	35	250*	190*	123*	80	254*	390*	114	48	349*	—
Hamilton Road at East Street											
v/c	0.40			0.31		0.05			0.20		—
Delay (s)	5.5			5.1		11.0			18.2		5.7
LOS	A			A		B			B		A
Queue (m)	68			48		4			10		—
Hamilton Road at Hale Street											
v/c	0.67	1.01	—	—	0.97	—	—	—	0.53	0.38	—
Delay (s)	17.2	50.3	—	—	46.7	—	—	—	30.4	6.6	41.8
LOS	B	D	—	—	D	—	—	—	C	A	D
Queue (m)	58	172	—	—	109*	—	—	—	36	13	—

Description of Movements:

EBL = eastbound left turn

WBL = westbound left turn

NBL = northbound left turn

SBL = southbound left turn

EBT = eastbound through

WBTR = westbound through-right turn

NBT = northbound through

SBTR = southbound through-right turn

EBR = eastbound right turn

NBR = northbound right turn

*Note: Under 95th percentile traffic volumes, volume exceeds capacity; queue represents two cycles under 95th percentile traffic demand.

Highbury Avenue at Hamilton Road

During the weekday morning (AM) peak hour, the opposing northbound left turn and southbound through movements will continue to be the primary constraints. Both of these movements are projected to operate well over capacity and with substantial delays of more than three minutes. The westbound left turn and northbound through movements will also be operating near capacity. The overall intersection LOS is projected to decline to LOS E.

During the weekday afternoon (PM) peak hour, conditions on current critical movements will worsen with increased delays and queues. The most substantial deficiency is on the northbound left turn, which is projected to have a demand that is more than double the available capacity; however, most other movements at the intersection are projected to be at or above capacity as well. Substantial queues are projected on the eastbound, northbound and southbound approaches, and on the westbound left turn; the northbound queues will approach or reach the Thames River Bridge, while the eastbound, westbound and southbound queues will extend through upstream unsignalized intersections and driveways. Since capacity deficiencies exist on at least one movement in each conflicting traffic signal phase (e.g., northbound left versus southbound through), there is no opportunity to substantially mitigate conditions by adjusting traffic signal timings; the only effect of such adjustments could be to strategically provide additional weighting to certain movements at the expense of others. The intersection will continue to fail, operating at LOS F overall.

Hamilton Road at East Street

The intersection of Hamilton Road and East Street is projected to continue operating at a very good overall LOS, with no critical movements identified.

Hamilton Road at Hale Street

The intersection of Hamilton Road and Hale Street is projected to operate at a reasonable overall LOS based on average delay. However, during the afternoon (PM) peak hour the eastbound and westbound through movements are identified as operating at or near capacity.

2.2.3 Traffic Safety

According to the City's 2014 Network Screening, there were 110 reported collisions at the Highbury Avenue North/Hamilton Road intersection, with 40% consisting of rear end collisions. Twenty-four collisions were reported along Highbury Avenue North, between Hamilton Road and Calvin Street, with 67% consisting of rear end collisions. The intersection ranks in the top 50 of the most collision-prone intersections in London according to the City's 2014 Network Screening.

The City's *Road Safety Strategy* (2014-2019), prepared in collaboration with the Middlesex-London Health Unit, Middlesex County and other partners, includes strategies to reduce fatal and injury collisions by 10% by the year 2019. An analysis of traffic collision data completed for the report concluded that 175 collisions a year involve red light running. Also, most traffic collisions and collisions involving vulnerable road users (pedestrians and cyclists) occur at or near intersections.

Intersections, pedestrians and cyclist safety were among six target areas identified in the strategy. The following actions were recommended for implementation by the City:

- Identify abnormally high collision locations
- Continue to review advance left-turn phasing and determine the need for protected left-turn phases
- Continue to review downstream visibility of signal heads where multiple signalized intersections are within 250 metres of each other. Also, review visibility of signal heads and sight distances at individual and adjacent signal locations
- Continue to identify locations suitable for the crosswalk pavement marking program, including ladder markings
- Install advance street name signs using certain types of fonts before major intersections
- Construct new pedestrian refuge islands and enhance pedestrian safety by expanding and upgrading pedestrian facilities
- Continue the expansion of dedicated bike lanes and "Share the Road" signage on major roads, as outlined in the City's *Cycling Master Plan Update* (March 2016)
- Continue to review signal clearance times and sight distances at high collision locations and optimize and coordinate signal timing along corridors.

2.2.4 Access Management

Access management is a major issue at the Highbury Avenue North/Hamilton Road intersection. There are numerous commercial driveways in the vicinity of the intersection, particularly along the section of Hamilton Road between Highbury Avenue North and Hale Street. The 2008 Traffic Study prepared by Stantec Consulting Ltd. recommended a median island be constructed along Hamilton Road between Highbury Avenue North and the No Frill's access, limiting all driveways (and the Coventry Drive intersection) to right turn movements only. This was recommended to mitigate capacity and queuing issues on this section of Hamilton Road, reduce conflicts between vehicles accessing the commercial uses and reduce turning movement collisions at the Hamilton Road/Coventry Lane intersection. Between 2001 and 2005 there were seven turning collisions at this intersection.

As explained in the City of London's *Access Management Guidelines* (2015), access management is a tool for coordinating land use planning and transportation planning and design. The objectives of access management are to reduce collisions, alleviate traffic congestion, reduce energy consumption, preserve the long term integrity of traffic movements and promote an aesthetically pleasing transportation corridor.

Proper access control maintains a high level of service for straight-through traffic and provides reasonable access to abutting properties. The principles of good access management are:

- Good traffic flow is essential for successful development
- Good access management is essential to support traffic flow that may be associated with achieving development objectives
- Good access management ensures that municipal road corridors can meet current/projected transportation needs.

Without good access management, the function and character of transportation corridors can deteriorate rapidly. Failure to manage access can cause an increase in vehicular collisions and a reduction in roadway efficiency. A lack of access management also causes an increase in commute times, fuel consumption and vehicular emissions since numerous access points and traffic signals intensify road network congestion.

The significant number of individual access points to residential and commercial uses along Highbury Avenue North and Hamilton Road is a major cause of traffic congestion, back-ups and collisions at the intersection. To alleviate these issues, access management changes, including changes to driveway movements, have been recommended as part of the Class EA Study. Changes in traffic patterns resulting from the driveway modifications have been carried forward into the future projections and analysis of future conditions.

2.3 Municipal Services and Utilities

Municipal services and utilities requiring improvements or relocation will be determined in consultation with City staff and the affected utilities. No improvements have been outlined in the City of London's infrastructure Master Plans. Figure 8 provides a composite plan of the existing municipal services and utilities within the project limits. Municipal services and utilities are summarized in the following subsections.

2.3.1 Watermains

As shown on Figure 8, there is an existing 150 mm ductile iron watermain on Hamilton Road west of Highbury Avenue North and a 400 mm PVC watermain on Hamilton Road east of Highbury Avenue North. On Highbury Avenue North, from the intersection northerly, there is an existing 150 mm ductile iron and a 400 mm ductile iron watermain. No mains exist on Highbury Avenue North southerly from the intersection.

2.3.2 Storm Sewers, Sanitary Sewers and SSOs

As shown on Figure 8, the intersection includes a combination of underground local sanitary and storm sewers and trunk infrastructure. Many of them are in “non-standard” locations and configurations due to the age of the services and the many years of expansions and upgrades. The City of London’s *Vauxhall Storm and Sanitary Sewer Modelling Study* completed in 2016 modeled the local sanitary sewers, sanitary sewage overflow (SSO) and the Highbury storm and relief sewer (2100 mm).

Although modelling focused on assessing the performance of the sanitary collection system and the operation of the SSOs located within the Vauxhall sewershed, it also included modelling of the trunk storm sewers. The VX-01 SSO is located within the Highbury/Hamilton intersection as is the Highbury storm and relief sewer (2100 mm). No improvements are anticipated.

Although there are no 'defined' combined sewer drainage areas upstream of the VX-01 overflow, the modelling determined that this SSO was installed as a 'back-door' relief mechanism due to capacity constraints in the downstream combined sanitary collection system. The 'long-section' profile view of the combined sanitary sewer from the intersection to the confluence with the Eleanor trunk illustrates that during large, high intensity rainfall events (extreme condition) the combined sanitary sewer surcharges high enough to cause an SSO at the VX-01. Based on the findings of the City’s modelling study, the VX-01 SSO must remain in place until sewer separation is completed within the area bounded by Trafalgar to the north, Tommy Hunter Way to the south, Highbury Avenue North to the east, and St Julien Street to the west.

The Highbury storm and relief sewer is a significant piece of drainage infrastructure that was built in 1958-1959. At the outlet to the South Branch of the Thames River, it has a 348 hectare service area. The system was designed to provide storm outlets for the separation of combined sewers associated with the Eleanor/East End Interceptor Sewer. A total of six SSO locations relieve the previously combined (now partially separated) sanitary sewers at various locations along the Highbury storm and relief sewer.

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CITY OF LONDON
HIGBURY AVENUE/HAMILTON ROAD
INTERSECTION IMPROVEMENTS
ENVIRONMENTAL ASSESSMENT STUDY
TS-1309-11



- | | | |
|-------------------------|--------------------------------------|-------------------------|
| BELL UNDERGROUND | LONDON HYDRO (UNDERGROUND) | EXISTING WATERMAIN |
| GAS UNDERGROUND | LONDON HYDRO (UNDERGROUND ABANDONED) | EXISTING STORM SEWER |
| LONDON HYDRO (OVERHEAD) | | EXISTING SANITARY SEWER |

SCALE - HORZ.
12.5m 0 25m



PROJECT No. 14-1203
DATE: JANUARY, 2017



HIGBURY AVENUE AND
HAMILTON ROAD
INTERSECTION
EXISTING MUNICIPAL SERVICES
AND UTILITIES COMPOSITE PLAN
FIGURE 8

Based on the hydraulic assessment of the Highbury storm and relief system, the modelling study concluded that it operates under a small surcharge (at the Highbury/Hamilton intersection) for the 5-year, three hour duration design storm event. This design storm is approximately equal to the City of London 2-year IDF curve used for normal storm sewer design. The 'long-section' profile view illustrates the performance of the storm and relief system during the 5-year storm. During the 5-year storm the HGL rises to an elevation of approximately 242.610 within the intersection area.

Along with the Highbury Avenue Trunk Storm Relief Sewer, there is a 600 mm storm sewer on Highbury Avenue north of the intersection, 900 mm storm to the east on Hamilton Road and a 675 mm storm to the west. On Highbury Avenue North (south of Hamilton Road), the roadway drainage outlets to existing roadside ditches. All storm water from within the project limits flows south to the Thames River.

2.3.3 Utility Companies

London Hydro

London Hydro's existing plant is illustrated on Figure 8. Relocation of the overhead plant will be required in advance of construction to accommodate the roadway widening. As well, some underground plant may require relocation. The exact extent of relocations will be developed following the completion of the environmental assessment.

Union Gas, Bell Canada

Bell and Union Gas also have underground plant within the project limits. The need for relocation or plant upgrades will be confirmed during detailed design.

2.4 Geotechnical

Golder Associates prepared an overview of existing geotechnical conditions at the Highbury Avenue North/Hamilton Road intersection involving a site reconnaissance and a review of existing geotechnical data. Based on an analysis of site geology and general subsurface conditions, the report included preliminary recommendations regarding excavations, bedding for underground services, trench backfill and pavement reconstruction.

A site-specific geotechnical investigation will be completed during Detailed Design.

2.5 Transit

London Transit Commission (LTC) operates two transit routes within the Study Area, including the 14 Highbury Route (north-south on Highbury Avenue North) and the 3 Hamilton Route

(east-west on Hamilton Road). As shown on Figure 9, there are 11 existing bus stops within the project limits. Bus bays are not present at the existing bus stop locations.

2.6 Cycling and Pedestrian Infrastructure

The intersection improvements at Highbury Avenue North and Hamilton Road will be designed to accommodate pedestrians and cyclists. This is consistent with two of the five “Smart Moves” included in the *2030 Transportation Master Plan* promoting alternatives to car use. Sidewalks are located on Hamilton Road and on Highbury Avenue North, north of the intersection.

As shown in the City of London’s *Cycling Master Plan Update* (September 2016), designated northbound and southbound cycling routes will be connected in the future to Hamilton Road, east and west of Highbury Road North, including along Hale Street and Meadowlilly Road to the east and East Street and Elgin Street to the west.

2.7 Natural Environment

There are no natural heritage features designated in the Study Area by the existing Official Plan or Draft London Plan (adopted by City Council in June 2016). The Study Area is located in “The Forks” of the Thames River subwatershed.

To achieve the London Plan’s goals for London’s urban forest, the Plan requires tree inventories and tree preservation plans for all infrastructure projects located outside the Natural Heritage System. When tree removal is required, all trees with a diameter greater than 10 cm at breast height must be replaced at the rate of one replacement for every 10 cm of tree diameter removed (e.g., four trees at least 5 cm in diameter are required to replace a 45 cm diameter tree).

Dillon’s ISA certified arborist completed a Tree Inventory for lands potentially affected by the intersection improvements on August 28, 2015. Specimens on public lands were identified/confirmed, measured and assessed for condition. Potentially impacted trees on private lands were assessed from the roadway. The Tree Inventory is included in Appendix B.

As shown on the table in the appendix, lands around the intersection have a fairly diverse community of tree species ranging from juvenile trees to established specimens. Common species included ash species (*Fraxinus*), apple species (*Malus*), hackberry (*Celtis occidentalis*), honey locust (*Gleditsia triacanthos*), maple species (*Acer*), oak species (*Quercus*), Austrian pine (*Pinus nigra*), blue spruce (*Picea pungens*), Norway spruce (*Picea abies*) and white mulberry species (*Morus alba*). Other species included basswood linden (*Tilia Americana*), purple leaf

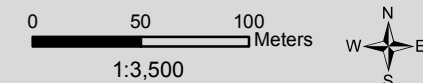


CITY OF LONDON

Highbury Avenue/Hamilton Road
Intersection Improvements
Environmental Study Report

Socio-Economic Environment Figure 9

- Community Commercial Node
- Potential On-Road Bike Lane
- Multi-Use Pathway
- BUS STOP Bus Stop



MAP DRAWING INFORMATION:
DATA PROVIDED BY THE CITY OF LONDON

MAP CREATED BY: BJF
MAP CHECKED BY: JMS
MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 14-1203
STATUS: FINAL
DATE: 04/13/2016

birch (*Bitula 'Crimson Frost'*), Eastern white cedar (*Thuja occidentalis*), false cypress (*Chamaecyparis*), Manitoba maple (*Acer negundo*), northern catalpa (*Catalpa speciosa*), serviceberry (*Amelanchier*) and smoke tree (*Cotinus*). Common shrubs included red cedar (*Juniperus Virginia*), elm species (*Ulmus*), lilac species (*Syringa*), boxwood (*Buxus*), burning bush (*Euonymus alatus*), stagehorn sumac (*Rhus typona*), rose of Sharon (*Hibiscus syriacus*) and yew (*Taxus baccata*). No regionally, provincially or nationally significant species were noted during the inventory.

Most of the trees on public lands were in good to fair condition, with some trees in poor condition. Several honey locust trees on Highbury Avenue North are in decline with insects or eggs on the trunk. Several Austrian pines on the east side of Giles Street show signs of needle blight and oozing sap possibly caused by the significant amount of mulch around the base of the tree. Several ash species, an amure maple and a ginkgo tree were identified as hazard trees. These trees could cause personal injury or property damage and should be removed immediately.

2.8 Land Uses and Socio-Economic Environment

2.8.1 Existing Land Uses and Official Plan Policies

Functioning as a gateway into this part of the City from Highway 401, the Highbury Avenue North/Hamilton Road intersection is part of a Community Commercial Node, as designated in the existing Official Plan. As shown on Figure 9, land uses surrounding the intersection include a McDonald's restaurant, gas stations on three quadrants of the intersection, two Tim Horton's restaurants and a commercial plaza. Almost all of the commercial uses have separate entrances onto Highbury Avenue North and Hamilton Road.

The remaining Study Area surrounding the intersection consists of low density residential neighbourhoods. Single detached residences along Highbury Avenue North, north of Hamilton Road, front onto the road and have direct access to Highbury Avenue North.

The existing City of London Official Plan designates the Study Area as follows:

- Lands along Hamilton Road, east of Highbury Avenue North to Hale Street, are designated as Community Commercial Node
- The surrounding areas, including the northwest and southwest quadrants of the intersection, are designated as Low Density Residential. This designation applies to the Esso gas station at the northwest quadrant and the commercial plaza on the southwest quadrant.

The London Plan (adopted by Council in June 2016) designates Hamilton Road as a Civic Boulevard and Highbury Avenue North as an Urban Thoroughfare. As explained in the London Plan, each street classification has a design priority toward pedestrians or vehicles along a continuum:

- An Urban Thoroughfare emphasizes through movement of vehicles and freight and has a high quality pedestrian realm, along with a high standard of urban design
- A Civic Boulevard emphasizes pedestrian, cycle and transit movements, moves medium volumes of vehicular traffic and provides a higher quality pedestrian realm and a higher standard of urban design

2.8.2 Noise Policies

The City of London's *City Council Policy Manual* (September 6, 2013, Consolidation) includes guidelines for the installation of retrofit noise barriers for existing residential development affected by an arterial road widening. As explained in Chapter 25(12) of the manual, the installation of retrofit noise barriers is intended to ensure that existing residential backyards backing onto arterial roads widened to four lanes or greater are not subjected to significant noise level increases from levels that existed in the design year.

Policies for retrofit noise barriers include the following:

- To qualify for barriers, the property must be in residential use and back lotted onto an arterial road
- Masonry walls or other suitable materials or earth berms will be used
- The design, placement and height of the barriers will be determined by a noise study
- The wall will be built within one foot of the property line on the road allowance. Private property working easements must be provided to the City.

Since the residences along Highbury Avenue North front onto the road, these properties are not eligible for retrofit noise barriers. However, with the proposed acquisition of some residential properties on the west side of Highbury Avenue North required for the road improvements, the remaining houses on Giles Street may qualify for noise barriers under the City's policy.

2.8.3 Current Development Activity

According to the City of London Planning Department, there are no current development applications on the lands surrounding the intersection.

2.9 Cultural Resources

Dillon retained Fisher Archaeological Consulting (FAC) to determine if an archaeological assessment of the project is required as part of the Class EA.

In July 2015, FAC completed an overview of the project's archaeological context (environmental factors, registered archaeological sites and past settlements) and the historic context of the intersection, including regional history and an overview of development in the Study Area. FAC's major background findings include:

- This part of Ontario has been inhabited for over 11,000 years by Aboriginal peoples. The Study Area is located in a promising environment for Aboriginal inhabitants due to the presence of the Thames River, approximately 220 metres to the south, with its many floral and faunal resources
- Once Euro-Canadian settlement began in the early 19th century, lands in the Study Area were cleared for agriculture and then developed for urban uses in the 20th century. The Study Area is now heavily urbanized and has been deeply disturbed by development and infrastructure
- Seven archaeological sites, consisting mostly of Aboriginal findspots, are registered within 1 km of the intersection, but there are no known sites close to the Study Area
- According to the City of London's Archaeological *Master Plan* (1993), the Study Area has low integrity for the preservation of archaeological resources due to extensive soil disturbance caused by urbanization.

Based on these findings, the Study Area has low archaeological potential and an archaeological assessment is not required.

