Rapid Transit Implementation Working Group
Report

The 2nd Meeting of the Rapid Transit Implementation Working Group
June 30, 2020

Attendance

PRESENT: Councillor M. Cassidy (Chair), Councillors J. Helmer, S. Hillier, A. Hopkins, S. Lehman, E. Peloza, P. Squire, M. van Holst, Mayor E. Holder; T. Khan, T. Park, S. Rooth

ABSENT: Councillor A. Kayabaga

ALSO PRESENT: J. Taylor, D. Turner, and B. Westlake-Power

Remote attendance: Councillor J. Morgan; A.L. Barbon, K. Burns, J. Dann, A. Kemick, L. Livingstone, L. MacInnis, D. MacRae, K. Paleczny, and K. Scherr

The meeting was called to order at 12:04 PM; it being noted that the following Members were in remote attendance: Councillors J. Helmer, S. Hillier, A. Hopkins, S. Lehman, M. van Holst, and Mayor E. Holder; T. Khan, T. Park, and S. Rooth

1. Call to Order

1.1 Disclosures of Pecuniary Interest

Councillor Lehman discloses a pecuniary interest with respect to agenda Item 3.2, having to do with the North Corridor transit options review, by indicating that he owns a business located on Richmond Street.

Deputy Mayor Helmer discloses a pecuniary interest with respect to agenda Item 3.2, having to do with the North Corridor transit options review, by indicating that he anticipates future employment with Western University.

2. Scheduled Items

2.1 West and North Corridor Reviews

That it BE NOTED that the presentation from J. Dann, Director, Major Projects and K. Scherr, Managing Director, Environmental and Engineering Services and City Engineer, as appended to the agenda, with respect to a review of the West Corridor and North Corridor transit options, was received.

3. Consent

3.1 1st Report of the Rapid Transit Implementation Working Group

That it BE NOTED that the 1st Report of the Rapid Transit Implementation Working Group, from its meeting held on January 27, 2020, was received.

3.2 North Corridor Transit Options Review

That the staff report dated June 30, 2020, entitled "North Corridor Transit Options Review", BE RECEIVED for information.

3.3 West Corridor Transit Options Review

That the staff report dated June 30, 2020, entitled "West Corridor Transit Options Review", BE RECEIVED for information.

4. Items for Discussion

None.

5. Adjournment

The meeting adjourned at 1:48 PM.

Improving Transit for West and North London

Jennie Dann, Director, Major Projects

June 30, 2020

Current Context

- Cognizant of current financial and funding reality in responding to Council motions
- Today is not a funding ask; seeking greater clarity on types of options Council prefers in order to do more detailed work
- Continue to support long-term transportation strategy to position the City for future economic recovery and potential stimulus funding

Funding Opportunities

- After 10 approved ICIP projects $150.5 M remains in federal and provincial allocation
- Multi-Year Budget approved placeholders for West and North transit connections with matching municipal share:

Total Project Capital Budget Allocation	
WEST CONNECTION	$73.7 M
NORTH CONNECTION	$136.7 M

- Including the municipal contribution, an additional $42M in transit infrastructure could be supported*.

(*noting the municipal share of approx. $11M is currently unfunded)

West Resolution – November 2019

That the Civic Administration BE REQUESTED to review and report back with recommendations for providing higher order transit service and/or transit improvement projects to West London, including but not limited to potential modifications of the West Connection project that address:

a) options for higher order transit serving West London, including the extension of service further west;
b) local service integration opportunities;
c) additional road design alternatives along the corridor, including a review of lane configurations and options for phased delivery;
d) the possibility of a quick-start program that includes prioritized intersections with mixed traffic routes,
e) opportunities for park and ride;
f) the possible need for electric bus infrastructure; and
g) the Civic Administration BE DIRECTED to consult with the London Transit Commission on the matters identified in part a), above

North Resolution – January 2020

That the following actions be taken with respect to the transit routes along Richmond Street and Western Road between the Masonville Transit Hub, Western University and the Downtown:

a) The Civic Administration BE DIRECTED to work with the London Transit Commission to identify:

   i) Enhancements to roadway geometry, including, but not limited to, intersection design;
   ii) Traffic controls, including signal design and operations;
   iii) Transit routing and stop locations; and
   iv) Other potential short and long term improvements to enhance transit service and connectivity along these corridors; and,

a) The Civic Administration BE DIRECTED to report back to a future meeting of the Strategic Priorities and Policy Committee, in advance of the next project intake opportunity for the Public Transit Infrastructure Funding – Transit Stream Program, with the results of the review set out in a) above.

Corridor Review Resources

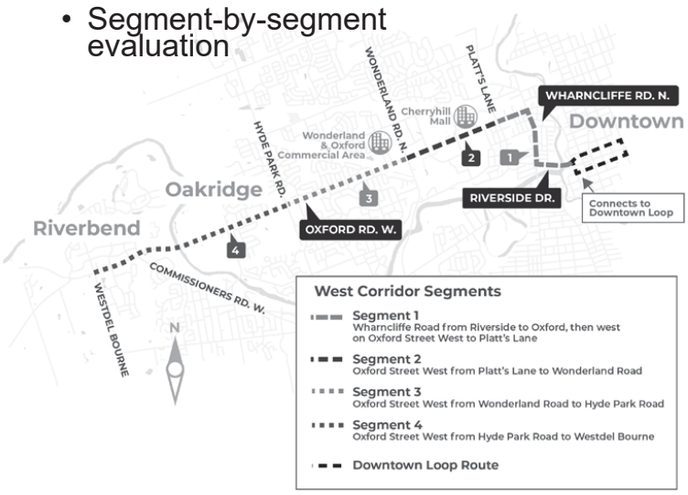
North and West reviews completed separately, but to be considered in parallel. Analysis included:

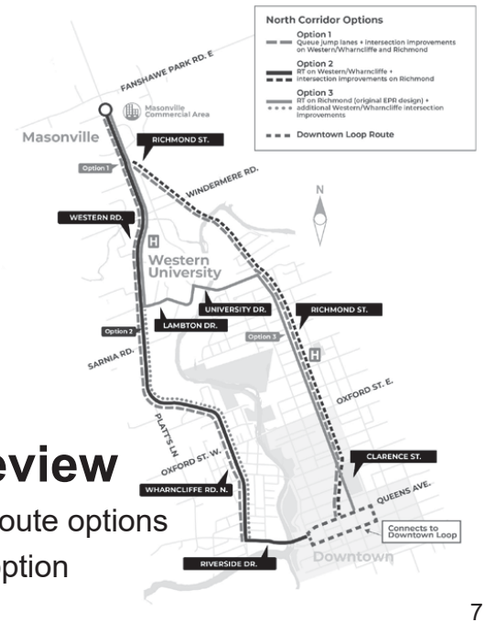
- Qualitative assessments of measures to improve transit
- High-level concept drawings
- Conceptual roadway configurations
- Traffic modelling analysis
- High-level cost estimates

Reviews: West vs. North

West review

- Defined route
- Segment-by-segment evaluation





North review

- Combined route options
- High-level option evaluation

Today's Presentation

1. Background Information and Review Framework
2. West Corridor Review
3. North Corridor Review

Part 1: Background Information and Review Framework

Options Developed

Minor Transit Improvements / Lowest cost

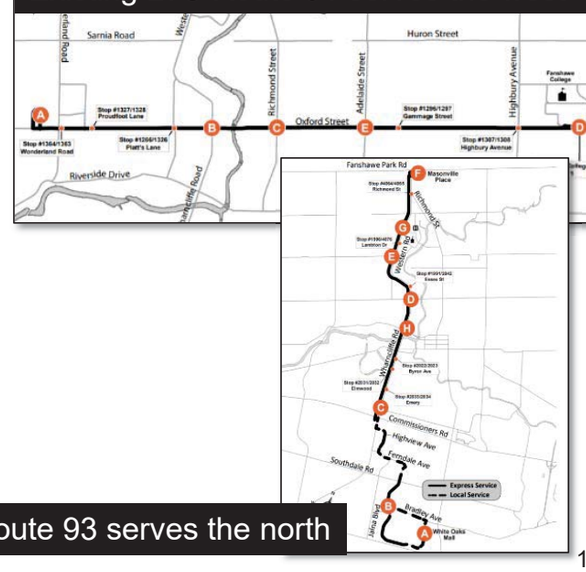
- Express bus service
- Transit signal priority
- Intersection improvements (queue jump lanes)
- Convert an existing lane to two-way transit-only lane
- Convert two existing lanes to transit-only lanes
- Widen to add a two-way transit-only lane
- Widen to add transit-only lanes

Major Transit Improvements / Highest Cost

Express Bus Service

- Fewer stops and more direct routes reduce travel times
- LTC already operates express service
- LTC reviews routes and service frequency annually with public input
- Doesn’t require funding through ICIP
- Not carried forward for evaluation

Existing LTC Route 91 serves the west



Existing LTC Route 93 serves the north

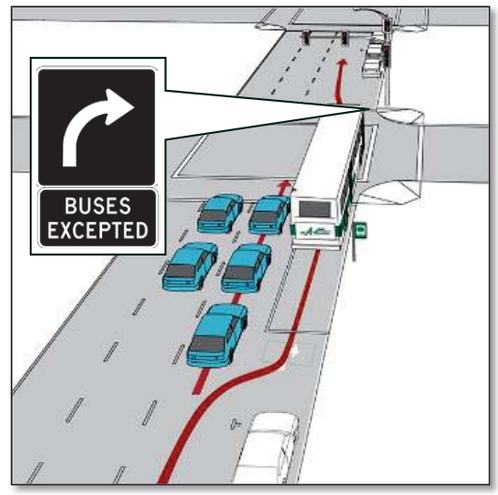
Transit Signal Priority

Part of Transportation Intelligent Mobility Management System (“TIMMS”)

- Reduces intersection delays
- Shortens travel times for all modes
- Prepares transportation network for the future
- Includes Oxford St. to Sanatorium Rd.
- Includes Western Rd./Wharncliffe Rd. from Fanshawe Park Rd. to Riverside Dr.

Intersection Improvements (Queue Jump Lanes)

- Curbside transit lanes allow buses to reach intersection during red signal
- Extending curbside lanes allows buses to bypass peak hour traffic queues up to 95% of the time
- Advance green signal further reduces transit travel times



Bus Bays

Bus bays not considered, due to:

- Reduced priority for buses, set back from intersection with no signal priority
- Increased transit travel times and operational concerns with merging
- Difficulty re-entering traffic: bus drivers must wait for gap to merge
  - Legislation requires motorists to yield to buses, but compliance is a challenge

Bus bay on Wellington Rd, south of Commissioners Rd

Two-Way Transit Lanes

Options screened out:

1. Widening to add two-way transit lane
2. Converting existing lane to two-way transit lane

Not evaluated due to:

- Transit delays
- Complex design and operation
- Costs and impacts, compared to benefits

Two-way bus lane in Oregon

Convert Existing Lanes to Transit-Only Lanes

- Converts existing lanes, which minimizes widening
- Some widening still required at intersections and platform locations
- Benefits transit reliability and frequency
- Impacts traffic operations and reduces capacity
- Triggers need for centre median

Widen to add Transit-Only Lanes

- Transit-only lanes improve transit travel times and reliability
- Separates buses from general traffic and congestion
- Retains existing traffic capacity
- Triggers the need for a centre median

Wellington Rd will be widened at Commissioners Rd to add transit-only lanes

Short List of Options

Minor Transit Improvements / Lowest cost

- Express bus service
- **Transit signal priority**
- **Intersection improvements (queue jump lanes)**
- Convert an existing lane to two-way transit-only lane
- **Convert two existing lanes to transit-only lanes**
- Widen to add a two-way transit-only lane
- **Widen to add transit-only lanes**

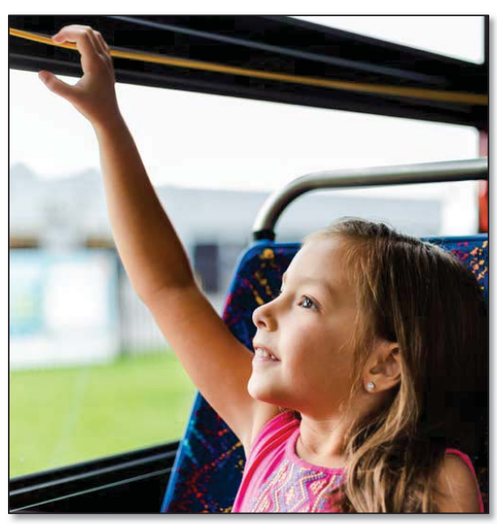
Major Transit Improvements / Highest Cost

Evaluation Criteria

1. Benefit to transit operations
2. Increase in ridership
3. Benefit to traffic operations
4. Least property impacts
5. Least cultural heritage impacts
6. Least impact on trees
7. Least impact on utilities
8. Least impact on driveways
9. Redevelopment potential
10. Capital costs
11. Most consistent with City's policy objectives
12. Least Environmental Assessment implications

Questions?

Any technical questions about the background information presented?



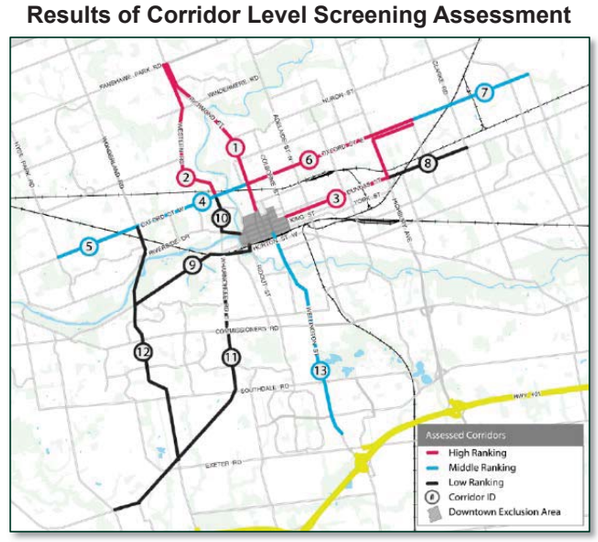
Part 2: West Corridor Review

West Route Background

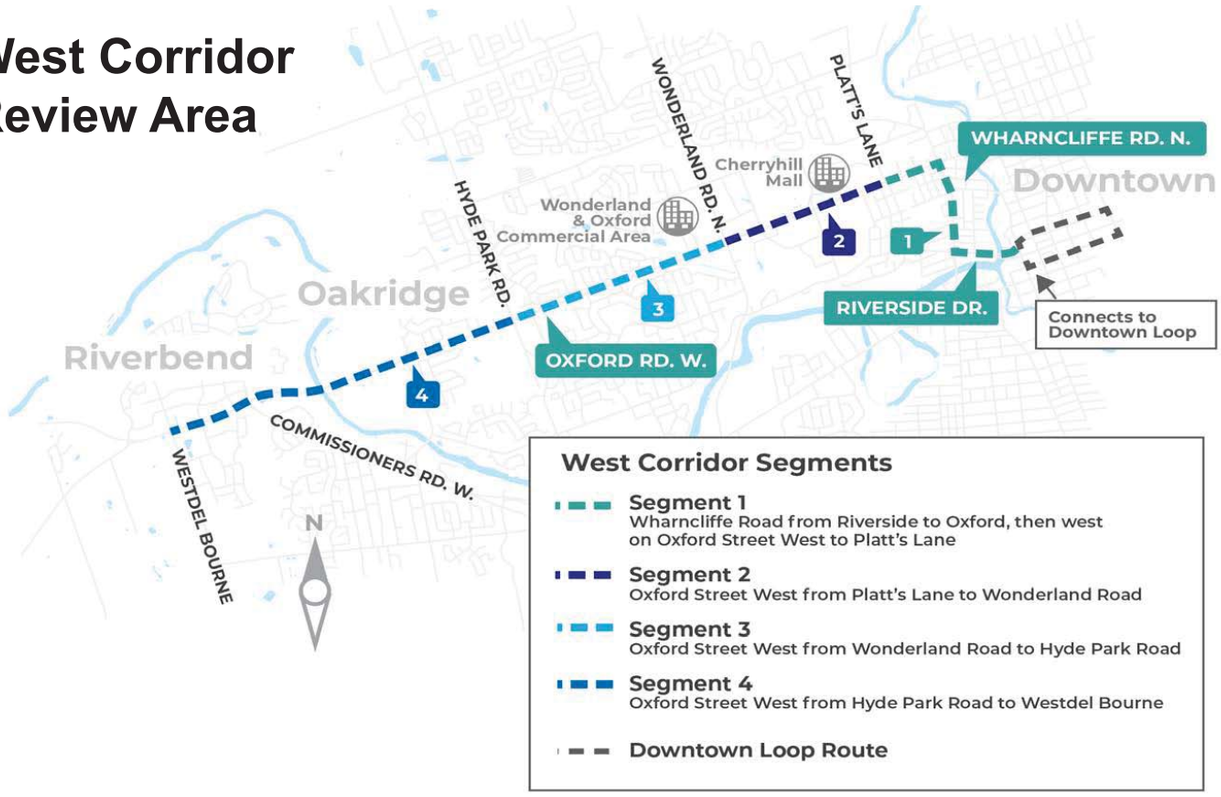
The RTMP confirmed Oxford as the preferred BRT corridor, based on an evaluation of:

- Land use density
- Growth in people and jobs
- Major destinations
- Existing transit ridership

RTMP Exhibit 3.7
Results of Corridor Level Screening Assessment



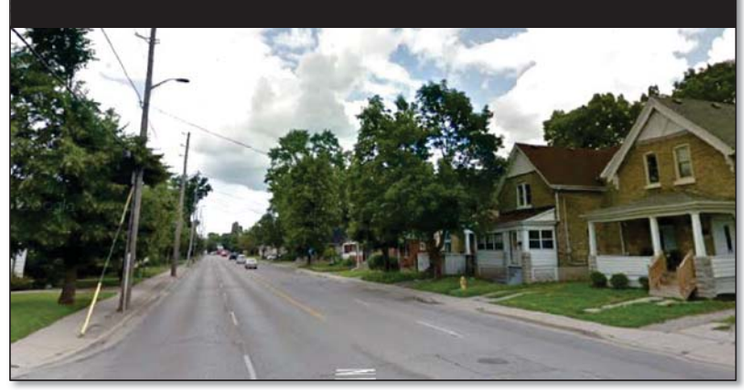
West Corridor Review Area



Segment 1: Wharncliffe Rd. and Oxford St W. from Riverside Dr. to Platt's Lane

- High traffic area
- Daytime truck route
- Blackfriars-Petersville heritage district
- Located in a floodplain
- Narrow road width

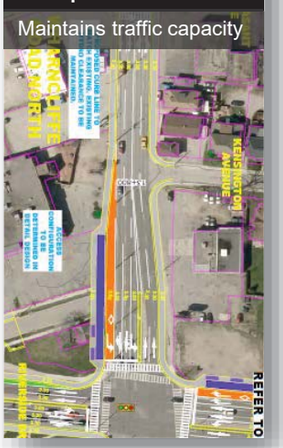
Looking north on Wharncliffe Rd., north of Charles St.



Segment 1: Transit Options

Option 1: Intersection Improvements

Maintains traffic capacity



Option 2: 4 lanes

Reduces traffic capacity

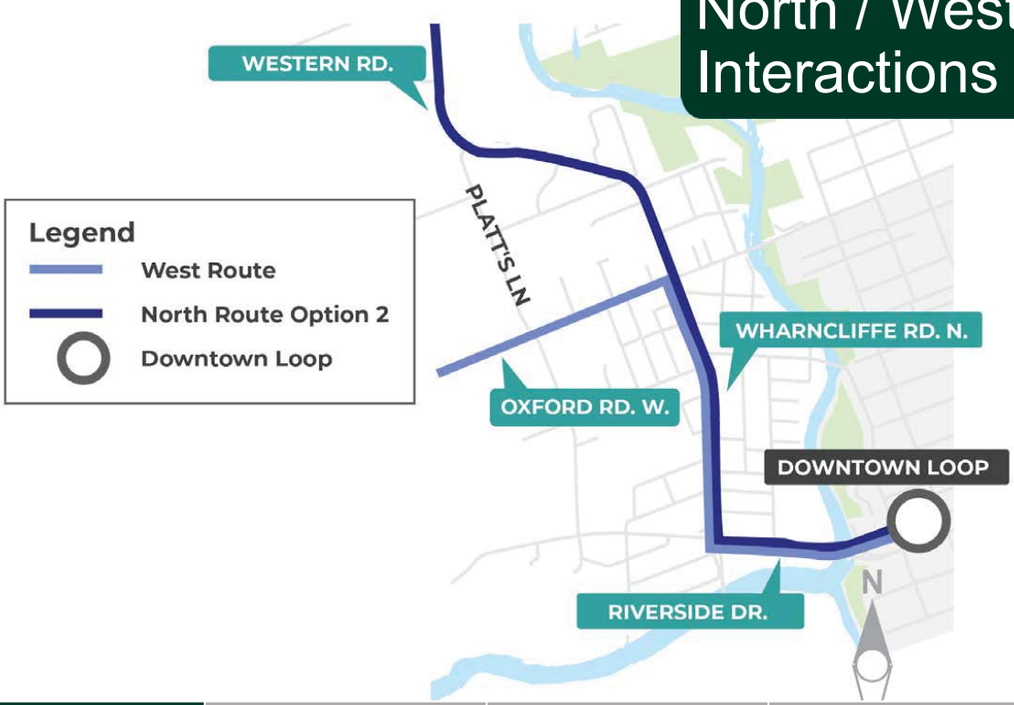
Option 3: 6 lanes

Maintains traffic capacity

Option 4: Transit signal priority

Maintains traffic capacity

North / West Corridor Interactions



Option 1

Maintains 4 general traffic lanes, buses in mixed traffic, intersection improvements

KEY INDICATOR	DETAILS
Transit	Queue jump lanes allow buses to by-pass congestion at Riverside and Oxford west intersections, improving reliability.
Traffic	Maintains existing traffic capacity with no left-turn restrictions.
Heritage	Limits cultural heritage impacts (2 buildings)
Capital costs	Lower cost than options that propose widening to add transit-only lanes.
EA implications	No further studies required. City can proceed to detailed design.

Option 2

Maintain 2 general traffic lanes (one lane in each direction), and convert 2 of the general traffic lanes to dedicated transit lanes

KEY INDICATOR	DETAILS
Transit	Removes buses from general traffic, improving transit reliability
Traffic	Reduces capacity for general traffic, results in increase in delays Centre median restricts left-turn to the signalized intersections
Heritage	Impactful to cultural heritage (22 buildings)
Capital costs	Higher capital costs associated with property acquisitions
EA implications	Addendum required to further assess heritage impacts

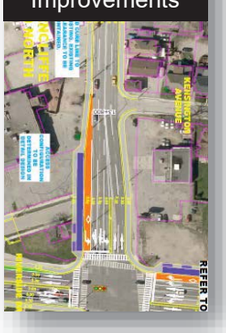
Option 3

Maintain 4 general traffic lanes (two in each direction), and widen corridor to add 2 dedicated centre-running transit lanes

KEY INDICATOR	DETAILS
Transit	Removes buses from general traffic, improving transit reliability
Traffic	Maintains existing traffic capacity Centre median restricts left-turn to the signalized intersections
Heritage	Most significantly impact to cultural heritage (41 buildings)
Capital costs	Highest capital cost for segment 1 associated with property acquisitions
EA implications	Addendum required to further assess heritage impacts

Segment 1: Transit Options 1, 2 & 3

Option 1:
Intersection
Improvements



$37.3M - $41.9M
Transit in mixed traffic
Maintains 4 gen. traffic lanes
Impacts 2 heritage properties

Option 2:
4 lanes

$54.6M – $62.6M
Transit in transit-only lanes
2 gen. traffic lanes (reduction)
Impacts 22 heritage properties

Option 3:
6 lanes

$66.6M – $76.5M
Transit in transit-only lanes
Maintains 4 gen. traffic lanes
Impacts 41 heritage properties

Segment 2: Oxford Street W. from Platt's Lane to Wonderland Rd.

- Very high traffic area
- 24-hour truck route
- Opportunities for infill and intensification
- Wide road allowance
- Limited environmental features

Looking west on Oxford St. W., east of Cherryhill Mall

Looking west on Oxford St. W., east of Beaverbrook Ave.

Segment 2: Transit Options

Option 1: Widen to add centre-running transit-only lanes (6 lanes)

Maintains traffic capacity

Option 2: Widen to add curbside transit-only lanes (6 lanes)

Maintains traffic capacity

Option 3: Intersection improvements and extending right-turn lanes (4 lanes)

Maintains traffic capacity

Option 4: Transit signal priority (4 lanes)

Maintains traffic capacity

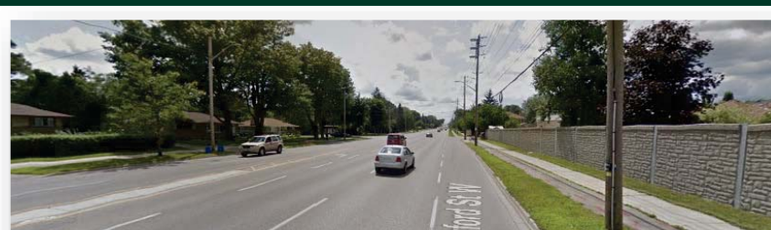
Option 1 Preferred for Segment 2

Widen to 6 lanes. Maintain 4 general traffic lanes and add 2 centre-running transit-only lanes with median.

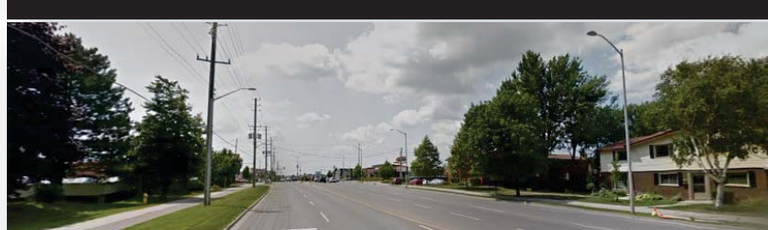
KEY INDICATOR	DETAILS
Transit	Removes buses from general traffic, improving transit reliability. Centre-running RT is the highest form for reliable, high-frequency transit.
Traffic	Widens road to add transit-only lanes, removing buses from mixed traffic and providing additional traffic capacity.
Intensification	Higher order transit supports infill and intensification and encourages sustainable transportation options.
Capital costs	Higher cost of widening options provide greatest benefit to transit and the overall transportation network, resulting in a positive ROI.

Segment 3: Oxford St. W. from Wonderland Rd. to Hyde Park Rd.

- Mostly designated Neighbourhoods or Green Space
- High traffic area
- Daytime truck route
- Limited environmental features
- Mostly wide road allowance



Looking west on Oxford St. W., east of Laurel St.



Looking west on Oxford St. W., west of Fiddler's Green Rd.

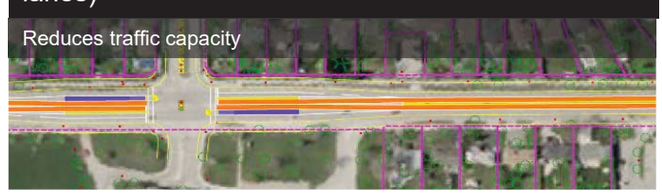
Segment 3: Transit Priority Options

Option 1: Widen to add transit-only lanes (6 lanes)

Maintains traffic capacity

Option 2: Convert 2 lanes to transit-only lanes (4 lanes)

Reduces traffic capacity

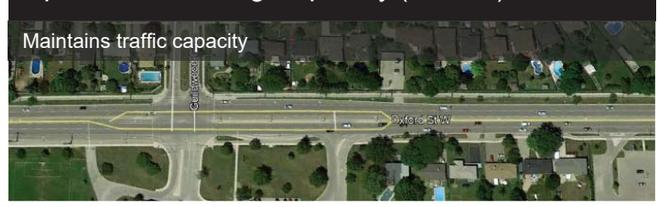


Option 3: Intersection improvements (4 lanes)*

Maintains traffic capacity

Option 4: Transit signal priority (4 lanes)

Maintains traffic capacity



***Right-turn lane length sufficient to accommodate future demand**

Option 3 Preferred for Segment 3

Maintain 4 lanes for general traffic, with intersection improvements

KEY INDICATOR	DETAILS
Ridership	Density does not support infrastructure investment in transit-only lanes.
EA implications	Pre-approved under the Municipal Class Environmental Assessment process, therefore no further implications.
Capital costs	Investment costs appropriate given expected land use and ridership.
Intensification	Consistent with City's policy objectives, since majority of corridor is abutted by stable, residential neighbourhoods and green space.

Segment 4: Oxford St. W. from Hyde Park Rd. to Westdel Bourne

- Mostly Neighbourhoods or Green Space designations
- Medium to high traffic volume
- Daytime truck route
- Some Environmentally Sensitive Areas

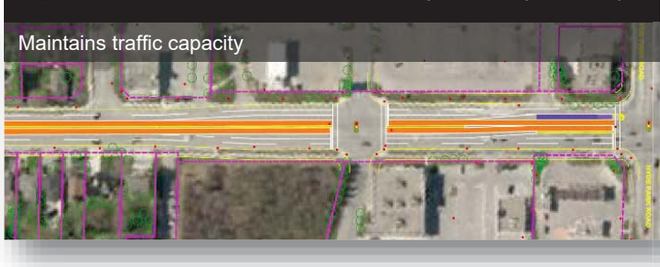
Looking west on Oxford St. W., west of Headley Dr.

Looking west on Oxford St. W, west of Commissioners Rd W.

Segment 4: Transit Priority Options

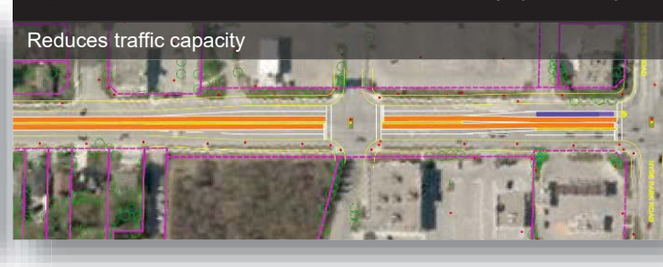
Option 1: Widen to add transit-only lanes (6 lanes)

Maintains traffic capacity



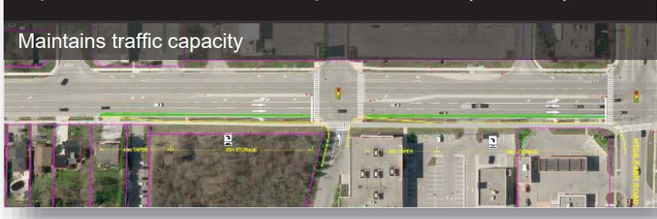
Option 2: Convert 2 lanes to transit-only (4 lanes)

Reduces traffic capacity



Option 3: Intersection improvements (4 lanes)

Maintains traffic capacity



Option 1: Transit priority measures (4 lanes)

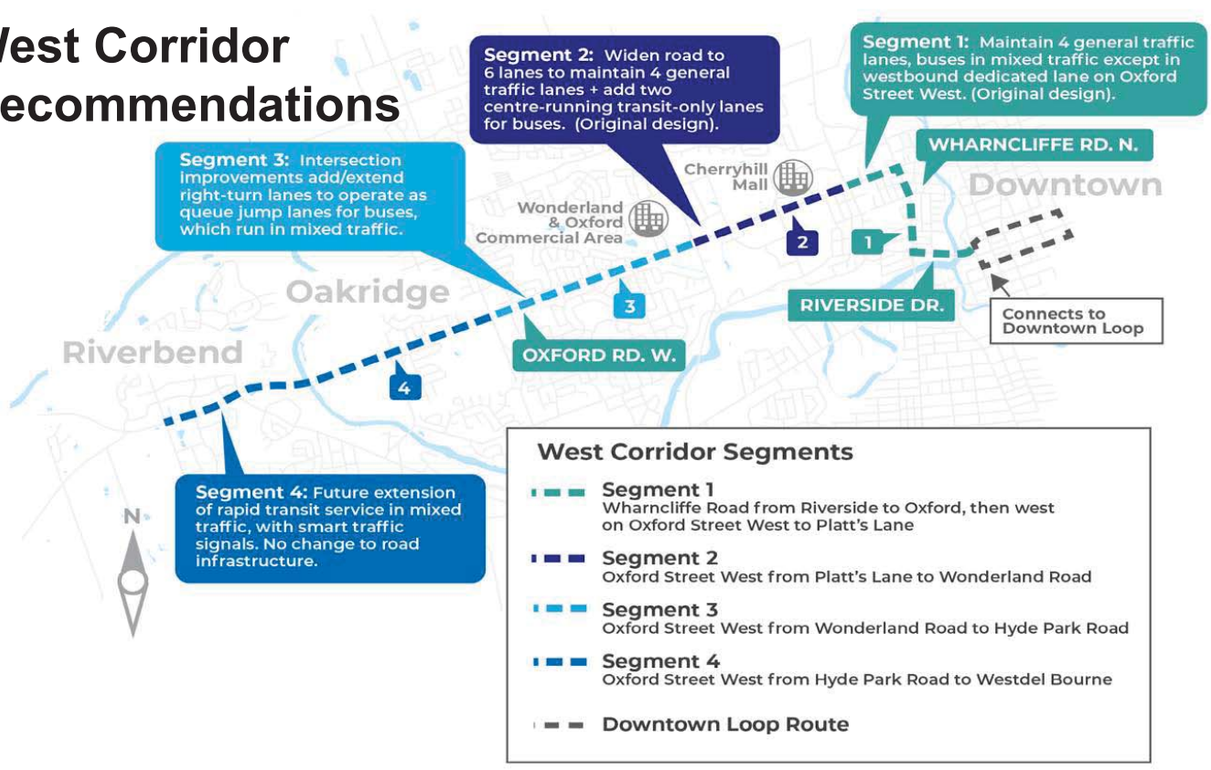
Maintains traffic capacity

Option 4 Preferred for Segment 4

Transit signal priority: future implementation of express transit operation in mixed traffic with smart signals to be determined through LTC service reviews.

KEY INDICATOR	DETAILS
Ridership	Density does not support infrastructure investment in transit-only lanes.
EA implications	Pre-approved under the Municipal Class Environmental Assessment process, therefore no further implications.
Capital costs	Investment in transit supportive infrastructure not justified at this time given expected land use and ridership.
Intensification	Place types in this segment don't support high-density development.

West Corridor Recommendations



West Corridor Recommendations

A total of $73.7 million is in the capital budget for the West Connection.

Segment		Recommendation	Cost range *
1	Wharncliffe/Oxford: from Riverside to Platt's Lane	Maintain 4 general traffic lanes, buses in mixed traffic with intersection improvements	**$37.3-$41.9 M**
2	Oxford: from Platt's Lane to Wonderland	Widen to 6 lanes. Maintain 4 gen. traffic lanes and add 2 centre transit-only lanes with median.	**$34.9-$38.8 M**
		Segment 1 and 2 Subtotal	**$72.2-$80.7 M**

* Estimates reflect Total Project Cost, including the Federal, Provincial & Municipal Share.

West Corridor Recommendations

A total of $73.7 million is in the capital budget for the West Connection.

Segment		Recommendation	Cost range *
1	Wharncliffe/Oxford from Riverside to Platt's Lane	Maintain 4 general traffic lanes, buses in mixed traffic with intersection improvements	**$37.3-$41.9 M**
2	Oxford from Platt's Lane to Wonderland	Widen to 6 lanes. Maintain 4 gen. traffic lanes & add 2 centre transit-only lanes with median.	**$34.9-$38.8 M**
		Segment 1 and 2 Subtotal	**$72.2-$80.7 M**
3	Oxford from Wonderland to Hyde Park	Maintain 4 gen. traffic lanes, buses in mixed traffic with intersection improvements.	**$8.8-$13.5 M**
4	Oxford from Hyde Park to Westdel Bourne	Buses in mixed traffic with smart traffic signals. No change to road infrastructure.	**$0.6 M**
		West Corridor Recommendation (4 Segments) Total	**$81.5–$94.8 M**

* Estimates reflect Total Project Cost, including the Federal, Provincial & Municipal Share.

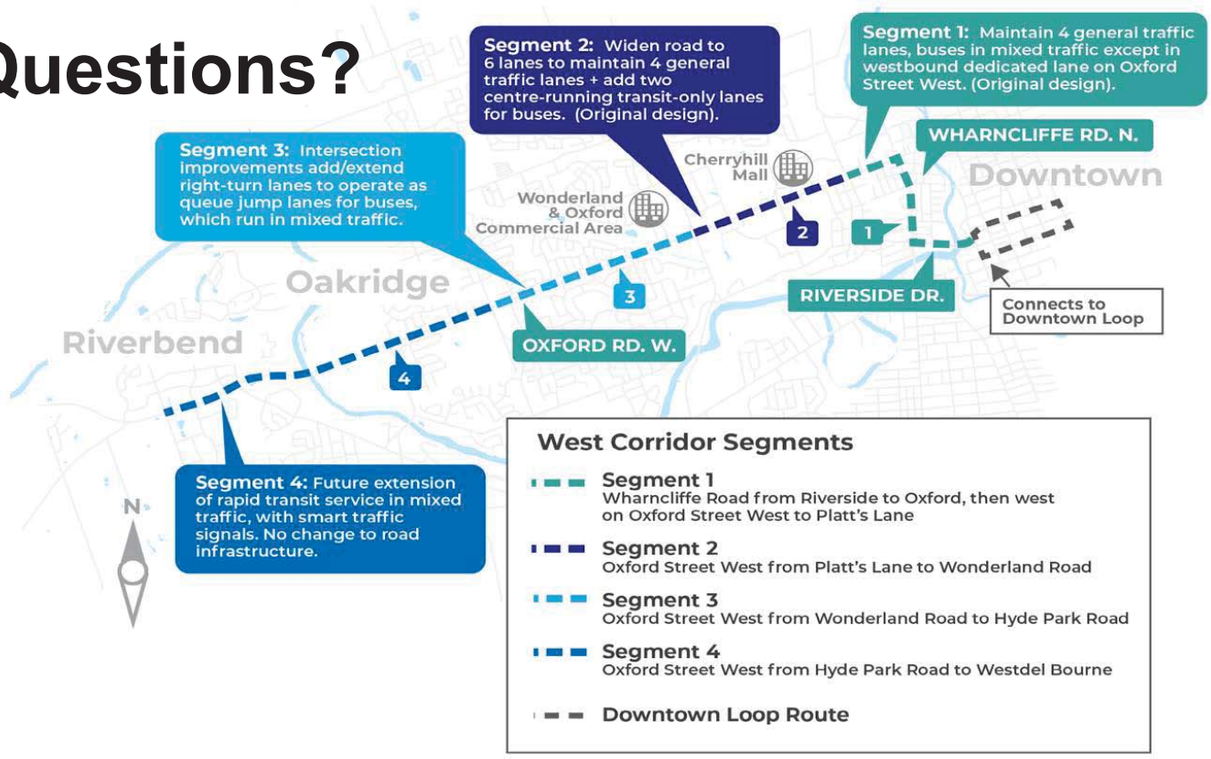
LTC Coordination

Local service integration	Fleet electrification
• LTC's 2018 Rapid Transit Integration Strategy gives direction • LTC's annual service plan process responds to ridership shifts, allowing for modifications	• Modelling done during Master Plan and EA • LTC analysis underway • Decision-making for RT must be considered in context of larger fleet

Park and Rides

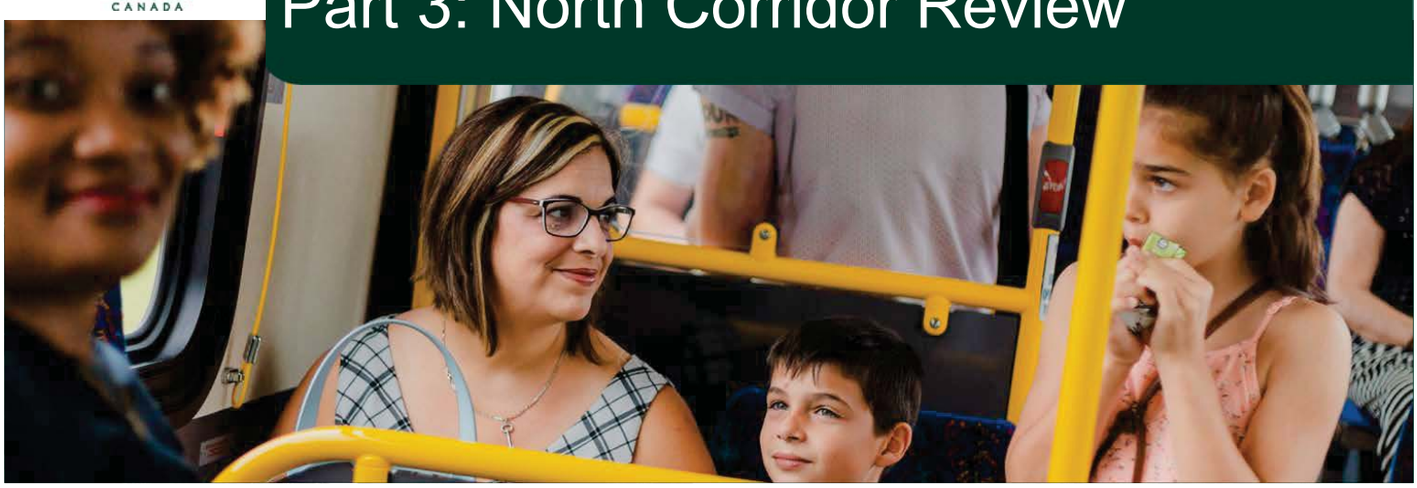
- Variety of ways to establish Park and Rides
- Challenging to find public opportunities to invest in P&Rs in funding window
- Future opportunities exist if transit extends west beyond original design, potentially aligned with development applications

Questions?



London CANADA

Part 3: North Corridor Review



North Corridor Review

Option 1: Intersection improvements on Western and Richmond

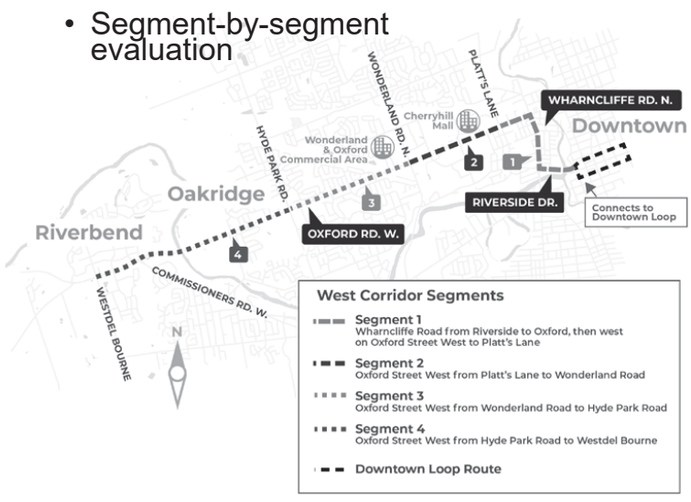
Option 2: Rapid transit on Western + intersection improvements on Richmond

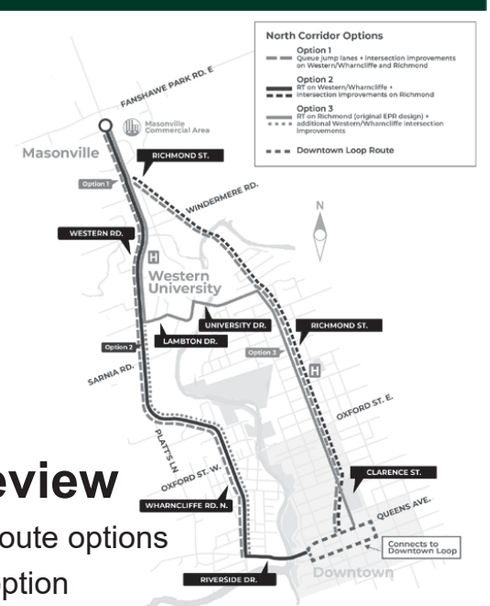
Option 3: Rapid transit on Richmond + intersection improvements on Western

Reviews: West vs. North

West review

- Defined route
- Segment-by-segment evaluation





North review

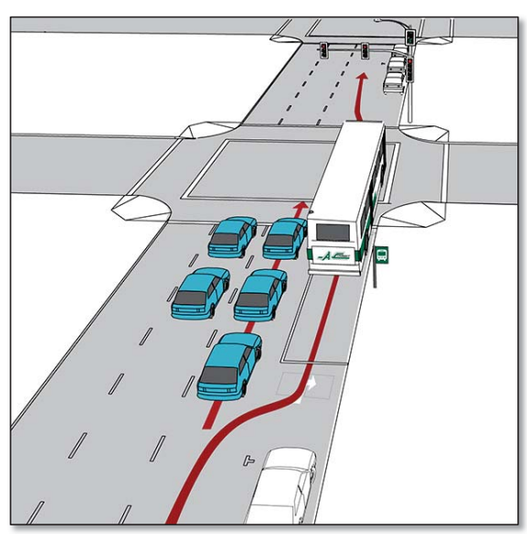
- Combined route options
- High-level option evaluation

Option 1: Intersection Improvements on Western Rd. and Richmond St.

- Shared right-turn/bus queue jump lanes at select intersections along Richmond St. and Western Rd./Wharncliffe Rd.
- Enhanced intersection improvements at select Richmond St. intersections
- Works with recommended mixed traffic option for Wharncliffe Rd. south of Oxford St. (West Corridor Option 1)

Enhanced Intersection Improvements

- Lack of turn lanes on Richmond St. from Central Ave. to Western Rd. delay general traffic and transit
- Congestion at some intersections would obstruct the benefit of queue jump lanes
- Introducing vehicle turn lanes at select intersections would ease congestion from turn movements, improving mobility for transit and drivers



Option 1: Intersection Improvements on Western Rd. and Richmond St.

KEY INDICATOR	DETAILS
Transit	Minor benefit to local and express bus routes. Buses operating in mixed traffic still subject to delays. Not anticipated to attract significant ridership.
Traffic	Maintains existing capacity. No anticipated change to Western Rd operations. Richmond St operations expected to improve.
Impact	Least impact to trees, utilities, property and heritage conservation.
Policy	Does not encourage the redevelopment and intensification envisioned by London Plan.
Cost	Lowest capital cost to implement.

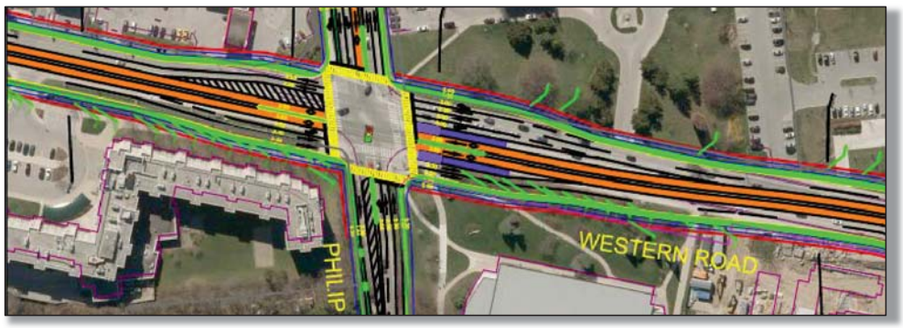
Option 2: RT on Western with Intersection Improvements on Richmond

- Centre-running rapid transit on Western Rd./Wharncliffe Rd.

Plus:

- Shared right-turn/bus queue jump lanes on Richmond with additional improvements at select intersections (consistent with Option 1)
- 3 “sub-options” considered for Western Rd./Wharncliffe Rd. between Platt’s Lane and Oxford St.

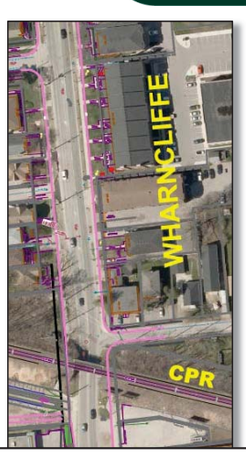
Option 2: Western Road North of Platt's Lane

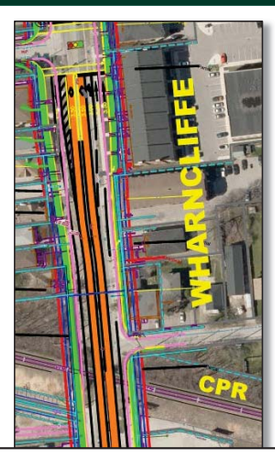


Widen road to 6 lanes to add centre-running transit-only lanes and maintain 4 lanes of general traffic

- Centre-running RT is consistent with the EA from Masonville to Lambton Dr.
- Centre-running RT would continue south on Western Rd to Platt's Lane
- Sub-options were considered for Western/Wharncliffe Rd. south of Platt's Lane

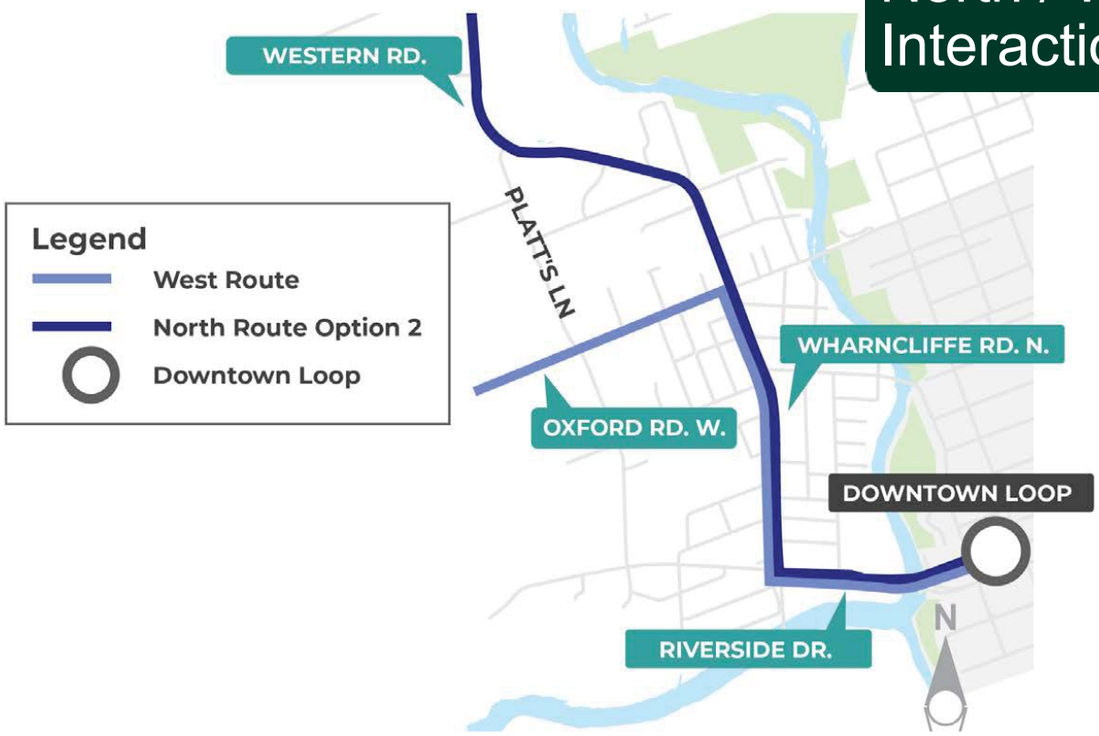
Option 2: Western Rd./Wharncliffe Rd. South of Platt's Lane





2a: existing conditions south of Platt's Lane, RT buses run in mixed traffic	**2b:** convert 2 general traffic lanes to transit-only lanes south of Platt's Lane	**2c:** widen south of Platt's Lane to add 2 transit-only lanes, maintaining 4 general traffic lanes (SCREENED OUT)

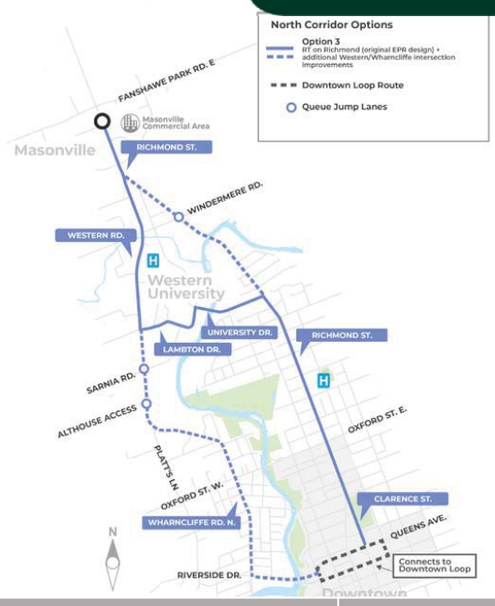
North / West Interactions



Option 2: RT on Western and Intersection Improvements on Richmond

KEY INDICATOR	DETAILS
Transit	Removes buses from general traffic, improving transit reliability and frequency. RT route would serve fewer key destinations than Option 3.
Traffic	Widening for centre-running transit retains existing roadway capacity. Traffic constraints anticipated in non-widened sections. Centre median restricts left turns, but improves safety.
Impact	Most impactful on properties, heritage conservation, trees and utilities. Option 2b has greatest impacts, triggering full removal of 23 heritage properties.
EA Implications	Requires additional studies and EA addendum.
Policy	RT service encourages redevelopment and intensification though limited in some areas by floodplain and heritage conservation district.
Cost	High capital costs, including large land component

Option 3: RT on Richmond with Intersection Improvements on Western



- Centre-running rapid transit south from Masonville Place following:
  - Richmond St. to Western Rd.(widen)
  - Western Rd. to Lambton Dr. (widen)
  - 3 stops serving Western University (convert)
  - Richmond to Downtown Loop (convert)

Plus:

- Shared right-turn/bus queue jump lanes at select Western Rd. intersections

Option 3: RT on Richmond with Intersection Improvements on Western

KEY INDICATOR	DETAILS
Transit	Removes buses from general traffic, improving transit reliability and frequency. Longest RT route, serving the greatest number of potential passengers.
Traffic	Re-distributes traffic volume over the Wellington and Richmond Corridors Minor traffic delay on Richmond south of the University – only during peak times. Centre-median restricts left-turns, but improves roadway safety.
Impact	Widening impacts to properties, heritage conservation, trees and utilities. Overall, less impacts than Option 2
Policy	RT service encourages redevelopment and intensification.
Cost	High capital cost provides for the most transit benefit.

North Corridor Recommendations

A total of $136.7 million is in the capital budget for the North Connection.

Option	Description	Cost Range *
1	Intersection improvements along both Western and Richmond	**$17.6 M - $24.1 M**
2a	Rapid transit on Western (mixed traffic south of Platt's) with intersection improvements on Richmond	**$108.5 M - $133.0 M**
2b	Rapid transit on Western (convert two lanes south of Platt's) with intersection improvements on Richmond	**$136.4 M - $168.0 M**
3	Rapid transit on Richmond with intersection improvements on Western	**$154.6 M - $172.0 M**

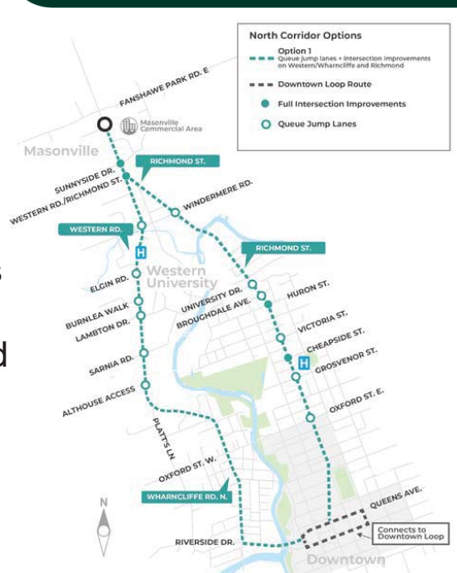
* Estimates reflect Total Project Cost, including the Federal, Provincial & Municipal Share.

Transit approaches for further considertaion

Option 1

INTERIM MEASURES

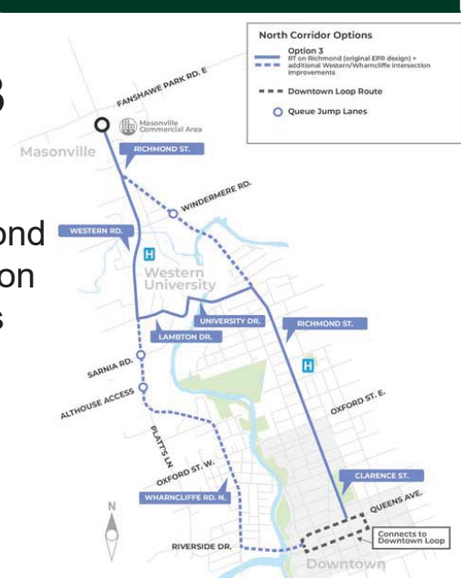
Intersection improvements on Western and Richmond



Option 3

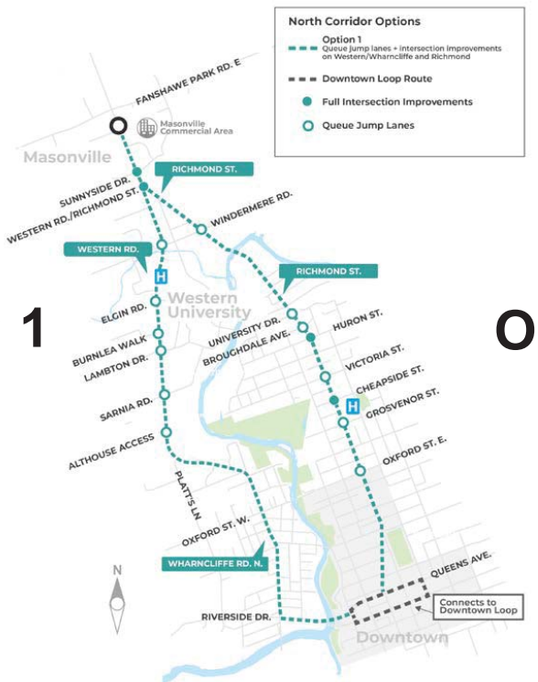
LONG-TERM MEASURES

RT on Richmond with intersection improvements on Western

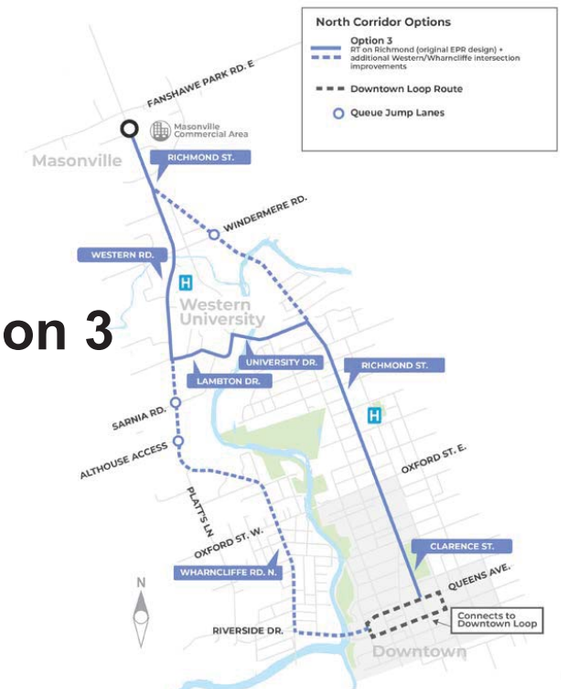


Questions?