3.0

Phases 1 and 2 Review and Update

3.1

Introduction

The City's 2030 *Smart Moves Transportation Master Plan* (TMP) (May 2013) was completed following the Master Planning process outlined in the *Municipal Class EA*. The TMP covers Phase 1, Problem/Opportunity Identification, and Phase 2, Alternative Solutions, of the Class EA process for the transportation improvement projects identified in the Master Plan.

Phases 1 and 2 were reviewed and updated as part of the Highbury Avenue North/Hamilton Road EA Study. The purpose of the Phases 1 and 2 review and update was to:

- Confirm the need for improvements, as identified in the TMP
- Refine the road network improvements recommended by the TMP.

3.2

Phase 1, Problem/Opportunity Statement

Based on the findings of the TMP and the overview of existing conditions provided in Section 2 of this report, improvements to the Highbury Avenue North/Hamilton Road intersection are required to address:

- Existing Traffic Volumes (2015):
 - o Heavy northbound and southbound straight-through traffic volumes, northbound and westbound left-turn volumes and eastbound right turn volumes during morning/afternoon rush hours
- Future Traffic Volumes (2025):
 - o Up to 2.5 minutes of delay and 270 metres of vehicle back-ups during weekday morning rush hour
 - o More than 4.5 minutes of delay and up to 390 metres of vehicle back-ups during weekday afternoon rush hour
- Intersection Safety (2010 to 2014, City of London's Network Screening):
 - o One hundred and ten reported collisions at the intersection, with 40% consisting of rear end collisions
 - o Twenty-Four reported collisions along Highbury Avenue North, between Hamilton Road and Calvin Street, with 67% consisting of rear end collisions
 - o Intersection ranks in the top 50 most collision-prone intersections in London
- Access Management Issues:
 - o Individual access points to commercial and residential uses are contributing to the existing queuing and collision issues
- Pedestrian and cyclist needs.

Other planning, engineering and environmental factors that will be considered in the planning and design of the intersection improvements include:

- The intersection functions as a gateway into this part of the City
- The London Plan designates Hamilton Road as a Civic Boulevard and requires that street reconstruction projects emphasize pedestrian, cycling and transit movements. Pedestrian and vehicular scaled lighting, street furniture, tree plantings and sidewalks are required
- Highbury Avenue North is designated as an Urban Thoroughfare in the London Plan. This type of road emphasizes through movement of vehicles and freight and has a high quality pedestrian realm, along with a high standard of urban design
- The need to minimize impacts on the surrounding low density residential neighbourhoods, existing and future commercial uses at the intersection and existing trees, where possible.

3.3 Phase 2, Alternative Solutions, Review and Update

3.3.1 2030 Transportation Master Plan (TMP)

The key goal of the City's *2030 Transportation Master Plan* (TMP) is to provide more attractive travel choices for people who live, work and play in London. To achieve this goal, significant improvements in transit service are required, as well as greater support for walking, cycling and carpooling, along with road network improvements. As part of a long-term transportation strategy, the City's TMP identified the following five "Smart Moves" that form the basis of the Master Plan:

- *Rethinking Growth to Support the Transportation Master Plan*, consisting of encouraging an urban structure and form that encourages increased use of transit, walking and cycling
- *Taking Transit to the Next Level*, including a rapid transit system. This is currently being implemented as part of the City's *Shift* initiative
- *Greater Investment in Cycling and Walking Infrastructure*
- *More Actively Managing Transportation Demand*, including ways to reduce and manage vehicular transportation demand
- *More Strategic Program of Road Network Improvements*. Based on the need for improvements to support future growth, the TMP identified a series of major road improvements and smaller scale road improvement projects, including the proposed improvements to the Highbury Avenue North/Hamilton Road intersection.

As part of the Phase 2 review and update, Dillon refined the intersection improvements recommended by the TMP for the Highbury Avenue North/Hamilton Road intersection. Although the City's TMP emphasizes transit, active transportation and Transportation Demand Management (TDM) measures, it identified the need for road improvements to support future growth. The TMP (Table 15 in Section 3.3 of the TMP) recommended that the following improvements be made to the Highbury Avenue North/Hamilton Road intersection within 0 to 10 years:

- Centre, two way left turn lane on Highbury Avenue North from north of Hamilton Road to north of Calvin Street/Magee Street
- Centre raised median on Hamilton Road from Highbury Avenue North to Coventry Lane
- Additional through lane southbound on Highbury Avenue North on the west side, north of Hamilton Road, merge with parallel taper before Power Street, south of Hamilton Road
- Modify southbound and northbound channelized right turn lanes on Highbury Avenue North to pedestrian friendly channelized right turn lanes.

According to the TMP, these types of projects, such as the proposed improvements to the Highbury Avenue North/Hamilton Road intersection consist of “smaller, simpler improvements...that can alleviate traffic congestion in the short term”. Most of the improvements identified in the TMP are based on recommendations from local traffic studies completed for new development.

Major road improvements are shown on Table 14 in Section 3.3 of the TMP. Proposed improvements potentially affecting improvements to the Highbury Avenue North/Hamilton Road intersection include the widening of Hamilton Road from two to four through lanes from Highbury Avenue North to River Run Terrace to be completed within 15 to 20 years. Also to be completed within 15 to 20 years, is the optimization of Hamilton Road from Adelaide Street to Highbury Avenue North.

3.3.2 Access Management Changes

The significant number of individual access points to residential and commercial uses along Highbury Avenue North and Hamilton Road is a major cause of traffic congestion, back-ups and collisions. To alleviate these issues, potential access management changes considered at the Highbury Avenue North/Hamilton Road include:

- Restrict some access points to right-in/right-out access. Median islands will be used to physically restrict left-turns that cause conflicts with other traffic movements

- Close entrances in close proximity to the intersection subject to the availability of other entrances
- Consolidation of existing entrances.

Dillon identified and evaluated access management options for the entrances to the Petro-Canada Service Centre, No Frills, Fairmont Shopping Plaza, Shell Service Centre and McDonald's, the plaza in the southwest quadrant and Esso Service Centre, as well as unsignalized side street intersections within the intersection limits. Recommended access changes, based on an evaluation of operational impacts, including traffic and site impacts, are shown on Figure 10. These changes were incorporated into the Design Options developed for the proposed intersection improvements.

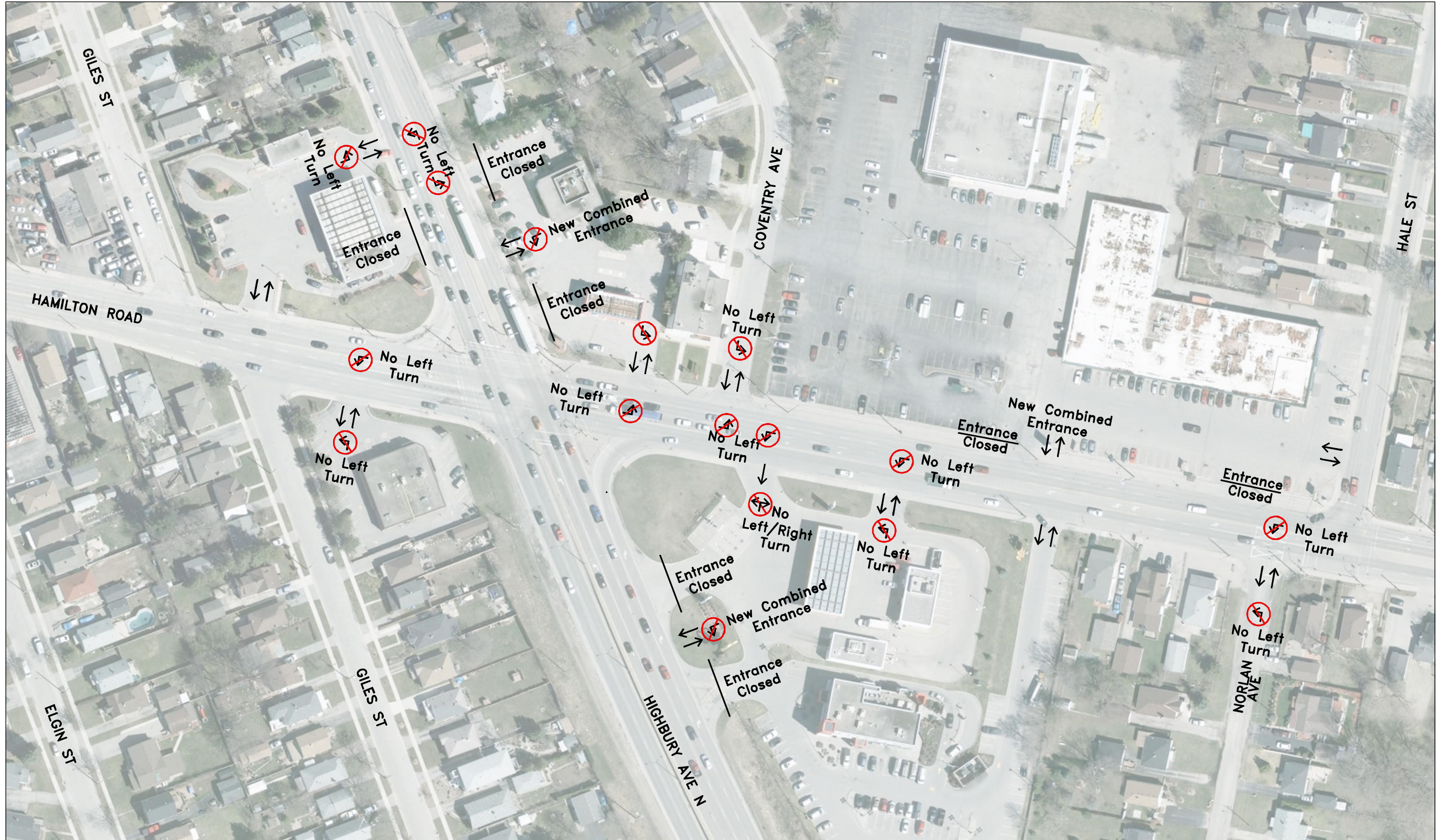
3.3.3 "Do Nothing" Alternative

The "Do Nothing" alternative consists of maintaining the intersection "as is" with no improvements. The intersection is currently operating at Level of Service (LOS) 'D' during the morning (AM) peak hour and LOS 'F' during the afternoon (PM) peak hour. As explained in Section 2.2.8 of this ESR, 2025 volumes were assessed under the existing geometric conditions to determine future "do nothing" conditions. Table 2 summarizes the future "do nothing" morning (AM) and afternoon (PM) peak hour traffic operations at the Study Area's signalized intersections.

In summary, the "Do Nothing" alternative was dismissed from further consideration because it does not address existing and future capacity, queuing and collision issues, access management issues or pedestrian and cyclist needs. For the purposes of the comparative evaluation of alternative designs, the "Do Nothing" alternative was the "base case" scenario.

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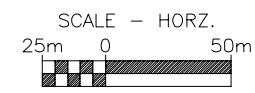
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CITY OF LONDON
Highbury Avenue/Hamilton Road
Intersection Improvements
Environmental Assessment Study



TS-1309-11



PROJECT No. 14-1203
DATE: JANUARY, 2017



Highbury Avenue and
Hamilton Road
Intersection

ACCESS MANAGEMENT CHANGES
FIGURE 10

3.3.4 Alternative Design Components

Alternative design components were developed and evaluated to address the issues associated with the major traffic movements at the intersection.

The alternative design components were based on the recommendations of the TMP. Examples of design components include dual left turn lanes, increased green time for traffic signals, increased traffic capacity by adding straight-through lanes, separate or longer turn lanes and increased storage length for turns. Examples of design components are shown on Figure 11. The evaluation of the design components is shown on Table 3.

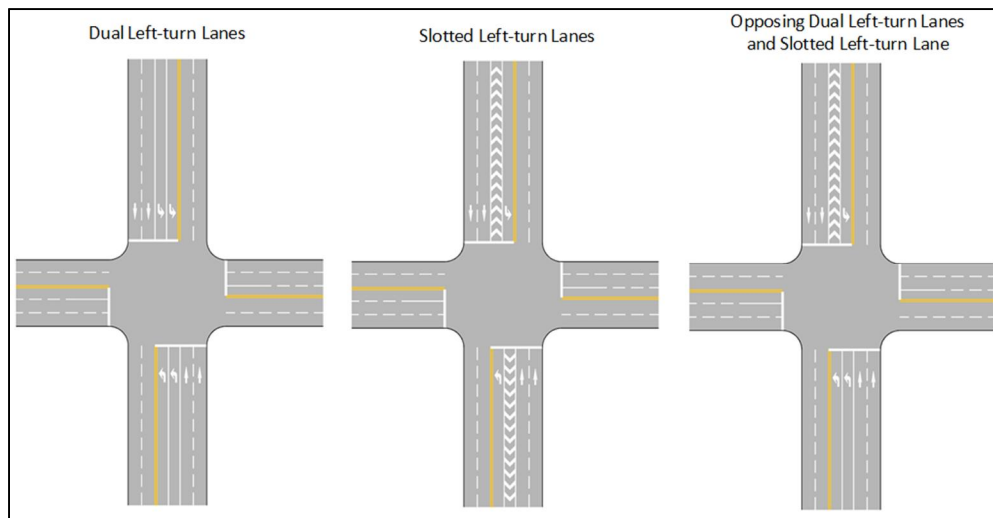


Figure 11: Examples of Alternative Design Components

The most effective components were carried forward and incorporated into the Design Options developed for the improvements. These are discussed in Section 4 of this ESR.

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Table 3: Alternative Design Components

Traffic Movement	Issue (2025 Projected PM Peak Traffic Volumes – Do Nothing)	Potential Solutions	Key Considerations
Highbury Avenue North Northbound Left-turn  (LOS F)*	- Long traffic backup (254 m) with insufficient storage - Long delay (>180 sec/vehicle) - Traffic volume exceeds capacity	Increase green time for advance left	Creates longer delays for other traffic
		Provide dual left turn lanes	- Increases pavement width, affecting pedestrian crossing time for Hamilton Road - Potential property impacts - Affects painted stop line placement on west leg of intersection, reducing available left turn storage (eastbound straight-through lane) - Requires a protected phase - Protected phase improves safety of this traffic movement - Requires a southbound dual or slotted left turn lane - Potential for property and utility impacts north of intersection
		Provide longer left turn lane	- Longer left only provides storage for vehicles in waiting to turn left, reducing interference in straight-through lane and improving safety - Does not improve the delay
		Reduce opposing traffic (provide more gaps)	High volume of opposing traffic means that this will not improve

Traffic Movement	Issue (2025 Projected PM Peak Traffic Volumes – Do Nothing)	Potential Solutions	Key Considerations
Highbury Avenue North Northbound Straight-through  (LOS E)*	- Long traffic backup (390 m) - Traffic volume exceeds capacity	Increase green time	Creates longer delays for other traffic movements
		Increase capacity (number of straight-through lanes)	- Increases pavement width, affecting pedestrian crossing time for Hamilton Road - High potential for property impacts - Downstream merge creates a bottleneck
		Provide a continuous two-way left turn lane from Calvin Street to the end of Southbound Left Turn Lane	- Results in less downstream interference to straight-through traffic movements - Provides safer turning traffic movements for access to residential entrances (reduces potential for rear-end collisions) - Potential property impacts
		Reduce downstream interference at commercial entrances (apply access management).	- Results in less disruption to straight-through traffic movements and potential for rear-end collisions - Impacts access to commercial properties
Highbury Avenue North Southbound Straight-through/ Right  (LOS F)*	- Long traffic backup (349 m) - Traffic volume exceeds capacity	Increase green time	Creates longer delays for other traffic movements
		Increase capacity (number of straight-through lanes)	- Increases pavement width, affecting pedestrian clearance time for Hamilton Road - High potential for property impacts - Downstream merge creates conflict point
		Reduce interference at Esso/Tim Horton's entrance (apply access management)	- Results in less disruption to straight-through traffic movement and potential for rear-end collisions - Impacts access to commercial properties
		Provide a separate right turn lane	- Results in less disruption to straight-through traffic movement and potential for rear-end collisions - Increases pavement width, affecting pedestrian clearance time for Hamilton Road - Potential property impacts

Traffic Movement	Issue (2025 Projected PM Peak Traffic Volumes – Do Nothing)	Potential Solutions	Key Considerations
Highbury Avenue North Southbound Left-turn  (LOS E)*	- Moderate traffic backup (48 m) - Moderate delay (70 sec/veh)	Provide longer left turn lane	- Longer left provides storage for vehicles waiting to turn left, reducing interference in straight-through lane - Does not improve the delay
		Provide dual left turn lanes	- Increases pavement width, affecting pedestrian clearance time for Hamilton Road - Potential property impacts - Affects painted stop line placement on east leg of intersection, reducing available left turn storage (westbound left turn) - Requires a protected phase - Protected phase improves safety of this traffic movement - Requires a dual or slotted northbound left turn lane
Hamilton Road Westbound Left-turn  (LOS F)*	- Long traffic backup (123 m) - Long delay (>180 sec/veh) - Traffic volume exceeds capacity	Increase green time for advanced left	Creates longer delays for other traffic movements
		Provide dual left turn lanes	- Increases pavement width, affecting pedestrian clearance time for Highbury Avenue North - Potential property impacts - Affects painted stop line placement on south leg of intersection, reducing available left turn storage (northbound left turn) - Requires a protected phase - Protected phase improves safety of this traffic movement - Requires a dual or slotted eastbound left turn lane
		Increase storage length	- Longer left only provides storage for vehicles waiting to turn left, reducing interference in straight-through lane and improving safety - Does not improve the delay
		Reduce opposing traffic (provide more gaps)	High volume of opposing traffic means that this will not improve

Traffic Movement	Issue (2025 Projected PM Peak Traffic Volumes – Do Nothing)	Potential Solutions	Key Considerations
Hamilton Road Westbound Straight-through/ Right  (LOS D)*	- Moderate traffic backup (125 m) - Moderate delay (47 sec/veh)	Create bus bay downstream of Highbury Avenue North to avoid interference to straight-through traffic movement Consolidate upstream bus stops to eliminate the stop immediately east of Highbury Avenue North	- Reduces interference caused by buses parking for longer duration than a normal stop (driver transition and washroom breaks occur here) - Eliminates the stop immediately east of Highbury Avenue North, reducing the capacity of the right lane
Hamilton Road Eastbound Straight-through  (LOS F)*	- Long traffic backup (241 m) - Long delay (>180 sec/veh) - Traffic volume exceeds capacity	Increase green time Increase capacity (number of straight-through lanes) Increase capacity beyond Hale Street to Eliminate merge occurring between Highbury Avenue North and Hale Street Reduce interference at commercial entrances (apply access management) Increase left turn lane storage at Hale Street Eliminate eastbound left turn to Coventry Street	- Creates longer delays for other traffic movements - Increases pavement width, affecting pedestrian clearance time - High potential for property impacts - Downstream merge creates bottleneck - Planned widening - Potential property impacts - Reduces interference by vehicles turning into commercial entrances - Results in less disruption to straight-through traffic movement and potential for rear-end collisions - Impacts access to commercial properties - Provides more storage for high volume of left turns, reducing impact on the eastbound straight-through. - Does not improve weave condition - Reduces downstream interference to eastbound straight-through traffic, particularly at a location that is very close to the Highbury Avenue North intersection

Traffic Movement	Issue (2025 Projected PM Peak Traffic Volumes – Do Nothing)	Potential Solutions	Key Considerations
Hamilton Road Eastbound Right-turn  (LOS F)*	- Long traffic backup (190 m) - Long delay (121 sec/veh) - Traffic volume exceeds capacity	Increase green time	Creates longer delays for other traffic movements
		Increase storage length	- Longer right only provides storage for vehicles waiting to turn left, reducing interference on the straight-through lane. - Does not improve the delay
		Provide a channelized right turn lane	- Creates an essentially free-flow traffic movement, providing significant operational improvement - Potential for property impact
Hamilton Road Eastbound Left-turn  (LOS E)*	Moderate delay (60 sec/veh)	Increase storage length	- Longer left provides storage for vehicles waiting to turn left, reducing interference in the straight-through lane - Does not improve the delay

*Level-of Service (LOS)

- A Unrestricted Capacity – Free flowing traffic
- B Affcted Capacity – Traffic volume is stable
- C Disturbed Capacity – Traffic volume is steady
- D Restricted Capacity – Traffic volume makes road difficult to navigate
- E Reaching Capacity – Traffic volume makes road more difficult to navigate
- F Over Capacity – Road cannot handle volume of traffic.

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4.0 Phase 3 Design Options

4.1 Introduction

Phase 3 of the Class EA process involved the identification and evaluation of Design Options to implement the preferred solution. A preferred design was chosen at the end of Phase 3.

4.2 Design Options

Four Design Options were developed and evaluated for the Highbury Avenue North/Hamilton Road intersection based on the Phases 1 and 2 Review and Update to address the problems and opportunities identified for the Highbury Avenue North/Hamilton Road intersection. All options include the following improvements:

- Recommended access management changes, as shown on Figure 10
- Median islands on Hamilton Road at the intersection and between Highbury Avenue North and Hale Street
- Additional southbound through lane. The northbound left turn is a critical movement with a high volume of vehicles and delays during peak hours. Extending the advance left turn signal reduces the green time for southbound through traffic. Adding a southbound through lane compensates for the reduced green time
- Eastbound and westbound bike lanes on Hamilton Road
- Eastbound left turn lane to No Frills/Fairmont Plaza
- Westbound left turn lane into McDonald's
- Raised median and two-way left turn lane between Magee Street and the end of the southbound median island, north of Hamilton Road
- Consolidation of bus stops and provision of bus bays
- Upgraded street lighting
- Landscaping and urban design elements
- Meet current *Accessibility for Ontarians with Disabilities Act* (AODA) standards.

All options also include the following improvements to the limits of work to ensure that the comparative evaluation focussed on the intersection improvements only:

- The north tie in point is Magee Street. Common improvements between Magee Street and the north limits of work include a southbound left to Magee Street, also acting as the opposing run-out for the centre two-way left turn (common for all alternatives)

- The east tie-in point is Hale Street. Common improvements between Hale Street and the east limits include a centre two-way left turn lane and the transition from the four lane to two lane roadway section. Moving the transition area east of Hale Street ensures that no rework is necessary west of the intersection when Hamilton Road is widened to the east
- The south tie-in point is Power Street
- The west tie-in point is west of Giles Street.

The range of options that could be developed for the intersection improvements is constrained by the surrounding residential and commercial development and the cost implications of property acquisitions. As shown on Figures 12, 13, 14 and 15, four options were developed. Along with the common improvements, Design Options 1 to 4 include the following additional improvements:

Design Option 1:

- Additional northbound and southbound through lanes along Highbury Avenue North.

Design Option 2:

- Additional southbound through lane along Highbury Avenue North
- Eastbound channelized right turn lane with receiving lane on Highbury Avenue North.

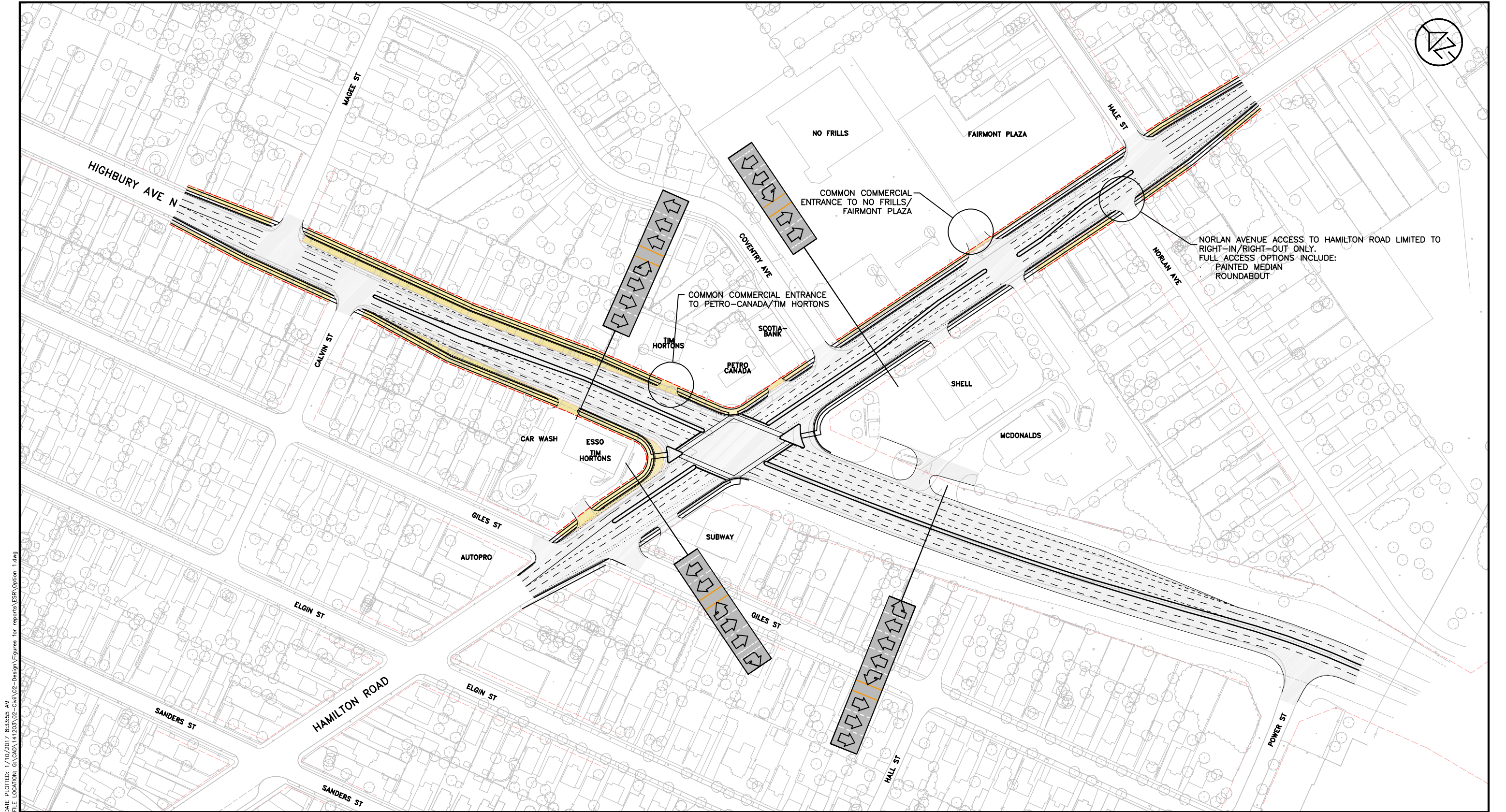
Design Option 3:

- Additional northbound and southbound through lanes along Highbury Avenue North
- Eastbound channelized right turn lane with receiving lane on Highbury Avenue North
- Westbound dual left turn (requires an eastbound slotted left)
- Northbound channelized right turn lane.

Design Option 4:

- Additional northbound and southbound through lanes along Highbury Avenue North
- Westbound dual left turn (requires an eastbound slotted left)
- Northbound dual left turn (requires a southbound slotted left)
- Northbound channelized right turn lane.

The lane configuration for the Design Options, along with the existing layout are summarized in Table 4.



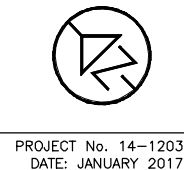
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CITY OF LONDON
 Highbury Avenue/Hamilton Road
 Intersection Improvements
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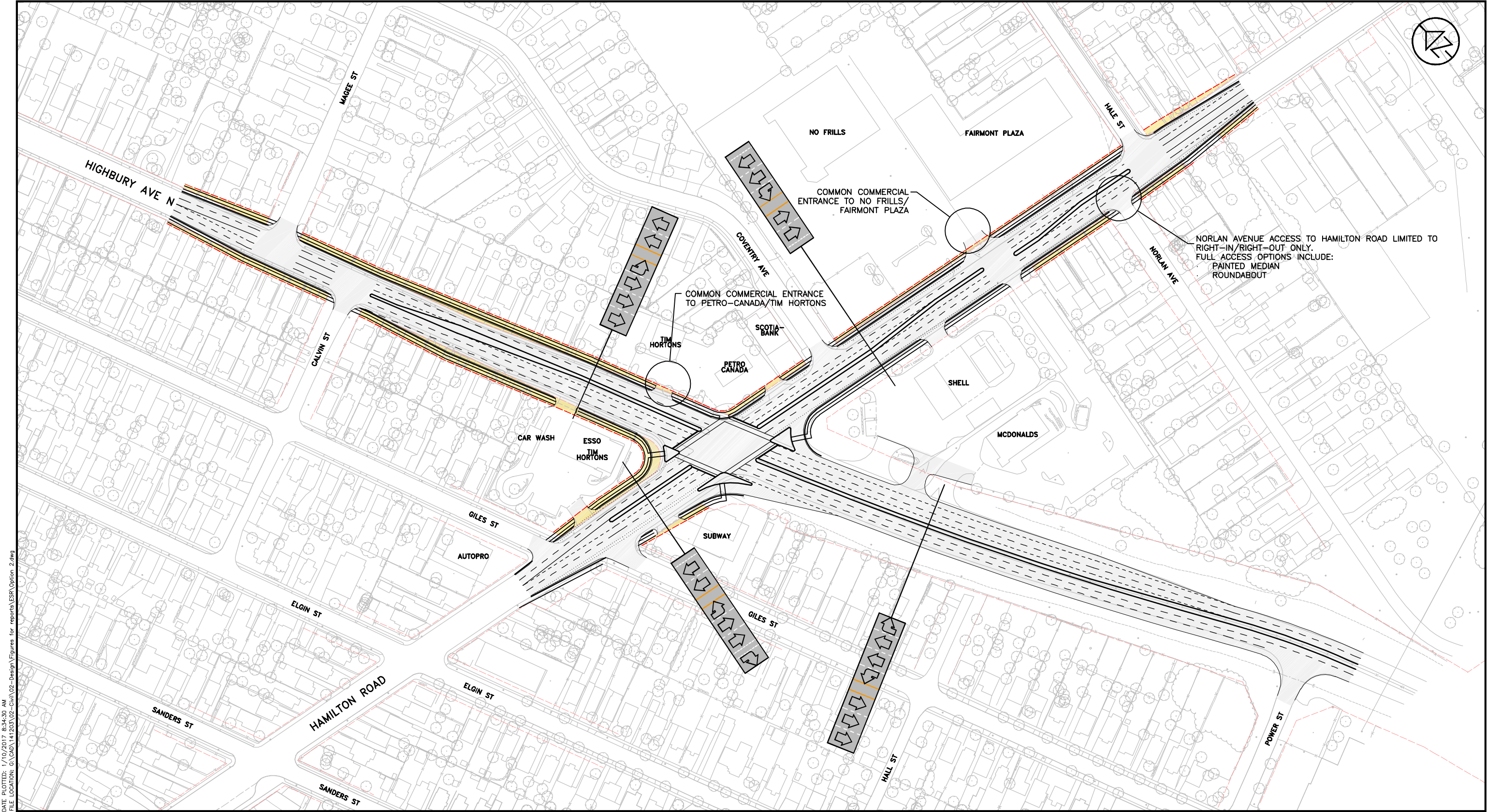


EXISTING ROW
 PROPOSED ROW
 PROPOSED NEW RIGHT-OF-WAY
 PROPOSED BIKE LANES

SCALE - HORZ.
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HIGHBURY AVENUE AND
 HAMILTON ROAD
 INTERSECTION
 DESIGN OPTION 1
 FIGURE 12



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CITY OF LONDON

HIGHBURY AVENUE/HAMILTON ROAD
 INTERSECTION IMPROVEMENTS
 ENVIRONMENTAL ASSESSMENT STUDY

TS-1309-11

**CORPORATION OF THE
CITY OF LONDON**

--- EXISTING ROW

--- PROPOSED ROW

--- PROPOSED NEW RIGHT-OF-WAY

..... PROPOSED BIKE LANES

SCALE - HORZ.

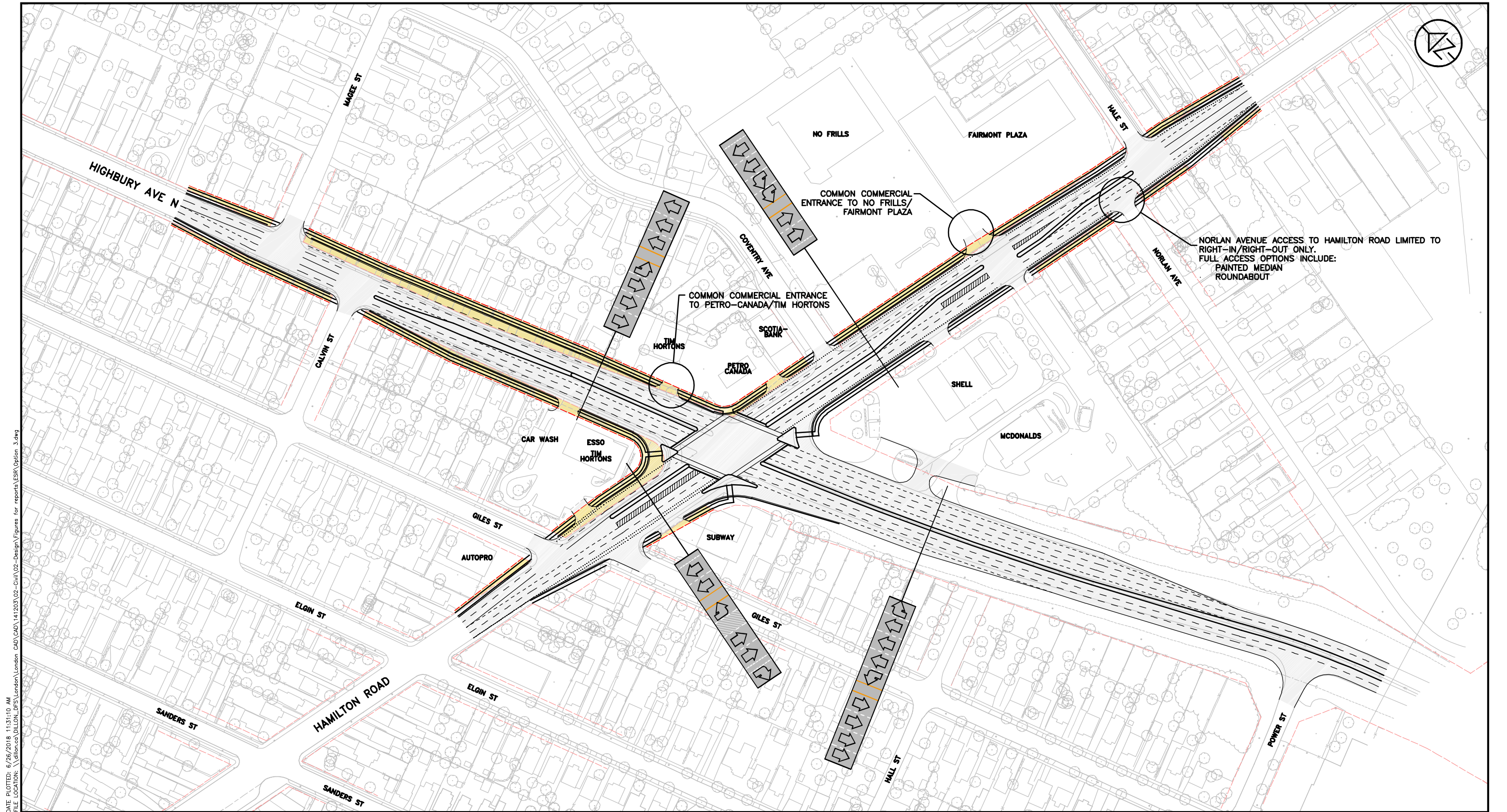
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PROJECT No. 14-1203
 DATE: JANUARY, 2017

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CONSULTING**

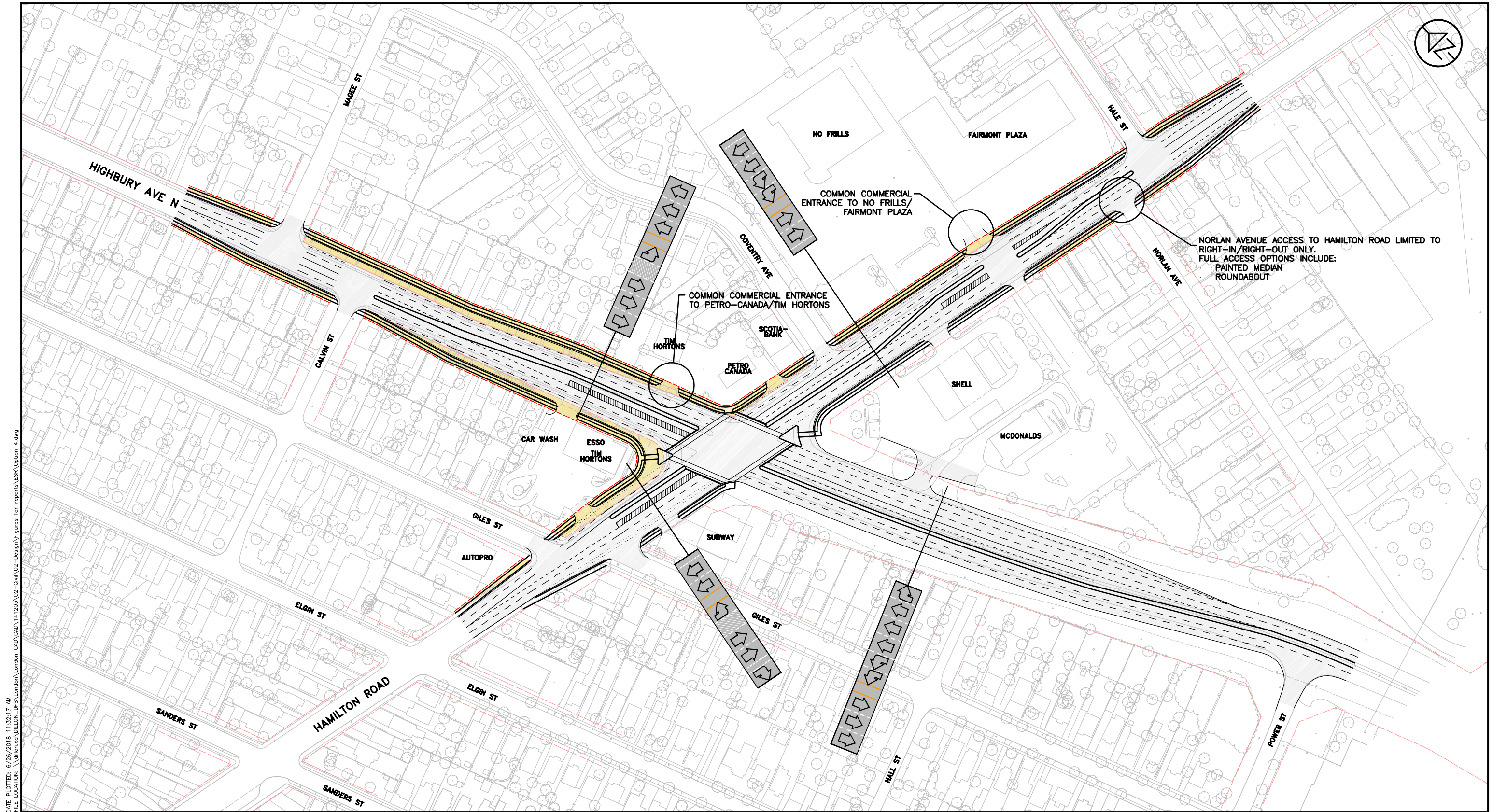
HIGHBURY AVENUE AND
 HAMILTON ROAD
 INTERSECTION

DESIGN OPTION 2
 FIGURE 13



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CITY OF LONDON

HIGHBURY AVENUE/HAMILTON ROAD
 INTERSECTION IMPROVEMENTS
 ENVIRONMENTAL ASSESSMENT STUDY

TS-1309-11

CORPORATION OF THE
CITY OF LONDON

----- EXISTING ROW

----- PROPOSED ROW

----- PROPOSED NEW RIGHT-OF-WAY

..... PROPOSED BIKE LANES

SCALE - HORZ.