Option 1



Option 3



London CANADA

Discussion of Corridor Reviews

Rapid Transit Implementation Working Group

Report

1st Meeting of the Rapid Transit Implementation Working Group
January 27, 2020
Council Chambers

Attendance

PRESENT: Councillor M. Cassidy (Chair), Councillors J. Helmer, S. Hillier, A. Hopkins, A. Kayabaga, S. Lehman, E. Peloza, P. Squire and M. van Holst, T. Khan, S. Rooth; and D. Turner (Committee Clerk)

NOT PRESENT: T. Park

ALSO PRESENT: K. Burns, J. Dann, A. Kemick, S. Maguire, K. Paleczny, M. Ribera, and J. Taylor

The meeting was called to order at 4:33 PM

1. Call to Order

1.1 Disclosures of Pecuniary Interest

That it BE NOTED that no pecuniary interests were disclosed.

1.2 Election of Chair and Vice Chair for the term ending November 30, 2020

That it BE NOTED that the Rapid Transit Implementation Working Group elected Councillor M. Cassidy and Councillor E. Peloza as Chair and Vice Chair, respectively, for the term ending November 30, 2021.

2. Scheduled Items

2.1 Update on Projects

That it BE NOTED that the presentation from J. Dann, Director, Major Projects, as appended to the agenda, with respect to an update on current and future rapid transit projects, was received.

3. Consent

3.1 1st Report of the Rapid Transit Implementation Working Group

That it BE NOTED that the 1st Report of the Rapid Transit Implementation Working Group, from its meeting held on February 21, 2019, was received.

3.2 Municipal Council Resolution - Rapid Transit Implementation Working Group

That it BE NOTED that the Municipal Council resolution, from its meeting held on November 26, 2019, with respect to the Rapid Transit Implementation Working Group, was received.

4. Items for Discussion

None.

5. Adjournment

The meeting adjourned at 5:46 PM.

TO:	**CHAIR AND MEMBERS RAPID TRANSIT IMPLEMENTATION WORKING GROUP MEETING ON JUNE 30, 2020**
FROM:	**KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR ENVIRONMENTAL & ENGINEERING SERVICES AND CITY ENGINEER**
SUBJECT:	**NORTH CORRIDOR TRANSIT OPTIONS REVIEW**

RECOMMENDATION

That on the recommendation of the Managing Director, Environmental and Engineering Services and City Engineer, the following actions **BE TAKEN** with respect to transit routes along Richmond Street and Western Road between the Masonville Transit Hub, Western University and the Downtown:

(a) The following two approaches for improving transit **BE ADVANCED** for further consideration;

i) Option 1 – Intersection improvements on both Western Road and Richmond Street;

ii) Option 3 – Rapid transit on Richmond Street, with intersection improvements on Western Road; and

(b) Staff **BE DIRECTED** to report back with a work plan and fee estimate to provide further assessment of transit options for the north based on the Council's preferred approach.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

- Civic Works Committee – June 19, 2012 – London 2030 Transportation Master Plan;
- Civic Works Committee – October 7, 2013 – Bus Rapid Transit Strategy;
- Civic Works Committee – July 21, 2014 – Rapid Transit Corridors Environmental Assessment Study Appointment of Consulting Engineer;
- Civic Works Committee – June 2, 2015 – Rapid Transit Funding Opportunities;
- Civic Works Committee – August 24, 2015 – Shift Rapid Transit Initiative Appointment of Survey Consultants;
- Strategic Priorities and Policy Committee – November 9, 2015 – Shift Rapid Transit Update;
- Strategic Priorities and Policy Committee – January 28, 2016 – Downtown Infrastructure Planning and Coordination;
- Strategic Priorities and Policy Committee – May 5, 2016 – Shift Rapid Transit Business Case;
- Strategic Priorities and Policy Committee – September 12, 2016 – Rapid Transit Implementation Working Group;
- Strategic Priorities and Policy Committee – May 3, 2017 – Rapid Transit Alternative Corridor Review;
- Strategic Priorities and Policy Committee – May 15, 2017 – Rapid Transit Corridors;
- Civic Works Committee – July 17, 2017 - Shift Rapid Transit Additional Engineering and Legal Survey;

- Strategic Priorities and Policy Committee – July 24, 2017 – Rapid Transit Master Plan and Business Case;
- Strategic Priorities and Policy Committee – September 18, 2017 – Project Management Plan, Communications Plan and Consulting Fees Amendment;
- Strategic Priorities and Policy Committee – April 23, 2018 – Bus Rapid Transit Environmental Assessment Initiative;
- Civic Works Committee – March 14, 2018 – The History of Rapid Transit;
- Strategic Priorities and Policy Committee – March 25, 2018 – Investing in Canada Infrastructure Program - Public Transit Stream Transportation Projects for Submission;
- Strategic Priorities and Policy Committee – March 25, 2019 – Investing in Canada Infrastructure Program, Public Transit Stream, Transportation Projects for Submission; and
- Strategic Priorities and Policy Committee – October 28, 2019 – Investing in Canada Infrastructure Program, Public Transit Infrastructure Stream, Approved Projects.

2019-2023 STRATEGIC PLAN

The following report supports the Strategic Plan through the strategic focus area of "Building a Sustainable City" by implementing and enhancing safe and convenient mobility choices for transit riders, automobile users, pedestrians, and cyclists.

BACKGROUND

Context

On March 26, 2019, Council selected ten transportation projects to be submitted for approval under the Public Transit Infrastructure Stream (PTIS) of the Investing in Canada Infrastructure Program (ICIP) from a list of eligible projects capable of being constructed within the funding window.

On June 25, 2019, the Province pledged $103.2 M for all ten of the transit and transit-supportive projects under the ICIP program, and on August 23, 2019, the Federal government announced $123.8 M for the same projects.

The current approved ICIP projects were part of an initial funding application window. A second ICIP application window is anticipated. The ten approved ICIP projects did not utilize the full funding allocation, leaving an available balance to support future applications for transit-supportive works. A further breakdown of available ICIP funding is provided later in this report.

The rapid transit (RT) plan was presented for ICIP consideration as five component projects able to stand alone or work in combination with other projects on the list. Council prioritized three of the RT projects for the ICIP funding application: the Downtown Loop, the East London Link and the Wellington Gateway. The West and North corridor RT projects were not prioritized at the time, providing opportunity for further discussion of transportation needs for those parts of the city.

Purpose

On January 14, 2020, Council directed staff to explore further options for improving transit service to North London through the following resolution:

That the following actions be taken with respect to the transit routes along Richmond Street and Western Road between the Masonville Transit Hub, Western University and the Downtown:

a) the Civic Administration BE DIRECTED to work with London Transit Commission to identify:

i) enhancements to roadway geometry, including, but not limited to, intersection design;
ii) traffic controls, including signal design and operations;
iii) transit routing and stop locations; and
iv) other potential short and long term improvements to enhance transit service and connectivity along these corridors; and,

b) the Civic Administration BE DIRECTED to report back to a future meeting of the Strategic Priorities and Policy Committee, in advance of the next project intake opportunity for the Public Transit Infrastructure Funding – Transit Stream Program, with the results of the review set out in a) above.

The approved Environmental Assessment for London's rapid transit initiative provides the foundation to continue exploring options for improving transit service to North London. Staff was able to review transit options for the North under the current consulting contract for the Environmental Assessment and representatives of the London Transit Commission continued their participation on the project team.

This report summarizes the development and assessment of options to optimize transit service to North London addressing a) parts i) through iv) of the resolution.

DISCUSSION

Overview of North Corridor Review

Status of the Environmental Assessment
The Rapid Transit Initiative Environmental Assessment followed the Transit Project Assessment Process (TPAP) – a provincially regulated protocol created to support transit initiatives (O.Reg. 231/08). On June 4, 2019, the City of London received a "Notice to Proceed with Transit Project" from Ontario's Minister of Environment, Conservation and Parks. This process allows the City to proceed with any or all components of the Bus Rapid Transit project in accordance with the Environmental Project Report (EPR).

The engineering work, technical studies and consultation that went into the EPR provide the foundation to review alternatives to the approved design concept. The North Corridor Review (Appendix A) provides a Master Plan-level evaluation of a range of measures to improve transit, including elements of the Original Design proposed in the EPR, for comparison purposes.

Any options that increase the footprint of the Original Design or extend beyond the previous study limits may require an additional Environmental Assessment and public

consultation, culminating in an addendum to the EPR. Additional analysis and data gathering may include but not be limited to: traffic and transit operations, natural environment, cultural heritage, archaeology, stormwater and utilities. The length of time required to complete the additional analysis would vary depending on the study area and range of options. At a minimum, it is anticipated that any further study would take at least one year to complete.

Environmental Assessment implications were included as an evaluation criterion in the corridor review.

Transit Service for North London

Two primary transit corridors connect Downtown to Masonville Place: Wharncliffe/ Western Road and Richmond Street. As the City grows, there will continue to be transit needs along both. To address potential short-and long-term needs for both corridors, three approaches to improving transit were developed and evaluated:

Option 1: Intersection improvements on both Western Road and Richmond Street

Option 2: Rapid transit on Western Road, with intersection improvements on Richmond Street

Option 3: Rapid transit on Richmond Street, with intersection improvements on Western Road

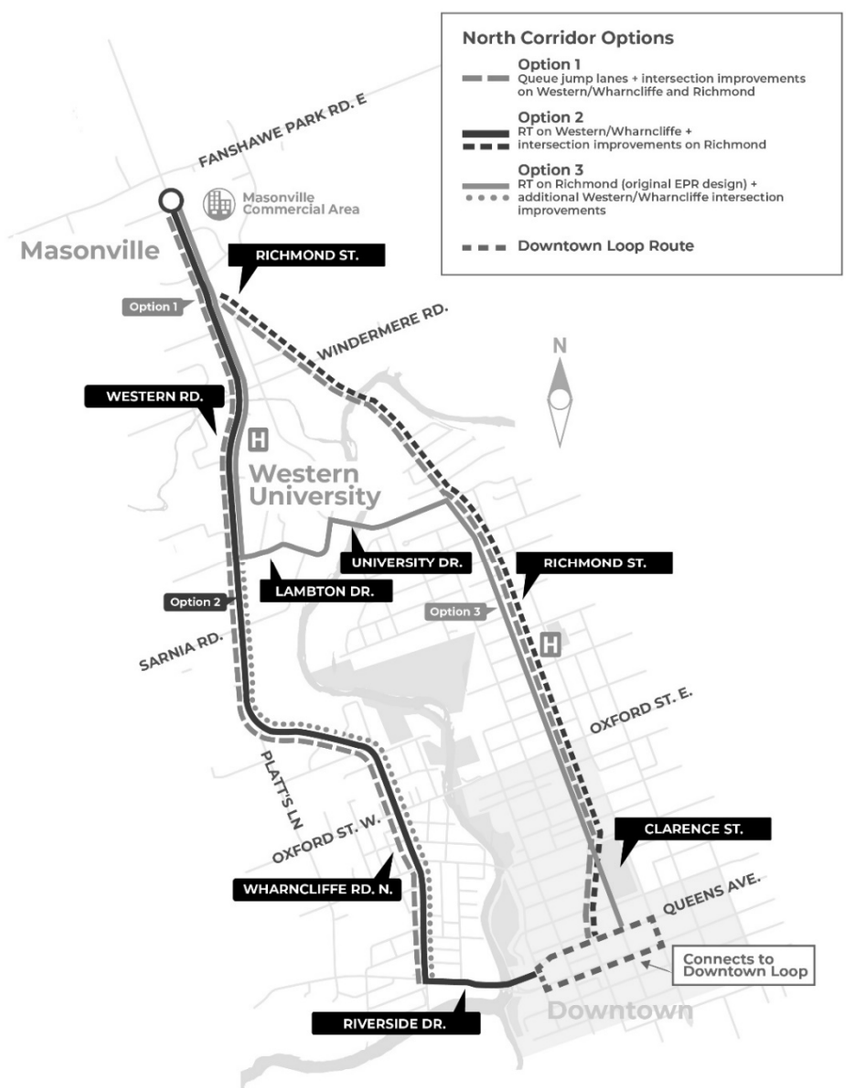


Exhibit 1: North Corridor Review Map

Interactions with West Corridor Review

On November 26, 2019, Council passed a resolution directing staff to explore further options for improving transit service in the West end of the city.

The North Corridor Review considers transit options along both Richmond Street and Western Road/Wharncliffe Road. Under some North options, Segment 1 of the West Corridor Review (Wharncliffe Road south of Oxford Street West) would need to accommodate the transit demand of both the West and North RT corridors.

This section of Wharncliffe Road would have the highest frequency of buses of the City's RT network outside of the downtown core, potentially accommodating the 10-minute frequency of RT for the West Corridor plus the 5-minute frequency of RT for the North Corridor and some continued local transit routes.

The West Corridor Review is detailed in a companion SPPC report. The West review establishes a baseline for Segment 1 by reviewing options independent of the north corridor review. However, this North Corridor Review considers the influence on Wharncliffe Road South of Oxford Street West (Segment 1) when evaluating measures to improve transit. The implications of North and West route interactions are reflected in the detailed evaluation tables in Appendix A.

Supporting Documentation

The North and West Corridor Reviews are presented in separate concurrent reports to be considered in tandem.

Staff were able to complete both corridor reviews using remaining budget under the existing Environmental Assessment contract. The project team was able to build on baseline information, studies, modelling and past analysis from the Rapid Transit Master Plan and EPR.

Attached in Appendix A is the North Corridor Review technical memorandum and detailed evaluation tables. This work was supported by traffic analysis of conceptual roadway configurations, preparation of high-level concept drawings and qualitative assessment of measures to improve transit.

Order of magnitude capital cost estimates were prepared for all alternatives. These were based on per-metre cost estimates for each typical roadway configuration, derived from the London RT network cost estimate prepared with the EPR. These costs include infrastructure costs and associated contingencies, utility relocation costs, allowance for property acquisition, and additional bus fleet requirement costs. The estimates also include engineering and project management costs and applied contingency consistent with the master planning level of detail available.

The costs presented in the West Corridor Review are reflective of the West segment only, while the costs presented in the review of the North Corridor include any additional works as a result of overlap in RT service on Wharncliffe Road south of Oxford Street West.

The cost estimates have been inflated to reflect nominal dollars and broken down into their ICIP-funded and municipally funded shares, reflecting any ineligible costs.

Developing Options to Improve Transit

A full range of transit improvement measures was considered when developing options for evaluation. However, some options were considered operationally infeasible or not applicable under ICIP, and therefore were not carried forward for evaluation.

Table 1: Options Developed*

Minor Transit Improvements/ Lowest Cost ↕ Major Transit Improvements/ Highest Cost	• Express bus service • Transit signal priority – enhancing existing transit service • **Intersection improvements (queue jump lanes)** • Convert existing lane to two-way transit-only lane • **Convert existing lanes to transit-only lanes** • Widen to add a two-way transit-only lane • **Widen to add transit-only lanes**

***** Only bolded options were incorporated into one of the three transit options for evaluation

Table 1 summarizes transit improvement measures considered as part of this review and highlights those that were incorporated as part of one of the three evaluated transit options. The following sections provide a brief explanation of each and the detailed evaluation tables are included in Appendix A.

Express Service

Express bus service is intended to reduce travel times over conventional local service by making fewer stops and following more direct routes. LTC already operates express routes 90 on Richmond Street and 93 on Western Road. Express bus service is considered through LTC's annual service reviews and does not require infrastructure investment under ICIP. This option was not carried forward for evaluation.

Enhancing Transit Service with Transit Signal Priority (TSP)

The Transportation Intelligent Mobility Management System (TIMMS) project, currently funded as one of the 10 approved ICIP projects, includes transit signal priority and other traffic signal improvements – such as sensors and video cameras – along major corridors. The project will reduce intersection delays and smooth traffic flow for both transit and drivers. Installing priority signals for transit would provide benefit to local and express routes, but would not implement any rapid transit buses or infrastructure. It would not require an infrastructure investment under ICIP since the City has already received funding approval for the TIMMS project. As such, Transit Signal Priority measures were considered to reflect an existing condition, and were not carried forward for further evaluation under the north review.

Intersection Improvements

This option would add or extend right-turn lanes at signalized intersections that buses can use as queue jump lanes, while maintaining four lanes of general traffic. Queue jump lanes improve transit travel times by allowing buses to bypass traffic and get to the front of the queue at signals. Transit signal priority would provide a head start for transit with an advance green transit only signal phase. Intersections were assessed to determine the lane length needed for a bus to by-pass through traffic 50 per cent of the time, and 95 per cent of the time, during peak hours.

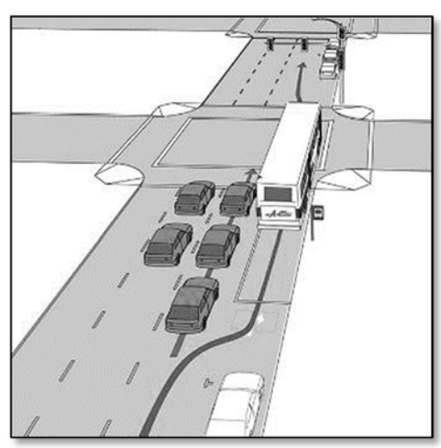


Diagram of queue jump lane.

While intersection improvements would benefit transit operations at intersections, buses would still be operating in mixed traffic for the majority of the route and experience delays associated with congestion and right-turning movements. Providing priority for transit at intersections may also increase delay for drivers due to adjusted signal timing.

Queue jump lanes are not the same as bus bays which require drivers to yield the right-of-way to buses when the bus indicates an intention to re-enter the adjacent traffic lane. Ontario has Yield to Bus legislation, however, compliance is a concern, particularly on high-volume roads. Bus bays only are useful in specific circumstances (i.e. stops with higher passenger loads and ridership needing mobility aids or stops with schedule layovers requiring the bus to sit longer). Increased use of bus bays would have a negative impact on transit schedule adherence and therefore were not considered as part of this review.

At some intersections on Richmond Street, traffic flow forecasts continue to show traffic operating at a low Level-of-Service (LOS), in part due to the lack of turning lanes at select signalized intersections. In these particular instances, poor traffic flow would obstruct the transit benefit of queue jump lanes. In these cases, the intersections were considered to receive a full range of improvements, including widening to accommodate the addition of left and right turn lanes. Full intersection improvements at these locations would take advantage of the ICIP funding opportunity to improve mobility for both transit and drivers.

Two-way transit-only lane options

A two-way transit lane consists of a single transit-only lane in the centre of the road. Buses travelling in both directions alternate use of the lane controlled by signals at either end of the shared lane.

Options for two-way transit-only lanes were considered initially, but not included as part of the evaluation. Two-way transit-only lanes would require complex signal operations, which result in transit delays and would only be feasible for short segments framed by signalized intersections. Plus, the design requirements for safe operation and maintenance would result in widening impacts and costs nearly equal to those of two single-direction transit-only lanes.

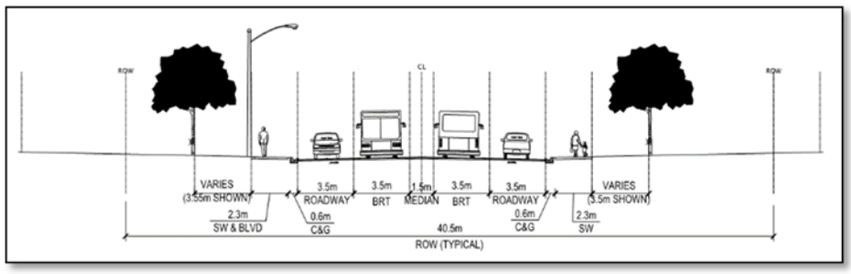
Two-way transit lane in Eugene, Oregon.

Centre-running transit-only lanes

Transit-only lanes run down the centre of the road with a raised centre median. RT stops are located on sheltered platforms in the centre of the road while local service continues to run in the curb lane. RT passengers access the protected centre platform by crossing the road at a signalized cross-walk.

The raised centre median restricts unsignalized side streets and mid-block driveways to right-in/right-out access. Without the raised centre median, drivers would inevitably try to turn left from the centre-running transit-only lanes, resulting in stopped vehicles blocking RT buses and decreasing the reliability of the RT service. Left-turn movements are consolidated at signalized intersections to provide protected, safe turns across on-coming traffic. The centre-running transit-only lanes would increase the radius for drivers completing U-turns, which would make the movement easier for drivers to manoeuvre.

Centre-running transit-only lanes provide the purest form of RT in terms of their ability to support service frequency and reliability. Centre-running RT is also the most efficient configuration for winter maintenance.



Example of centre-running RT.

Evaluating Options to Improve Transit

Each North option was evaluated against the following 14 criteria (Table 2).

These criteria support the evaluation and comparison of options. They are not intended to carry equal weight but provide insight into how different options balance transit benefit against physical impacts, operational impacts, study implications and cost.

Detailed evaluation tables are provided in Appendix A.

Table 2: Evaluation Criteria

Benefit to transit operations	Transit operations, including reliability and travel time delay, considered, with input from LTC.
Increase in Ridership	Ability to grow transit ridership by attracting new or choice riders based on implementing enhancements.
Benefit to traffic operations	Traffic operations assessed with modelling including signalized intersection operations, queue lengths, and potential for traffic diversion, with consideration for pedestrians and cyclists.
Least property impacts	Impacts to buildings and properties assessed for each option, indicating potential full and partial property impacts.
Least cultural heritage impacts	For options that would result in some form of property impact to a property with potential cultural heritage value or interest, a Cultural Heritage Evaluation Report would be required with timing and cost implications.
Least impact on trees	A high-level assessment of the number of trees impacted. This did not include a Tree Inventory to assess the health, size or type of trees.
Least impact on utilities	A high-level assessment of above-ground utilities, based on previously collected utility information.
Least impact on driveways	A high-level assessment of the number of driveways and potential parking impacts.
Redevelopment potential	For options that include widening, considered ability to encourage redevelopment and potential opportunities to merge residual parcels.
Most consistent with City's policy objectives	Assessed whether options support the goals and objectives of the London Plan.
Least EA Implications	Identified whether options would trigger the need for an addendum to the approved EA and the related study, consultation and timing implications.
Interaction with West Corridor	Compatibility with Segment 1 of the West Corridor review, Wharncliffe Road south of Oxford Street.
Constructability	Potential impacts on lane closures, traffic detours and other constructability challenges.
Capital cost	High-level cost estimates developed using costs for similar roadway configurations to provide a range of potential capital costs.

Developing North Transit Options

The following three sections provide a detailed description for each of the proposed transit options, highlighting key assumptions, benefits and challenges.

OPTION 1: Intersection Improvements along both Western Road and Richmond Street

Description and Assumptions
As an alternative to higher order transit on either Richmond Street or Western Road, a concept was developed to implement intersection improvements (queue jump lanes and transit signal priority) along both corridors. By adding or extending right-turn lanes, buses would be able to bypass the general traffic queues during peak traffic periods. Option 1 assumes intersection improvements on Western Road and Richmond Street would benefit existing express and local bus routes operating in mixed traffic. Option 1 would not include RT buses or station infrastructure.

Option 1 considers intersection improvements along Western Road at the existing signalized intersections of Althouse, Sarnia Road, Lambton Drive, Burnlea Walk, Elgin Road, and Windermere Road. Intersection improvements would be implemented on Richmond Street at the existing signalized intersections of Oxford Street East, Grosvenor Street, Victoria Street, Broughdale Avenue, University Drive, Windermere Road, Western Road, and Sunnyside Drive.

The Richmond Street corridor between Central Avenue and Huron Street currently experiences significant traffic congestion due to the lack of turn lanes at critical intersections. In this area, it was determined that adding queue jump lanes and transit signal priority would not alleviate the impact of turning movements on transit operations. Therefore, it is recommended that the intersections of Richmond with Cheapside Street and Huron Street receive full intersection improvements, including widening the road as required to accommodate the necessary additional turning lanes.

The Original Design proposed in the EPR included a reconfiguration of the intersection of Western Road and Richmond Street in order to direct longer-distance through trips away from Richmond Street. Option 1 assumes the existing configuration of the intersection would remain, with through traffic prioritized along Richmond Street.

Considerations
Option 1 is anticipated to provide a minor improvement to transit operations based on the addition of queue jump lanes and widening at signalized intersections. It would also take advantage of Transit Signal Priority included as part of the TIMMS project. Since Option 1 is geared towards local and express buses operating in mixed traffic, there would still be transit delays associated with congestion and right-turn movements.

Option 1 would provide limited potential to attract new ridership compared to a rapid transit solution. Based on the limited improvement to transit operations, Option 1 is not anticipated to encourage redevelopment or intensification (other than what would occur naturally), and thus is not consistent with the City's policies that designated Richmond Street as a Rapid Transit Corridor. Additionally, this option would not provide a range of viable transportation options that encourage sustainable modes of transportation and discourage sprawling development patterns.

Option 1 would minimize property impacts, as any widening required for implementation would be located at intersections, limiting the number of cultural heritage properties, trees and utilities that would be impacted.

Option 1 could be progressed as a quickstart implementation for RT in the North. There would be no further Environmental Assessment implications to Option 1, as the intersection improvements identified are covered under Schedule A+ of the Municipal Class Environmental Assessment process and the previous EA addressed ultimate road widening needs. Overall this option would keep initial implementation and operating costs low. However, curbside queue jump lanes would not be compatible with transition to the ultimate EPR design and result in future throw away costs.

Finally, since this option for the North Corridor assumes no rapid transit north of Oxford Street along Wharncliffe/Western, there would be no adverse impacts to the operations of Segment 1 of the West corridor, which recommended four general traffic lanes with transit operating in mixed traffic.

Capital Cost Estimate
The Option 1 estimated total project cost ranges from $17.6M to $24.1M.

OPTION 2: Rapid Transit on Western Road with intersection improvements on Richmond Street

Description and Assumptions
Option 2 considers locating rapid transit on Western Road, paired with the same intersection improvements recommended for Richmond Street in Option 1. Providing rapid transit infrastructure on Western Road would not alleviate the need for continued local and express bus service on Richmond Street.

From Masonville Place to Platt's Lane, Option 2 with RT on Western Road would include two centre-running transit-only lanes separated by a median with four general traffic lanes.

The Original Design proposed in the EPR included reconfiguring the intersection of Western Road and Richmond Street in order to prioritize north/south bound through traffic along Western Road. Option 2 assumes that the Western Road/Richmond Street intersection would retain its current configuration, so that through traffic continues to follow Richmond Street, maintaining capacity for RT along Western Road.

Sub-Options:
The Western Road corridor, south of Platt's Lane to Oxford Street, was recently widened to four general traffic lanes in 2018, including expansion of the rail crossing. That raised the question of how to approach this brand new stretch of road if rapid transit is on Western Road.

Three sub-options were considered for Western Road/Wharncliffe Road South of Platt's Lane.

- 2a – Existing conditions: four general traffic lanes and buses would operate in mixed traffic.

- 2b – Convert two traffic lanes to transit only lanes: Some widening would be required at signalized intersections to convert two existing lanes to dedicated

transit-only lanes. Transit-only lanes would be centre-running and include a centre-median to restrict left-turns to signalized intersections.

- 2c – Widen to add two transit-only lanes: Widening would be required to accommodate two additional centre-running transit-only lanes and maintain the recently upgraded four general traffic lanes. This option would have significant impacts to property, newly installed hydro/aerial utility and the reconstructed rail crossing. For this reason, Option 2c was screened out, and the evaluation focused on Options 2a and 2b.

Implications for the West Corridor

Under both Option 2 scenarios, the segment of Wharncliffe Road south of Oxford Street West would be shared by two rapid transit routes, additional local transit routes and general traffic. Therefore, the North Corridor review had to consider the implications for Wharncliffe Road south of Oxford Street West when evaluating options.

The configuration of Western Road north of Oxford Street West influences the design of Wharncliffe Road south of Oxford Street West (West Segment 1):

- 2a – Mixed traffic could be carried south through the intersection at Oxford Street West (consistent with West Option 1)

- 2b – Conversion of two traffic lanes to transit-only lanes would need to be carried south through the intersection at Oxford Street West (triggering West Option 2 and associated impacts)

This 1.5 km stretch of Wharncliffe Road between Oxford and Riverside would need to support 10-minute RT frequency for the West Corridor, 5-minute RT frequency for the North Corridor and some local service, making it the busiest segment in the rapid transit network outside of the Downtown Loop.

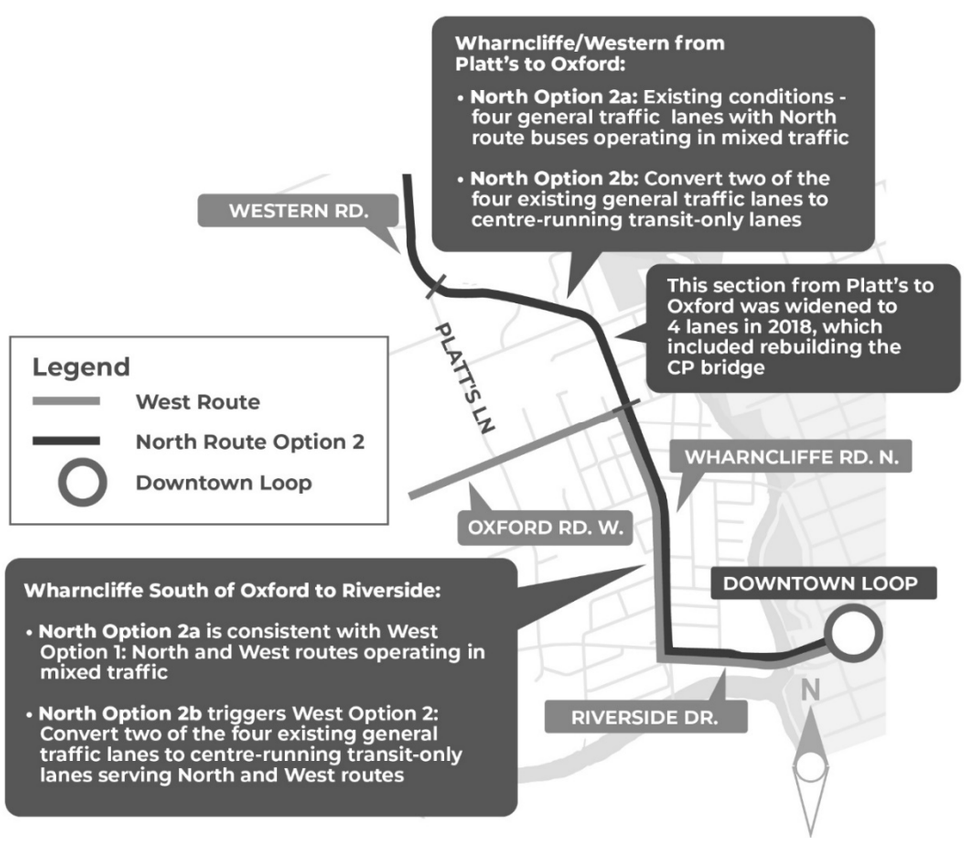


Exhibit 2: North and West Corridor Interactions

Considerations
Option 2 provides centre-running transit-only lanes along Western Road from Masonville Place to Platt's Lane. Centre-running transit is most reliable as buses are separated from general traffic congestion and not impacted by the right-turn movements that impact curb-side transit-only lanes.