12.5m 0 25m

PROJECT No. 14-1203
 DATE: MAY 2018

DILLON
 CONSULTING

HIGHBURY AVENUE AND
 HAMILTON ROAD
 INTERSECTION

DESIGN OPTION 4
 FIGURE 15

Table 4: Lane Configuration for Design Options

	Existing	Option 1	Option 2	Option 3	Option 4
Hamilton Road Eastbound					
Through lanes	2	2	2	2	2
Left turn lane	Single*	Single	Single	Single	Single
Right turn lane	Yes	Yes	Yes**	Yes**	Yes
Bike lanes	No	Yes	Yes	Yes	Yes
Hamilton Road Westbound					
Through lanes	2	2	2	2	2
Left turn lane	Single*	Single	Single	Dual	Dual
Right turn lane	No	No	No	No	No
Bike lanes	No	Yes	Yes	Yes	Yes
Highbury Avenue North Northbound					
Through lanes	2	3	2	3	3
Left turn lane	Single	Single	Single	Single	Dual
Right turn lane	Yes**	Yes**	Yes**	Yes**	Yes**
Bike lanes	No	No	No	No	No
Highbury Avenue North Southbound					
Through lanes	2	3	3	3	3
Left turn lane	Single	Single	Single	Single	Single
Right turn lane	No**	No**	No**	No**	No**
Bike lanes	No	No	No	No	No

*No curbed median present

**With channelized island.

4.3 Traffic Analysis

The four Design Options for the intersection improvements were assessed using the 2025 horizon AM/PM peak hour volumes. In general, the HCM 2000 methodology was applied to the analyses. Amber, all-red and flashing “do not walk” intervals were adjusted for each option as follows:

- Amber intervals are based on OTM Book 12 timings for posted speeds of 50 km/h east/west and 60 km/h north/south
- All-red intervals are as per the OTM Book 12 methodology for posted speeds of 50 km/h on all approaches, based on the intersection width for each individual design option
- Flashing “do not walk” intervals in each direction were based on the walking time along the length of the longest crosswalk at a speed of 1.0 m/s, discounting the amber and all-red intervals.

The amber and all-red intervals for Highbury Avenue North are based on different speeds because the posted speed limits differ north and south of the intersection. The higher speed limit was applied to the amber interval (longer time required to stop) and the lower speed limit was applied to the all-red interval (longer time required to travel through the intersection).

The “do nothing” alternative assumes existing signal timings. Traffic signal phase lengths were automatically optimized for all four options. There may also be opportunities to redistribute green time amongst conflicting movements as a means to strategically prioritize certain movements and deprioritize others, if desired. Examples include prioritizing the westbound approach to reduce the effect of queues on a roadway with short intersection spacing and deprioritizing the northbound through movement to reduce the risk of overloading downstream intersections.

The LOS and delay on Hamilton Road reflect optimized offsets and traffic progression between the adjacent Highbury Avenue North and Hale Street signalized intersections. The Hale Street intersection was assumed to operate at a half cycle (70 seconds, versus 140 seconds at Highbury Avenue North).

The traffic analysis of the four options is presented in four tables:

- Table 5 shows the volume-to-capacity (v/c) ratios for each movement
- Table 6 shows the average vehicle delay on each movement and for the intersection overall
- Table 7 shows the corresponding LOS on each movement and for the intersection overall
- Table 8 shows the calculated 95th percentile queue for each movement.

In each table, critical movements are shown in red.

There is little difference among the design options at the Hamilton Road intersections with East Street and Hale Street. Delays and queues may vary slightly depending on the details of traffic signal timings at Highbury Avenue North and any resulting variation in east/west traffic progression. However, the level of capacity is the same at both intersections for all design options. Results from Design Option 1 are presented in the tables for these two intersections.

Table 5: 2025 Volume-To-Capacity (V/C) Ratios

Design Option	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR
AM Peak Hour										
Hamilton Road at Highbury Avenue North										
Do nothing	0.52	0.58	0.41	0.94	0.59	1.18	0.93	0.40	0.64	1.10
1	0.46	0.43	0.30	0.98	0.55	1.08	0.87	0.39	0.58	1.05
2	0.51	0.50	0.10	0.99	0.58	1.02	0.94	0.38	0.64	0.99
3	0.61	0.64	0.10	1.08	0.68	1.08	0.79	0.24	0.54	0.88
4	0.56	0.63	0.38	0.82	0.62	0.88	0.63	0.24	0.56	0.65
Hamilton Road at East Street										
1	0.23			0.33		0.09			0.07	
Hamilton Road at Hale Street										
1	0.72	0.37	—	—	0.80	—	—	—	0.25	0.46
PM Peak Hour										
Hamilton Road at Highbury Avenue North										
Do nothing	0.51	1.43	1.13	1.51	0.59	2.19	1.09	0.68	0.83	1.09
1	0.33	1.10	0.80	1.38	0.47	1.46	1.18	0.79	0.89	1.30
2	0.33	1.10	0.31	1.38	0.47	1.41	1.34	0.80	0.89	1.26
3	0.37	1.13	0.31	1.30	0.52	1.41	1.12	0.45	0.89	1.21
4	0.31	1.02	0.80	1.08	0.47	1.08	0.94	0.45	0.89	1.01
Hamilton Road at East Street										
1	0.40			0.31		0.05			0.20	
Hamilton Road at Hale Street										
1	0.80	1.01	—	—	0.92	—	—	—	0.53	0.39

Movements:

EBL = eastbound left turn

EBT = eastbound through

EBR = eastbound right turn

WBL = westbound left turn

WBTR = westbound through-

right turn

NBL = northbound left turn

NBT = northbound through

NBR = northbound right turn

SBL = southbound left turn

SBTR = southbound through-

right turn

Table 6: 2025 Average Vehicle Delay (S/Veh)

Design Option	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR	Overall
AM Peak Hour											
Hamilton Road at Highbury Avenue North											
Do nothing	58.5	50.4	22.4	75.3	47.0	142	41.3	6.9	47.8	96.9	64.3
1	56.4	46.2	11.9	78.1	35.0	105	36.5	4.3	37.6	83.5	54.1
2	62.5	51.0	0.1	80.1	36.0	88.0	42.4	3.0	49.1	68.2	51.1
3	77.2	61.3	0.1	130	38.6	104	27.5	0.4	32.4	46.2	45.9
4	68.8	59.1	12.9	74.4	36.9	75.8	24.4	0.4	34.1	34.7	36.8
Hamilton Road at East Street											
1	3.9			1.9		12.9			13.7		3.0
Hamilton Road at Hale Street											
1	17.0	6.0	—	—	23.0	—	—	—	26.6	8.3	16.2
PM Peak Hour											
Hamilton Road at Highbury Avenue North											
Do nothing	60.3	241	121	278	37.3	575	79.6	14.9	70.4	83.8	131
1	43.0	104	31.3	222	39.9	258	124	25.5	85.8	177	123
2	41.9	104	0.5	223	35.5	235	189	25.7	85.9	162	134
3	51.1	118	0.5	205	29.5	235	95.9	0.9	84.3	140	102
4	45.0	82.0	38.9	130.4	28.4	123	46.2	0.9	85.3	66.4	58.3
Hamilton Road at East Street											
1	5.5			4.2		11.0			18.2		5.3
Hamilton Road at Hale Street											
1	31.3	40.1	—	—	36.7	—	—	—	30.2	6.7	35.5

Movements:

EBL = eastbound left turn

EBT = eastbound through

EBR = eastbound right turn

WBL = westbound left turn

WBTR = westbound through-

right turn

NBL = northbound left turn

NBT = northbound through

NBR = northbound right turn

SBL = southbound left turn

SBTR = southbound through-

right turn

Table 7: 2025 Level of Service

Design Option	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR	Overall
AM Peak Hour											
Hamilton Road at Highbury Avenue North											
Do nothing	E	D	C	E	D	F	D	A	D	F	E
1	E	D	B	E	D	F	D	A	D	F	D
2	E	D	A	F	D	F	D	A	D	E	D
3	E	E	A	F	D	F	C	A	C	D	D
4	E	E	B	E	D	E	C	A	C	C	D
Hamilton Road at East Street											
1	A			A		B			B		A
Hamilton Road at Hale Street											
1	B	A	—	—	C	—	—	—	C	A	B
PM Peak Hour											
Hamilton Road at Highbury Avenue North											
Do nothing	E	F	F	F	D	F	E	B	E	F	F
1	D	F	C	F	D	F	F	C	F	F	F
2	D	F	A	F	D	F	F	C	F	F	F
3	D	F	A	F	C	F	F	A	F	F	F
4	D	F	D	F	C	F	D	A	F	E	E
Hamilton Road at East Street											
1	A			A		B			B		A
Hamilton Road at Hale Street											
1	C	D	—	—	D	—	—	—	C	A	D

Movements:

EBL = eastbound left turn

EBT = eastbound through

EBR = eastbound right turn

WBL = westbound left turn

WBTR = westbound through-right turn

NBL = northbound left turn

NBT = northbound through

NBR = northbound right turn

SBL = southbound left turn

SBTR = southbound through-right turn

Table 8: 2025 95th Percentile Queues

Design Option	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR
AM Peak Hour										
Hamilton Road at Highbury Avenue North										
Do nothing	26	53	28	115*	125	212*	268*	35	29*	272*
1	40	80	34	100*	82	200*	172	22	20*	183*
2	40	81	0	105*	82	193	282*	16	28*	174*
3	40	80	0	68*	82	204*	181	0	24*	190*
4	38	76	31	51*	79	93*	165	0	28*	154
Hamilton Road at East Street										
1	36			48		5			4	
Hamilton Road at Hale Street										
1	70	58	—	—	97*	—	—	—	16	13
PM Peak Hour										
Hamilton Road at Highbury Avenue North										
Do nothing	35	250*	190*	123*	80	254*	390*	114	48*	349*
1	26	209*	73	119*	109	222*	288*	155	52*	273*
2	24	214*	0	122*	98	218*	445*	156	52*	269*
3	35	222*	0	73*	61	218*	278*	0	52*	263*
4	35	207*	127*	65*	60	105*	229*	0	52*	229*
Hamilton Road at East Street										
1	68			36		4			10	
Hamilton Road at Hale Street										
1	64	135*	—	—	106*	—	—	—	36	13
*Note: Under 95 th percentile traffic volumes, volume exceeds capacity; queue represents two cycles under 95 th percentile traffic demand.										

Movements:

EBL = eastbound left turn

EBT = eastbound through

EBR = eastbound right turn

WBL = westbound left turn

WBTR = westbound through-

right turn

NBL = northbound left turn

NBT = northbound through

NBR = northbound right turn

SBL = southbound left turn

SBTR = southbound through-

right turn

Highbury Avenue North at Hamilton Road

Design Options 1 and 2 result in minor improvements in traffic operations at the intersection by adding a through lane northbound and/or southbound, and (for Design Option 2) by adding a free-flow channelized eastbound right turn. Dual left turn lanes in Design Option 4 provide the most improvement to the northbound and westbound movements, and the third northbound and southbound through lanes continue farther north, thereby maximizing the effect of the additional through capacity. Design Option 3 falls between Options 1 and 2 and Option 4 by providing a dual westbound left turn lane to mitigate queue lengths where storage length is constrained, while maintaining the existing single northbound left turn lane to mitigate property impacts in the section to the north.

The operational analysis for each option generally reflects the relative magnitude of the proposed road modifications:

- Design Options 1 and 2 result in minor benefits in terms of capacity, delays and queues. In fact, a reduction in north/south through capacity was modeled compared to the “do nothing” condition because signal timing optimizations favoured northbound left turn and the eastbound/westbound movements
- Design Option 4 results in the greatest benefits in terms of capacity, delays and queues. It is the only alternative where the capacity for each through movement meets or exceeds projected future volumes, and where the northbound and westbound left turn capacity nearly meets the projected volumes. The dual northbound and westbound left turn lanes result in substantially shorter left turn queues and reduce the likelihood of queue spillback affecting operations in the adjacent through lanes. During the PM peak hour, delays will be substantially reduced for most through movements and the high-volume left turn movements, compared to “do nothing” and Design Options 1 and 2
- Design Option 3 has fewer benefits in terms of capacity, delays and queues compared to Design Option 4, but provides a modest level of improvement compared to Options 1 and 2. One anomaly is the westbound left turn movement where the dual left turn lane mitigates conditions during the afternoon (PM) peak hour by doubling the flow rate during the advance left turn phase and by reducing the length of the queue. However, it also increases delays and reduces capacity during the morning (AM) peak hour because left turns can no longer be made during gaps in opposing flow and during the westbound amber/all-red interval. In this case, the benefits of the reduced queuing east of Highbury Avenue North would need to be weighed against the increased left turn delays at off-peak times.

The intersection operations for Design Options 1 to 4 reflect optimized traffic signal timings that generally balance operations on all movements. Alternatively, signal timings could be weighted to strategically favor certain movements. Design Option 4 provides a substantial increase in capacity to Highbury Avenue North during the afternoon (PM) peak hour with the through capacity increasing to approximately 2,100 vph northbound and 1,700 vph southbound.

This northbound capacity could be higher than the capacity at downstream signalized intersections to the north, and if so, it might be preferable to favor the westbound approach and reduce queues on Hamilton Road, and use the intersection to meter the rate at which the freeway-level demand is released onto the arterial network and avoid overloading downstream links.

Hamilton Road at East Street

The intersection of Hamilton Road and East Street is projected to continue operating at a very good overall LOS, with no critical movements identified.

Hamilton Road at Hale Street

The intersection of Hamilton Road and Hale Street is projected to operate at a reasonable overall LOS based on average delay. However, similar to future “do nothing” conditions, the eastbound and westbound through movements are identified as operating at or near capacity during the afternoon (PM) peak hour.

The assessment reflects the existing lane configuration on Hamilton Road. Although there are two through lanes in each direction on Hamilton Road, the cross-section narrows immediately east of Hale Street and therefore the second lane contributes very little additional capacity. The eastbound and westbound conditions could be mitigated by widening Hamilton Road so that the cross-section transition is shifted farther from the intersection. As noted in the 2030 TMP, the City plans to widen Hamilton Road from two to four lanes from Highbury Avenue North to River Run Terrace within 15 to 20 years.

4.4 Comparative Evaluation of Design Options

As shown on Table 9, a comparative evaluation of Design Options 1 to 4 was conducted. Reflecting existing and future conditions potentially affected by the alternatives, evaluation factors and criteria included the following:

- Transportation Planning and Operations:
 - o Future (2025) Traffic Operations
 - o Impacts on Transit Operations
 - o Potential to Reduce Neighbourhood Traffic Infiltration
 - o Pedestrian and Cyclist Safety Improvements.
- Road Design:
 - o New Infrastructure Requirements
 - o Opportunity for Urban Design Elements
 - o Compatibility with Future Infrastructure
 - o Drainage Modifications
 - o Impacts on City Services (water, sanitary, storm)
 - o Utility Relocations.
- Construction:
 - o Construction Staging and Traffic Management.
- Land Uses and Socio-Economic Environment:
 - o Property/Access Impacts on Residential Uses
 - o Property/Access Impacts on Commercial Uses
 - o Impacts on Street Trees.
- Relative Costs:
 - o Infrastructure Costs
 - o Property Costs.

For this project, the most important evaluation criteria are future Level of Service, especially future overall intersection delays, property impacts on residential and commercial properties and infrastructure and property costs.

4.4.1

Similar Impacts

Many of the impacts shown on Table 9 are similar for all four Design Options. Shaded in grey, these impacts are summarized on Table 10 and include the following:

Transportation Planning and Operations:

- Since all options consolidate bus stops and include bus bays, they have the same impacts on transit operations. Transit delays will occur during construction
- All options reduce neighbourhood traffic infiltration since the new curbed median along Hamilton Road reduces access to some side streets. However, Options 3 and 4 cause the least traffic infiltration because the intersection will be less congested. By including bike lanes on Hamilton Road, all alternatives improve cyclist safety
- Design Option 2 has the shortest pedestrian crossing distances, while Design Option 4 has the longest. However, all options are basically equal with respect to pedestrian safety since the channelized right turns (included in all options) and dual left turns (included in Design Options 3 and 4) are generally less preferred for pedestrians. Although the channelized right turns provide a pedestrian refuge they are considered to be less preferred because they encourage higher speeds and drivers concentrate on finding a gap in traffic rather than checking for pedestrians.

Road Design:

- All four options equally provide opportunities to incorporate urban design elements (trees, street furniture, signage, etc.) into the design. Areas where these elements could be added include the west side of Highbury Avenue North, north of Hamilton Road (where several residences may require removal) and in the proposed two-way centred left turn lane on Highbury Avenue North. This lane could be changed into a wide median to incorporate urban design elements
- All options are compatible with future infrastructure, including the future widening of Hamilton Road, east of Hale Street
- All options are basically equal with respect to drainage impacts. Design Option 2 has the least new paved (impervious areas), while Option 4 has the most, potentially increasing run-off
- All options have similar impacts on City water, sanitary and storm sewer services
- Required utility relocations are similar for all options.

Construction:

- Lane closures will be required for all options during construction.

Land Uses and Socio-Economic Environment:

- The access management changes incorporated into all options provide the same access to businesses and side streets.

Relative Costs:

- Due to the similar scope and limits of work, infrastructure costs are similar for all options.

4.4.2

Significant Differences in Impacts

Evaluation criteria indicating significant differences in the impacts of the design options are shown in white on Table 9 and summarized on Table 11. As shown on Table 11, criteria indicating significant differences include traffic operations, residential and commercial property impacts and property cost.

Traffic Operations (2025 afternoon (PM) Peak Hour Volumes):

- As shown on Table 6, the average overall intersection delay for the base case “do nothing” scenario is 131 seconds per vehicle (s/veh) for the 2025 afternoon (PM) Peak Hour Volume. Overall, Design Options 3 and 4 improve traffic operations and reduce delays to 102 s/veh for Option 3 and 58 s/veh for Option 4. Design Options 1 and 2 do not provide an overall improvement in intersection operations. Option 1 causes a 123 s/veh delay, while Option 2 increases the delay to 134 s/veh.