Widening Western Road from Masonville Place to Platt's Lane to accommodate the additional transit-only lanes would maintain the existing capacity of general traffic lanes. While the addition of the centre median may impact some drivers (as mid-block left-turns would be restricted), the separation would provide safer road operations overall.

Overall, for either Option 2a or 2b, there is a moderate potential to attract ridership based on this corridor's connections to key trip generators, including the downtown core, Western University, Masonville Mall, University Hospital, and others. Other key trip generators on Richmond Street, including St. Joseph's Hospital, and King's University College, and student residences would continue to be served by local bus routes. The presence of a rapid transit system along Western Road would likely encourage redevelopment and intensification, though this potential is somewhat limited by the floodplain and natural features of the North Thames River.

Option 2 requires additional widening of Western Road from Lambton Drive to Platt's Lane, which would result in several impacts to properties, some with cultural heritage value.

Option 2 has the greatest Environmental Assessment implications. The segment of Western Road north of Lambton Drive is consistent with the EPR; however, Western Road/Wharncliffe Road between Lambton Drive and Oxford Street would require an EPR addendum. This would include conducting studies for traffic, natural environment, archaeology, stormwater, cultural heritage, utilities and more, which is anticipated to take a minimum of one year to complete.

Capital Cost Estimate
The Option 2a estimated total project cost ranges from $108.5M to $133.0M.
The Option 2b estimated total project cost ranges from $136.4M to $168.0M.

Option 3: Rapid Transit along Richmond Street with Intersection Improvements along Western Road

Description and Assumptions
The RT alignment for Option 3 is consistent with the Original Design recommended in the EPR, paired with the same intersection improvements recommended for Western Road in Option 1. Providing rapid transit infrastructure on Richmond Street would not alleviate the need for continued local and express bus service on Western Road.

This option considers centre-running transit-only lanes on Richmond Street from Central Avenue to University Drive, through Western University Campus and continuing north along Western Road from Lambton Drive to Masonville Place.

Option 3 assumes that the Richmond Street/Western Road intersection would be reconfigured to better prioritize north/south-bound through traffic along Western Road, where capacity would be retained via four general traffic lanes. Consistent with Option 1 above, Western Road is also considered to have intersection improvements at the existing signalized intersections of Althouse Entry and at Sarnia Road which would

include the extension of transit lanes for local service from Lambton Drive to the Sarnia Road intersection.

Finally, since this option for the North Corridor assumes no rapid transit immediately north of Oxford Street along Wharncliffe Road/Western Road, there would be no adverse impacts to the operations of the West corridor, which recommended four general traffic lanes with transit operating in mixed traffic and intersection improvements at Riverside Drive and Oxford Street West.

Considerations

The centre-running transit-only lanes for Option 3 provide the most reliable transit solution for this rapid transit corridor. Where road widening occurs to accommodate the infrastructure, traffic capacity in the existing four general traffic lanes would be maintained. The installation of centre medians would restrict left-turns to signalized intersections, representing a minor impact to drivers, but would result in safer road operations overall. Additionally, in areas where road widening is not occurring (Richmond Street from Central to University), traffic operations would experience a minor increase in delay during peak hours due to two of the four general traffic lanes being converted to transit-only lanes.

Locating rapid transit on Richmond Street provides the greatest potential for ridership increase as it serves the most trip generators (including downtown, Western University, Masonville Place, two hospitals, etc.). Rapid transit on Richmond Street is consistent with City polices that designated Richmond Street as a Rapid Transit Corridor and would provide the highest potential for redevelopment and intensification.

The slightly reduced traffic volumes on Richmond Street resulting from the reconfigured intersection at Western Road would also provide more flexibility to improve cycling infrastructure from where RT connects into Western University at University Drive to north of the Thames River.

Option 3 would require widening of the corridor for significant segments, and the introduction of centre-island passenger platforms would result in further widening requirements. It is anticipated that 9 properties (including 7 cultural heritage properties) would be fully impacted, with an additional 93 properties (including 30 cultural heritage properties) being partially impacted.

Option 3 is consistent with the design concept assessed under TPAP, so there would be no further Environmental Assessment implications. The additional intersection improvements to Western Road, outside of the EPR boundary, are covered under the Municipal Class Environmental Assessment, and do not need further study.

Capital Cost Estimate

The Option 3 estimated total project cost ranges from $154.6 M - $172.0 M.

PRELIMINARY RECOMMENDATION

Based on the review of alternative approaches for short- and long-term transit improvements for the North Corridor, it is recommended that Options 1 and 3 be carried forward for further consideration. These options can be evaluated in more detail and compared on a segment-by-segment basis (similar to the West Corridor Review) with consideration for possible staging of implementation.

Staff can report back with a work plan and fee estimate to provide further assessment of transit options for the north based on the Council's preferred approach

FINANCIAL IMPLICATIONS

In early 2018, the federal and provincial governments allocated a total of $375.6 million to London to support transit improvement initiatives ($204.9 Federal plus $170.7 Provincial). Municipal matching requirements of $136.6M would support total eligible funding program of $512.2M.

In early 2019, the federal government announced the Investing in Canada Infrastructure Program (ICIP) - Public Transit Infrastructure Stream (PTIS), a cost-shared infrastructure funding program between the federal and provincial governments and municipalities. In March 2019, City Council approved a list of ten transit and transit-supportive projects to be submitted under the ICIP–PTIS program. This list included the Downtown Loop, the East London Link, and the Wellington Gateway. In June 2019, the Government of Ontario approved $103.1 million to support these projects, followed by approval for $123.8 million from the Government of Canada in August 2019. The ten approved PTIS projects will utilize $225.1 million of the $375.6 million allocation, leaving an available balance of $150.5 million.

A placeholder for transit connections in the North and West was approved in the 2020 – 2023 Multi-Year Budget (see Table 1). A total of $136.7 million is in the capital budget for the North Connection.

Table 1 - North Connection in 2020-2023 Multi-Year Budget

$(000's)	Life to Date	2020-2023	2024-2029	Total
North Connection				
Federal/Provincial Share	1,878		84,204	**86,082**
Municipal Share	3,158		47,464	**50,622**
Total	**5,036**	**0**	**131,668**	**136,704**

After funding the placeholders for the North and West connections, approximately $42 million of funding is still available for other transit related projects (remaining allocation of federal and provincial funding plus municipal matching, noting that the matching municipal share is currently unfunded).

SUMMARY

The high-level recommendations outlined in this report are the result of a thorough review that aimed to determine the best approach to serve North London's current and future transit needs. They represent the greatest opportunities to capitalize on available funding opportunities while delivering excellent value for residents of North London, and London as a whole.

For the purposes of this review, each corridor's distinct ridership needs, land uses, traffic volumes and cultural and environmental conditions were considered, ensuring the recommendations support appropriate levels of infrastructure investment along North London's critical transit routes.

The need to maintain existing traffic capacity was balanced with the ridership requirements of each corridor, and the potential transit benefits were weighed against other key considerations, such as physical impacts (for example, to trees and properties), operational impacts, study implications and cost.

Neither of the recommended approaches have impacts on the existing Environmental Assessment, meaning the City could potentially move forward with improvements without the need for any study addendums.

With this in mind, it is the project team's recommendation that an even more detailed review be undertaken once a preferred approach to improving transit for the North is identified.

With clarity on the preferred approach, the project team could further break down the North's selected corridors/options into distinct segments, honing in on and taking into consideration the unique needs of each area. The team could then report back on short- and long-term transit improvement options by segment, with the same detailed level of consideration undertaken on the West Corridor Review.

SUBMITTED BY:	
JENNIE DANN, P.ENG. PROJECT DIRECTOR, MAJOR PROJECTS	
CONCURRED BY:	**RECOMMENDED BY:**
ANNA LISA BARBON, CPA, CGA MANAGING DIRECTOR, CORPORATE SERVICES AND CITY TREASURER, CHIEF FINANCIAL OFFICER	**KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR, ENVIRONMENTAL AND ENGINEERING SERVICES & CITY ENGINEER**

Attach: Appendix A: North Corridor Alternatives – Summary Memorandum
cc. London Transit Commission

Appendix A

MEMO

TO: Jennie Dann, City of London

FROM: Andrew Shea, WSP Canada Group Ltd

SUBJECT: **North Leg Options**

DATE: **March 20, 2020, revised May 19, 2020**

The purpose of this memorandum is to present the high-level planning analysis and resulting recommendations for higher order transit along London's North Leg.

BACKGROUND

Options to optimize transit in the North Leg were developed and assessed in response to a motion from the December 12, 2019 meeting of the Strategic Priorities and Policy Committee (SPPC)1:

That the following actions be take with respect to the transit routes along Richmond Street and Western Road between the Masonville Transit Hub, Western University, and Downtown:

a) the Civic Administration BE DIRECTED to work with London Transit Commission to identify:

i. enhancements to roadway geometry, including, but not limited to, intersection design;

ii. traffic controls, including signal design and operations;

iii. transit routing and stop locations; and

iv. other potential short and long term improvements to enhance transit service and connectivity along these corridors; and,

b) the Civic Administration BE DIRECTED to report back to a future meeting of the Strategic Priorities and Policy Committee, in advance of the next project intake opportunity for the Public Transit Infrastructure Funding – Transit Stream Program, with the results of the review set out in a) above. (4.1/2/SPPC) (2019-T03)

In 2019, the Transit Project Assessment Process (TPAP) was completed for the Rapid Transit network, including the Downtown Loop and the North, South, East and West legs. The Environmental Project Report (2019) was completed as part of the TPAP to document the Environmental Assessment, following Ontario Regulation 231/08. The Environmental Project Report identifies the potential impacts of the preliminary design and proposed mitigation measures. The approved design for the North Leg has been included in the options assessed as part of this analysis.

610 Chartwell Road
Suite 300
Oakville, ON, Canada L6J 4A5

T: +1 905-823-8500
F: +1 905-823-8503
wsp.com

LONDON RAPID TRANSIT – NORTH LEG

The North Leg, as defined in the Environmental Project Report, begins in the intersection of Queens Avenue and Clarence Street, continuing north along Clarence Street and Richmond Street to University Drive, through Western University via University Drive/Lambton Drive, and northerly on Western Road/Richmond Street to the existing bus terminal at Masonville Place (**Exhibit 1**).

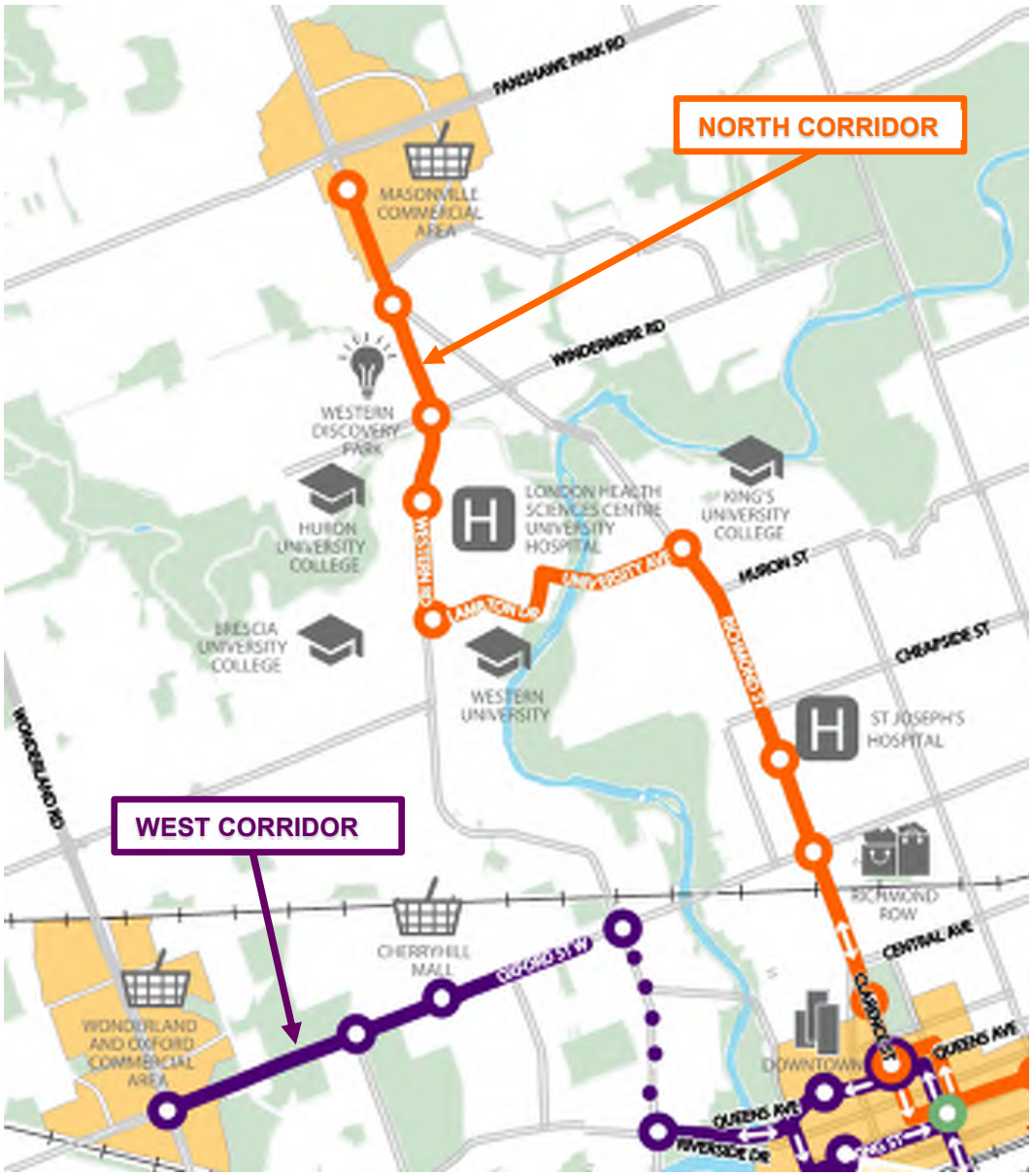


Exhibit 1: North Leg Key Plan

As documented in the Rapid Transit Master Plan (2017), to serve projected ridership in the North Leg of London's Rapid Tranist (RT) network, a bus is required every 5 minutes in each direction is proposed during peak periods, with 10-minute service in off-peak periods.

Projected peak hour ridership for the North Corridor in 2034 is provided in **Exhibit 2**.

As documented in the Environmental Project Report, the Rapid Transit network is planned to operate seven days a week, from 6 a.m. to midnight (12 a.m.). Articulated buses (buses comprising two sections, linked by a pivoting accordion-like join) can carry 70 passengers comfortably, and up to 110 passengers. The resulting capacity of the proposed Rapid Transit service is provided in **Exhibit 2**.

Exhibit 2: Projected peak passengers per hour in the peak direction passenger load (2034) (source: Rapid Transit Master Plan, Exhibit 3.23)

	North	East	South	West
Peak Rapid Transit Ridership in the Peak Direction during the Peak Hour	1450	1350	650	600
Rapid Transit Peak Hour Capacity	840 to 1320	840 to 1320	420 to 660	420 to 660

ALTERNATIVE ROUTES AND DESIGNS

North London is served by two primary transit corridors connecting Downtown London to Masonville Place:

- Richmond Street
- Wharncliffe Road / Western Road

As the city grows, there will continue to be transit needs along both corridors.

Three options were identified to review alternative transit priority measures along these combined corridors, as illustrated in **Exhibit 3**.

Several design options were considered and assessed for each of these routes. These alternatives include:

1. **Option 1 - Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road**: Implement shared right-turn/ queue-jump lanes at selected intersections in both Richmond and Western/Wharncliffe corridors, with supplementary intersection improvements (auxiliary turn lanes) at selected intersections in the Richmond Road corridor.
2. **Option 2 - Higher Order Transit along Western Road paired with intersection improvements along Richmond Street**: The implementation of a centre-running Western/Wharncliffe Rapid Transit (RT) facility, with localized intersection and transit priority measures (i.e. queue-jump lanes) at selected signalized intersections in the Richmond Street corridor.
    a. Option 2a: existing conditions (i.e. buses operating in mixed traffic) on Wharcliffe Road south of Platt's Lane
    b. Option 2b: convert two centre general traffic lanes (GPLs) on Wharncliffe Road south of Platt's Lane to two centre-running bus lanes, and maintain two general traffic lanes; and
    c. Option 2c: widen to add two centre-running bus lanes and maintain four general traffic lanes south of Platt's Lane.
3. **Option 3 - Higher Order Transit along Richmond Street paired with intersection improvements along Western Road**: Richmond Corridor RT (per the approved TPAP) with

new localized transit priority measures (i.e. bus-only queue-jump lanes) at selected intersections in the Western/Wharncliffe corridor.

These routes were also considered in the Rapid Transit Master Plan stage.

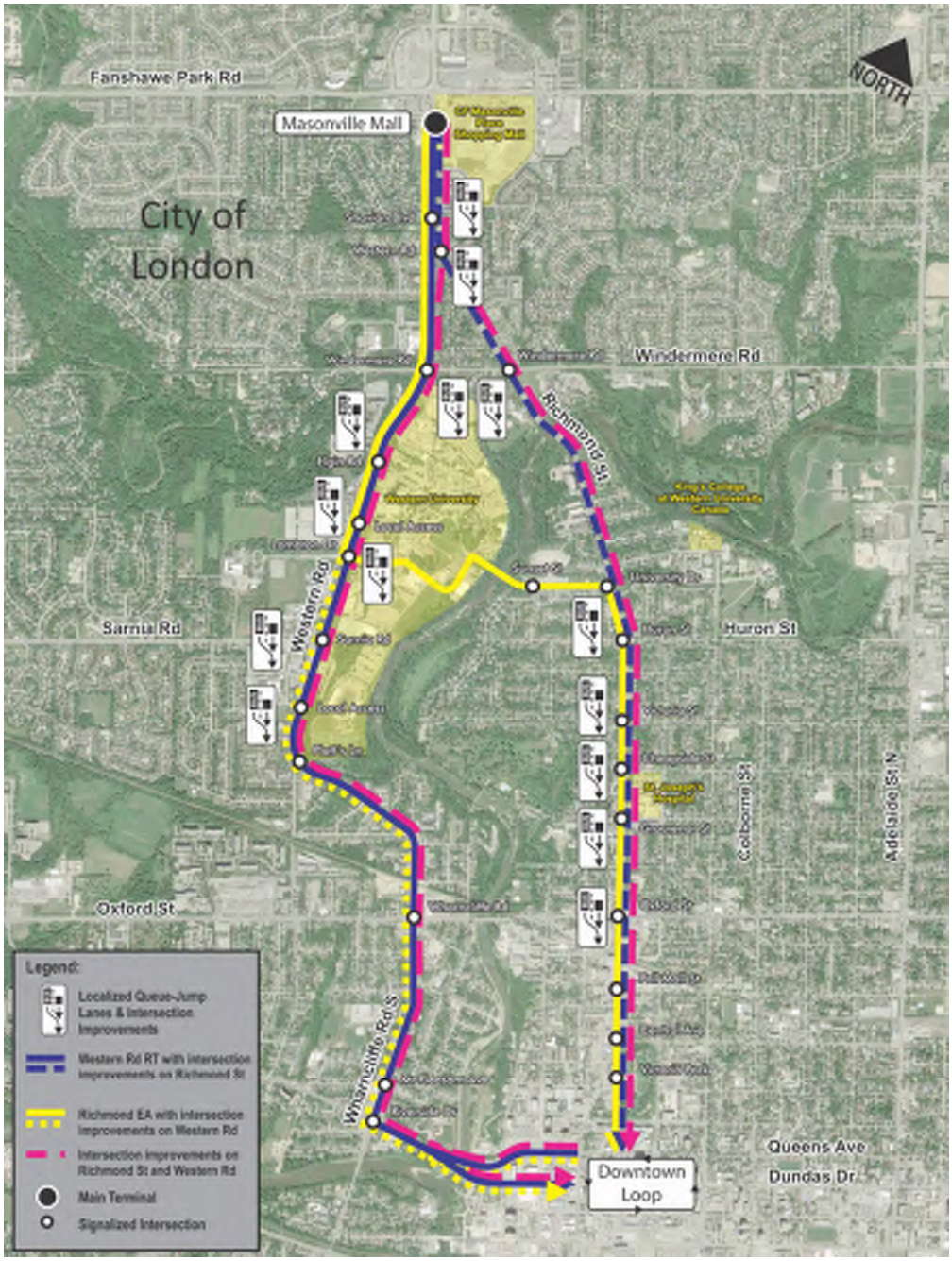


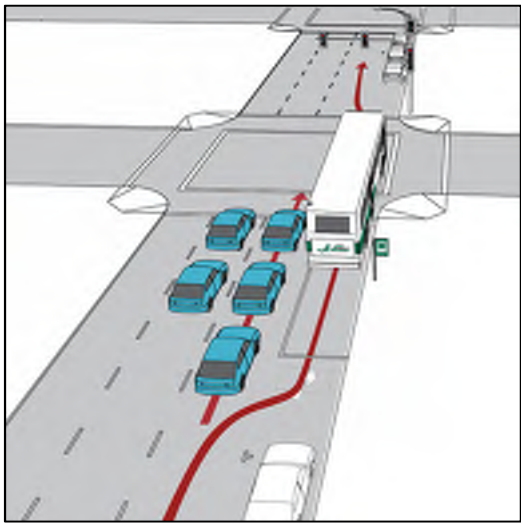
Exhibit 3: Key Map of North Corridor Options

DESCRIPTION OF THE ALTERNATIVE DESIGN CONCEPTS

The following section provides a description of the design options. Conceptual corridor plans for each alternative are provided in **Appendix A**.

OPTION 1: INTERSECTION IMPROVEMENTS ALONG BOTH RICHMOND STREET AND WESTERN ROAD/WHARNCLIFFE ROAD

As an alternative to developing full, rapid transit – that is, buses running primarily on transit-only lanes, a concept was developed that would provide transit priority at selected intersections where general traffic queue-lengths would otherwise impede the movement of buses. This concept is illustrated below in **Exhibit 4**. In this concept, minor roadway widening would provide an additional curb lane for transit use to bypass the queues of general traffic.



https://www.calgary.ca/citycouncil/ward-10/Pages/Latest-news-detail.aspx?SidebarListCategory=0&ArticleID=48

Exhibit 4: Queue-Jump Lane (Typical)

Further, during the Transit Project Assessment Process for the London RT, it was concluded that the existing capacity on the Richmond Road corridor between Central Avenue and Huron Street is severely constrained due to the lack of auxiliary (turning) lanes at critical intersections. Given the lack of such facilities, turning vehicles must wait in the existing through traffic lanes while awaiting a gap in oncoming traffic (for left-turning vehicles) or in pedestrian crossings (for right-turning vehicles). This results in localized blockages and delays to queued through-moving vehicles. As such, opportunities to address such delays at signalized intersections were incorporated into the design concept for Option 1. The assessment assumed that a general roadway widening was not acceptable, per the direction received during the TPAP phase of the project.

OPTION 2: HIGHER ORDER TRANSIT ALONG WESTERN ROAD PAIRED WITH INTERSECTION IMPROVEMENTS ALONG RICHMOND STREET

This option features centre-running bus-only lanes connecting Downtown to Masonville Place in the north but travelling on Wharncliffe Road / Western Road corridor, with two centre-running, transit-only lanes, separated by a physical median to prohibit left-turn movements across the transit lanes. The general concept is illustrated in **Exhibit 5**.

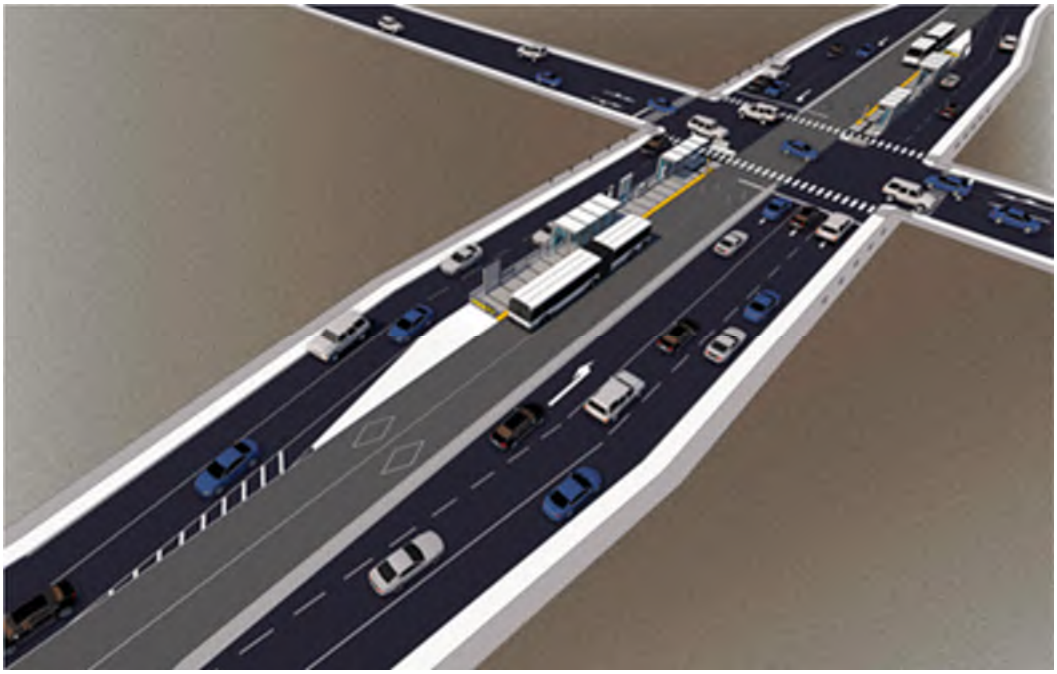


Exhibit 5: Centre-Running RT Facility (Typical)

The portion of Option 2 on Western Road north of Lambton Drive is consistent with the designs put forward in the Environmental Project Report. However, there is a divergence from the Environmental Project Report design in the portion that is south of Lambton Drive, as buses would continue on Western Road / Wharncliffe Road North, to Riverside Drive, rather than traveling through campus and continuing onto Richmond Street.

This change to the corridor route would mean that the portion of Wharncliffe Road south of Oxford Street (between Oxford Street and Riverside Drive) would be required to accommodate buses for both the West and North Rapid Transit corridors, resulting in additional pressure to provide transit priority measures in this section of Wharncliffe Road (the Environmental Project Report currently proposes a mixed traffic design for this section, which would not be sufficient in an Option 2 scenario). With the higher order transit demand of both the West and North RT corridors, this section of Wharncliffe Road would become the busiest section of the city's rapid transit network outside of the downtown core, accommodating the 10-minute frequency of rapid transit services for the west corridor and the 5-minute frequency of rapid transit services for the north corridor. Additionally, conventional transit services in the corridor would continue to operate in an all-stops fashion in the Western Road / Wharncliffe Road corridor, serving typical curbside bus stops.

Due to the interrelationship between Option 2 and the west corridor, the design of Wharncliffe Road North/Western Road immediately north of Oxford Street for Option 2 depends on the preferred design concept for the west corridor in the portion south of Oxford Street. To address this interdependency, the following three "sub-options" were considered and assessed:

Option 2a: Existing Conditions (i.e. buses operating in mixed traffic) south of Platt's Lane: This Sub-Option would see all buses (RT and conventional) operating in mixed traffic immediately north of Oxford Street to Platt's Lane, where they would enter/exit a centre-running sub-only facility. This configuration recognizes and protects the City's recent investment in widening

Western Road. This typical cross-section is illustrated below in **Exhibit 6**. Recognizing that the initial recommendation for the West RT Corridor was to not introduce any RT infrastructure in the Wharncliffe Road corridor, by not introducing any RT infrastructure between Oxford Street and Platt's Lane, this Sub-Option would be directly compatible with the recommended Option for the West RT Corridor.