Residential and Commercial Property Impacts:

- All options impact almost all residential properties within the project limits. Design Options 1, 2 and 3 requires the removal of 8 houses. Design Option 4 requires the removal of 11 houses due to the additional road width required to accommodate the southbound slotted left turn on Highbury Avenue North
- All options have minor property impacts on all commercial properties within the project limits. Options 1, 2 and 3 have moderate impacts on the Esso/Tim Horton's site. Option 4, due to the extra land required, has significant impacts on the Esso/Tim Horton's site and likely requires a total site reconfiguration or property acquisition.

Impacts on Street Trees

- All options require the removal of a significant number of street trees. Option 2 removes the least (38 trees), while Option 4 removes the most (49). Options 1 and 3 remove 45 and 48 trees, respectively.

Property Costs:

- Design Options 1, 2 and 3 are similar with respect to residential and commercial property costs, with Design Option 2 costing the least. Option 4 has the highest property costs since it requires the most houses and has the most significant impacts on the Esso/Tim Horton's site.

Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4

Evaluation Factors and Criteria (Significant differences in criteria shown in WHITE. Little to no differences shown in GREY.)		Design Options (All options include the same access management changes)				Summary	
		Design Option 1	Design Option 2	Design Option 3	Design Option 4		
1. Transportation Planning and Traffic Operations							
1.1 Future Traffic Operations (2025 afternoon (PM) Peak Hour Volumes) LEGEND Acceptable LOS or reductions in average delay* Neutral change +/- 20% in delay* Significant increases in delay* <i>*Compared to the projected 2025 base case “do nothing” scenario</i>		Does not improve intersection operations. Negative impacts when compared to the base case are: · Significant increase in delay for NB/SB through movements · Moderate increase in delay for SB left and WB left movements.	Does not improve intersection operations. Negative impacts when compared to the base case are: · Significant increase in delay for NB/SB through movements · Moderate increase in delay for SB left and WB left movements.	Improves intersection operations. Negative impacts when compared to the base case are: · Significant increase in delay for SB through movement · Moderate increase in delay for NB through and SB left movements.	Significantly improves intersection operations. All delays (including delays with LOS F) have been significantly improved from the base case except for: · Moderate increase in delay for SB left movement.	Significant difference between options. Future Traffic Operations (2025 afternoon (PM) Peak Hour Volumes) criterion is carried forward to evaluation in Table 11.	
Eastbound	Left	· Moderate delay · LOS D	· Moderate delay · LOS D	· Moderate delay · LOS D	· Moderate delay · LOS D		
	Through	· Average delay reduced 57%	· Average delay reduced 57%	· Average delay reduced 51%	· Average delay reduced 66%		
	Right	· Moderate delay · LOS D	· No delay · LOS A	· No delay · LOS A	· Moderate delay · LOS D		
Westbound	Left	· Average delay reduced 19% · LOS F	· Average delay reduced 19% · LOS F	· Average delay reduced 25%	· Average delay reduced 53%		
	Through/Right	· Moderate delay · LOS D	· Moderate delay · LOS D	· Moderate delay · LOS C	· Moderate delay · LOS C		
Northbound	Left	· Average delay reduced 55%	· Average delay reduced 59%	· Average delay reduced 59%	· Average delay reduced 79%		
	Through	· Average delay increase 55% · LOS F	· Average delay increase 137% · LOS F	· Average delay increase 20% · LOS F	· Average delay reduced 42% · LOS D		
	Right	· Moderate delay · LOS C	· Moderate Delay · LOS C	· No delay · LOS A	· No delay · LOS A		
Southbound	Left	· Average delay increase 22% · LOS F	· Average delay increase 22% · LOS F	· Average delay increase 20% · LOS F	· Average delay increase 21% · LOS F		
	Through/Right	· Average delay increase 111% · LOS F	· Average delay increase 93% · LOS F	· Average delay increase 67% · LOS F	· Average delay reduced 21% · LOS E		

LEGEND

Poor (significant impacts/complexity)



Fair (high impacts/complexity)



Moderate (moderate impacts/complexity)



Good (moderate-low impacts/complexity)



Very Good (low impacts/complexity)

Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4

Evaluation Factors and Criteria (Significant differences in criteria shown in WHITE. Little to no differences shown in GREY.)	Design Options (All options include the same access management changes)				Summary
	Design Option 1	Design Option 2	Design Option 3	Design Option 4	
1.2 Impacts on Transit Operations					Equal impacts between options. All options consolidate some bus stops and provide bus bays. Transit delays will occur during construction. <u>Impacts on Transit Operations</u> criterion is not carried forward to evaluation and is summarized in Table 10.
1.3 Potential to Reduce Neighbourhood Traffic Infiltration					Significant difference between options. <u>Potential to Reduce Neighbourhood Traffic Infiltration</u> criterion is carried forward to evaluation in Table 11.
1.4 Pedestrian and Cyclist Safety Improvements					Similar impacts between options. All options improve cyclist safety since bike lanes are provided on Hamilton Road. For pedestrians, Option 2 has the shortest crossing distances while Option 4 has the longest. The channelized right turns (included in all options) and dual left turns (Options 3 and 4) are generally considered less preferred for pedestrians. <u>Pedestrian and Cyclist Safety Improvements</u> criterion is not carried forward to evaluation and is summarized in Table 10.

LEGEND

- Poor (significant impacts/complexity)
- Fair (high impacts/complexity)
- Moderate (moderate impacts/complexity)
- Good (moderate-low impacts/complexity)
- Very Good (low impacts/complexity)

Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4

Evaluation Factors and Criteria (Significant differences in criteria shown in WHITE. Little to no differences shown in GREY.)	Design Options (All options include the same access management changes)				Summary
	Design Option 1	Design Option 2	Design Option 3	Design Option 4	
2. Road Design					
2.1 New Infrastructure Requirements * common for all design options	Hamilton Road: - EB and WB bike lanes * - EB and WB left turn lanes with median to replace existing centre two-way left turn lane east of intersection* - Median added adjacent to EB left turn lane at intersection. * Highbury Avenue North: - NB though lane - SB through lane * - Centre two-way left turn lane north of Hamilton Road. *	Hamilton Road: - EB and WB bike lanes * - EB and WB left turns lanes with median to replace existing centre two-way left turn lane east of intersection* - Median added adjacent to EB left turn lane at intersection * - EB channelized right. Highbury Avenue North: - SB through lane * - Centre two-way left turn lane north of Hamilton Road. *	Hamilton Road: - EB and WB bike lanes * - EB and WB left turns lanes with median to replace existing centre two-way left turn lane east of intersection* - Median added adjacent to EB left turn lane at intersection * - WB dual left and opposing EB slotted left - EB channelized right with receiving lane. Highbury Avenue North: - NB though lane - SB through lane * - Centre two-way left turn lane north of Hamilton Road. *	Hamilton Road: - EB and WB bike lanes * - EB and WB left turns lanes with median to replace existing centre two-way left turn lane east of intersection* - Median added adjacent to EB left turn lane at intersection * - WB dual left and opposing EB slotted left. Highbury Avenue North: - NB though lane - SB through lane * - Centre two-way left turn lane north of Hamilton Road * - NB dual left and opposing SB slotted left.	Significant difference between options. New Infrastructure Requirements criterion is carried forward to evaluation in Table 11.
					

LEGEND

-  Poor (significant impacts/complexity)
-  Fair (high impacts/complexity)
-  Moderate (moderate impacts/complexity)
-  Good (moderate-low impacts/complexity)
-  Very Good (low impacts/complexity)

Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4

Evaluation Factors and Criteria (Significant differences in criteria shown in WHITE. Little to no differences shown in GREY.)	Design Options (All options include the same access management changes)				Summary
	Design Option 1	Design Option 2	Design Option 3	Design Option 4	
2.2 Opportunity to Incorporate Urban Design Elements					Equal impacts between options. Urban design elements can be provided in two areas: - Residential properties required for removal on the west side of Highbury Avenue North (north of the intersection) - Proposed two-way centered left turn lane on Highbury Avenue North (north of intersection) could be modified to a wider median to incorporate urban design elements. <u>Opportunities to Incorporate Urban Design Elements</u> criterion is not carried forward to evaluation and is summarized in Table 10.
2.3 Compatibility with Future Infrastructure					Equal impacts between options. All four options are compatible with the future widening of Hamilton Road, east of Hale Street. <u>Compatibility with Future Infrastructure</u> criterion is not carried forward to evaluation and is summarized in Table 10.
2.4 Drainage Modifications	Increases the total area of new impervious areas potentially increasing run-off. 	Increases the total area of new impervious areas potentially increasing run-off but has the least new paved area of all options. 	Increases the total area of new impervious areas potentially increasing run-off. 	Increases the total area of new impervious areas potentially increasing run-off. Has the most new paved areas of all options. 	Similar Impacts between options. All options increase impervious areas but the additional lanes required for Option 4 potentially increase run-off more. <u>Drainage Modifications</u> criterion is not carried forward to evaluation and is summarized in Table 10.

LEGEND

Poor (significant impacts/complexity)

Fair (high impacts/complexity)

Moderate (moderate impacts/complexity)

Good (moderate-low impacts/complexity)

Very Good (low impacts/complexity)

Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4

Evaluation Factors and Criteria (Significant differences in criteria shown in WHITE. Little to no differences shown in GREY.)	Design Options (All options include the same access management changes)				Summary
	Design Option 1	Design Option 2	Design Option 3	Design Option 4	
2.5 Impacts on City Services (water, sanitary, storm)					Similar impacts on City services. New lanes require the relocation of catch basins and minor reconfiguration of storm sewer within limits of work. <u>Impacts on City Services</u> criterion is not carried forward to evaluation and is summarized in Table 10.
3. Construction					
3.1 Construction Staging and Traffic Management					Construction staging similar for all options. Lane closures will be required during widening. <u>Construction Staging and Traffic Management</u> criterion is not carried forward to evaluation and is summarized in Table 10.

LEGEND

-  Poor (significant impacts/complexity)
-  Fair (high impacts/complexity)
-  Moderate (moderate impacts/complexity)
-  Good (moderate-low impacts/complexity)
-  Very Good (low impacts/complexity)

Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4

Evaluation Factors and Criteria (Significant differences in criteria shown in WHITE. Little to no differences shown in GREY.)	Design Options (All options include the same access management changes)				Summary
	Design Option 1	Design Option 2	Design Option 3	Design Option 4	
4. Land Uses and Socio-Economic Environment					
4.1 Access Impacts					Equal Impacts on all options. Access management changes incorporated into all options provide the same access to businesses and side streets. <u>Access Impacts</u> criterion is not carried forward to evaluation and is summarized in Table 10.
4.2 Property Impacts on Residential Uses	Impacts almost all residential properties within project limits Similar impacts as Options 3 and 4 on houses along Highbury Avenue North due to addition of NB through lane Sliver widenings required from residential properties along Hamilton Road within limits of work Requires the removal of 8 residential houses. 	Impacts almost all residential properties within project limits. Fewer impacts than other options on houses along Highbury Avenue North since this option does not include an additional NB through lane. Similar impacts as Option 1 on residential properties along Hamilton Road. Requires the removal of 8 residential houses. 	Impacts almost all residential properties within project limits. Similar impacts as Options 1 and 4 on houses along Highbury Avenue North due to addition of NB through lane. More property impacts on residential properties along Hamilton Road than Options 1 and 2. Requires the removal of 8 residential houses 	Impacts almost all residential properties within project limits. Similar impacts on houses along Highbury Avenue North as Options 1 and 3 due to addition of NB through lane. Similar impacts as Option 3 on residential properties along Hamilton Road. Requires the removal of 11 residential houses. 	Significant difference between options. <u>Property Impacts on Residential Uses</u> criterion is carried forward to evaluation in Table 11.

LEGEND

 Poor (significant impacts/complexity)

 Fair (high impacts/complexity)

 Moderate (moderate impacts/complexity)

 Good (moderate-low impacts/complexity)

 Very Good (low impacts/complexity)

Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4

Evaluation Factors and Criteria (Significant differences in criteria shown in WHITE. Little to no differences shown in GREY.)	Design Options (All options include the same access management changes)				Summary
	Design Option 1	Design Option 2	Design Option 3	Design Option 4	
4.3 Property Impacts on Commercial Uses	Moderate impacts on Esso/Tim Horton's site in NW quadrant. Minor site adjustments required. Minor property (i.e., sliver widenings) required at: ScotiaBank, PetroCanada/Tim Hortons, Fairmont Plaza, No Frills and AutoPro, causing a loss of some parking spaces at AutoPro, Fairmont Plaza and No Frills. Although reconfiguration of parking spaces is required at Tim Hortons/PetroCanada, it will likely not reduce the total number of parking spaces. No impacts on plaza in southwest quadrant. 	Moderate impacts on Esso/Tim Horton's site in NW quadrant. Minor site adjustments required. Minor property (i.e., sliver widenings) required at: ScotiaBank, PetroCanada/Tim Hortons, Fairmont Plaza, No Frills and AutoPro, causing a loss of some parking spaces at AutoPro, Fairmont Plaza and No Frills. Same impacts as Design Option 1 on Tim Hortons/PetroCanada . Moderate impacts on plaza in southwest quadrant, restricting internal site movements. 	Moderate impacts on Esso/Tim Horton's site in NW quadrant. Minor site adjustments required. Minor property (i.e., sliver widenings) at: ScotiaBank, PetroCanada/Tim Hortons, Fairmont Plaza, No Frills and AutoPro, causing a loss of some parking spaces at AutoPro, Fairmont Plaza and No Frills. Same impacts as Design Option 1 on Tim Hortons/PetroCanada. Moderate impacts on plaza in southwest quadrant, restricting internal site movements 	Significant impacts on Esso/Tim Horton's site in the NW quadrant, likely requiring total site reconfiguration or property acquisition. Minor property (i.e. sliver widenings) required at: ScotiaBank, PetroCanada/Tim Hortons, Fairmont Plaza, No Frills and AutoPro, causing a loss of parking spaces at AutoPro, Fairmont Plaza and No Frills. Same impacts as Design Option 1 on Tim Hortons/PetroCanada. No impacts on plaza in southwest quadrant. 	Significant difference between options. <u>Property Impacts on Commercial Uses</u> criterion is carried forward to evaluation in Table 11.
4.4 Impacts on Street Trees	Requires removal of 45 street trees 	Requires removal of 38 street trees 	Requires removal of 48 street trees 	Requires removal of 49 street trees 	Significant difference between options. <u>Impacts on Street Trees</u> criterion is carried forward to evaluation in Table 11.

LEGEND

 Poor (significant impacts/complexity)

 Fair (high impacts/complexity)

 Moderate (moderate impacts/complexity)

 Good (moderate-low impacts/complexity)

 Very Good (low impacts/complexity)

Table 9: Comparative Evaluation of Design Options 1, 2, 3 and 4

Evaluation Factors and Criteria (Significant differences in criteria shown in WHITE. Little to no differences shown in GREY.)	Design Options (All options include the same access management changes)				Summary
	Design Option 1	Design Option 2	Design Option 3	Design Option 4	
5. Relative Costs					
5.1 Infrastructure Costs					Due to the similar scope and limits of work, infrastructure costs are similar for all options. Materials, construction staging, utility relocations and schedule impacts do not differ significantly for options with additional lanes. <u>Infrastructure Costs</u> criterion is not carried forward to evaluation and is summarized in Table 10.
5.2 Property Costs					Significant difference between options. <u>Property Costs</u> criterion is carried forward to evaluation in Table 11 and combined with Commercial and Residential Property Impacts Criteria.

LEGEND

-  Poor (significant impacts/complexity)
-  Fair (high impacts/complexity)
-  Moderate (moderate impacts/complexity)
-  Good (moderate-low impacts/complexity)
-  Very Good (low impacts/complexity)

Table 10: Summary of Similar Impacts for Design Options 1, 2, 3 and 4

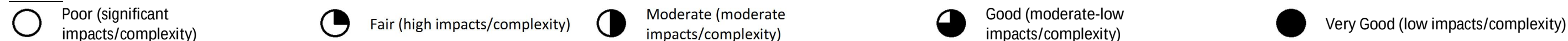
Evaluation Factors and Criteria	Design Options 1, 2, 3 and 4	Preferred Option
Transportation Planning and Operations		
Impacts on Transit Operations	All options consolidate some bus stops and provide bus bays.	Equal
Pedestrian Safety Improvements	Option 2 has the shortest crossing distance, while Option 4 has the longest. Channelized right turns (all alternatives) and dual left turns (Options 3 and 4) are considered less preferred for pedestrians.	Approximately Equal
Cyclist Safety Improvements	Bike lanes on Hamilton Road will improve cyclist safety.	Equal
Road Design		
Opportunity for Urban Design Elements (signage, trees, street furniture, etc.)	Constrained for all alternatives but could be provided in some areas.	Approximately Equal. Fewer opportunities with Option 2
Compatibility with Future Infrastructure	All are compatible with future widening of Hamilton Road, east of Hale Street.	Equal
Drainage Modifications	All options increase impervious areas potentially increasing run-off. Option 4 potentially causes the most run-off since it has additional lanes.	Approximately Equal
Impacts on City Services (water, sanitary, storm)	All options have similar impacts.	Approximately Equal
Utility Relocations	Relocations are similar for all.	Approximately Equal
Construction		
Construction Staging and Traffic Management	Construction staging similar for all options. Lane closures required during construction.	Approximately Equal
Land Uses & Socio-Economic Environment		
Access Impacts	Access management changes incorporated into all options provide the same access to businesses and side streets.	Equal
Relative Costs		
Infrastructure Costs	Due to similar scope and limits of work, costs are similar for all options.	Equal

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Table 11: Summary of Significant Differences in Impacts of Design Options 1 to 4

Evaluation Criteria	Design Option 1	Design Option 2	Design Option 3	Design Option 4
Traffic Operations (2025 PM Peak Hour Volumes) <i>The average overall intersection delay for the base case ("do nothing") scenario is 131 s/veh.</i>	Does not provide an overall improvement in traffic operations compared to base case. Causes significant increases in delays for northbound and southbound through movements. <u>Average overall intersection delay 123 s/veh.</u> 	Does not provide an overall improvement in traffic operations compared to base case. Causes significant increases in delays for northbound and southbound through movements. <u>Average overall intersection delay 134 s/veh.</u> 	Provides an overall improvement in traffic operations compared to base case. Causes a slight increase in delays for northbound through and southbound left movements and significant increase in delays for southbound through movements. <u>Average overall intersection delay 102 s/veh.</u> 	Provides an overall improvement in traffic operations compared to base case. Causes a slight increase in delays for southbound left movement. <u>Average overall intersection delay 58 s/veh.</u> 
Potential to Reduce Neighbourhood Traffic Infiltration	Reduces infiltration since new curbed median reduces access to some side streets. 	Reduces infiltration since new curbed median reduces access to some side streets. 	Reduces infiltration more than Options 1 and 2 because the intersection will be less congested. 	Reduces infiltration more than Options 1 and 2 since the intersection will be less congested. 
New Infrastructure Requirements <u>Hamilton Road</u> – Bike Lanes, EB/WB Left turn lanes, EB Curbed Median <u>Highbury Avenue</u> – SB through lane, Centre two-way left north of Hamilton	All common improvements as well as: <u>Highbury Avenue</u> – NB through lane 	All common improvements as well as: <u>Hamilton Road</u> – EB channelized right 	All common improvements as well as: <u>Hamilton Road</u> – WB dual left with EB slotted left, EB channelized right with receiving lane <u>Highbury Avenue</u> – NB through lane 	All common improvements as well as: <u>Hamilton Road</u> – WB dual left with EB slotted left <u>Highbury Avenue</u> – NB through lane, NB dual left with SB slotted left 
Residential Property Impacts and Costs	Impacts almost all residential properties within project limits. Requires the removal of eight houses. 	Impacts almost all residential properties within project limits. Requires the removal of eight houses. 	Impacts almost all residential properties within project limits. Requires the removal of eight houses. 	Impacts almost all residential properties within project limits. Requires the removal of 11 houses, resulting in the highest residential property costs. 
Commercial Property Impacts and Costs	Minor property impacts on all commercial properties within property limits. Moderate impacts on Esso/Tim Horton's site. 	Minor property impacts on all commercial properties within property limits. Moderate impacts on Esso/Tim Horton's site. 	Minor property impacts on all commercial properties within property limits. Moderate impacts on Esso/Tim Horton's site. 	Minor property impacts on all commercial properties within property limits. Significant impacts on Esso/Tim Horton's site, likely requiring total site reconfiguration or property acquisition, resulting in the highest commercial property costs. 
Impacts on Street Trees	Removes 45 trees. 	Removes 38 trees. 	Removes 48 trees. 	Removes 49 trees. 
Summary	Does not provide an overall improvement in traffic operations and has moderate impacts on residential and commercial properties.	Does not provide an overall improvement in traffic operations and has moderate impacts on residential and commercial properties.	Since Design Option 3 provides an overall improvement in traffic operations and a moderate impacts on residential and commercial properties, it was chosen as the preferred option. PREFERRED DESIGN OPTION	Although Design Option 4 results in the most significant improvement in traffic operations, it has the most significant impacts on residential and commercial properties.