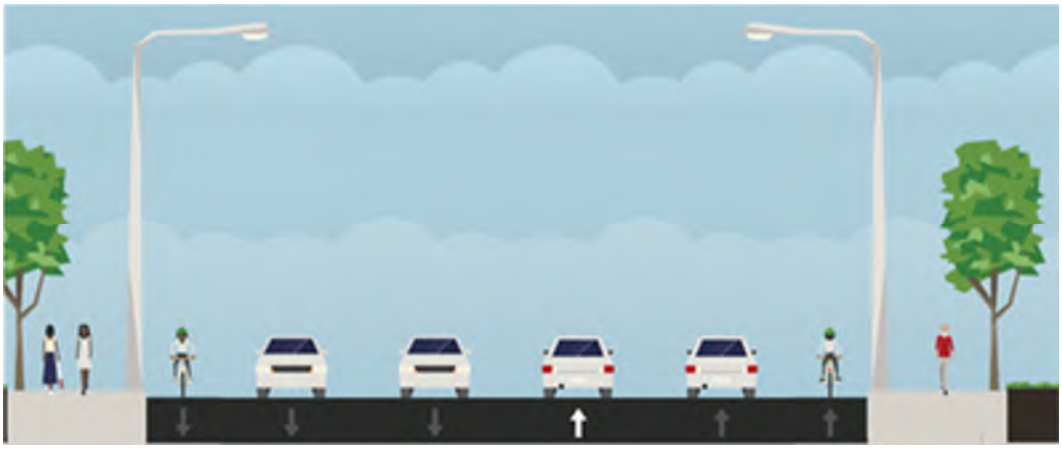


Exhibit 6: Option 2a – Typical Cross-Section, between Oxofrd and Platt's Lane

O**ption 2b: two general traffic lanes south of Platt's Lane with two centre-running bus lanes**: This Option would see RT bus services operating in centre-running dedicated bus lanes north of Oxford Street. The existing roadway width would be largely maintained, as the two centre lanes would be converted to bus-only use, and median installed. Localized widening would be required at intersections and station areas. This would be consistent with the approach to the Richmond Corridor under the TPAP-approved concept, but applied to the Wharncliffe Road corridor between Oxford Street and Platt's Lane. This Option is illustrated below in **Exhibit 7**.

Exhibit 7: Option 2b - Typical Cross-Section, between Oxford and Platt's Lane

Option 2c: four general traffic lanes south of Platt's Lane with two centre-running bus lanes: This Sub-Option would see bus services operating in centre-running dedicated bus lanes north of Oxford Street. The roadway would be widened to maintain two lanes of general traffic capacity (as recently implemented). This Option is illustrated in **Exhibit 8**.

Exhibit 8: Option 2c - Typical Cross-Section, between Oxford and Platt's Lane

This Sub-Option was developed to address the concern of compromising on the general traffic capacity of the roadway under Option 2a. However, this Sub-Option was screened out of further consideration on the basis of the following:

- This Option would introduce significant property impacts and building removals;
- In order to accommodate the widening, relocation of new hydro and aerial utility infrastructure would be required
- The widening of the roadway would also require widening of recently-reconstructed rail crossing north of Oxford Street.

OPTION 3: HIGHER ORDER TRANSIT ALONG RICHMOND STREET PAIRED WITH INTERSECTION IMPROVEMENTS ALONG WESTERN ROAD

Option 3 is consistent with the design concept assessed under the Transit Project Assessment Process and documented in the London RT Network Environmental Project Report. The north leg of London's RT network generally comprises four main segments:

1. Downtown (Queens Avenue) to Central Avenue;
2. Richmond Row / Richmond North: Central Avenue to University Drive
3. Western University Campus
4. Western Road / Richmond Street: Lambton Drive to Masonville Place

The RT design for each segment was considered independently of the others, in order to ensure that the approach chosen reflected the specific challenges and opportunities specific to each corridor. The following is a summary of the design concept for each segment, as presented in the approved Environmental Project Report:

1. Downtown (Queens Avenue) to Central Avenue: Buses would operate in centre-running dedicated bus lanes on Clarence Street between Queens Avenue and Dufferin Avenue, with a centre median stop (southbound only) at Queens Avenue. North of Dufferin Avenue, buses would continue in dedicated lanes along Clarence Street to Central Avenue, however, no northbound general traffic lane would be provided. A centre median stop would be provided at Central Avenue.
2. Richmond North: Central Avenue to University Drive: For this segment, two of the existing four general purpose traffic lanes would be converted to bus-only use. The resulting

roadway configuration would be comprised of two centre-running transit lanes, and two general traffic lanes adjacent to the curb. To mitigate the impacts to general traffic, new auxiliary turn lanes would be provided at signalized intersections. Centre median RT stops would be provided at Oxford Street, Grosvenor Street, and Victoria Street.

3. Western University Campus: Throughout the Western University Campus, University Drive and Lambton Drive would be converted from general traffic use to bus-only use. Transit stops would be provided on University Drive at Richmond Street, and on Lambton Drive at University Drive.

4. Western Road / Richmond Street: Lambton Drive to Masonville Place: Western Road and Richmond Street would be widened to accommodate two centre-running transit-only lanes, with centre median RT stops at Lambton Drive, Elgin Road, University Hospital, Richmond Street, and terminating at the Masonville Transit Terminal. The Richmond Street / Western Road intersection would be reconfigured to better accommodate traffic movements from Richmond Street to Western Road, encouraging general traffic to move onto Western Road and reducing general traffic demand on Richmond Street.

EVALUATION CRITERIA

In total, 12 criteria were used to evaluate the options for the North Leg.

1 Benefit to Transit Operations
2 Increase in Ridership
3 Benefit to Traffic Operations
4 Least Property Impacts
5 Least Cultural Heritage Impacts
6 Least Impact on Trees
7 Least Impact on Utilities
8 Least Impact on Driveways and Access
9 Redevelopment Potential
10 Capital Costs
11 Most Consistency with City's Policy Objectives
12 Least Environmental Assessment Implications

The following sections discuss the relative performance of the Options against each of the evaluation criteria identified above.

BENEFIT TO TRANSIT OPERATIONS

Options 2 and 3 propose dedicated transit lanes, separating buses from general traffic and congestion, therefore improving transit reliability and accommodating a higher service frequency. In Option 1, buses run in mixed traffic. Provision of dedicated transit lanes under Options 2 and 3 best segregate transit services from the influence of potential conflicts with general traffic, resulting in higher operating speeds, and overall predictability and reliability, and is therefore preferred over Option 1. Option 3 is anticipated to offer a better transit operation than that of Option 2 in that Option 2 would focus all of the buses from both the North and West RT corridors on the intersection of Oxford Street West and Wharncliffe Road; one of the busiest intersections in the network, and Wharncliffe Road and Riverside Drive. Both intersections experience congestion. In Option 1, intersection improvements provide transit priority at Riverside Drive and Oxford Street West, which would provide some improvement to transit reliability, but less so than Options 2 or 3.

INCREASE IN RIDERSHIP INCREASE, REDEVELOPMENT POTENTIAL

Land Use / Density

Land use, in terms of residents and jobs per hectare, is an important consideration when planning transit service. The density of residents and jobs provide an indication of ridership potential near transit. MTO's Transit Supportive Guidelines[1] suggest minimum density thresholds for areas within a 5 to 10 minute walk of transit for different types of transit service, specifically:

- 50 residents and jobs per hectare for basic transit service (a bus every 30 minutes or better); and
- 80 residents and jobs per hectare for frequent transit service (a bus every 15 minutes or better).

In 2011, segments of both corridors contained densities of up to 100 residents and jobs per hectare, however, the Richmond Corridor (i.e. Option 3) contains more areas of substantial density than that of the Western / Wharncliffe Corridor. The common area of Western Road, north of Lambton Drive, is a notable area of density. That is, however, the only segment of Option 2 where such density exists. The Richmond Corridor exhibits substantial densities in the 50-100 residents and jobs per hectare between Downtown and Grosvenor Street.

Further, per the Rapid Transit Master Plan, the Richmond / Western corridor currently exhibits the highest population and employment within 500m of the route (considered the catchment area for transit services), when compared against the Western corridor. Potential for future development is comparable to that of the Western corridor, resulting in a larger total population and employment figure of approximately **62,650** by 2034. Conversely, the Western corridor currently exhibits slightly less population and employment within 500m of the route, when compared against the Richmond corridor. Potential for future development, however, is comparable to that of the Richmond corridor, resulting in a total population and employment figure of approximately **48,750** by 2034.

The infrastructure investment proposed in Options 2 and 3 are appropriate given the future expected land use and associated ridership generated. Fixed-route rapid transit facilities have been proved to attract development and redevelopment, which will support the City's intensification objectives and encourage ridership growth. Option 1 provides only minor improvements to transit services in both corridors, but is not anticipated to attract a significant uptake in ridership or development.

[1] MTO's Transit Supportive Guidelines (2012)
http://www.mto.gov.on.ca/english/transit/supportive-guideline/index.shtml

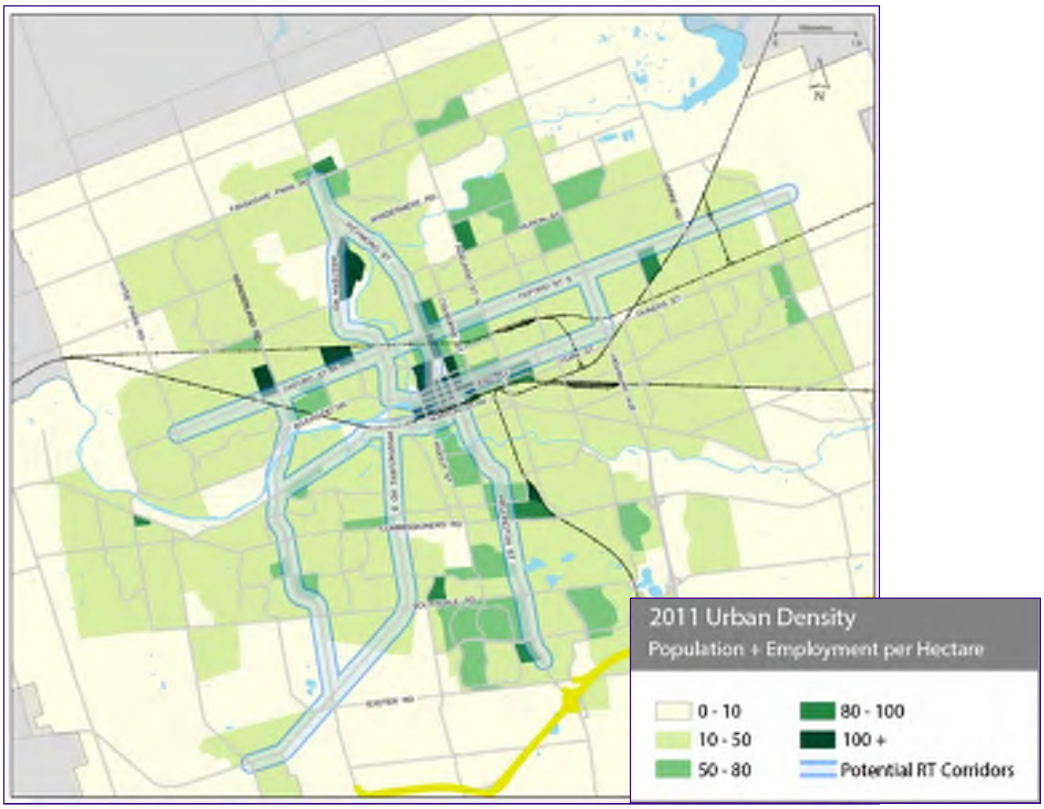


Exhibit 9: London's Rapid Transit Master Plan (2017), Exhibit 2-6

Key Destinations

Option 3 connects more major destinations with rapid transit service than Option 2. The following table summarizes the key destinations served by each.

Exhibit 10: Key Destinations

Option 2: Western / Wharncliffe Corridor	Option 3: Richmond Corridor
Downtown London	Downtown London
TD Stadium	Richmond Row
	St. Joseph's Hospital
	King's College
Western University (periphery only)	Western University (three locations within campus)
Ivey School of Business	Ivey School of Business
Brescia College	Brescia College
Huron University	Huron University
University Hospital	University Hospital
Masonville Transit Village	Masonville Transit Village

BENEFIT TO TRAFFIC OPERATIONS

Options 1 and 2a generally maintain the existing general traffic capacity in the Western / Wharncliffe corridors. In the Richmond Corridor, Options 1 and 3 offers potential to improve on

existing general traffic operations through the introduction of auxiliary turning lanes at signalized intersections in the Richmond Street corridor between Oxford Street and University Drive. Option 2b and 3, however, both require conversion of a general traffic lane to bus-only use in both directions for segments of their route.

The median barriers proposed under Options 2 and 3 will impact the ability of general traffic to turn left at unsignalized accesses and intersections throughout their route. This is expected to result in an overall safer roadway operation in that left-turn movements will only occur at controlled (singalized) intersections on dedicated left-turn signal phases, thereby eliminating potential conflicts, but will impact the route that drivers need to take to reach certain destinations.

LEAST PROPERTY IMPACTS (GENERAL AND CULTURAL HERITAGE)

Options 1 is anticipated to have the fewest property impacts. Option 1 requires the least amount of widening, with impacts focused around signalized intersections. Options 2 and 3 both require widening of the corridor for significant segments, and the introduction of centre-island passenger platforms results in further widening requirements. The following table summarizes the estimated property impacts associated with each alternative. Overall, Option 2b requires the greatest amount of property and impacts the most adjacent buildings, requiring full acquisition of an estimated 14 general properties and 23 heritage properties.

Exhibit 11: Summary of Estimated Property Impacts

	General Property Impacts		Cultural Heritage Property Impacts	
Option	**Partially-Impacted**	**Fully-Impacted**	**Partially-Impacted**	**Fully-Impacted**
Option 1	65	1	24	0
Option 2a	97	9	29	3
Option 2b	125	45	29	23
Option 3	93	9	30	7

LEAST TREES AND UTILITIES

Option 1 requires relatively little widening compared to the alternatives, therefore there are few impacts to trees or utilities under that Option. Impacts are generally limited to trees and utilities at signalized intersections. Options 2 and 3 both require widening throughout much of their routes, resulting in impacts to substantial sections of aerial and subsurface utility infrastructure.

Exhibit 12: Tree and Utility Impacts

Option	Trees	Utilities
Option 1	185	Minor localized impacts to surface utilities and municipal services at queue-jump lane locations in the Richmond corridor and Western / Wharncliffe corridors.

Option 2a	478	It is anticipated that this option will result in the significant impacts to utilities and municipal services throughout the corridor, and only marginally-less than those of the worst performing Option (2b).
Option 2b	508	It is anticipated that this option will result in the greatest impact to utilities and municipal services throughout the corridor.
Option 3	446	It is anticipated that this option will result in significant impact to utilities and municipal services throughout the corridor, and only marginally-less than those of the worst performing Option (2b).

LEAST IMPACT ON DRIVEWAYS AND ACCESS

None of the Options result in significant impacts to driveways. Access to properties fronting on to the Western Road corridor under Option 2, or the Richmond Street corridor under Option 3, would be largely restricted to right-in/right-out operations under the RT concepts due to the implementation of a median barrier.

CAPITAL COSTS

Order of magnitude capital cost estimates were prepared for all alternatives, based on per-metre cost estimates for each typical roadway cross-section, derived from the London RT Network overall cost estimate as prepared in the TPAP/Preliminary Design study. These costs include infrastructure costs and associated contingencies and add-on allowances, utility relocation costs, allowance for property acquisition, and additional bus fleet requirement costs.

Options 2 and 3 would be the most expensive to construct, maintain traffic capacity, and provide the greatest benefit to transit reliability. In Option 1, the capital investment in road infrastructure needed to realize benefit for transit is substantial, and provides less reliability for transit operations than Options 2 and 3. Option 1 also has the potential to result in throw-away costs if dedicated transit lanes are implemented in the future in either the Richmond or Wharncliffe / Western corridors.

The following table summarizes the order-of-magnitude capital cost ranges for each of the Options, calculated on a parametric basis, based on the high-level design concepts presented in **Appendix A**.

610 Chartwell Road
Suite 300
Oakville, ON, Canada L6J 4A5

T: +1 905-823-8500
F: +1 905-823-8503
wsp.com

Exhibit 13: Order-of-Magnitude Capital Cost Estimates

Option	Description	Order-Of-Magnitude Capital Cost
Option1	Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road	$15-$20M (est)
Option 2a	Higher Order Transit along Western Road paired with intersection improvements along Richmond Street, existing conditions (i.e. buses operating in mixed traffic) on Wharcliffe Road south of Platt's Lane	$95-$120M (est)
Option 2b	Higher Order Transit along Western Road paired with intersection improvements along Richmond Street, convert two centre general traffic lanes on Wharncliffe Road south of Platt's Lane to two centre-running bus lanes, and maintain two general traffic lanes	$120-$150M (est)
Option 3	Higher Order Transit along Richmond Street paired with intersection improvements along Western Road	$150-$155M (est)

MOST CONSISTENCY WITH CITY'S POLICY OBJECTIVES

The London Plan designates the majority of the original North RT Corridor outlined in the Environmental Project Report (i.e. Option 3) as a Rapid Transit Corridor, with small portions also designated as Transit Village and Institutional. The Rapid Transit Corridor and Transit Village designations are to be the focus of transit and infrastructure investment and encourage intensification to achieve an urban, vibrant corridor that is supportive of transit. Policy 60.3 of the London Plan states that one of its goals is to "establish a high-quality rapid transit system in London and strategically use it to create an incentive for development along rapid transit corridors and at transit villages and stations".

Options 2 and 3 are most consistent with the City's policy objectives. Both options include the implementation of dedicated rapid transit infrastructure, which has been proven to spur development and intensification in other municipalities in Ontario. Option 1 only proposes dedicated transit queue-jump lanes at intersections. It is unlikely that the redevelopment and intensification envisioned by the London Plan will be achieved without the implementation of dedicated rapid transit infrastructure along the corridor.

LEAST ENVIRONMENTAL ASSESSMENT IMPLICATIONS

Options 1 and 3 do not likely have any Environmental Assessment implications. Options 1 and 3 do not have any Environmental Assessment implications. Option 1 proposes constructing localized intersection improvements; undertakings are pre-approved under the Municipal Class Environmental Assessment. Option 3 has already received approval under Ontario Regulation 231/08 after having completed a Transit Project Assessment Process.

Option 2, however, would require an Addendum to the approved Environmental Project Report for the London RT network. While part of this route was addressed previously, the majority of this route is outside of the original EPR study area. Implementing dedicated transit lanes on Wharncliffe / Western Roads, south of Lambton Drive, would require a number of specialist studies to evaluate the impacts of the widening, including, but not limited to:

- Traffic
- Natural environment
- Stormwater
- Structural
- Archaeology
- Cultural heritage
- Utilities

It is anticipated that an addendum to the Environmental Project Report would take, at minimum, one year to complete. Timing is dependent on when the various studies take place, noting that some studies can only be completed at certain times of year. For example, the natural environment study

610 Chartwell Road
Suite 300
Oakville, ON, Canada L6J 4A5

T: +1 905-823-8500
F: +1 905-823-8503
wsp.com

would have to be completed over a number of months to document existing conditions at different times of the year.

COMPARATIVE ASSESSMENT OF ALTERNATIVES

The following table summarizes the comparative assessment of options. It should be noted that the ratings provided under each category represent their relative performance within a given criteria, but the table does not reflect the relative weight of the assessment criteria against other criteria. For example, given the objective of the project is to improve transit operations, the performance of a design option under the "Transit Operations" criteria may warrant a heavier consideration than that of, say "Utility Impacts". The ratings provided, therefore, should not be simply added to identify a best-performing option, but are intended to guide a discussion on the most appropriate solution to address the need for transit improvements for the City of London.

Exhibit 14: Comparative Assessment of Alternatives

Indicators	Option 1: Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road		Option 2a: Higher Order Transit along Western Road (mixed traffic between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 2b: Higher Order Transit along Western Road (2 General Purpose Lanes between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 3: Higher Order Transit along Richmond Street paired with intersection improvements along Western Road		Least Preferred to Most Preferred ○ ◔ ◑ ◕ ●
	Richmond Street	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	
Description	Auxiliary (turn) lanes added to selected signalized intersections along the Richmond corridor between Oxford and Masonville Place. Localized bus-only queue-jump lanes at selected intersections in the Richmond corridor from Queens to Masonville Place.	Localized bus-only queue-jump lanes at selected intersections in both the Wharncliffe / Western corridor from Oxford Street to Richmond Street. Consistent with the design recommended for the West Corridor between downtown and Oxford.	Auxiliary (turn) lanes introduced at selected signalized intersections along the Richmond corridor between Oxford and Western. Localized bus-only queue-jump lanes at selected intersections in the Richmond corridor from Queens to Masonville Place.	Buses in mixed traffic on Wharncliffe from Oxford to Platt's Lane Centre-running RT on Wharncliffe / Western Road / from Platt's Lane to Masonville Place. Consistent with the design recommended for the West Corridor between downtown and Oxford.	Auxiliary (turn) lanes introduced at selected signalized intersections along the Richmond corridor between Oxford and Western. Localized bus-only queue-jump lanes at selected intersections in the Richmond corridor from Queens to Masonville Place.	Centre-running RT on Wharncliffe / Western Road / from Oxford to Masonville Place. Not consistent with the design recommended for the West Corridor between downtown and Oxford; would trigger the need for centre running .transit south of Oxford.	Centre-running bus lanes on Clarence / Richmond Street from Queens to University, dedicated bus lanes on University / Lambton to Western. RT on Western/Richmond to Masonville Place.	Localized bus-only queue-jump lanes at selected intersections on Wharncliffe / Western between Oxford and Lambton. Consistent with the design recommended for the West Corridor between downtown and Oxford.	

610 Chartwell Road
Suite 300
Oakville, ON, Canada L6J 4A5

T: +1 905-823-8500
F: +1 905-823-8503
wsp.com

Indicators	Option 1: Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road		Option 2a: Higher Order Transit along Western Road (mixed traffic between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 2b: Higher Order Transit along Western Road (2 General Purpose Lanes between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 3: Higher Order Transit along Richmond Street paired with intersection improvements along Western Road		Least Preferred to Most Preferred ○ ◔ ◑ ◕ ●
	Richmond Street	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	
Benefit to Transit Operations	Minor improvement to transit operations along Richmond Street north of Oxford, associated with overall intersection improvements, including queue-jump lanes. Buses in mixed traffic would experience delays associated with congestion and right-turning movements.	Buses in mixed traffic would experience delays associated with congestion and right-turning movements. Minor improvements to transit operations would result from introduction of transit signal priority and queue-jump lanes at selected intersections.	Buses in mixed traffic would experience delays associated with congestion and right-turning movements, impacting both travel time and overall reliability for transit services. Minor improvements to transit operations would result from introduction of transit signal priority and queue-jump lanes at selected intersections.	Centre-running transit is most reliable and capable of accommodating the anticipated 5-minute transit headways. Buses not impacted by right-turning movements. Buses running mixed traffic from Platts to Oxford would experience delays associated with congestion. Would be consistent with mixed traffic for Wharncliffe south of Oxford (West Option 1)	Buses in mixed traffic would experience delays associated with congestion and right-turning movements, impacting both travel time and overall reliability for transit services. Minor improvements to transit operations would result from introduction of transit signal priority and queue-jump lanes at selected intersections.	Centre-running transit is most reliable and capable of accommodating the anticipated 5-minute transit headways. Buses not impacted by right-turning movements. Would trigger the need for centre-running RT on Wharncliffe south of Oxford (West Option 2)	Centre-running transit is most reliable and capable of accommodating the anticipated 5-minute transit headways. Buses not impacted by right-turning movements.	Buses in mixed traffic would experience delays associated with congestion and right-turning movements, impacting both travel time and overall reliability for transit services. Minor improvements to transit operations would result from introduction of transit signal priority and queue-jump lanes at selected intersections.	All options would be expected to result in an improvement in transit operations over existing conditions.
	◔	◔	◔	●	◔	●	●	◔	
Increase in Ridership	Limited potential to attract new ridership due to minor improvement in transit operations.		Moderate potential to attract significant ridership due to rapid transit connections to key trip generators on North London. RT in the Western/Wharncliffe corridor would connect Downtown London with TD Stadium, Western University (periphery only), Ivey School of Business, Brescia College, Huron University, University Hospital, and the Masonville Transit Village		Moderate potential to attract significant ridership due to rapid transit connections to key trip generators on North London. RT in the Western/Wharncliffe corridor would connect Downtown London with TD Stadium, Western University (periphery only), Ivey School of Business, Brescia College, Huron University, University Hospital, and the Masonville Transit Village		Strong potential to attract significant ridership due to rapid transit connections to key trip generators on North London. RT in the Richmond corridor would connect Downtown London with Richmond Row, St. Joseph's Hospital, King's College, three points within Western University, Ivey School of Business, Brescia College, Huron University, University Hospital, and the Masonville Transit Village		
	○		◑		◑		●		

Indicators	Option 1: Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road		Option 2a: Higher Order Transit along Western Road (mixed traffic between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 2b: Higher Order Transit along Western Road (2 General Purpose Lanes between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 3: Higher Order Transit along Richmond Street paired with intersection improvements along Western Road		Least Preferred to Most Preferred ○ ◔ ◑ ◕ ●
	Richmond Street	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	
Benefit to Traffic Operations	Improves general traffic operations by reducing delays and maximizes the efficiency of the existing through-movements at signalized intersections.	Maintains existing traffic operations with dedicated bus-only queue-jump lanes at major signalized intersections in the Wharncliffe / Western Corridor. Existing mid-block left-turns permitted.	Improves general traffic operations by reducing delays and maximizes the efficiency of the existing through-movements at signalized intersections.	Medians between Platts and Masonville restrict left-turns to signalized intersections. Reduced potential for significant collisions due to restriction of mid-block left-turns in sections where median is introduced. Per West Corridor Option 1, maintains existing traffic capacity with on Wharncliffe between Riverside and Oxford.	Improves general traffic operations by reducing delays and maximizes the efficiency of the existing through-movements at signalized intersections.	Increased traffic delays with single lane in each direction between Oxford and Platts. Medians restrict left-turns to signalized intersections. Reduced potential for significant collisions due to restriction of mid-block left-turns. Per West Corridor Option 2, increased traffic delays with single lane, and medians restricting left-turns to signalized intersections, in each direction between Riverside and Oxford.	Minor increase in delay to general traffic between Central and University. Medians restrict left-turns to signalized intersections. Reduced potential for significant collisions due to restriction of mid-block left-turns.	Maintains existing traffic capacity with dedicated bus-only queue-jump lanes at major signalized intersections.	
	●	●	◕	●	◕	◔	◕	◕	

Indicators	Option 1: Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road		Option 2a: Higher Order Transit along Western Road (mixed traffic between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 2b: Higher Order Transit along Western Road (2 General Purpose Lanes between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 3: Higher Order Transit along Richmond Street paired with intersection improvements along Western Road		Least Preferred to Most Preferred ○ ◔ ◑ ◕ ●
	Richmond Street	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	
Least Property Impacts	*Whancliffe – Western Queue-Jumps:* 1 full property impact 32 partial property impacts *Richmond Corridor Intersection Improvements and Queue-Jumps:* 0 full property impacts 33 partial property impacts **TOTAL:** **1 full property impacts** **65 partial property impacts**		*Western/Whartcliffe RT Corridor:* 5 full property impacts (Riverside to Oxford) 0 full property impacts (Wharnfliffe / western s of Lambton) 3 full property impacts north of Lambton 0 partial property impacts (Riverside to Oxford) 14 partial property impacts (Wharncliffe/Western s of Lambton) 57 partial property impacts north of Lambton *Richmond Corridor Queue-Jumps:* 1 full property impacts 26 partial property impacts **TOTAL:** **9 full property impacts** **97 partial property impacts**		*Western/Whartcliffe RT Corridor:* 31 full property impacts (Riverside to Oxford) 10 full property impacts (Wharnfliffe / western s of Lambton) 3 full property impacts north of Lambton 0 partial property impacts (Riverside to Oxford) 42 partial property impacts (Wharncliffe/Western s of Lambton) 57 partial property impacts north of Lambton *Richmond Corridor Queue-Jumps:* 1 full property impacts 26 partial property impacts **TOTAL:** **45 full property impacts** **125 partial property impacts**		*Richmond RT Corridor:* 9 full property impacts 91 partial property impacts *Western/Whanrcliffe Queue-Jump Lanes:* 0 full property impacts 2 partial property impacts **TOTAL:** **9 full property impacts** **93 partial property impacts**		
	●		◑		◔		◑		

Indicators	Option 1: Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road		Option 2a: Higher Order Transit along Western Road (mixed traffic between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 2b: Higher Order Transit along Western Road (2 General Purpose Lanes between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 3: Higher Order Transit along Richmond Street paired with intersection improvements along Western Road		Least Preferred to Most Preferred ○ ◔ ◑ ◕ ●
	Richmond Street	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	
Least Cultural Heritage Impacts	*Richmond Corridor Intersection Improvements and Queue-Jumps:* 0 heritage properties would have to be removed 21 heritage properties would be partially impacted *Western Queue-Jump Lanes:* 0* heritage properties would have to be removed 3* heritage properties would be partially impacted ***Total:*** **0* heritage properties would have to be removed** **24* heritage properties would be partially impacted** **Based on London CityMap Data. To be confirmed with Heritage Specialist if option is pursued*		*Western RT Corridor:* 2 heritage properties (Riverside to Oxford) 1* heritage Property (Western/Wharncliffe /Richmond Corridor) will have to be removed. 8* heritage properties would be partially impacted *Richmond Intersection Improvements and Queue-Jump Lanes:* 0 heritage Property (Western/Wharncliffe /Richmond Corridor) will have to be removed. 21 heritage properties would be partially impacted ***Total:*** **3* heritage Properties (Western/Wharncliffe /Richmond Corridor) will have to be removed.** **29* heritage properties would be partially impacted** **Based on London CityMap Data. To be confirmed with Heritage Specialist if option is pursued*		*Western RT Corridor:* 22 heritage properties (Riverside to Oxford) 1* heritage Property (Western/Wharncliffe /Richmond Corridor) will have to be removed. 8* heritage properties would be partially impacted *Richmond Intersection Improvements and Queue-Jump Lanes:* 0 heritage Property (Western/Wharncliffe /Richmond Corridor) will have to be removed. 21 heritage properties would be partially impacted ***Total:*** **23* heritage Properties (Western/Wharncliffe /Richmond Corridor) will have to be removed.** **29* heritage properties would be partially impacted** **Based on London CityMap Data. To be confirmed with Heritage Specialist if option is pursued*		*Richmond RT Corridor:* 7 heritage properties will have to be removed 27 heritage properties would be partially impacted *Western Queue-Jump Lanes:* 0* heritage properties would have to be removed 3* heritage properties would be partially impacted ***Total:*** **7* heritage Property (Western/Wharncliffe /Richmond Corridor) will have to be removed.** **30* heritage properties would be partially impacted** **Based on London CityMap Data. To be confirmed with Heritage Specialist if option is pursued*		
	●		◑		○		◑		
Least Impact on Trees	**185 trees impacted**		RT corridor: 48 Trees impacted (Lambton to Platt's) 19 (approx.) Trees impacted (Platt's to Oxford) 4 Trees impacted (Riverside to Oxford) 285 trees (Lambton to Masonville) TOTAL = 368 trees impacted) Queue-Jump Lanes on Richmond: 106 trees impacted **TOTAL:** **478 trees impacted**		RT corridor: 64 Trees impacted (Lambton to Platt's) 19 (approx.) Trees impacted (Platt's to Oxford) 34 Trees impacted (Riverside to Oxford) 285 trees (Lambton to Masonville) TOTAL = 368 trees impacted) Queue-Jump Lanes on Richmond: 106 trees impacted **TOTAL:** **508 trees impacted**		RT Corridor: Requires removal of approximately 442 trees in RT corridor Queue-Jump Lanes on Western/Wharncliffe: 4 trees impacted **TOTAL:** **446 trees impacted**		
	●		◔		◔		◔		

Indicators	Option 1: Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road		Option 2a: Higher Order Transit along Western Road (mixed traffic between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 2b: Higher Order Transit along Western Road (2 General Purpose Lanes between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 3: Higher Order Transit along Richmond Street paired with intersection improvements along Western Road		Least Preferred to Most Preferred ○ ◔ ◑ ◕ ●
	Richmond Street	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	
Least Impact on Utilities	Minor localized impacts to surface utilities and municipal services at queue-jump lane locations in the Richmond corridor and Western / Wharncliffe corridors.		It is anticipated that this option will result in the significant impacts to utilities and municipal services throughout the corridor.		It is anticipated that this option will result in the greatest impact to utilities and municipal services throughout the corridor.		It is anticipated that this option will result in significant impacts to utilities and municipal services throughout the corridor.		
	●		◔		○		◔		
Least Impact on Driveways	0 driveways impacted No access impacts.		0 driveways impacted Some encroachment into driveways beyond sidewalks. Majority of properties will be able to park one vehicle in driveway. Access becomes right-in/right-out.		7 driveways impacted Some encroachment into driveways beyond sidewalks. Majority of properties will be able to park one vehicle in driveway. Access becomes right-in/right-out.		0 driveway impacts. Some encroachment into driveways beyond sidewalks. Majority of properties will be able to park one vehicle in driveway. Access becomes right-in/right-out.		If a building is impacted, driveway impacts were not counted. Most driveways extend beyond the front of the dwelling, and therefore widening does not impact the ability of the property owner to park one vehicle in the driveway.
	●		◕		◕		◕		
Redevelopment Potential	While redevelopment and intensification will naturally occur, this option is not expected to influence or encourage redevelopment and intensification in either the Richmond or Western corridors.		The presence of a fixed-route, rapid transit system in the Western corridor will encourage redevelopment and intensification. Per the RTMP, the Western corridor currently exhibits slightly less population and employment within 500m of the route, when compared against the Richmond corridor. Potential for future development, however, is comparable to that of the Richmond corridor, resulting in a total population and employment figure of approximately 48,750 by 2034.		The presence of a fixed-route, rapid transit system in the Western corridor will encourage redevelopment and intensification. Per the RTMP, the Western corridor currently exhibits slightly less population and employment within 500m of the route, when compared against the Richmond corridor. Potential for future development, however, is comparable to that of the Richmond corridor, resulting in a total population and employment figure of approximately 48,750 by 2034.		The presence of a fixed-route, rapid transit system in the Richmond/Western corridor will encourage redevelopment and intensification. Per the RTMP, the Richmond / Western corridor currently exhibits the highest population and employment within 500m of the route, when compared against the Western corridor. Potential for future development is comparable to that of the Western corridor, resulting in a larger total population and employment figure of approximately 62,650 by 2034.		Potential for redevelopment in corridor (per RTMP)
	○		◕		◕		●		

Indicators	Option 1: Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road		Option 2a: Higher Order Transit along Western Road (mixed traffic between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 2b: Higher Order Transit along Western Road (2 General Purpose Lanes between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 3: Higher Order Transit along Richmond Street paired with intersection improvements along Western Road		Least Preferred to Most Preferred ○ ◔ ◑ ◕ ●
	Richmond Street	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	**Richmond Street**	**Wharncliffe Road / Western Road**	
Most Consistency with City's policy objectives	Does not supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns	In keeping with the goals and objectives of the Blackfriars-Petersville HCD plan, by conserving heritage resources. Not in keeping with the Rapid Transit Corridor designation, as the lack of dedicated transit infrastructure means that the area is unlikely to intensify. Does not supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns.	Does not supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns. Transit queue-jump lanes on Richmond are generally consistent with the direction of the SmartMoves 2030 plan.	Supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns.	Does not supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns. Transit queue-jump lanes on Richmond are generally consistent with the direction of the SmartMoves 2030 plan.	Supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns.	Supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns.	In keeping with the goals and objectives of the Blackfriars-Petersville HCD plan, by conserving heritage resources. Not in keeping with the Rapid Transit Corridor designation, as the lack of dedicated transit infrastructure means that the area is unlikely to intensify.	Richmond Street Corridor is designated as a Rapid Transit Corridor. Part of Wharncliffe Road is designated as a Rapid Transit Corridor.
	○		◑		◑		●		
Least Environmental Assessment Implications	No implications. Localized intersection improvements would be considered a Schedule A+ undertaking (i.e. pre-approved with notification) under the Municipal lass EA process.		TPAP Addendum required for centre-running RT on Wharncliffe/Western between Oxford and Lambton. CHERs and HIAs required for newly-impacted heritage property not assessed during TPAP.		TPAP Addendum required for centre-running RT on Wharncliffe/Western between Oxford and Lambton. CHERs and HIAs required for newly-impacted heritage property not assessed during TPAP.		No implications. Approved design. Localized transit priority measures on Western/Wharncliffe would be considered a Schedule A+ undertaking (i.e. pre-approved with notification) under the Municipal Class EA process.		

Indicators	Option 1: Intersection improvements along both Richmond Street and Western Road/Wharncliffe Road		Option 2a: Higher Order Transit along Western Road (mixed traffic between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 2b: Higher Order Transit along Western Road (2 General Purpose Lanes between Oxford and Platts) paired with intersection improvements along Richmond Street		Option 3: Higher Order Transit along Richmond Street paired with intersection improvements along Western Road		Least Preferred to Most Preferred ○ ◔ ◑ ◕ ●
	Richmond Street	Wharncliffe Road / Western Road	Richmond Street	Wharncliffe Road / Western Road	Richmond Street	Wharncliffe Road / Western Road	Richmond Street	Wharncliffe Road / Western Road	
	●		○		○		●		
Bus Compatibility with West Corridor Options	No impact.		Compatible with mixed traffic options south of Oxford. If centre-running RT lanes are selected for Wharncliffe Road south of Oxford, buses would be required to transition between the curb to median at Oxford, and again at Platt's Lane.		Compatible with centre-running bus lane options south of Oxford. If a mixed traffic operation is selected for Wharncliffe Road south of Oxford, buses would be required to transition between the curb to median at Oxford.		No impact.		
Constructability / Construction Disruption	No specific constructability challenges.		Typical roadway construction lane closures and traffic detours would be required during construction of the RT and queue-jump lane infrastructure.		Typical roadway construction lane closures and traffic detours would be required during construction of the RT and queue-jump lane infrastructure.		Typical roadway construction lane closures and traffic detours would be required during construction of the RT and queue-jump lane infrastructure. Construction of the University Drive bridge would be a significant undertaking and would require environmental protection measures consistent with those of a major river crossing.		
Capital Costs	Option 1 would result in the lowest cost to implement, operate and maintain.		Options 2 and 3 would be the most expensive to construct, maintain traffic capacity, and provide the greatest benefit to transit reliability. Option 2a is likely the lowest cost of the RT options, but also results in the shortest segment of dedicated guideway for transit, and therefore lower transit service speed and reliability.		Options 2 and 3 would be the most expensive to construct, maintain traffic capacity, and provide the greatest benefit to transit reliability.		Options 2 and 3 would be the most expensive to construct, maintain traffic capacity, and provide the greatest benefit to transit reliability. Option 3 is anticipated to result in the highest cost of the Options, but also the longest RT route which therefore serves the greatest number of potential passengers.		
	$15-$20M (est)		$95-$120M (est)		$120-$150M (est)		$150-$155M (est)		
Preliminary Recommendation	**Carry Forward for further consideration as an interim measure**		Do Not Carry Forward		Do Not Carry Forward		**Carry forward for further consideration.**		

CONCLUSIONS AND RECOMMENDATIONS

On balance of the benefits and drawbacks associated with the North Corridor design concepts, presented in this report, it is recommended that Option 3 be carried forward for further consideration. These options can then be considered on a segment by segment basis (similar to the West corridor Review) to determine the preference and priority of interim and long-term transit priority measures servicing the north.

While Option 2 does offer the potential to accommodate RT services between Downtown and Masonville Place, it compromises in a number of areas relative to Option3. Option 2 both duplicates a portion of the West RT Corridor, and serves areas of lesser population and employment than Option 3, and is therefore expected to attract less new ridership. The property impacts associated with Option 2 – both regular and heritage properties – are equal to or greater than those of Option 3. The order-of-magnitude cost estimate of the Options indicates that, at a high level, that Option 3 will likely be higher than Option 2, but the RT Options are all anticipated to result in comparable capital costs. Option 2a would likely be the least expensive of the RT options, but also result in the shortest segment of dedicated guideway. Option 1 may provide some limited benefit to transit operations in the near term, and may provide some relief to existing operational challenges as an interim measures until a full RT facility is realized. It is not, however, anticipated to provide the benefit to transit operations sufficient to affect a notable growth in ridership, nor encourage any substantial redevelopment in the City.

NEXT STEPS / FUTURE WORK

The assessment presented herein represents a high-level assessment of the implications associated with alternative routes and configurations for the London RT North Corridor, and is intended to guide the planning of future analyses and design work. For any proposed works that differ from those identified in the Environmental Project Report, these activities would likely include:

- Technical and/or public stakeholder consultation;
- Travel demand forecasting;
- Detailed traffic analysis;
- Preliminary infrastructure design;
- Cultural heritage impact assessment (Western Road / Wharncliffe Road corridor);
- Utility impact investigation;
- Natural environmental surveys and impact assessment (Western Road / Wharncliffe Road corridor); and
- Stage 1-2 Archaeological investigations (Western Road / Wharncliffe Road corridor).

610 Chartwell Road
Suite 300
Oakville, ON, Canada L6J 4A5

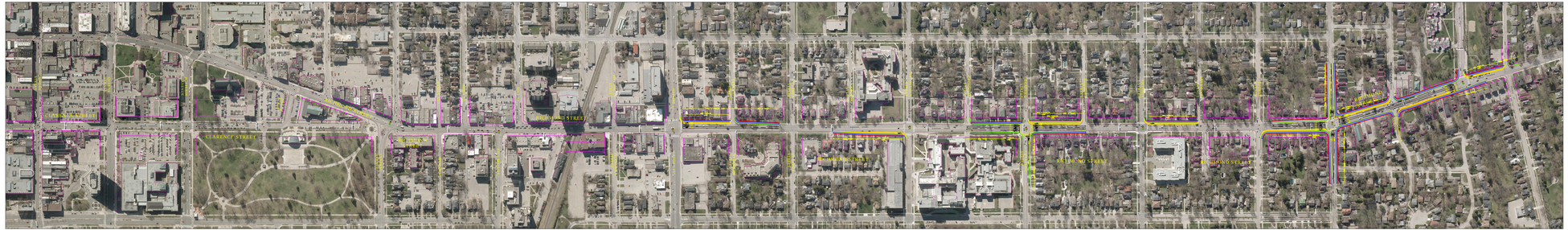
T: +1 905-823-8500
F: +1 905-823-8503
wsp.com

Andrew Shea
Project Manager, Transit Planning and Engineering

APPENDIX A: CORRIDOR DESIGN CONCEPTS

610 Chartwell Road
Suite 300
Oakville, ON, Canada L6J 4A5

T: +1 905-823-8500
F: +1 905-823-8503
wsp.com



1:2000

1:2000

OPTION 1: RICHMOND CORRIDOR QUEUE–JUMP LANES
FROM KING STREET TO HILLVIEW BOULEVARD

1:2000

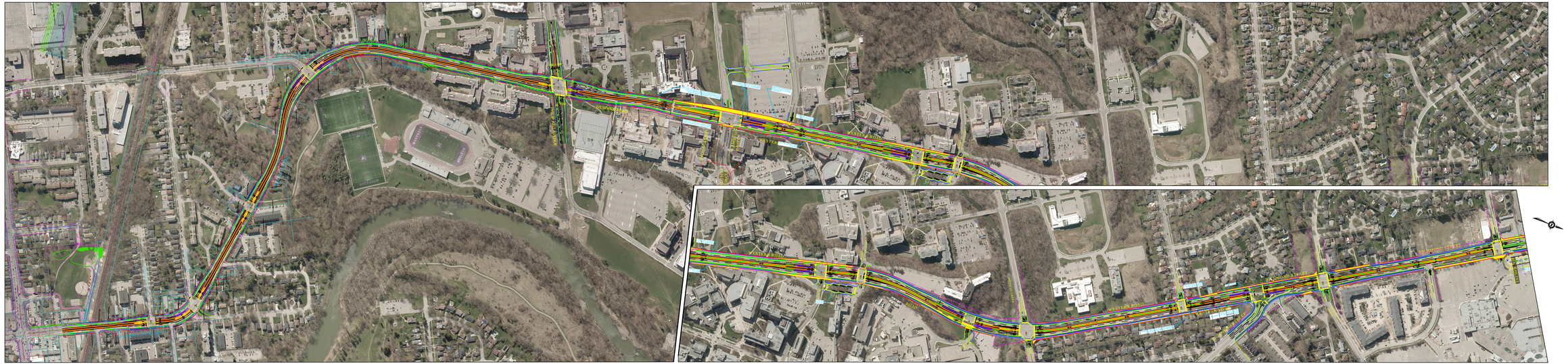
OPTION 1: WESTERN/WHARNCLIFFE CORRIDOR QUEUE-JUMP LANES
FROM OXFORD STREET TO HILLVIEW BOULEVARD

1:2000

1:2000

OPTION 2a: WESTERN/WHARNCLIFFE CORRIDO
FROM OXFORD STREET TO HILLVIEW BOULEVARD – BASE

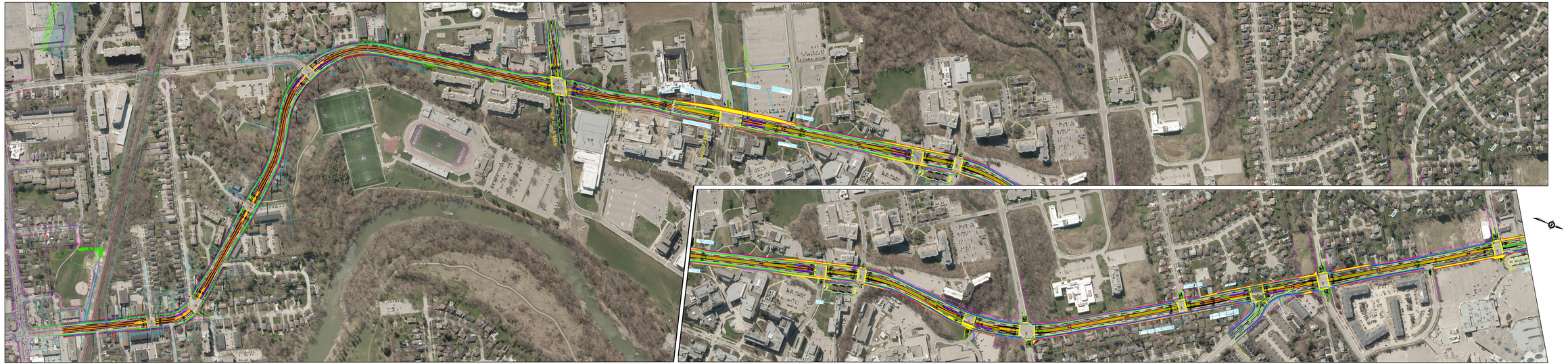
1:2000



1:2000

OPTION 2b: WESTERN/WHARNCLIFFE CORRIDO
FROM OXFORD STREET TO HILLVIEW BOULEVARD (2 GPL)

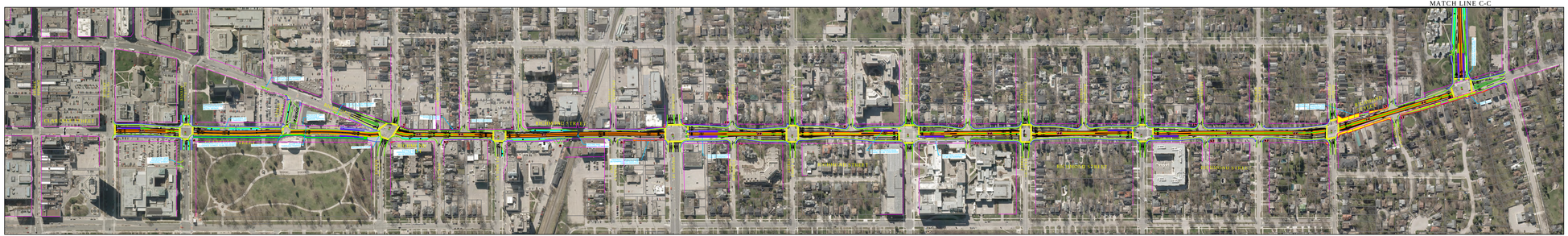
1:2000

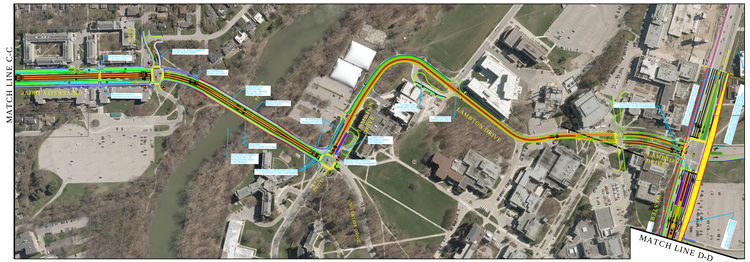


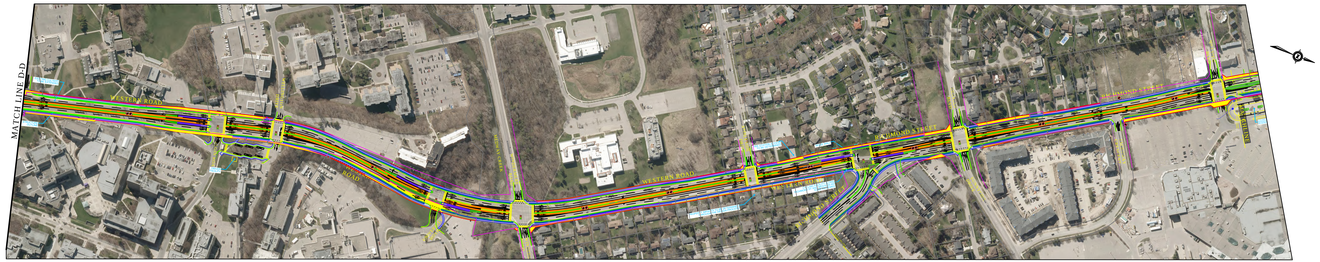
1:2000

OPTION 2c: WESTERN/WHARNCLIFFE CORRIDO
FROM OXFORD STREET TO HILLVIEW BOULEVARD (4 GPL)

1:2000







1:2000

OPTION 3: RICHMOND CORRIDOR FROM KING STREET TO HILLVIEW BOULEVARD

1:2000

TO:	**CHAIR AND MEMBERS RAPID TRANSIT IMPLEMENTATION WORKING GROUP MEETING ON JUNE 30, 2020**
FROM:	**KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR ENVIRONMENTAL & ENGINEERING SERVICES AND CITY ENGINEER**
SUBJECT:	**WEST CORRIDOR TRANSIT OPTIONS REVIEW**

RECOMMENDATION

That on the recommendation of the Managing Director, Environmental and Engineering Services and City Engineer, the following actions **BE TAKEN** with respect to the review of higher order transit service and/or transit improvement projects to West London;

(a) the following options **BE ENDORSED** for further consideration under the Public Transit Infrastructure Stream of the Investing in Canada Infrastructure Program;

i) Segment 1 – Wharncliffe Road from Riverside Drive to Oxford Street West and Oxford Street West from Wharncliffe Road to Platt's Lane - maintain four general traffic lanes on Wharncliffe Road, buses in mixed traffic, plus a westbound dedicated lane on Oxford Street West (Original Design);

ii) Segment 2 – Oxford Street West from Platt's Lane to Wonderland Road - Widen to six lanes: maintain four general traffic lanes and widen to add two centre-running transit-only lanes (Original Design);

iii) Segment 3 – Oxford Street West from Wonderland Road to Hyde Park Road - intersection improvements, adding or extending right-turn lanes to operate as queue jump lanes for buses;

iv) Segment 4 – Oxford Street West from Hyde Park Road to Westdel Bourne – future extension of rapid transit service in mixed traffic with smart traffic signals, with no change to road infrastructure;

PREVIOUS REPORTS PERTINENT TO THIS MATTER

- Civic Works Committee – June 19, 2012 – London 2030 Transportation Master Plan;
- Civic Works Committee – October 7, 2013 – Bus Rapid Transit Strategy;
- Civic Works Committee – July 21, 2014 – Rapid Transit Corridors Environmental Assessment Study Appointment of Consulting Engineer;
- Civic Works Committee – June 2, 2015 – Rapid Transit Funding Opportunities;
- Civic Works Committee – August 24, 2015 – Shift Rapid Transit Initiative Appointment of Survey Consultants;
- Strategic Priorities and Policy Committee – November 9, 2015 – Shift Rapid Transit Update;
- Strategic Priorities and Policy Committee – January 28, 2016 – Downtown Infrastructure Planning and Coordination;
- Strategic Priorities and Policy Committee – May 5, 2016 – Shift Rapid Transit Business Case;

- Strategic Priorities and Policy Committee – September 12, 2016 – Rapid Transit Implementation Working Group;
- Strategic Priorities and Policy Committee – May 3, 2017 – Rapid Transit Alternative Corridor Review;
- Strategic Priorities and Policy Committee – May 15, 2017 – Rapid Transit Corridors;
- Civic Works Committee – July 17, 2017 - Shift Rapid Transit Additional Engineering and Legal Survey;
- Strategic Priorities and Policy Committee – July 24, 2017 – Rapid Transit Master Plan and Business Case;
- Strategic Priorities and Policy Committee – September 18, 2017 – Project Management Plan, Communications Plan and Consulting Fees Amendment;
- Strategic Priorities and Policy Committee – April 23, 2018 – Bus Rapid Transit Environmental Assessment Initiative;
- Civic Works Committee – March 14, 2018 – The History of Rapid Transit;
- Strategic Priorities and Policy Committee – March 25, 2018 – Investing in Canada Infrastructure Program - Public Transit Stream Transportation Projects for Submission;
- Strategic Priorities and Policy Committee – March 25, 2019 – Investing in Canada Infrastructure Program, Public Transit Stream, Transportation Projects for Submission; and
- Strategic Priorities and Policy Committee – October 28, 2019 – Investing in Canada Infrastructure Program, Public Transit Infrastructure Stream, Approved Projects.

2019-2023 STRATEGIC PLAN

The following report supports the Strategic Plan through the strategic focus area of “Building a Sustainable City” by implementing and enhancing safe and convenient mobility choices for transit riders, automobile users, pedestrians, and cyclists.

BACKGROUND

Context

On March 26, 2019, Council selected ten transportation projects to be submitted for approval under the Public Transit Infrastructure Stream (PTIS) of the Investing in Canada Infrastructure Program (ICIP) from a list of eligible projects capable of being constructed within the funding window.

On June 25, 2019, the Province pledged $103.2 million for all ten of the transit and transit-supportive projects under the ICIP program, and on August 23, 2019, the Federal government announced $123.8 million for the same projects.

The current approved ICIP projects were part of the first round of funding. A second round of ICIP funding is anticipated. The ten approved ICIP projects did not utilize the full funding allocation, leaving an available balance to support future applications for transit-supportive works. A further breakdown of available ICIP funding is provided later in this report.

The rapid transit (RT) plan was presented for ICIP consideration in 2019 as five component projects able to stand alone or work i combination with other projects on the

list. Council prioritized three of the RT projects for the initial ICIP funding application: the Downtown Loop, the East London Link and the Wellington Gateway. The West and North corridor RT projects were not prioritized at the time, providing opportunity for further discussion of transportation needs for those parts of the city.

Purpose

On November 26, 2019, Council directed staff to explore further options for improving transit service to West London through the following resolution:

That the Civic Administration BE REQUESTED to review and report back with recommendations for providing higher order transit service and/or transit improvement projects to West London, including but not limited to potential modifications of the West Connection project that address:

a) options for higher order transit serving West London, including the extension of service further west;
b) local service integration opportunities;
c) additional road design alternatives along the corridor, including a review of lane configurations and options for phased delivery;
d) the possibility of a quick-start program that includes prioritized intersections with mixed traffic routes,
e) opportunities for park and ride;
f) the possible need for electric bus infrastructure; and
g) the Civic Administration BE DIRECTED to consult with the London Transit Commission on the matters identified in part a), above.

The approved Environmental Assessment for London's rapid transit initiative provides the foundation to continue exploring options for measures to improve transit service to West London. Staff was able to review transit options for the West under the current consulting contract for the Environmental Assessment and representatives of the London Transit Commission continued their participation on the project team.

This report summarizes the development and assessment of options to optimize transit service to West London addressing parts a), c) and d) of the resolution. This report also provides supporting background information and commentary in response to parts b), e) and f) of the resolution.

DISCUSSION

Overview of West Corridor Review

Status of the Environmental Assessment
The Rapid Transit Initiative Environmental Assessment followed the Transit Project Assessment Process (TPAP) – a provincially regulated protocol created to support transit initiatives (O.Reg. 231/08). On June 4, 2019, the City of London received a "Notice to Proceed with Transit Project" from Ontario's Minister of Environment, Conservation and Parks. This process allows the City to proceed with any or all components of the Bus Rapid Transit project in accordance with the Environmental Project Report (EPR).

The engineering work, technical studies and consultation that went into the EPR provide the foundation to review alternatives to the approved design concept. The West Corridor Review (Appendix A) provides a Master Plan-level evaluation of a range measures that

would improve transit, including elements of the Original Design proposed in the EPR, for comparison purposes.

Any options that increase the footprint of the Original Design, or extend beyond the previous study limits, may require additional Environmental Assessment and public consultation, culminating in an addendum to the EPR. Additional analysis and data gathering may include but not be limited to: traffic and transit operations, natural environment, cultural heritage, archaeology, stormwater and utilities. The length of time required to complete the additional analysis would vary depending on the study area and range of options. At a minimum, it is anticipated that any further study would take at least one year to complete.

Environmental Assessment implications were included as an evaluation criterion in the corridor review.

<u>West Transit Corridor Route</u>
The Rapid Transit Master Plan (2017) identified various potential corridors within the city for higher order transit, considering land use density; growth in people and jobs; major destinations; and existing transit ridership. Detailed corridor and network assessments analyzed criteria related to transportation capacity and mobility; the ease of implementation and operational viability; opportunities for community building and revitalization, and impacts to the natural environment and climate change. Exhibit 1 illustrates the long list of corridor segments considered at the master planning stage.

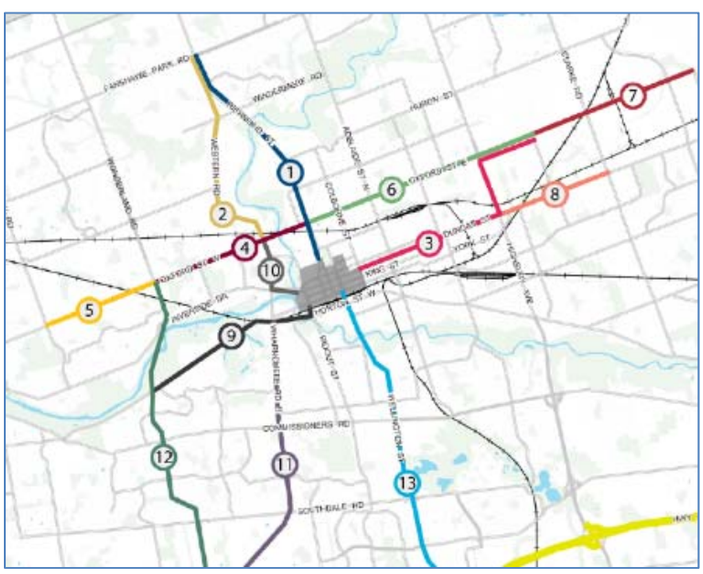


Exhibit 1: Rapid Transit Master Plan Exhibit 3.5 Long List of Corridor Segments

A long list of potential corridors was developed for the West end of the city, including Oxford Street West, Springbank Drive, Wharncliffe Road and Wonderland Road. Each of the corridors was screened and ranked on their ability to support rapid transit.