LEGEND



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4.5

Preferred Design

For the Highbury Avenue North/Hamilton Road intersection improvements, the most important evaluation criteria are future Level of Service, especially overall intersection delays, property impacts on residential and commercial properties and infrastructure and property costs. Based on these criteria, Design Option 3 is recommended as the preferred design:

- Design Options 1 and 2 do not provide an overall improvement in traffic operations and result in average overall intersection delays of 123 s/veh and 134 s/veh by the year 2025. In contrast, Design Option 3 results in an average delay of 102 s/veh, while Design Option 4 results in a delay of only 58 s/veh
- Design Options 3 and 4 reduce neighbourhood traffic infiltration more than Options 1 and 2 because the intersection will be less congested with Options 3 and 4
- Although Design Option 4 results in the most significant improvement in traffic operations, it has the most significant impacts on residential and commercial properties and the highest property costs. Option 4 requires the removal of 11 houses and has significant impacts on the Esso/Tim Horton's site, likely requiring the total reconfiguration of the site or acquisition of the property
- Design Option 3 provides an overall improvement in traffic operations and minimizes impacts on residential and commercial properties. It requires the removal of eight houses and has only moderate impacts on the Esso/Tim Horton's site. For these reasons, it was chosen as the preferred option.

With the modifications presented in Design Option 3 implemented, all movements at the intersection of Highbury Avenue North and Hamilton Road are anticipated to operate below capacity during the weekday AM (morning) peak hour. During the weekday PM (afternoon) peak hour, several movements would continue to operate over capacity; however, the magnitude of the capacity deficiencies would be lower, and average delays and queues would be reduced compared to the “do nothing” conditions.

In summary, Design Option 3 was chosen as the preferred option because it provides a balance between improvements in overall traffic operations, property impacts and costs. Section 6.0 summarizes the selected design, including benefits and impacts

5.0

Public and Agency Consultation

5.1

Introduction

This section of the ESR summarizes the public and agency consultation undertaken throughout the Class EA process. Key points of public and agency contact are shown on the following table.

Table 12: Key Points of Public and Agency Contact

Contact/Date	Notification	Purpose
Notice of Study Commencement, January 2015	Notice mailed to Consultation Area around intersection (see Figure 1), agency contact list and First Nations. Appeared in January 29 and February 5, 2015, editions of The Londoner and posted to City's website.	Background and purpose of Class EA Study and how to get involved.
Public Information Centre (PIC) 1, May 14, 2015	Notice mailed to Consultation Area, agency contact list, First Nations and individuals who responded to Notice of Study Commencement. Also appeared in April 30 and May 7, 2015, editions of The Londoner and posted to City's website.	Present existing engineering and environmental conditions and alternative design components for the proposed intersection improvements.
PIC 2, March 9, 2016	Notice mailed to Consultation Area, agency contact list, First Nations and individuals who attended PIC 1. Appeared in February 25 and March 3, 2016, editions of The Londoner and posted to City's website.	Present the Design Options developed for the intersection improvements, comparative evaluation of the Design Options and the preferred option.
Notice of Study Completion, July 6 2018	Will be mailed to Consultation Area, agency contact list, First Nations and individuals who attended PICs 1 and 2. Will appear in two editions of The Londoner and be posted to City's website.	Public Notice advertising availability of ESR for public/agency review and comments, including how to submit a Part II Order request.

All consultation materials are included in Appendix C.

5.2 Contact List

The Contact List for the project includes potentially interested/affected federal agencies, provincial ministries, the Ward 1 Councillor, various City of London departments, local agencies, interest groups, emergency services and utilities. The list was updated throughout the project to include individuals who replied to the notices and attended the Public Information Centres.

5.3 Notice of Study Commencement

The Notice of Study Commencement explained that the Class EA study will develop and evaluate design options to implement the improvements proposed in the City's 2030 *Smart Moves Transportation Master Plan* (TMP). On January 23, 2015, a copy of the long version of the notice and a comment form (requesting comments by February 9) were mailed to the agencies on the Contact List. Also on January 23, 2015, the City mailed a long version of the notice and comment form to approximately 1,000 addresses within the Consultation Area shown on Figure 1. The City arranged for a short version of the notice to appear in the January 29 and February 5, 2015, editions of *The Londoner*. The long version of the notice was posted on the City's website.

In reply, the City received five completed comment forms from agencies and 138 forms from residents for a total of 143 responses. Of the residents who responded, 118 requested to be kept informed and 20 requested to be removed from the Contact List. Forty-five residents provided comments. Completed comment forms indicating interest in the project were received from the Middlesex- London Health Unit, London District Secondary School and Bell Canada.

As mentioned, 45 residents submitted comments. Comments, questions and concerns included the following:

General Concerns

- Property and access impacts during construction and the timing/duration of construction
- Pedestrian safety, especially neighbourhood children. Also, the traffic signals at the intersection do not provide enough time for pedestrians to cross
- Improvements should be bike friendly
- The difficulty of backing out of driveways onto Highbury Avenue North during peak periods

- High traffic volumes and speed of traffic on Giles, Hale, Elgin and Magee Streets and other side streets. Several suggestions were made for improving the side streets:
 - o Magee Street should have sidewalks
 - o “Whenever work is being done on Highbury Avenue North, Giles Street becomes Highway 401”
 - o Traffic on Hale Street has increased since the roundabout was constructed at Hale and Trafalgar Streets
 - o Stop signs should be provided on Giles Street to slow traffic down
 - o Speed bumps should be installed on Coventry Avenue, Elgin Street and many of the other side streets
- Exhaust fumes from idling vehicles is bad
- Too many accidents at the intersection.

Several people also mentioned that traffic through their neighbourhoods increased significantly during the construction of the Hale/Trafalgar roundabout. They are opposed to any new construction in this area.

Specific Improvement Suggestions

- An “indented” bus bay should be provided on Hamilton Road, east of Highbury Avenue North, since the bus interferes with traffic
- Access to Giles Street should be restricted during peak periods since it is difficult to access the street at certain times of the day
- No parking should be allowed on both sides of Giles Street from Calvin Street to Highbury Avenue North
- Advanced green lights should be provided at Hamilton Road/Highbury Avenue North and at Highbury Avenue North/Brydges Street
- Traffic going east on Hamilton Road gets backed up by left turns onto Coventry Avenue and traffic in and out of the plaza
- Highbury Avenue North should have a turning lane to facilitate access to houses along the street
- Truck traffic should be redirected to Veterans Memorial Parkway
- Not in favour of dual southbound left-turn lanes. Problems can be solved by providing longer advanced green lights
- Turning lanes from Hamilton Road to Highbury Avenue North are needed
- The study should also cover traffic impacts on the Trafalgar Street/Highbury Avenue North intersection.

Other Concerns

- One person stated that road and storm sewer upgrades are required on Fairhaven Circle
- Another person stated that Meadowlilly Road North should be resurfaced
- The intersection at Highbury Avenue North and Langmuir Street should also be improved.

5.4 Consultation with First Nations

The Ministry of the Environment and Climate Change (MOECC) provided information and resources to assist with First Nations consultation. A checklist provided by MOECC was completed indicating that there are no First Nations rights affected by the intersection improvements.

The Notice of Study Commencement, along with a comment form, was mailed to the First Nations on the Contact List by a City letter dated January 23, 2015. Only one First Nation replied to the letter. The Chippewas of the Thames Consultation Coordinator commented that the project was screened and no concerns were identified.

On April 10, 2015, representatives of the City of London met with the Caldwell First Nation Chief and two councillors to provide an overview of on-going Class EA projects in the City, including the Highbury Avenue North/Hamilton Road intersection improvements. The purpose of the meeting was to assist the First Nation in determining those projects which the First Nation would like to be involved in. No concerns were expressed regarding the proposed improvements at the Highbury Avenue North/Hamilton Road intersection.

First Nations were also advised of the Public Information Centres (PIC) held for the project by City of London letters. A letter dated April 27, 2015, was sent to First Nations on the Contact List for PIC 1 while a letter dated February 22, 2016, advised First Nations of PIC 2. As requested, the City sent a copy of the PIC 2 displays to the Consultation Co-ordinator of the Chippewas of the Thames First Nation.

Following PIC 1, the Ministry of Aboriginal Affairs (MAA) advised that the Oneida Nation of the Thames, Chippewas of the Thames First Nation and Munsee-Delaware First Nation could have an interest in the project. All three were already included on the project Contact List. MAA requested to be removed from the mailing list

5.5 Public Information Centre 1

PIC 1 was held on May 14, 2015, at the Fairmont United Church on Tweedsmuir Avenue, from 4:30 p.m. to 8:00 p.m. The purpose of PIC 1 was to obtain public and agency input on existing engineering and environmental conditions and alternative design components for the proposed intersection improvements.

5.5.1 Distribution of PIC 1 Notice

The PIC 1 Notice was distributed as follows:

- A long version of the notice was mailed to agencies on the project Contact List by letter dated April 27, 2015. The letter invited them to an agency session from 4:30 p.m. to 5:30 p.m.
- A long version of the notice was mailed to residents on the Contact List dated April 27, 2015
- Also on April 27, 2015, a copy of the notice was mailed to approximately 1,000 addresses, including residential and commercial property owners in the Consultation Area
- The short version of the notice appeared in The Londoner on April 30 and May 7, 2015
- The notice was posted to the City's website on April 28, 2015.

5.5.2 Format and Displays

PIC 1 was an informal walk-in session with displays summarizing the work completed to date. The project team, including City of London and Dillon staff, were available to answer questions and record comments from attendees. The displays covered the following:

- Study/Consultation Area
- Problem/Opportunity Statement
- Class EA Process
- Socio-Economic Environment
- Existing (2015) and Projected (2025) Traffic Conditions with no improvements
- Access Management, including potential modifications
- Public and Agency Consultation to date
- Alternative Design Components to improve traffic movements at the intersection
- Next Steps in the Class EA Process.

Copies of the displays, along with a comment form requesting comments by May 31, 2015, were handed out to all present. The City uploaded the PIC displays to the project website prior to the PIC.

5.5.3 Attendance

A total of 33 individuals signed the Record of Attendance. Almost all of the attendees were residents of the surrounding neighbourhoods. A representative of the Upper Thames River Conservation Authority (UTRCA) also attended.

5.5.4 Key Issues and Written Submissions

In general, most of the PIC attendees agreed that intersection improvements are required to relieve traffic congestion, improve traffic and pedestrian safety and reduce traffic “cutting through” local neighbourhood streets to avoid the intersection. Concerns about the improvements included property requirements, changes in access, the timing and length of construction, traffic signal timing, and movement of pedestrians and cyclists. In total, 16 written submissions were received, including the following:

Agencies and Utilities

- The Middlesex-London Health Unit recommended that since this intersection ranks among the City’s top 50 collision prone intersections (according to the City’s 2014 Network Screening):
 - o Safety is maximized for all road users, especially vulnerable users such as pedestrians (all abilities) and cyclists by using a Complete Streets approach
 - o Safe pedestrian access be provided to commercial facilities
 - o The improvements be designed to minimize driver-cyclist collisions
- UTS Consultants, acting on behalf of Bell Canada, noted that it will be conducting the conflict analysis
- Hydro One confirmed that it has high voltage transmission facilities in the Study Area.

Business and Residents

Local residents made many suggestions on a variety of issues, including:

- Locations where left turns should not be allowed, such as onto Giles, Elgin and Power Streets. One person suggested that Coventry Avenue be closed to separate residential and commercial traffic

- Left turns should be prohibited onto Coventry Avenue, Norlan Avenue and Magee Street. A median in front of Giles Street will prevent left turns onto the street. One resident said that all left turn lanes should be prohibited on Highbury Avenue North between Trafalgar Street and Hamilton Road. Raised medians will be more effective than signage
- Access restrictions to reduce through traffic on local streets
- Access modifications to local businesses
- Double left turn lanes from Hamilton Road to southbound Highbury Avenue North were suggested since cars back up all the way to Hale Street at times. Longer left turn lanes should also be provided
- Advanced green times should be increased and advanced green signals are required for left turns from Hamilton Road to Highbury Avenue North. The lights at Hamilton Road/Hale Street and Highbury Avenue North and Hamilton Road should be “in sync”
- The intersection of Hale Street and Hamilton Road acts as a “bottle neck” affecting traffic at the Highbury Avenue North/Hamilton Road intersection
- Bus bays should be provided
- Parking should be prohibited on Giles Street. One resident noted that a local repair garage uses Giles Street as a “personal parking lot”
- The parking lot at Scotiabank should be modified to remove the ATM from the parking lot
- Bike lanes should not be added since they would be too dangerous and pedestrians need more time to cross the intersection. There is a lot of pedestrian traffic in the area
- The speed limit on the freeway portion of Highbury Avenue North should be reduced
- One resident suggested a multi-lane roundabout for the intersection.

Two residents on Highbury Avenue North asked how much land will be required from their properties. One resident commented that the value of his property will decrease significantly if more land is taken from the front yard and asked if the City will construct and maintain a new retaining wall.

The Manager of the Esso Station asked for an electronic copy of the PIC displays. A representative of Brookfield Global Integrated Solutions Realty (on behalf of Esso) noted that the PIC displays show the potential closure of the south entrance to the station from Highbury Avenue North. She stated that she will assess the impacts of the potential closure on fuel truck delivery. She also asked if any property is required from the site.

5.5.5 PIC 1 Follow-up

Following PIC 1, a copy of the displays, along with a comment form, were mailed and e-mailed on May 26, 2015, to the agencies on the project Contact List.

On May 27, 2015, a letter and copy of the displays were delivered to approximately 25 businesses at the intersection potentially affected by access changes and property impacts. Both letters included a comment form requesting comments by June 12, 2015.

All comments received at PIC 1 were replied to by letters dated September 24, 2015.

5.6 Public Information Centre 2

Public Information Centre 2 was held on March 9, 2016, at the BMO Centre from 4:30 p.m. to 7:00 p.m. The purpose of PIC 2 was to present the Design Options developed for the intersection improvements, comparative evaluation of the Design Options and the preferred option.

5.6.1 Distribution of PIC 2 Notice

The PIC 2 Notice was distributed as follows:

- A long version of the notice was mailed to agencies on the project Contact List by letter dated February 22, 2016
- A long version of the notice was mailed to residents on the Contact List February 22, 2016
- A long version of the notice was mailed to approximately 1,000 addresses in the Consultation Area on February 22, 2016
- The short version of the notice appeared in the February 25, 2016 and March 3, 2016 editions of The Londoner
- The notice was posted to the City's website on February 23, 2016.

5.6.2 Format and Displays

PIC 2 was an informal walk-in session with displays summarizing the work completed to date. City of London and Dillon staff was available to answer questions and record comments from attendees. The displays covered the following:

- Consultation/Study Area and Class EA Process
- Problem/Opportunity Statement
- Public and Agency Consultation to Date

- Road Safety
- Proposed Access Management Changes
- Design Options 1, 2, 3 and 4
- Summary of the Comparative Evaluation of Design Options 1, 2, 3 and 4. Option 3 was identified as the preferred design
- Construction timing, staging and traffic management
- Next Steps in the Class EA and design process.

Copies of the displays, along with a comment form requesting comments by March 25, 2016, were handed out to all present. The City uploaded the displays to the project website prior to the PIC.

Following PIC 2, a copy of the PIC displays was mailed and e-mailed to all agencies on the Contact List, along with a comment form, by letter dated March 10, 2016.

5.6.3 Attendance

A total of 36 individuals signed the Record of Attendance at PIC 2. Almost all of the attendees were residents of the surrounding area, along with the City of London Ward 1 Councillor and a representative of the Middlesex-London Health Unit.

5.6.4 Key Issues and Written Submissions

Most of the PIC attendees agreed with the proposed intersection improvements. Concerns included impacts on the houses along Highbury Avenue North, pedestrian and cyclist safety, traffic safety, including the speed of traffic and visibility problems at the intersection and the difficulty of making left turns onto Giles and Elgin Streets. Other concerns included the increased proximity of Highbury Avenue North to the existing houses due to the required property acquisitions.

In total, nine written submissions were received, including the following:

Agencies and Utilities

- The Middlesex-London Health Unit stated that it supports facilitating environments that increase the use of active and safe modes of transportation, including walking, cycling and public transit for health, environmental and economic benefits. As shown in the letter included in Appendix C, the Health Unit made many suggestions for landscape and urban design features and improving pedestrian and cyclist facilities and safety

- A representative of the London Development Institute asked about the source of funding for the project
- London Hydro provided comments on the impacts of the intersection improvements on its facilities.

Residents

- A resident of Highbury Avenue North agreed with the choice of Design Option 3 as the preferred design but expressed some concerns about the length of time it will take to construct and traffic impacts during construction. Speed was also mentioned as a problem
- A local resident agreed with the choice of Design Option 3 and supported the median along Hamilton Road to prevent left turns. Concerns included visibility at the intersection due to the skew of the intersection. This resident also suggested an advanced left turn phase for the traffic signals
- A resident of Magee Street is concerned that Magee Street will be used as “detour” during construction. At present, the street is used to avoid the Highbury Avenue North/Hamilton Road intersection. The resident is also concerned about the speed of traffic and the safety of residents and children
- A resident of Hale Street made many suggestions for improvements, including adding bus bays, measures to deal with the skew of the intersection and changing the location of the entrance to Fairmont Plaza
- The owner of a house on Highbury Avenue North asked several questions of the City’s property acquisition process.

5.6.5 PIC 2 Follow-up

Following PIC 2, a copy of the displays, along with a comment form, were mailed and e-mailed March 10, 2016, to the agencies on the project Contact List.

Letter replies were provided to all comments received at PIC 2.