Oxford Street West was ultimately chosen for the West Transit corridor based on its ability to:

- serve trip generating destinations;
- support higher levels of employment and/or population growth;
- connect to an area of high residential density around Wonderland Road;
- serve moderate to high levels of existing transit ridership;
- align with the Transportation Master Plan and previous LTC Rapid Transit studies; and,
- make rapid transit a more competitive transportation alternative to support and grow transit ridership.

The Original Design proposed in the EPR for the West Leg, starts at the intersection of Ridout Street and Queens Avenue, and continues west along Riverside Drive, north along Wharncliffe Road North, and west along Oxford Street West with a turnaround just west of Wonderland Road North at Capulet Walk.

The West Corridor Review, detailed in Appendix A, considered the Oxford Street West route recommended in the Rapid Transit Master Plan, and carried forward into the EPR, but also considered extensions further west. The West Corridor was separated into four segments reflecting the varied land use, traffic, and cultural environment conditions along the corridor. Segments 1 and 2, as shown in Exhibit 2, represent the Original Design proposed in the EPR. For the purpose of this analysis, review of the corridor was extended west along Oxford Street West to Westdel Bourne, shown as Segments 3 and 4 in Exhibit 2. Options to improve transit were developed and assessed for each of the four segments.

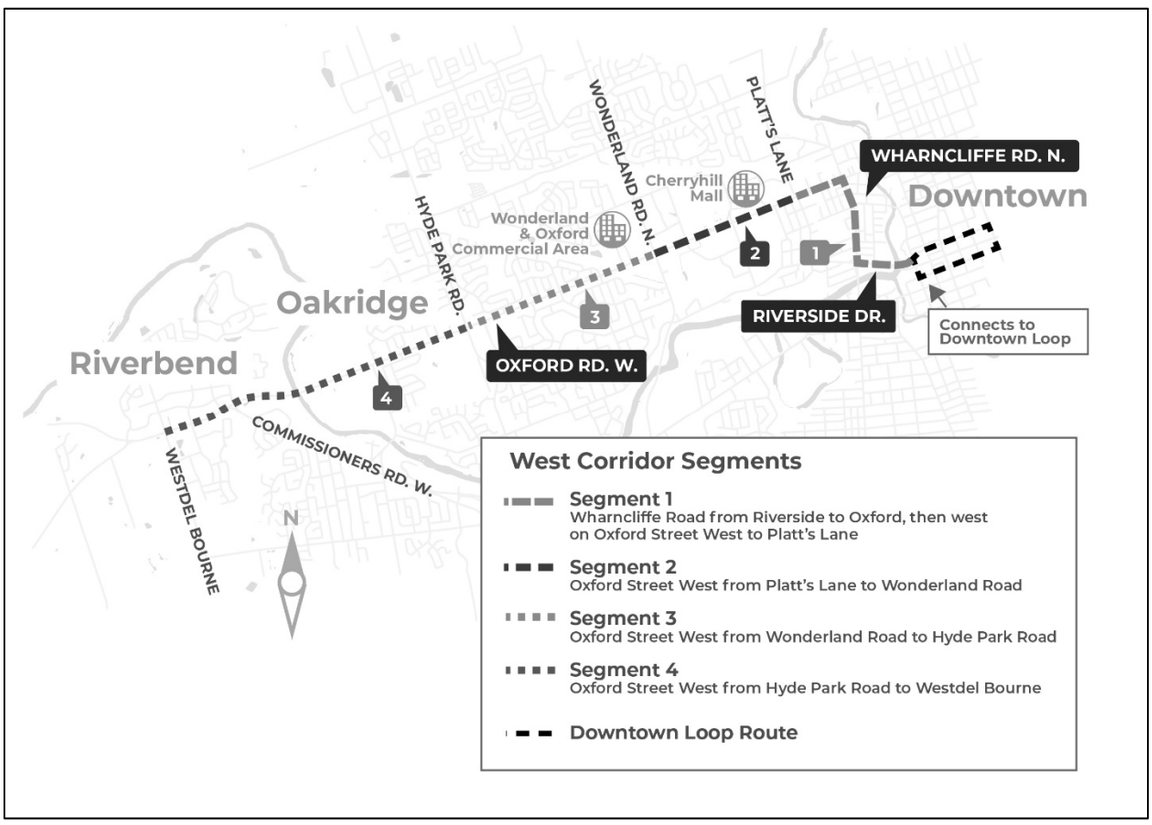


Exhibit 2: West Corridor Review Map

<u>Interactions with North Corridor Review</u>
On January 14, 2020, Council passed a second resolution directing staff to explore further options for improving transit service in the North end of the city.

The North Corridor Review is detailed in a companion SPPC report and considers transit options along both Richmond Street and Western Road/Wharncliffe Road. Under some North options, Segment 1 of the West Corridor Review (Wharncliffe Road south of Oxford Street West) would need to accommodate the transit demand of both the West and North RT routes. As a result, this section of Wharncliffe Road would have the highest frequency of buses of the City's RT network outside of the downtown core. Wharncliffe Road would need to accommodate the peak-hour 10-minute frequency of RT for the West Corridor plus the 5-minute frequency of RT for the North Corridor, plus some local transit routes and general traffic.

The West Corridor Review assesses options for Segment 1 independent of transit options for the North. The North Corridor Review considers the influence on Wharncliffe Road south of Oxford Street West (Segment 1) when evaluating options to improve transit.

Supporting Documentation

The West and North Corridor Reviews are presented in separate concurrent reports to be considered in tandem.

Staff were able to complete both corridor reviews using remaining budget under the existing Environmental Assessment contract. The project team was able to build on baseline information, studies, modelling and past analysis from the Rapid Transit Master Plan and EPR.

Attached in Appendix A is the West Corridor Review technical memorandum and detailed evaluation tables. This work was supported by traffic analysis of conceptual roadway configurations, high-level concept drawings and qualitative assessment of measures to improve transit. In the case of Segments 3 and 4, which extend service west beyond the limits of the EPR analysis, traffic volumes were forecasted to 2034 using the City-wide transportation model outputs and recent traffic impact studies completed for development applications.

Order-of-magnitude capital cost estimates were prepared for all alternatives, based on per-metre cost estimates for each typical roadway configuration, derived from the London RT network cost estimate prepared with the EPR. These costs include infrastructure costs and associated contingencies, utility relocation costs, allowance for property acquisition, and additional bus fleet requirement costs. The estimates also include engineering and project management costs and applied contingency consistent with the master planning level of detail available.

The cost estimates have been inflated to reflect nominal dollars and broken down into their ICIP-funded and municipally funded shares, reflecting any ineligible costs.

Developing Options to Improve Transit

The Project Team considered a full range of measures to improve transit when developing options for evaluation. However, some options were considered operationally infeasible or not applicable under ICIP, and therefore were not carried forward for evaluation.

Table 1: Options Developed for Various Sections of Corridor*

Minor Transit Improvements/ Lowest Cost ↕ Major Transit Improvements/ Highest Cost	• Express bus service • **Transit signal priority – RT operating in mixed traffic** • **Intersection improvements (queue jump lanes)** • Convert existing lane to two-way transit-only lane • **Convert existing lanes to transit-only lanes** • Widen to add a two-way transit-only lane • **Widen to add transit-only lanes**

* Only bolded options carried forward for evaluation

Table 1 summarizes transit improvement measures considered as part of this review and highlights those short-listed for evaluation. The following sections provide a brief explanation of each transit option considered and detailed evaluation tables are included in Appendix A.

Express Service

Express bus service is intended to reduce travel times over conventional local service by making fewer stops and following more direct routes. LTC already operates Route 91 on Oxford Street from Fanshawe College to Capulet Lane with plans to extend service easterly to Argyle Mall. Extending express bus service westerly is already considered through LTC's annual service reviews and does not require infrastructure investment under ICIP. This option was not carried forward for evaluation.

Enhanced Transit Service with Transit Signal Priority (TSP)

The Transportation Intelligent Mobility Management System (TIMMS) project, currently funded as one of the 10 approved ICIP projects, includes transit signal priority and other traffic signal improvements – such as sensors and video cameras – along major corridors. The project will reduce intersection delays and smooth traffic flow for both transit and drivers. This option assumes buses would operate in mixed traffic with intelligent traffic signals to help improve transit travel times, but does not include any changes to road infrastructure. In order for transit service beyond Capulet Lane to operate every 10 minutes, as identified in the EPR for the West Leg, additional buses would be required.

Intersection improvements

This option would add or extend right-turn lanes at signalized intersections that buses can use as queue jump lanes, while maintaining four lanes of general traffic. Queue jump lanes improve transit travel times by allowing buses to by-pass traffic and get to the front of the queue at signals. Transit signal priority would provide a head start for transit with an advance green transit-only signal phase. Intersections were assessed to determine the lane length needed for a bus to by-pass through traffic queues 50 per cent of the time or 95 per cent of the time during peak hours.

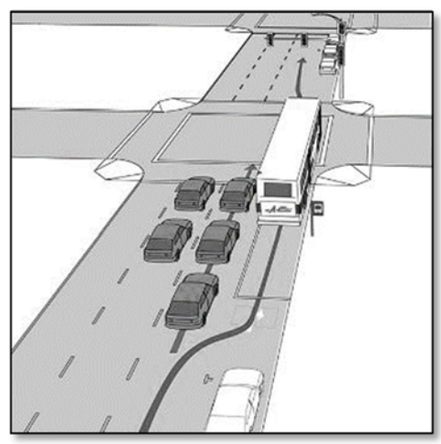


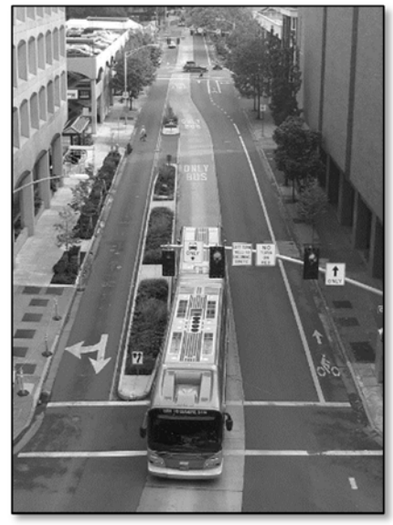
Diagram of queue jump lane.

While intersection improvements would benefit transit operations at intersections, buses would still be operating in mixed traffic for the majority of the route and experience delays associated with congestion and right-turning movements. Providing priority for transit at intersections may also increase delay for drivers due to adjusted signal timing.

Queue jump lanes are not the same as bus bays, which require drivers to yield the right-of-way to buses when the bus indicates an intention to re-enter the adjacent traffic lane. Ontario has Yield to Bus legislation , however, compliance is a concern, particularly on high-volume roads. Bus bays only are useful in specific circumstances (i.e. stops with higher passenger loads and ridership needing mobility aids or stops with schedule layovers requiring the bus to sit longer). Increased use of bus bays would have a negative impact on transit schedule adherence and therefore was not considered as part of this review.

Two-way transit-only lane options

A two-way transit lane consists of a single transit-only lane in the centre of the road. Buses travelling in both directions alternate use of the lane, controlled by signals at either end of the shared lane.



Two-way transit lane in Eugene, Oregon.

Options for two-way transit-only lanes were considered initially, but not included as part of the evaluation. Two-way transit-only lanes require complex signal operations, which result in transit delays and are only feasible for short segments framed by signalized intersections. Plus, the design requirements for safe operation and maintenance result in widening impacts and costs nearly equivalent to two single-direction transit-only lanes.

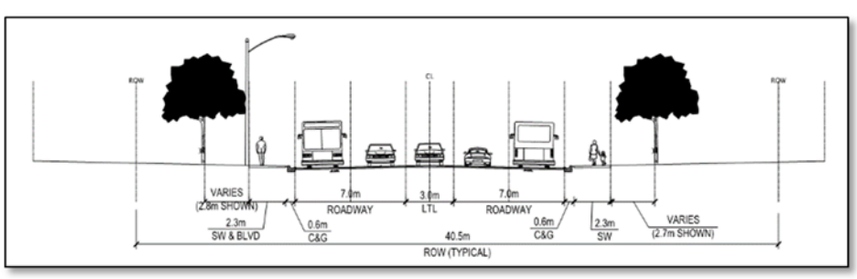
Curbside transit-only lanes

Transit-only lanes run along the outside curb and allow buses to pick up passengers at RT stops located along the roadside. Local service would also use the curbside transit-only lanes, but would only stop at RT stops to avoid slowing down RT buses.

For safety reasons, curbside transit-only lanes on busy arterials, such as Oxford Street West, would require a raised centre median to restrict left-turn movements to signalized intersections. U-turns would be permitted at signalized intersections, but completing a U-turn from the lanes adjacent to the centre median would be tight and challenging. Buses in the curb lane would receive transit priority, potentially increasing delay for drivers due to adjusted signal timing. Curbside transit-only lanes is less ideal than a

Example of curb-side RT.

centre-running design from both a traffic safety and transit reliability perspective, as motorists must cross the transit-only lanes for any right-turning movements.



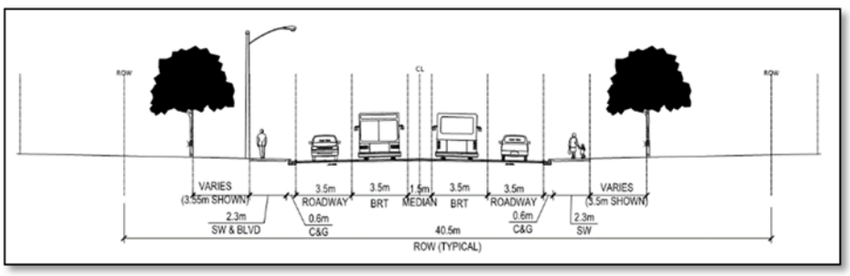
Centre-running transit-only lanes

Transit-only lanes run down the centre of the road with a raised centre median. RT stops are located on sheltered platforms in the centre of the road, while local service continues to run in the curb lane. RT passengers access the protected centre platform by crossing the road at a signalized cross-walk.

The raised centre median restricts unsignalized side streets and mid-block driveways to right-in/right-out access. Without the raised centre median, motorists would inevitably try to turn left from the centre-running transit-only lanes, resulting in stopped vehicles blocking RT buses and decreasing the reliability of the RT service. Left-turn movements are consolidated at signalized intersections to provide protected, safe turns across on-coming traffic. The centre-running transit-only lanes would increase the radius for

drivers completing U-turns, which would make the movement easier for drivers to manoeuvre.

Centre-running transit-only lanes provide the purest form of RT in terms of their ability to support service frequency and reliability. Centre-running RT is also the most efficient configuration for winter maintenance.



Example of centre-running RT.

Evaluating Options to Improve Transit

The options for each of the four segments were evaluated against the following 12 (Table 2).

These criteria support the evaluation and comparison of options. They are not intended to carry equal weight, but to provide insight into how different options balance transit benefit against physical impacts, operational impacts, study implications and cost.

Detailed evaluation tables are provided in Appendix A.

Table 2: Evaluation Criteria

Benefit to transit operations	Transit operations, including reliability and travel time delay, considered, with input from LTC.
Increase in ridership	Ability to grow transit ridership by attracting new or choice riders based on implementing enhancements.
Benefit to traffic operations	Traffic operations assessed with modelling, including signalized intersection operations, queue lengths, and potential for traffic diversion, with consideration for pedestrians and cyclists.
Least property impacts	Impacts to buildings and properties assessed for each option, indicating potential full and partial property impacts.
Least cultural heritage impacts	For options that would result in some form of property impact to a property with potential cultural heritage value or interest, a Cultural Heritage Evaluation Report would be required with timing and cost implications.
Least impact on trees	A high-level assessment of the number of trees impacted. This did not include a Tree Inventory to assess the health, size or type of trees.
Least impact on utilities	A high-level assessment of above-ground utilities, based on previously collected utility information.
Least impact on driveways	A high-level assessment of the number of driveways and potential parking impacts.
Redevelopment potential	For options that include widening, considered ability to encourage redevelopment and potential opportunities to merge residual parcels.
Most consistent with City's policy objectives	Assessed whether options support the goals and objectives of the London Plan.
Least EA Implications	Identified whether options would trigger the need for an addendum to the approved EA and the related study, consultation and timing implications.
Capital cost	High-level cost estimates developed using costs for similar roadway configurations to provide a range of potential capital costs.

Other Transit-related Discussion Items

The following sections provide background information and commentary on additional topics related to the future delivery of transit service as noted in the November 26, 2019 Council Resolution.

Local Service Integration

In September 2018, LTC presented its Rapid Transit Integration Strategy. The report included a forecast of the 2035 LTC bus network and provided strategic direction for how local service should integrate with rapid transit. Given the extended nature of the forecast, it is expected that the annual service plan review process will provide further in-depth analysis in order to respond to growing and shifting ridership.

In the event rapid transit service is extended even further west, the annual service plan process would identify any modifications to the local route network required to better integrate with the RT network. This review would be completed in advance of rapid transit service coming online to reflect ridership demand at that time.

As noted above, local service modifications including express bus service options were not carried forward in this corridor review evaluation. These options do not require infrastructure investment or funding under ICIP and are already considered through LTC annual service reviews.

Electrification Considerations

The background research for the Rapid Transit Master Plan (2017) and the Environmental Project Report (2019) considered the possibility for electric bus infrastructure. The Canadian Urban Transit Research and Innovation Consortium (CUTRIC) conducted economic modelling for different charging methods (fast charging versus slow charging), and the financial comparisons to diesel alternatives.

This information was presented at the SPPC meeting on September 17, 2018. The assessment demonstrated that:

- full electrification of the bus rapid transit system proposed in the original EPR was feasible;
- there are larger up-front costs for electrified vehicles (new infrastructure, specialized training, upgrades to electrical grid to support charging requirements, backup power solutions, etc.);
- there are long-term savings operationally; electricity is cheaper than diesel;
- advancements in technology will make electric vehicles more efficient; and
- there are environmental benefits with electrified vehicles which are three to five times cleaner than an equivalent diesel vehicle (when comparing carbon dioxide emissions).

Some considerations for electrified transit include:

- Bus configuration (length and size of battery)
- Range of operation (length of route and number of trips bus can make before batteries are empty)
- Charging options – trickle charge (slow rate of charge over a long time) or rapid charging (high rate of charge over a short time)
- Charging infrastructure – multiple rapid charges at the end points of routes or slow chargers at the depot
- Grid capacity

On November 27, 2019, the London Transit Commission directed LTC staff to report back on the steps involved with studying the impacts associated with electrification of the LTC bus fleet.

In response, LTC staff outlined an action plan to study fleet electrification beginning with an operational analysis, followed by an investigation of market analysis; energy and charging requirements; facility needs; utility interconnections and on-site power; and financial analysis and procurement strategy. At its meeting on January 29, 2020, the Commission approved the staff recommendation to award a contract to CUTRIC to undertake a Feasibility Analysis and Simulation-Based Planning Study.

Park and Ride Considerations

Park and Ride facilities provide an opportunity for drivers to transfer to transit. They are typically located at key locations such as major junctions within the transportation network and have strategic value. The goal is to encourage commuters from suburban and out-of-town locations with lower densities and higher levels of car use to connect to transit for the portion of their trip that is within the City.

Examples of ways other municipalities have established Park and Rides include:

- Sharing use with municipal parking lots/garages;
- Utilizing existing parking spaces at commercial locations;
- Exploring opportunities through Site Plan development applications;
- Sharing spaces within commercial parking lots;
- Exploring joint development opportunities; or
- Utilizing vacant land owned by municipalities.

The City of London and the London Transit Commission introduced a Park and Ride Monthly pass program for the downtown core in 2008. The program allows pass-holders to park at one of two municipal parking lots (Lot 1 & Lot 2) located in Old East Village (north of Dundas Street between Adelaide Street and English Street) and travel downtown via London Transit bus routes 2 Dundas, 7 Wavell and 20 Cherryhill. The service is available anytime Monday through Sunday, at a monthly rate of $60.

The EPR did not propose a Park and Ride facility on the west corridor, which ended at Oxford Street West and Capulet Lane in the Original Design.

However, if extending transit service further west to Hyde Park Road, there may be opportunities to explore Park and Ride options, including working with business and land owners in the Oxford/Hyde Park commercial area. All four corners of the intersection have commercial properties with some parking adjacent to Oxford Street West. There could be future opportunities to establish spaces through development applications should any these sites redevelop.

If extending transit service even further west to Westdel Bourne, ongoing and planned development activity may provide opportunities for coordination through site plan applications on undeveloped blocks or sharing of already planned parking spaces.

Opportunities for Park and Rides in the west will be driven by a combination of demand and opportunity. As ridership continues to grow in the west, both the City of London and LTC will continue to monitor potential to integrate Park and Ride options with transit service.

RECOMMENDED OPTIONS

The following section highlights some of the key considerations supporting the recommended options for each of the four segments of the West Corrdior. For more detailed information, Appendix A provides technical commentary on the options for each segment, including comprehensive evaluation tables with commentary for each of the criteria noted in Table 2.

SEGMENT 1: Wharncliffe Road North and Oxford Street West from Riverside Drive to Platt's Lane

Recommended Option: Option 1. Buses would operate in mixed traffic, maintaining four general traffic lanes on Wharncliffe Road, with intersection improvements at Riverside Drive and Oxford Street West. Additionally, a centre westbound transit-only lane would be provided on Oxford Street West from Wharncliffe Road North to Platt's Lane.

This option would maintain existing traffic capacity along Wharncliffe Road with buses operating in mixed traffic. Transit signal priority and queue jump lanes would be provided at the signalized intersections of Riverside Drive and Oxford Street West. Implementation would be coordinated with the separate ICIP approved Oxford/Wharncliffe intersection improvements and would also improve east-west local-route transit operations.

This segment is located within the Blackfriars-Petersville Heritage Conservation District and the existing flood plain of the Thames River. This option proposes no mid-block widening of Wharncliffe Road, which would minimize the impacts to cultural heritage resources, existing buildings, property, trees and utilities, as well as minimizing the increase to impermeable surface in the area.

This option is consistent with the Original Design proposed in the EPR, meaning there would be no further Environmental Assessment implications.

As noted above, the Wharncliffe Road portion of Segment 1 is also being considered as part of the North Corridor review and some options for the North Corridor would influence this recommended option. If RT for both the West and North Routes were to run along this segment of Wharncliffe Road, it could drive higher order transit options.

This review of the West Corridor assesses options for Segment 1 independent of transit options for the North Corridor.

Capital Cost Estimate
Option 1 is recommended for Segment 1 of the West Corridor when considered independent from the North Corridor.

Option 1 - Maintain 4 general traffic lanes, buses in mixed traffic, intersection improvements
The Option 1 estimated total project cost ranges from $37.3M to $41.9M.

The preferred approach for the North Corridor could drive higher order transit for West Segment 1. For reference, the estimated cost ranges for Options 2 and 3 are also provided.

Option 2 - Maintain two general traffic lanes (one lane in each direction), and convert 2 of the general traffic lanes to transit-only lanes.

The Option 2 estimated total project cost ranges from $54.6M to $62.6M.

Option 3 - Maintain 4 general traffic lanes (two in each direction), and widen corridor to add 2 dedicated centre-running transit-only lanes
The Option 3 estimated total project cost ranges from $66.6M to $76.5M.

SEGMENT TWO: Oxford Street West from Platt's Lane to Wonderland Road North

Recommended Option: Option 1. This option includes widening Oxford Street West to six lanes. The existing four general traffic lanes would be maintained, with the addition of two centre-running transit-only lanes. This option is consistent with the Original Design proposed in the EPR.

Option 1 would provide the greatest improvement to transit operations. Providing transit-only lanes would separate buses from general traffic and congestion, improving transit reliability. Furthermore, centre-running transit-only lanes do not experience delays from the turning movements of other vehicles. In addition, maintaining four general traffic lanes on Oxford Street West would provide capacity to support forecasted traffic volumes to 2034.

Widening the corridor to accommodate the dedicated transit lanes would have some impacts to properties, trees and driveways. Utilities along the corridor would require relocation on both the north and south sides of Oxford Street West. While being one of the most expensive options to construct, this option would provide the best return on investment; being supportive of the London Plan's intensification policies and objectives. The implementation of dedicated rapid transit infrastructure is likely to spur redevelopment and intensification within the designated Rapid Transit Corridor and Transit Village areas along this segment.

This option is consistent with the Original Design proposed in the EPR, meaning there would be no further Environmental Assessment implications.

Capital Cost Estimate
The Segment 2 - Option 1 estimated total project cost ranges from $34.9M to $38.8M.

SEGMENT THREE: Oxford Street West from Wonderland Road North to Hyde Park Road

Recommended Option: Option 3. This option would include intersection improvements (e.g. extending right-turn lanes to provide transit queue jump lanes) at strategic locations along the corridor.

Based on expected ridership for this segment, Option 3 would provide the most appropriate transit capacity. Intersection improvements would minimize the impacts to trees, utilities, driveways, and the surrounding established residential neighbourhood, while remaining consistent with the London Plan's intensification policies for this area.

Investing in moderate infrastructure improvements would be appropriate given the limited growth and intensification expected in the majority of this segment and in line with MTO guidelines for transit-supportive measures.
(http://www.mto.gov.on.ca/english/transit/supportive-guideline/index.shtml)

Segment 3 is outside the scope of the EPR; however this recommended option would not have any Environmental Assessment implications as the proposed undertakings are pre-approved under the Municipal Class Environmental Assessment.

Capital Cost Estimate
The Segment 3 - Option 3 estimated total project cost ranges from $8.8M to $13.5M.

SEGMENT FOUR: Oxford Street West from Hyde Park Road to Westdel Bourne

Recommended Option: Option 4. This option would extend rapid transit service through future LTC service reviews, taking advantage of smart traffic signals to operate buses in mixed traffic with transit signal priority. This option would require no change to the road infrastructure but may trigger the need for additional fleet.

Based on expected ridership for this segment, this option provides the most appropriate transit capacity. Implementation of Transit Signal Priority measures would limit impacts to the surrounding residential neighbourhoods, as these measures would not require any property, and would not have impacts to trees, driveways or utilities. This option is most consistent with the City's intensification policy objectives. The majority of the segment is designated Neighbourhoods or Green Space, which are place types not intended to support high-density development.

Segment 4 is outside the scope of the EPR; however this recommended option would not have any Environmental Assessment implications as the proposed undertakings are pre-approved under the Municipal Class Environmental Assessment.

Capital Cost Estimate
The Segment 4 - Option 4 estimated total project cost is $0.6M.

FINANCIAL IMPLICATIONS

In early 2018, the federal and provincial governments allocated a total of $375.6 million to London to support transit improvement initiatives ($204.9 Federal plus $170.7 Provincial). Municipal matching requirements of $136.6M would support total eligible funding program of $512.2M.

In early 2019, the federal government announced the Investing in Canada Infrastructure Program (ICIP) - Public Transit Infrastructure Stream (PTIS), a cost-shared infrastructure funding program between the federal and provincial governments and municipalities. In March 2019, City Council approved a list of ten transit and transit-supportive projects to be submitted under the ICIP–PTIS program. This list included the Downtown Loop, the East London Link, and the Wellington Gateway. In June 2019, the Government of Ontario approved $103.1 million to support these projects, followed by approval for $123.8 million from the Government of Canada in August 2019. The ten approved PTIS projects will utilize $225.1 million of the $375.6 million allocation, leaving an available balance of $150.5 million.

A placeholder for transit connections in the North and West was approved in the 2020 – 2023 Multi-Year Budget (see Table 1). A total of $73.7 million is in the capital budget for the West Connection.

Table 1 - West Connection in 2020-2023 Multi-Year Budget

$(000's)	Life to Date	2020-2023	2024-2029	Total
West Connection				
Federal/Provincial Share	663	550	43,257	**44,470**
Municipal Share	2,905	9,200	17,143	**29,248**
Total	**3,568**	**9,750**	**60,400**	**73,718**

Remaining Allocated Funding - Taking into account the Federal/Provincial share in the North and West "placeholder" budgets ($43.8 for the West (Table 1 above) and $84.2 for the North, for the years 2020-2029 only), plus $8.7 million in approved overlapping funding in other PTIS related projects (TIMMS, Oxford-Wharncliffe Intersection Improvements), there is $31.2 million of allocated Federal/Provincial funding remaining from the available balance of $150.5 million. Including the required 26.7% municipal contribution, there is approximately $42 million of project funding still available for transit related projects, noting that the matching municipal share is currently unfunded.

SUMMARY

The recommendations outlined in this report are the culmination of a comprehensive review that sought to determine how best to serve west London's transit needs, now and for years to come. They represent the best opportunity to capitalize on available funding opportunities, while delivering excellent value for the people of London, and west London in particular.

To support appropriate levels of transit infrastructure investment along the corridor, each area's distinct ridership needs, land uses, traffic volumes and cultural and environmental conditions were considered. The segment-by-segment recommendations in this report balance the need to maintain existing traffic capacity with the unique ridership requirements of each area. They thoroughly consider the potential transit benefits against other key considerations, such as physical impacts (for example, to trees and properties), operational impacts, study implications and cost.

Whether closer to the Downtown or further west toward London's outer limits, the City's objectives for intensification and development are upheld along the corridor, with recommendations aligning with enhanced growth in areas where that is the goal, and supporting neighbourhoods and green space, where intended.

The recommendations presented have no impacts on the existing Environmental Assessment, meaning the City can capitalize on years of existing study and consultation and move forward with implementing the recommended improvements without investing additional time or money in further study.

Together, the recommendations for the four segments of the West Corridor represent the best opportunity to maximize the City's return on investment while delivering improved transit to serve West London now and in the future.