5.7 Meetings with Local Businesses

Following PIC 1, a City of London letter dated September 30, 2015, to property owners around the intersection explained that the Design Options presented at PIC 1 potentially impact local businesses. Potential impacts included property acquisitions and changes in access to improve intersection operations and safety. Enclosed with the letter were plans showing potential impacts. The letter requested that the property owner call the City to arrange a meeting to discuss the impacts.

Meetings, attended by City and Dillon staff, were subsequently held with representatives of Esso, Suncor and Shell to discuss current site operations, proposed entrance closures and property acquisitions.

A meeting was held with representatives of Esso and Brookfield Global Integrated Solutions Realty on October 2, 2015, to discuss the proposed closure of the south entrance to the site on Highbury Avenue North. Representatives of Esso and Brookfield expressed concerns regarding the impacts of closing this entrance on site operations. The City and Dillon agreed to consider options for consolidating the entrances to address their concerns, if possible. Dillon also agreed to provide Esso/Brookfield with proposed property acquisitions following the selection of the preferred design.

A meeting was held with representatives of Suncor Energy (the owners of the Petro-Canada/Tim Horton's site at the northeast quadrant) on November 5, 2015, to discuss the proposed closure of the south entrance to the site on Highbury Avenue North. Suncor disagreed with the proposed closure since customers of Petro-Canada would be required to use the entrance to Tim Horton's to access Petro-Canada. To address this concern, Dillon suggested that both entrances to Highbury Avenue North be closed and replaced with a common entrance centred between the two existing entrances. Suncor supported this option but requested a plan showing the proposed modifications and property acquisitions.

Representatives of Shell Canada Products and CBRE Limited met with representatives of the City and Dillon on January 14, 2016. Located at the southeast quadrant of the intersection, the existing entrances to the site include two on Hamilton Road and one on Highbury Avenue North currently restricted to right-in/right-out only. An entrance to McDonald's can also be used for access to the Shell gas station. As discussed at the meeting, the City is considering consolidating the Highbury Avenue North entrances to Shell and McDonald's into one wider commercial entrance to alleviate safety concerns on Highbury Avenue North, particularly rear end collisions. Shell expressed some concerns regarding the impacts of the wider entrance on the safety of internal site traffic. The City also stated that the existing west access on Hamilton Road will be restricted to right-in/right-out due to the new median along Hamilton Road.

5.8 Meetings with Residential Property Owners

Prior to the notices being issued for PIC 2, residential property owners potentially affected by the acquisition of their properties for the road improvements received a City of London letter dated February 3, 2016. The letter requested that the property owner contact the City to arrange a meeting to discuss property impacts. Meetings and conference calls were

subsequently held with many of the affected property owners on February 19, 2016. The City will continue to negotiate with affected property owners throughout the design phase of the project.

5.9 Meeting with London Transit Commission

Representatives of the City and Dillon met with representatives of the London Transit Commission (LTC) on March 23, 2015. LTC provided the following information:

- Based on a recent review, the current transit routes are expected to remain the same over the next five years
- The Esso gas station at the northwest quadrant is a LTC staff turnover point and “pit stop”
- LTC would prefer that the Hamilton Road entrance to Esso be a right-in/right-out entrance. Drivers currently make unsafe turns in front of stopped buses for access to the gas station.

To improve the operational efficiency of the intersection, LTC agreed to consolidate some bus stops and provide bus bays. These changes were incorporated into the preferred design.

5.10 Notice of Completion

The ESR will be placed on the public record for the required 30-day public and agency review period. During the review period, the Class EA entitles any person who has significant concerns, which cannot be resolved with the City, to request the Minister of the Environment and Climate Change to change the status of the project from a Class EA to an individual EA by issuing a Part II Order under the *Environmental Assessment Act*. If there are no Part II Order requests, the proposed intersection improvements may proceed to Detailed Design and construction.

6.0 Preferred Design

6.1 Introduction

This section of the ESR describes the selected design, including its benefits and impacts and the environmental protection and mitigation measures which must be implemented during the subsequent Detailed Design and construction stages.

6.2 Preferred Design

6.2.1 Roadway Improvements

As shown on Figure 2, in Section 1, the preferred design of the intersection improvements (Design Option 3) includes the following major roadway features:

- Additional northbound and southbound through lanes along Highbury Avenue North
- Eastbound channelized right turn lane with a receiving lane on Highbury Avenue North
- Westbound dual left turn lanes with an eastbound slotted left
- Northbound channelized right turn lane.

Other design features include the following:

- Median islands on Hamilton Road at the intersection and between Highbury Avenue North and Hale Street
- Eastbound and westbound bike lanes on Hamilton Road
- Eastbound left turn lane on Hamilton Road into No Frills/Fairmont Plaza
- Westbound left turn lane on Hamilton Road into McDonald's
- Centred two-way left turn lane on Highbury Avenue North between Magee Street and the end of the southbound median island north of the intersection
- Bus bays
- Landscaping, urban design elements and new street lighting
- Turning restrictions and closures of some residential and commercial entrances, as shown on Figure 10 in Section 3.

The proposed lane configuration and traffic control measures are shown in Figure 16 and cross-sections of the proposed roadway improvements are shown on Figures 17 to 20.

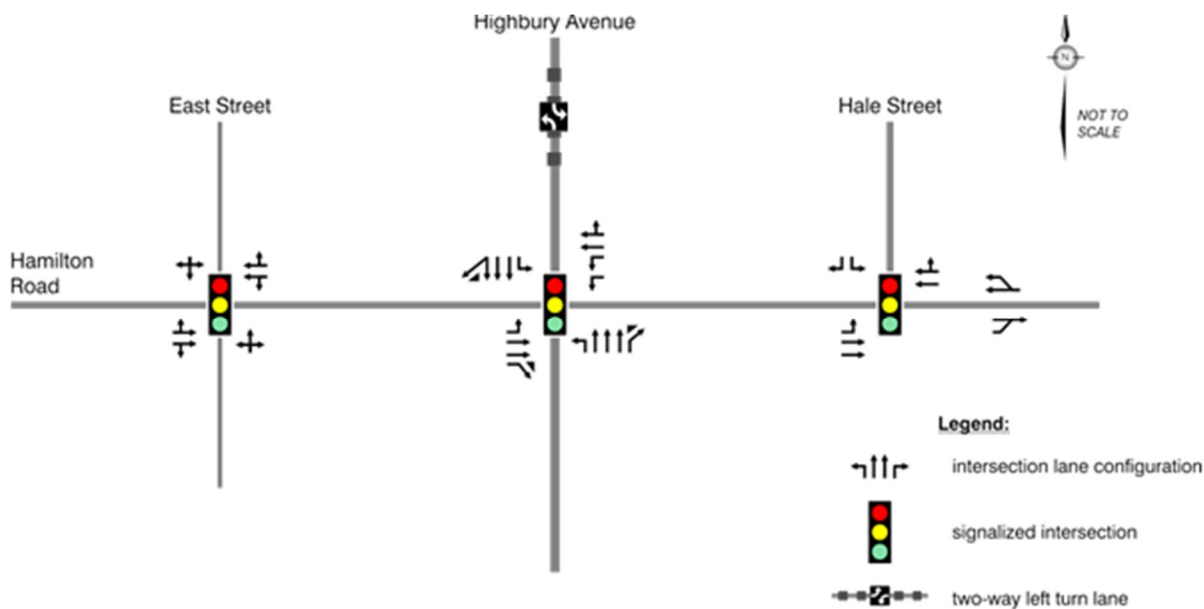


Figure 16: Preferred Design, Lane Configuration and Traffic Control Measures

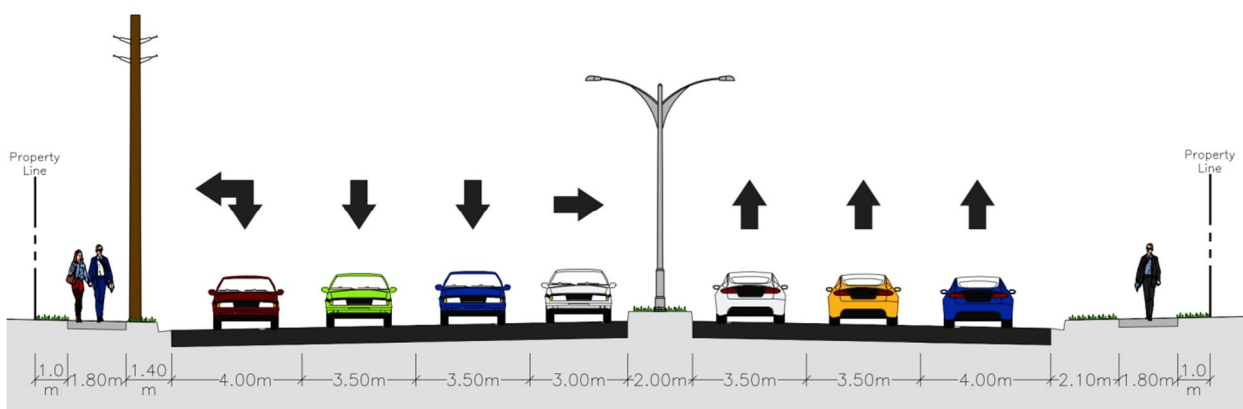


Figure 17: Preferred Design, Highbury Avenue North Cross-Section, North of Hamilton Road

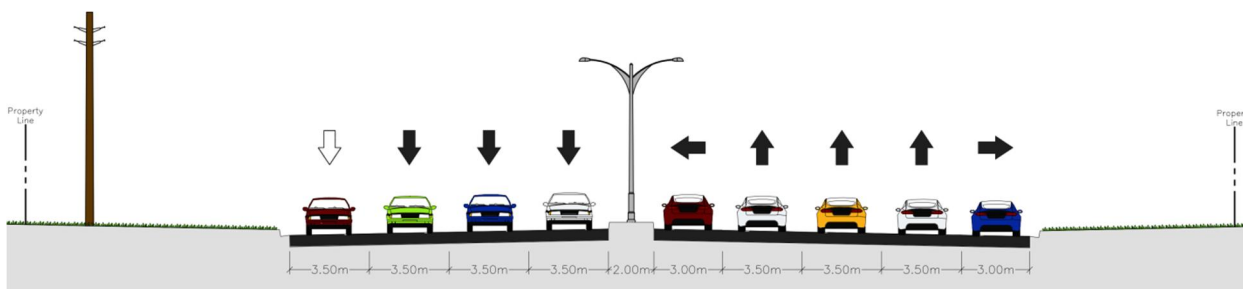


Figure 18: Preferred Design, Highbury Avenue North Cross-Section, South of Hamilton Road

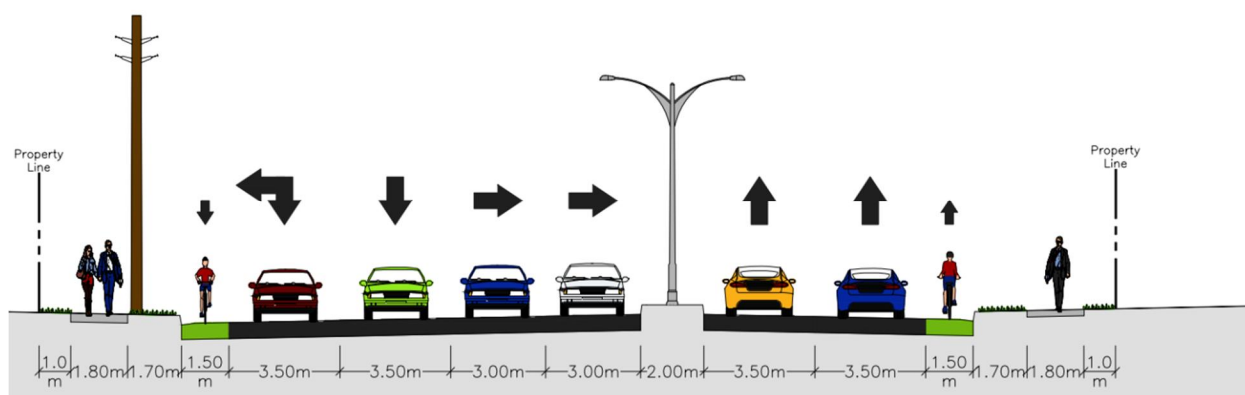


Figure 19: Preferred Design, Hamilton Road Cross-Section, East of Highbury Avenue North

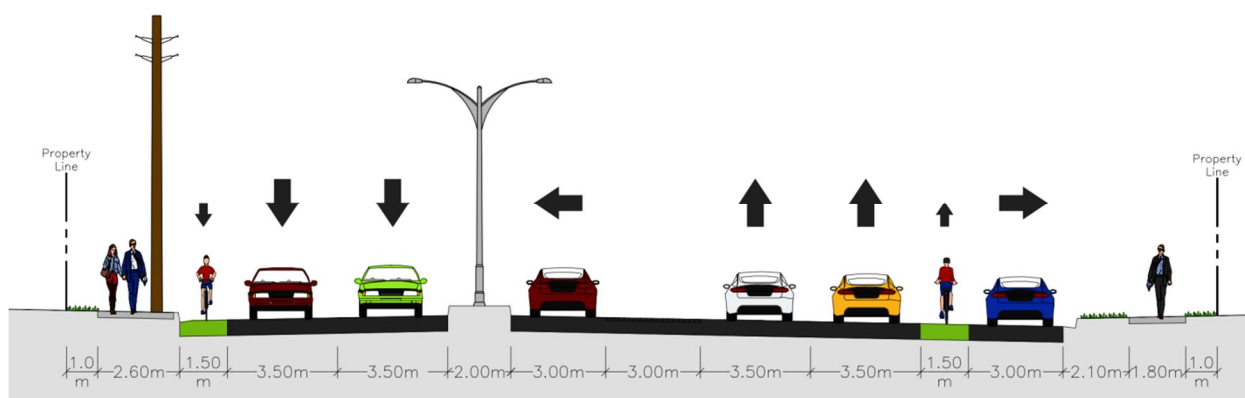


Figure 20: Preferred Design, Hamilton Road Cross-Section, West of Highbury Avenue North

6.2.2 Landscape and Urban Design

Figure 2 also shows potential locations for landscaping and urban design elements. A Landscape/Urban Design Plan for the following will be prepared during Detailed Design:

- The improvements require the removal of eight houses on the west side of Highbury Avenue North, north of the Esso station. The land occupied by seven of these houses could be developed as an urban parkette, as shown in Figure 2, with urban design features, such as planters, landscaping and street furniture
- Landscaped median treatments on Highbury Avenue North and Hamilton Road (in limited areas).

6.2.3 Watermains

The following watermain improvements will be implemented as part of this project:

- The 400 mm and 150 mm watermains running north on Highbury Avenue North will be reviewed during Detailed Design, including the need to upsize the 150 mm to 300 mm or replace both mains within the limits of the roadwork
- The existing valve chamber on Highbury Avenue North immediately north of the intersection will be reviewed during Detailed Design and possibly removed and replaced with a gate valve
- The 150 mm watermain on Hamilton Road will be replaced with a 400 mm main within the project limits
- The watermain to the east of Highbury is newer and appropriately sized and will not need replacing
- All services/valves/hydrants to be reviewed/replaced/updated to current specifications.

6.2.4 Storm Sewers, Sanitary Sewers and CSOs

Although no improvements to these services are specifically recommended by the Vauxhall Modelling Study (completed in 2016) for the intersection and surrounding area, modifications will be required to install new catch basins with new leads to the existing local storm sewer. These modifications will be designed during Detailed Design.

6.2.5 Utilities

Relocation of London Hydro's overhead plant will be required in advance of construction to accommodate the roadway widening. As well, some underground plant may require relocation. The exact extent of relocations will be developed during Detailed Design.

Bell and Union Gas also have underground plant within the project limits. The need for relocation or plant upgrades will be confirmed during Detailed Design.

6.2.6 Illumination

Illumination will meet the City's standards based on the ANSI/IES RP-8-14. For appearance and scale, 9.8 metre base mounted aluminum poles will be provided to maximize system efficiencies. Approved LED fixtures for intersection illumination will be mounted on the traffic signal poles and fill-in illumination for the approaches will be mounted in centre median islands and Hydro poles, as determined by the photometric evaluation during Detailed Design.

6.2.7 Traffic Signals

City standard traffic signal layout will include best practice design for Accessible Pedestrian Signals at intersections with a channelized island. Temporary traffic signals will be required for construction staging and for the reconstruction of the proposed traffic signal infrastructure.

6.3 Traffic Management during Construction

During construction:

- Temporary lane reductions will be required on Highbury Avenue North and Hamilton Road
- Access to residential properties and businesses will be maintained
- Temporary traffic signals will be in operation at the intersection.

6.4 Traffic Operations

Existing traffic volumes were analyzed with the preferred design (Design Option 3) to determine expected traffic operations in the short term when construction is completed. Tables 13 to 16 show intersection operations at various stages of construction and traffic demand, including:

- Existing conditions
- Option 3 under short-term conditions (assuming existing volumes)
- Option 3 at the 10-year horizon.

Table 13: Short-Term Effects on Volume-To-Capacity (V/C) Ratios, Highbury Avenue North at Hamilton Road

Scenario	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR
AM Peak Hour										
Existing	0.38	0.50	0.36	0.76	0.50	1.02	0.78	0.34	0.43	0.94
Option 3 (2015)	0.46	0.62	0.09	0.94	0.62	0.94	0.64	0.20	0.30	0.71
Option 3 (2025)	0.62	0.65	0.10	1.08	0.69	1.07	0.78	0.24	0.53	0.87
PM Peak Hour										
Existing	0.35	1.24	0.97	1.30	0.51	1.89	0.94	0.58	0.64	0.94
Option 3 (2015)	0.26	0.97	0.27	1.12	0.45	1.21	0.97	0.38	0.69	1.05
Option 3 (2025)	0.37	1.13	0.31	1.30	0.52	1.41	1.12	0.45	0.89	1.21

Movements:

EBL = eastbound left turn

WBL = westbound left turn

NBL = northbound left turn

SBL = southbound left turn

EBT = eastbound through

WBTR = westbound through-

NBT = northbound through

SBTR = southbound through-

EBR = eastbound right turn

right turn

NBR = northbound right turn

right turn

Table 14: Short-Term Effects on Average Vehicle Delay (S/Veh), Highbury Avenue North at Hamilton Road

Scenario	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR	Avg.
AM Peak Hour											
Existing	52.5	49.9	20.0	58.0	45.7	91.4	29.7	4.9	25.8	57.8	46.5
Option 3 (2015)	68.9	64.0	0.1	99.4	39.5	69.0	20.9	0.3	17.7	36.8	34.0
Option 3 (2025)	67.8	54.0	0.1	130	38.8	103	27.1	0.4	32.1	45.6	44.6
PM Peak Hour											
Existing	50.8	163	77.1	199	35.2	444	39.8	10.6	43.3	44.9	92.6
Option 3 (2015)	46.1	74.7	0.4	148	30.1	159	48.2	0.7	51.2	77.5	61.6
Option 3 (2025)	51.1	118	0.5	205	29.5	235	95.9	0.9	84.3	140	106

Movements:

EBL = eastbound left turn

WBL = westbound left turn

NBL = northbound left turn

SBL = southbound left turn

EBT = eastbound through

WBTR = westbound through-

NBT = northbound through

SBTR = southbound through-

EBR = eastbound right turn

right turn

NBR = northbound right turn

right turn

Table 15: Short-Term Effects on Level of Service, Highbury Avenue North at Hamilton Road

Scenario	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR	Avg.
AM Peak Hour											
Existing	D	D	C	E	D	F	C	A	C	E	D
Option 3 (2015)	E	E	A	F	D	E	C	A	B	D	D
Option 3 (2025)	E	D	A	F	D	F	C	A	C	D	D
PM Peak Hour											
Existing	D	F	E	F	D	F	D	B	D	D	F
Option 3 (2015)	D	E	A	F	C	F	D	A	D	E	E
Option 3 (2025)	D	F	A	F	C	F	F	A	F	F	F

Movements:

EBL = eastbound left turn

WBL = westbound left turn

NBL = northbound left turn

SBL = southbound left turn

EBT = eastbound through

WBTR = westbound through-

NBT = northbound through

SBTR = southbound through-

EBR = eastbound right turn

right turn

NBR = northbound right turn

right turn

Table 16: Short-Term Effects on 95th Percentile Queues, Highbury Avenue North at Hamilton Road

Scenario	EBL	EBT	EBR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR
AM Peak Hour										
Existing	25	52	25	100*	108	171*	200	24	13	213*
Option 3 (2015)	34	71	0	60*	63	162*	141	0	14	149*
Option 3 (2025)	25	51	0	68*	82	204*	181	0	24*	190*
PM Peak Hour										
Existing	27	204*	150*	122*	79	215*	286*	76	30*	271*
Option 3 (2015)	30	176*	0	74*	56	179*	217*	0	34*	208*
Option 3 (2025)	35	222*	0	73*	61	218*	278*	0	52*	263*
*Note: Under 95 th percentile traffic volumes, volume exceeds capacity; queue represents two cycles under 95 th percentile traffic demand.										

Movements:

EBL = eastbound left turn

WBL = westbound left turn

NBL = northbound left turn

SBL = southbound left turn

EBT = eastbound through

WBTR = westbound through-

NBT = northbound through

SBTR = southbound through-

EBR = eastbound right turn

right turn

NBR = northbound right turn

right turn

As noted in Tables 13 to 16, the preferred design (Option 3) will result in short-term improvements in capacity, delays and queues on most intersection turning movements compared to existing conditions.

With the proposed improvements, all movements are anticipated to operate below capacity during the weekday morning (AM) peak hour. During the weekday afternoon (PM) peak hour, several movements will continue to operate over capacity; however, the magnitude of the capacity deficiencies will be lower, and average delays and queues will be reduced compared to “do nothing” conditions Level of Service (LOS).

6.5 Benefits, Impacts and Mitigating Measures

Table 17 is an assessment of the benefits and impacts of the Highbury Avenue North/Hamilton Road intersection improvements. Avoidance and mitigation measures are also identified.

6.5.1 Benefits

The intersection improvements have several benefits:

- The improvements significantly improve traffic operations at the intersection for the future (2025) afternoon (PM) peak hour, the busiest time of day. However, the improvements cause some delays for the southbound through movement
- With the improvements, bus bays will be provided, helping to reduce traffic delays relating to transit. Bus stops will also be consolidated
- The planned bike lanes on Hamilton Road will improve cyclist safety
- The improvements are compatible with the future widening of Hamilton Road, east of Hale Street
- The new curbed median on Hamilton Road will reduce access to some side streets, thereby reducing neighbourhood traffic infiltration. However, future traffic growth may cause some infiltration at peak hours due to queued traffic. Traffic calming measures will be evaluated during Detailed Design
- The improvements provide opportunities to provide landscaping and urban design elements, including a parkette north of the Esso Station on the west side of Highbury Avenue North
- Access management changes will alleviate traffic congestion and reduce back-ups, reduce fuel consumption and improve safety. The changes will not affect traffic flow to local businesses since alternative entrances are available.

6.5.2 Impacts and Mitigation

Transportation Planning and Traffic Operations

- Although the channelized right turns and dual left turns will improve traffic operations, these features are generally considered less preferred for pedestrians. A potential configuration to encourage the yield condition and lower vehicle speeds is shown in Figure 21. Turning angles will be reviewed during Detailed Design to reduce the potential for pedestrian conflict points.

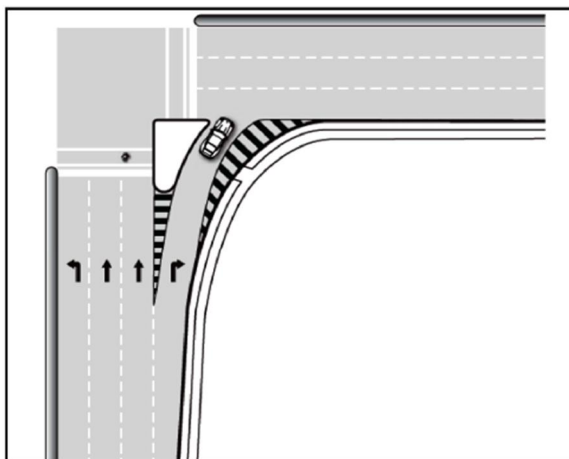


Figure 21: Right-Turn Channelization, “Smart Channel” Example Configuration
(TAC Geometric Design Guide for Canadian Road, June 2017)

Road Design

- The additional pavement required for the improvements will increase the total area of new impervious areas, potentially increasing run-off. Also, the new lanes require the relocation of catch basins and minor reconfiguration of storm sewers within the project limits. These impacts will be addressed during Detailed Design as part of the design of storm drainage modifications
- Some utility relocations are required, including Bell telephone ducts, underground Union Gas lines and overhead Hydro and transformers. The relocations will be addressed during Detailed Design. All relocations will be completed prior to construction.

Construction

- Temporary lane closures will be required during construction causing traffic delays. A Traffic Management Plan will be prepared during Detailed Design

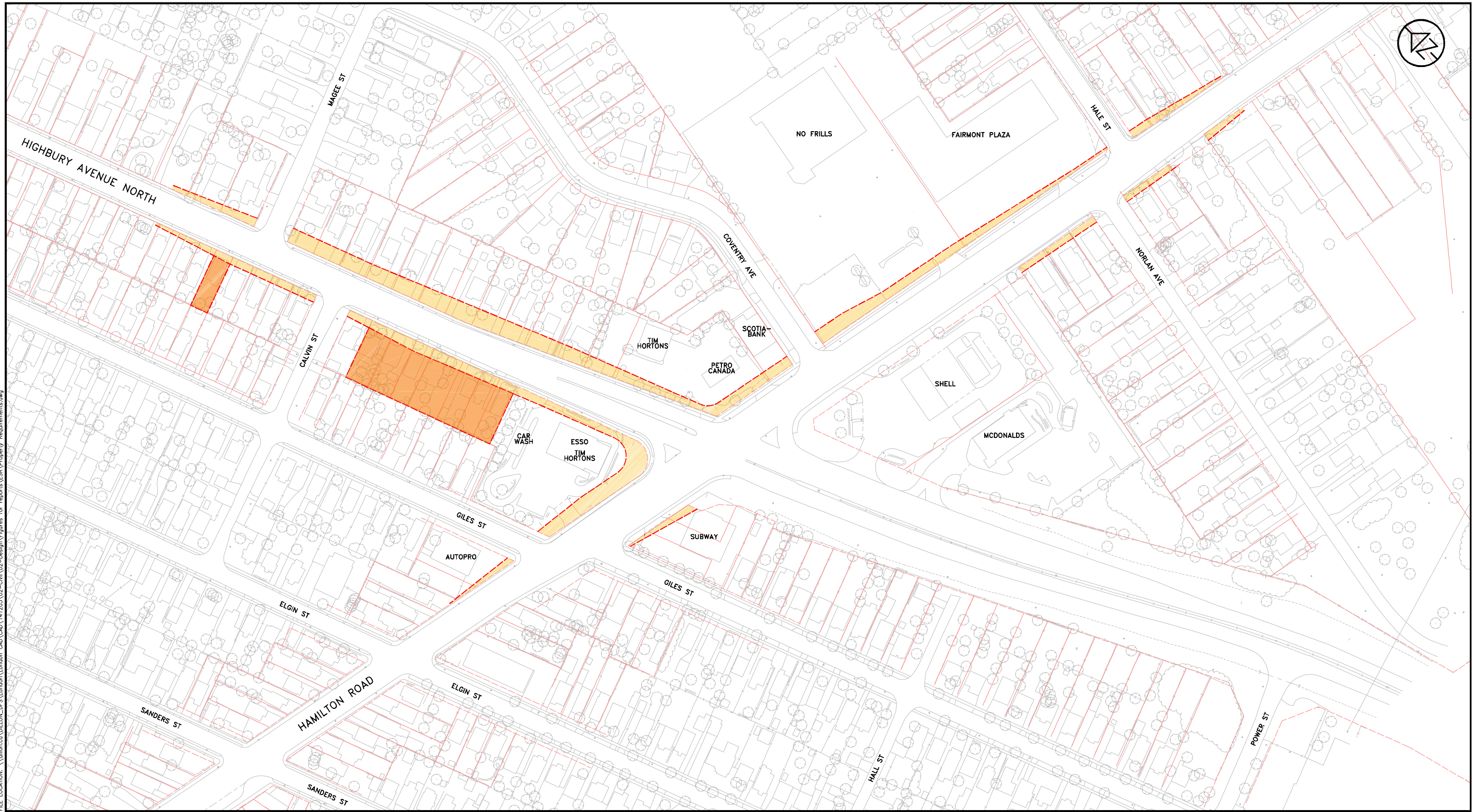
- Transit operations will be maintained during construction. However, some routes may be detoured. This issue, along with the location of bus bays, will be discussed further with LTC during Detailed Design.

Land Uses and Socio-Economic Environment

- The improvements require “slivers” of property from almost all of the residential properties (31) within the project limits along Highbury Avenue North and Hamilton Road
- The widened roadway will be closer to 32 houses along Highbury Avenue North and Hamilton Road due to the property acquisitions, potentially increasing traffic impacts, including noise and air quality impacts, on these houses. The existing houses along Highbury Avenue North do not qualify for retrofit noise barriers under the *City Council Policy Manual* (September 6, 2013) since they front onto the road
- The improvements also require the removal of eight houses on the west side of Highbury Avenue North, north of the Esso Station. As mentioned, the land occupied by seven of these houses could be developed as a parkette, with urban design features. These opportunities will be further investigated during Detailed Design
- Property acquisitions (shown on Figure 22) will be negotiated with the owners during the Detailed Design phase of the project. Property acquisitions will be completed prior to construction
- Since the houses to be removed on Highbury Avenue North currently act as a barrier to traffic noise from Highbury Avenue North, the remaining houses on Giles Street could be subject to increased traffic noise. Noise mitigation strategies will be assessed during Detailed Design
- Impacts on commercial uses include:
 - Moderate impacts on the Esso/Tim Horton’s site in the northwest quadrant of the intersection. Minor site adjustments will be required
 - Sliver widenings are required from a total of 9 commercial properties, including ScotiaBank, Petro-Canada/Tim Horton’s, Fairmont Plaza, No Frills and Auto Pro causing a loss of some parking spaces at Auto Pro, Fairmont Plaza and No Frills. Although the reconfiguration of parking spaces is required at the Petro-Canada/Tim Horton’s, this will not likely reduce the total number of parking spaces at the site
 - The improvements have moderate impacts on the plaza at the southwest quadrant of the intersection, restricting internal site movements
- In total, the preferred design removes 8 houses and requires property from 31 residential properties and 9 commercial properties for a total of 48 properties impacted

- The preferred design requires the removal of 48 street trees. As required by the London Plan, all trees greater than 10 cm at breast height must be replaced at the rate of one replacement for every 10 cm of tree diameter removed (e.g., four trees at least 5 cm in diameter are required to replace a 45 cm diameter tree). The number and type of trees required for compensation will be addressed during Detailed Design.

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CITY OF LONDON
HIGBURY AVENUE/HAMILTON ROAD
INTERSECTION IMPROVEMENTS
ENVIRONMENTAL ASSESSMENT STUDY
TS-1309-11



- | | | | |
|-----|--------------|--|--|
| --- | EXISTING ROW | | PROPOSED PROPERTY REQUIRED FOR NEW ROW |
| --- | PROPOSED ROW | | FULL PARCEL PURCHASE ANTICIPATED |

SCALE - HORZ.
12.5m 0 25m



PROJECT No. 14-1203
DATE: APRIL 2018



HIGBURY AVENUE AND
HAMILTON ROAD
INTERSECTION
PROPOSED PROPERTY REQUIREMENTS
FIGURE 22

Table 17: Benefits, Impacts and Mitigation Measures

Engineering/Environmental Feature	Potential Benefits and Impacts	Avoidance and Mitigation Measures
1. Transportation Planning and Traffic Operations		
Future (2025 PM Peak Hour) Traffic Operations	Significantly improves intersection operations although it causes some delays for southbound through movement.	Not required. Intersection operations are improved, overall.
Impacts on Transit Operations	Consolidates bus stops and provides bus bays, helping to reduce traffic delays. Some transit routes may be detoured during construction.	These issues will be further discussed with LTC during Detailed Design.
Neighbourhood Traffic Infiltration	New curbed median on Hamilton Road will reduce access to some side streets, thereby reducing neighbourhood traffic infiltration.	Infiltration will be reduced, overall. Traffic calming measures will be evaluated during Detailed Design.
Pedestrian Safety	Channelized right turns and dual left turns generally considered less preferred for pedestrians.	Turning angles will be reviewed during Detailed Design to reduce the potential for pedestrian conflict points.
Cyclist Safety	Bike lanes on Hamilton Road improve cyclist safety.	Not required
2. Road Design		
Landscaping & Urban Design Elements	Opportunities to provide these features in two areas: - Residential properties required on west side of Highbury Avenue North, north of Hamilton Road could be developed as a small parkette with urban design features - Proposed two-way centred left turn lane on Highbury Avenue North (north of intersection) could be widened to incorporate urban design features.	A Landscape Plan will be prepared during Detailed Design.
Compatibility with Future Infrastructure	Compatible with the future widening of Hamilton Road, east of Hale Street.	Not required
Drainage Modifications	Increases the total area of new impervious areas, potentially increasing run-off.	Impacts will be addressed during Detailed Design.
Impacts on City Services (water, sanitary, storm)	New lanes require relocation of catch basins and minor reconfiguration of storm sewer within limits of work.	Impacts will be addressed during Detailed Design.

Engineering/Environmental Feature	Potential Benefits and Impacts	Avoidance and Mitigation Measures
Utility Relocations	Required utility relocations include: - Hydro pole relocation within limits of work - Relocation of a Hydro transformer located on east side of Highbury Avenue North, adjacent to Petro-Canada - Underground Hydro and Bell on Hamilton Road, west of intersection and on Highbury Avenue North, north of Intersection - Underground gas on east side of Highbury Avenue North, north of intersection.	Relocations will: - Be addressed during Detailed Design - Completed prior to construction.
3. Construction		
Construction Staging and Traffic Management	Lane closures will be required causing traffic delays during construction	A Traffic Management Plan will be developed during Detailed Design.
4. Land Uses and Socio-Economic Environment		
Access Impacts on Businesses and Residential Side Streets	Access management changes (shown on Figure 11) include: - Restrict some access points to right-in/right-out access using medians to physically restrict left-turns - Close entrances close to the intersection - Provide street-side bus stops offset from traffic lanes. - These changes will: - o Alleviate traffic congestion and back-ups, reduce fuel consumption and improve safety - o Not affect traffic flow to businesses or local street access since alternative access/entrances are available	Access changes will be addressed in more detail during Detailed Design

Engineering/Environmental Feature	Potential Benefits and Impacts	Avoidance and Mitigation Measures
Residential Property Impacts	Property acquisitions include: - Requires slivers of property from almost all residential properties (31) within the project limits along Highbury Avenue North and Hamilton Road - Requires the removal of eight houses on the west side of Highbury Avenue North, north of Esso Station	Property acquisitions will be: - Negotiated with owners during Detailed Design - Completed prior to construction
Noise and Air Quality Impacts on Residential Uses	Roadway will be closer to 31 houses along Highbury Avenue North potentially increasing traffic related noise and air quality impacts The removal of seven houses on Highbury Avenue North potentially exposes houses on Giles Street to increased traffic noise.	Houses on Highbury Avenue North do not qualify for retrofit noise barriers under City policies Noise mitigation will be addressed during detailed design.
Commercial Property Impacts	Impacts on commercial uses include: - Moderate impacts on Esso/Tim Horton's site in northwest quadrant. Minor site adjustments required - Requires slivers of property from nine commercial properties causing minor impacts on ScotiaBank, Petro-Canada/Tim Horton's, Fairmont Plaza, No Frills and Auto Pro. Causes a loss of some parking spaces at Auto Pro, Fairmont Plaza and No Frills. Reconfiguration of parking spaces required at Petro-Canada/Tim Horton's but will likely not reduce the total number of parking spaces - Moderate impacts on plaza at southwest quadrant, restricting internal site movements.	Property acquisitions will be: - Negotiated with owners during Detailed Design - Completed prior to construction.
Impacts on Street Trees	Requires the removal of 48 street trees.	The number/type of trees to be provided as compensation will be determined during Detailed Design.

6.6 Preliminary Construction Cost Estimates

A preliminary construction cost estimate for the Hamilton Road/Highbury Avenue intersection improvements is summarized in Table 18. The costs include roadway construction, traffic signals, illumination, storm sewer, sanitary sewers, watermains, utility relocations, property acquisitions and miscellaneous costs.

Table 18: Preliminary Construction Cost Estimate

Item	Estimated Cost
Intersection Improvements Investments	
Roadworks and Earthworks	\$ 2,714,000
Storm Sewers and Appurtenances	\$ 495,000
Traffic Signals and Illumination	\$ 750,000
Miscellaneous	\$ 205,000
Utility Relocations	\$ 700,000
Sub-total	\$ 4,864,000
Contingency (15%)	\$ 729,600
Engineering and Consulting (15%)	\$ 729,600
Property Acquisition	\$ 4,157,900
Intersection Improvements Sub-total	\$ 10,481,100
Lifecycle Renewal Investments	
Sanitary Sewers and Appurtenances	\$ 436,300
Watermains and Appurtenances	\$ 597,400
Sub-total	\$ 1,033,700
Contingency (15%)	\$ 155,055
Engineering and Consulting (15%)	\$ 155,055
Lifecycle Renewal Sub-total	\$ 1,343,810
TOTAL PRELIMINARY COST ESTIMATE	\$ 11,824,910

6.7 Property Requirements

The preferred design will have minor impacts on almost all residential and commercial properties within the project limits. Significant property requirements at eight residential properties will result in the removal of these houses. Figure 21 shows the property required for the preferred design.

The city will have continued consultation with impacted property owners to discuss and negotiate compensation for property impacts as a result of the proposed plan.

6.8 Approvals

No additional environmental approvals are required prior to construction.

6.9 Future Project Phases

Following the 30-day public and agency review period for this ESR, the proposed project schedule is:

- Preparation of Detailed Design drawing and contract documents for the construction of the proposed improvements, including:
 - More detailed foundations and geotechnical investigations
 - Landscape Plan, including a potential parkette on the west side of Highbury Avenue North, north of the Esso Station
 - Utility relocation plans
- The drawings and documents must incorporate all of the environmental and mitigation measures identified in this report to avoid/mitigate adverse impacts. During Detailed Design, all mitigation measures will be developed in more detail
- Utility relocations and property acquisitions will be completed prior to construction
- The proposed schedule for construction is under review and is subject to budget availability, completion of Detailed Design and the receipt of all required approvals.

DILLON CONSULTING LIMITED
LONDON, ONTARIO



Brian Huston, P.Eng.
Project Manager