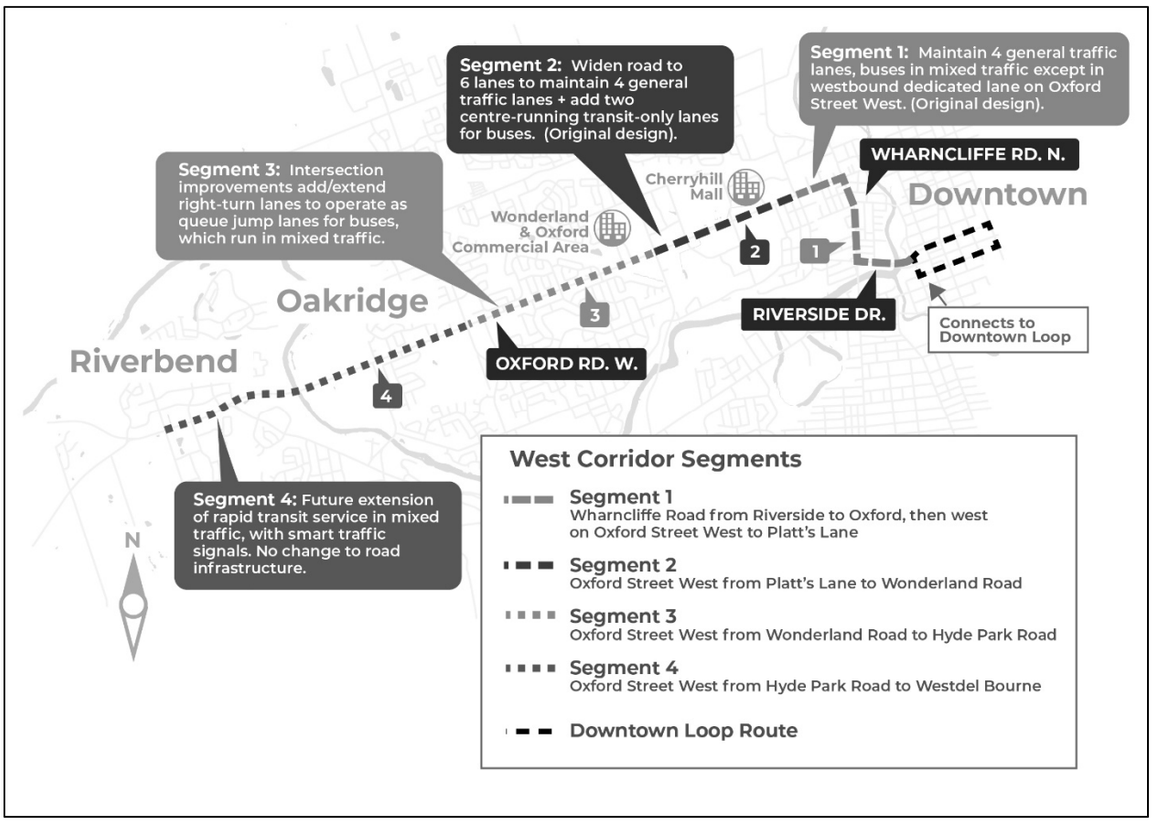


Exhibit 3: West Corridor Recommended Options: Segments 1 to 4

SUBMITTED BY:	
JENNIE DANN, P.ENG. **PROJECT DIRECTOR,** **MAJOR PROJECTS**	
CONCURRED BY:	**RECOMMENDED BY:**
ANNA LISA BARBON, CPA, CGA **MANAGING DIRECTOR,** **CORPORATE SERVICES AND CITY TREASURER,** **CHIEF FINANCIAL OFFICER**	**KELLY SCHERR, P.ENG., MBA, FEC** **MANAGING DIRECTOR,** **ENVIRONMENTAL AND ENGINEERING SERVICES & CITY ENGINEER**

Attach: Appendix A – West Corridor Alternatives – Summary Memorandum
cc. London Transit Commission

Appendix A

IBI GROUP
7th Floor – 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel 416 596 1930 fax 416 596 0644
ibigroup.com

Memorandum

To/Attention	Jennie Dann, City of London	**Date**	June 17, 2020
From	Margaret Parkhill, IBI Group	**Project No**	37176
cc	Andrew Shea, WSP		
Subject	**West Leg Transit Options**		

The purpose of this memo is to present the high-level planning analysis and resulting technically preferred options for the West Leg.

Background

Options to optimize transit in the West Leg were developed and assessed in response to a motion from the November 25, 2019 meeting of the Strategic Priorities and Policy Committee (SPPC)[1]:

That the Civic Administration BE REQUESTED to review and report back with recommendations for providing higher order transit service and/or transit improvement projects to West London, including but not limited to potential modifications of the West Connection project that address:

a) options for higher order transit serving West London, including the extension of service further west;
b) local service integration opportunities;
c) additional road design alternatives along the corridor, including a review of lane configurations and options for phased delivery;
d) the possibility of a quick-start program that includes prioritized intersections with mixed traffic routes,
e) opportunities for park and ride;
f) the possible need for electric bus infrastructure; and
g) the Civic Administration BE DIRECTED to consult with the London Transit Commission on the matters identified in part a), above

In 2019, the Transit Project Assessment Process (TPAP) was completed for the Rapid Transit network, including the Downtown Loop and the North, South, East and West legs. The Environmental Project Report (2019) was completed as part of the TPAP to document the Environmental Assessment, following Ontario Regulation 231/08. The Environmental Project Report identifies the potential impacts of the preliminary design and proposed mitigation measures. Elements of the approved design for the West Leg have been included in the options assessed as part of this analysis.

The West Leg, as defined in the Environmental Project Report, starts at the intersection of Ridout Street and Queens Avenue, and continues west along Riverside Drive, north along Wharncliffe Road North, and west along Oxford Street West to Capulet Walk (**Exhibit 1**).

---

[1] https://pub-london.escribemeetings.com/filestream.ashx?DocumentId=68978

For this analysis, the West Leg options were developed and assessed for this corridor, along with west extensions from Capulet Walk to Westdel Bourne.

Exhibit 1: West Leg of the Rapid Transit Corridor

As documented in the Rapid Transit Master Plan (2017), to serve projected ridership, a bus every 10 minutes in each direction is proposed for the South and West corridors during both peak and off-peak periods. For the North and East corridors, a bus every 5 minutes in each direction is proposed during peak periods, with 10 minute service in off-peak periods. Projected peak hour ridership in 2034 is provided in **Exhibit 2**.

As documented in the Environmental Project Report, the Rapid Transit network is planned to operate seven days a week, from 6 a.m. to midnight (12 a.m.). Articulated buses (buses comprising two sections, linked by a pivoting accordion-link joint) can carry 70 passengers comfortably, and up to 110 passengers. The resulting capacity of the proposed Rapid Transit service is provided in **Exhibit 2**.

Exhibit 2: Projected peak passengers per hour in the peak direction passenger load (2034) (source: Rapid Transit Master Plan, Exhibit 3.23)

	North	East	South	West
Peak Rapid Transit Ridership in the Peak Direction during the Peak Hour	1450	1350	650	600
Rapid Transit Peak Hour Capacity	840 to 1320	840 to 1320	420 to 660	420 to 660

West Leg Segments

Options to optimize transit in the West Leg were developed and assessed for four segments, from the intersection of Wharncliffe Road and Riverside Drive to the intersection of Oxford Street West and Westdel Bourne. Each segment has different land uses, traffic volumes and cultural environment conditions. The boundaries of the segments are shown in **Exhibit 3**, and are as follows:

1. Wharncliffe Road from Riverside Drive to Platt's Lane;
2. Oxford Street West from Platt's Lane to Wonderland Road;
3. Oxford Street West from Wonderland Road to Hyde Park Road; and
4. Oxford Street West from Hyde Park Road to Westdel Bourne.

Exhibit 3: West Leg Segments for Options Analysis

Evaluation Criteria

In total, 12 criteria were used to evaluate the options for the four segments:

1. Benefit to Transit Operations
2. Increase in Ridership
3. Benefit to Traffic Operations
4. Least Property Impacts
5. Least Cultural Heritage Impacts
6. Least Impacts on Trees
7. Least Impact on Utilities
8. Least Impact on Driveways and Access
9. Redevelopment Potential
10. Capital Costs
11. Most Consistent with City's Policy Objectives
12. Least Environmental Assessment Implications

Options Development

Through an initial option development and evaluation, the following two options were considered, but not advanced in the evaluation tables:

1. Two-way (bi-directional) dedicated centre transit lane, where a single lane in the centre of the road is dedicated transit-only (**Exhibit 4**). Buses travelling in both directions alternate use of the lane all day long. For example, if applied on the Wharncliffe Road corridor, and a southbound bus enters the lane at Oxford St, an opposing bus must wait at Riverside Drive until the eastbound bus clears the lane. This option was screened out for the following key reasons:

    a. **Operational complexity**: A bus travelling at a consistent average speed of 20 to 25 km/h requires about 3 minutes to travel one (1) kilometre. Holding one bus while the opposing bus uses the lane would require careful monitoring, scheduling, and dispatching to maintain the proposed 10-minute service. One delay in the two-way operation would have a domino effect and result in bus bunching and other operational issues.

    b. **Cross-section considerations**: Centre-running transit operates reliably and safely with a raised median island to restrict left-turns by general traffic across the bus lane. Without this restriction, buses are delayed by turning traffic and safety concerns arise. A two-way lane cannot have a raised island, as buses travel in both directions. Or, a raised island would be required on both sides of the single lane, with a 5 m

Exhibit 4: Two-way transit lane in Eugene

Source: http://www.pivotarchitecture.com/projects/emx/?cat=transit

wide bus lane to accommodate winter maintenance and drainage. The resulting cross-section is almost the same width as two centre transit lanes.

2. Express bus service, where buses serve a limited number of stops along the route to reduce travel times, was screened out. LTC already operates Route 91 on Oxford Street from Fanshawe College to Capulet Lane, west of Wonderland Road. Based on LTC's Five-Year Service Plan (2020-2024), the service is planned to extend easterly to Argyle Mall. Extending express bus service to the west does not require additional infrastructure and was screened out.

The following sections outline the options that were short-listed for each segment and provide an overview of the high-level planning evaluation. Detailed evaluation tables are provided in Attachment A.

Segment 1: Wharncliffe Road and Oxford Street West from Riverside Drive to Platt's Lane

Four options were short-listed for Segment 1:

1. Original Design: maintain four general traffic lanes, buses operate in mixed traffic, plus intersection improvements at Riverside Drive and Oxford Street West (**Exhibit 5**);
2. Maintain four lanes: maintain two general traffic lanes, one in each direction, and convert two general traffic lanes to dedicated transit lanes (**Exhibit 6**);
3. Widen to six lanes: maintain four general traffic lanes and widen to add two dedicated centre transit lanes (**Exhibit 7**); and
4. Transit Signal Priority: operate rapid transit in mixed traffic with smart traffic signals that improve transit travel times with no change to road infrastructure (**Exhibit 8**).

Centre-running transit requires a centre-median to restrict left-turns across the transit lanes for improved safety and reliability. In Options 2 and 3, centre-running transit lanes were selected over curbside transit lanes. This is due to the high volume of driveways in the segment. The high frequency of turning movements would impact the safety and reliability of curbside transit lanes.

In Options 1 and 4, buses run in mixed-traffic. No widening is proposed in Option 4. For Option 1, with the exception of the proposed rapid transit stops at Riverside Drive and Oxford Street West, no widening is required to implement the design on Wharncliffe Road.

Both Options 2 and 3 require widening. All widening would occur to the east side of Wharncliffe Road to limit impacts to hydro poles that are located on the west side. Widening to the east also results in fewer impacts to trees and buildings than widening to the west or evenly on each side of the road.

Exhibit 5: Maintain 4 General Traffic Lanes (Option 1)

Exhibit 6: Convert 2 Lanes to Transit Lanes (4-lanes) (Option 2)

Exhibit 7: Widen to Add 2 Dedicated Transit Lanes (6-lanes) (Option 3)

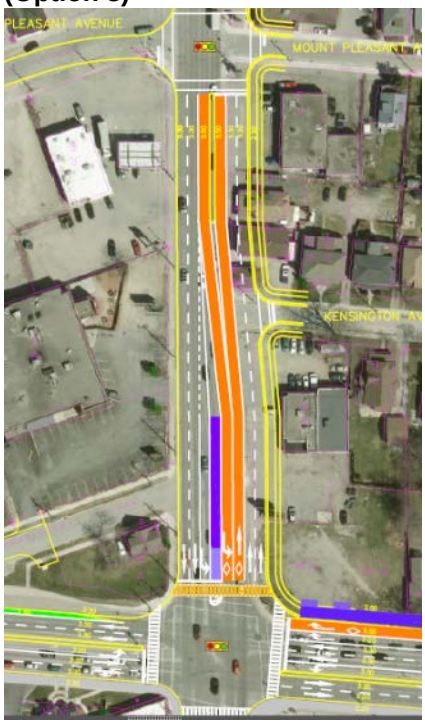


Exhibit 8: Transit Signal Priority (Option 4)

In this segment of the West Leg, key indicators include transit operations, cultural heritage, property, traffic operations and environmental assessment implications.

Options 2 and 3 most improve transit operations.

Options 2 and 3 propose dedicated transit lanes, separating buses from general traffic and congestion, therefore improving transit reliability. In Options 1 and 4, buses run in mixed traffic. In this segment, buses must turn at the intersection of Oxford Street West and Wharncliffe Road, and Wharncliffe Road and Riverside Drive. Both intersections experience congestion. In Option 1, intersection improvements provide transit priority at Riverside Drive and Oxford Street West, which improve transit reliability. Option 4 does not include any road infrastructure improvements to allow the buses fully reap the benefits of transit signal priority technology.

Options 1 and 4 best conserve cultural heritage resources.

The majority of the properties along Wharncliffe Road are located within the Blackfriars-Petersville Heritage Conservation District (**Exhibit 9**):

- Thames River to the east and the south
- Oxford Street West to the north and
- Wharncliffe Road to the west.
- Designated under Part V of the Ontario Heritage Act.

Exhibit 9: Blackfriars-Petersville Heritage Conservation District

Option 4 best conserves cultural heritage resources, with no impacts. Option 1 conserves most cultural heritage resources, as it does not require widening on Wharncliffe Road, with the exception of at rapid transit stop locations, reducing impacts to designated buildings. Options 2 and 3 require widening. Impacts are detailed in **Exhibit 10**.

Exhibit 10: Designated Building Impacts

Option	Designated Building Impacts
1. Original Design	2
2. Maintain four lanes	22
3. Widen to six lanes	41
4. Transit Signal Priority	0

Source: https://www.london.ca/About-London/heritage/Documents/Hertige-Conserv-Dist-Studies/B-P-Prop-Own-HeritGuideSept-2-2015.pdf

Options 1 and 4 have the least property impacts.

Option 4 has no road widening and no property impacts. Option 1 minimizes property impacts, with limited road widening to rapid transit stop locations, and no widening along Wharncliffe Road. This reduces the property impacts and has few building impacts. Options 2 and 3 require widening along the length of Wharncliffe Road, resulting in many properties and buildings impacted, as detailed in **Exhibit 11**. All impacts assume widening to the east side of Wharncliffe Road, which has fewer impacts to buildings, trees and utilities than widening to the west side of Wharncliffe Road.

Exhibit 11: Summary of Building Impacts

Option	Building Impacts[2]
1. Original Design	5
2. Maintain four lanes	49
3. Widen to six lanes	70
4. Transit Signal Priority	0

Option 3 best supports traffic operations.

Options 1, 3 and 4 maintain existing traffic capacity. Option 3 best supports traffic operations, as the dedicated lanes separate buses from general traffic. Option 1 provides separation at intersections only, while Option 4 does not provide any separation. Option 1 may increase the delay for traffic travelling east or westbound at signalized intersections. Option 2 converts two lanes to dedicated transit lanes, reducing traffic capacity over existing conditions. Options 2 and 3 require a median island, restricting left-turns to signalized intersections. U-turns would be permitted at signalized intersections.

Options 1 and 4 have the lowest capital costs.

Option 4 requires upgrades to the City's existing traffic signal technology. The upgrades are fully funded and the option does not include any road reconstruction, which results in the lowest capital costs. Option 1 involves widening and reconstruction at intersections only, limiting the cost.

Options 2 and 3 both involve road widening to construct transit-only lanes and rapid transit stops in the centre of the road. Option 3 has higher capital costs because the option proposes more widening than Option 2, which requires more property acquisition and utility relocations. Capital cost estimates for each of the options is provided in **Exhibit 12.**

Exhibit 12: Range of Capital Cost Estimates for Segment 1 Options

Segment 1 Options	Low Estimate	High Estimate
1. Original Design*	$29 million	$36 million
2. Maintain four lanes	$48 million	$55 million
3. Widen to six lanes	$59 million	$68 million
4. Transit Signal Priority	$1 million	$1 million

*Option 1 design has greater certainty of capital costs than other options.

[2] Building impacts include designated building impacts.

Options 1 and 4 do not have any Environmental Assessment implications.

Option 1 is the Original Design from the Environmental Project Report, therefore no further work is required prior to proceeding to detail design. Option 4 would be pre-approved under the Municipal Class Environmental Assessment, meaning no environmental assessment is required before installing the signals. Options 2 and 3 would require additional environmental assessment study and an addendum to the Environmental Project Report. A number of studies would be required to evaluate the impacts of the widening proposed in the Options, including but not limited to:

- Traffic
- Natural environment
- Stormwater
- Structural
- Archaeology
- Cultural heritage
- Utilities

It is anticipated that an addendum to the EPR would take, at minimum, one year to complete. Cultural Heritage Evaluation Reports and/or Heritage Impact Assessments be completed for all potentially impacted designated properties, meaning Option 3 may take more time to study than Option 2.

Option 1 is recommended for Wharncliffe Road and Oxford Street West from Riverside Drive to Platt's Lane: maintain four general traffic lanes, buses in mixed traffic, plus a westbound dedicated lane on Oxford Street West (Original Design).

Option 1 minimizes impacts to cultural heritage resources, minimizes building and property impacts, and maintains existing traffic capacity, while providing transit priority at the intersections of Riverside Drive and Oxford Street West.

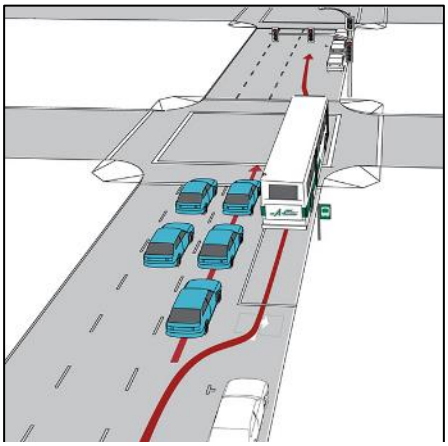
Option 1 is also sensitive to the existing floodplain limits in the area, with a minimal increase to impermeable surface area. Finally, Option 1 was recommended as part of the EPR, and there are no Environmental Assessment implications and the segment could proceed to detail design.

Segment 2: Oxford Street West from Platt's Lane to Wonderland Road

Four options were short-listed for Segment 2:

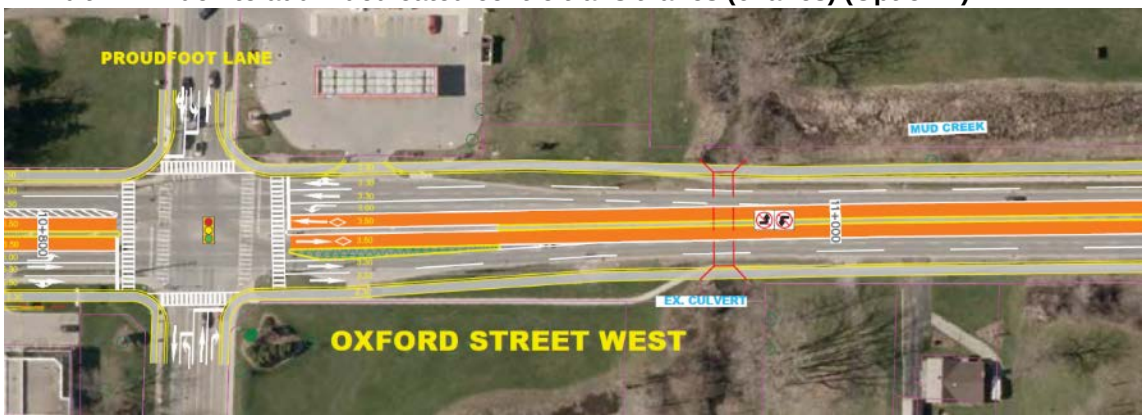
1. Original Design: widen to six lanes: maintain four general traffic lanes and widen to add two dedicated centre transit lanes (**Exhibit 14**);
2. Widen to six lanes: maintain four general traffic lanes and widen to add two dedicated curbside transit lanes (**Exhibit 15**);
3. Intersection improvements (**Exhibit 13**): adding or extending right-turn lanes to operate as queue jump lanes for buses (e.g. right-turn lane, buses excepted) (**Exhibit 16**); and
4. Transit Signal Priority: operate express transit service in mixed traffic with smart traffic signals that improve transit travel times with no change to road infrastructure (**Exhibit 17**).

Exhibit 13: Example of Queue Jump Lane



Source: https://www.calgary.ca/citycouncil/ward-10/Pages/Latest-news-detail.aspx?SidebarListCategory=0&ArticleID=48

Exhibit 14: Widen to add 2 dedicated centre transit lanes (6-lanes) (Option 1)



Legend:

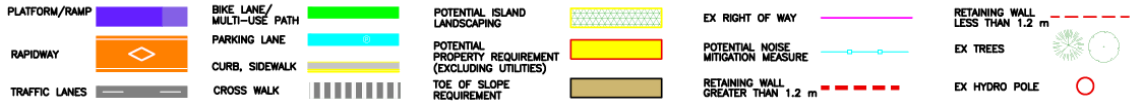


Exhibit 15: Widen to add 2 dedicated curbside transit lanes (6-lanes) (Option 2)

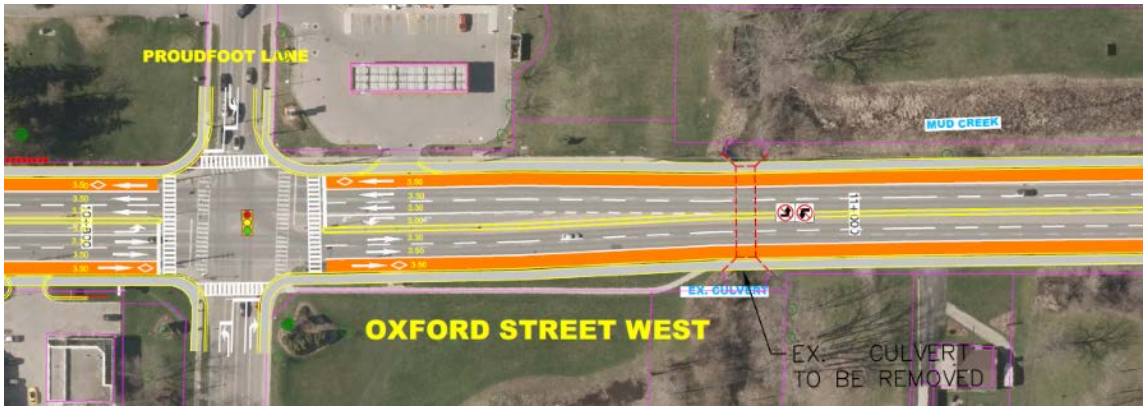


Exhibit 16: Intersection Improvements (Option 3)

Exhibit 17: Transit Signal Priority (Option 4)

In this segment of the West Leg, key indicators included transit operations, traffic operations, consistency with the City's policy objectives, transit ridership, and capital costs.

Option 1 most benefits transit operations.

Option 1 has centre-running dedicated transit lanes, removing transit from the flow of general traffic and providing the highest form of reliable transit. Option 2 also has dedicated transit lanes, however curbside operations will experience conflicts between right-turning traffic at driveways and intersections, and reduced reliability. Option 3 provides transit priority at intersections only, meaning buses would experience delays associated with congestion between signalized intersections in addition to conflicts with right-turning traffic. At intersections, queue jump lanes would allow buses to by-pass traffic. Option 4 does not provide any dedicated infrastructure for buses, which would lead to reductions in transit service reliability as traffic demand increases on Oxford Street.

Options 1 and 2 serve expected increases in transit ridership.

Options 1 and 2 provide more reliable transit, and will provide the appropriate amount of transit capacity to serve expected increases in transit ridership, as shown in **Exhibit 2**. Options 3 and 4 would have less reliable transit operations, requiring one (1) additional bus to account for operating in mixed traffic.

Options 1 and 2 increase traffic capacity.

Options 1 and 2 propose widening to support forecasted traffic volumes to 2034, and provide more traffic capacity than Options 3 and 4. Option 2 results in buses mixed with right-turning traffic at intersections, which will increase delays to both general traffic and transit, as compared to Option 1. Option 3 includes intersection improvements at signalized intersections only, for extended right-turn / queue jump lanes, and does not propose any widening between traffic signals. Options 2, 3, and 4 also have increased safety concerns due to conflicts between buses and right-turning vehicles at driveways and intersections.

To be most effective, Options 3 and 4 should include some form of active transit signal priority, to call the green traffic signal when buses approach the intersection during rush hour. Active transit signal priority may increase delay for vehicles travelling north-south at intersections within this segment, and may impact north-south signal coordination on arterials such as Wonderland Road.

Options 1 and 2 are most consistent with the London Plan's intensification policies.

The London Plan designates the majority of the corridor as a Rapid Transit Corridor, with small portions also designated Transit Village and Green Space. The Rapid Transit Corridor and Transit Village designations are to be the focus of transit and infrastructure investment and encourage intensification to achieve an urban, vibrant corridor that is supportive of transit. Policy 60.3 of the London Plan states that a goal of the London Plan is to "establish a high-quality rapid transit system in London and strategically use it to create an incentive for development along rapid transit corridors and at transit villages and stations".

Options 1 and 2 are most consistent with the City's policy objectives. Both options include the implementation of dedicated rapid transit infrastructure, which has been proven to spur development and intensification in other municipalities in Ontario. Option 3 only proposes dedicated transit lanes at intersections, while Option 4 does not propose any dedicated infrastructure. Dedicated transit infrastructure can spur development, using the tools available in the London Plan.

Options 1 and 2 provide the best return on investment.

Options 1 and 2 would be the most expensive to construct; however, these options provide more traffic capacity, and Option 1 provides the greatest benefit to transit reliability, compared to Options 3 and 4. In Option 3, the capital investment in road infrastructure needed to realize benefit for transit is substantial, and provides less reliability than Options 1 and 2. Option 3 also impacts traffic operations, and has the potential to result in throw-away costs if dedicated transit lanes are implemented in the future. Option 4 is relatively inexpensive to implement, and provides the least benefit to transit reliability and traffic operations. Capital cost estimates for each of the options is provided in **Exhibit 18**.

Exhibit 18: Range of Capital Cost Estimates for Segment 2 Options

Segment 2 Options	Low Estimate	High Estimate
1. Widen to six lanes: centre (Original Design)*	$27 million	$33 million
2. Widen to six lanes: curb	$30 million	$40 million
3. Intersection improvements	$13 million	$20 million
4. Transit Signal Priority	$1 million	$1 million

*Option 1 design has greater certainty of capital costs than other options.

Option 1 is recommended for Oxford Street West from Platt's Lane to Wonderland Road: Widen to six lanes: maintain four general traffic lanes and widen to add two dedicated centre transit lanes (Original Design).

Option 1 provides the most reliable transit operations, and is most consistent with the City's policy objectives and future land use patterns. Specifically, Option 1 accommodates forecasted traffic volumes to 2034, which will require two lanes in each direction for general traffic on Oxford Street West. The implementation of dedicated rapid transit infrastructure is likely to spur redevelopment and intensification within the designated Rapid Transit Corridor and Transit Village areas, supporting the policies of the London Plan. Option 1 also provides a better return on investment, providing more reliable transit and traffic operations with capital costs similar to Option 2. Finally, Option 1 was recommended as part of the EPR, and there are no Environmental Assessment implications and the segment could proceed to detail design.

Segment 3: Oxford Street West from Wonderland Road to Hyde Park Road

Four options were short-listed for Segment 3. This segment is beyond the study area of the Transit Project Assessment Process.

1. Widen to six lanes: maintain four lanes for general traffic and widen to add two dedicated lanes either curbside or centre-running transit lanes (**Exhibit 19**);
2. Maintain four lanes: maintain two lanes for general traffic and convert two general traffic lanes to dedicated curbside or centre-running transit lanes (**Exhibit 20**);
3. Intersection improvements: adding or extending right-turn lanes to operate as queue jump lanes for buses (e.g. right-turn lane, buses excepted) (**Exhibit 21**); and
4. Transit Signal Priority: operate express transit service in mixed traffic with smart traffic signals that improve transit travel times with no change to road infrastructure (**Exhibit 22**).

Exhibit 19: Widen to add 2 dedicated transit lanes (6-lanes) (Option 1)

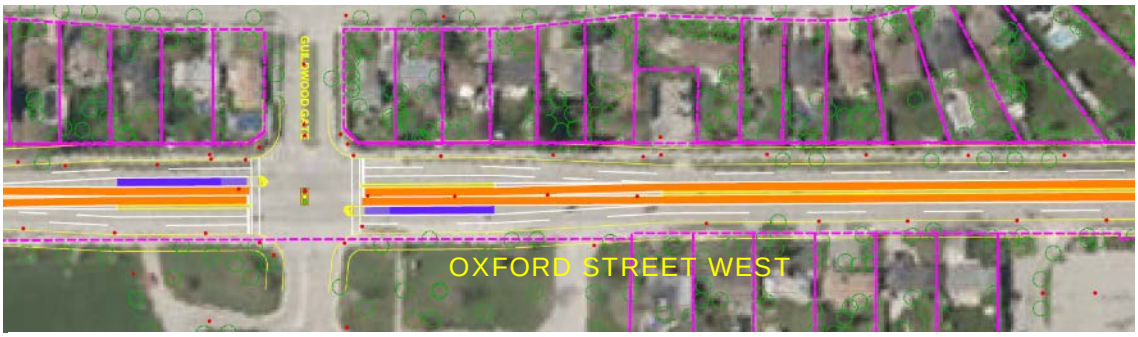


Exhibit 20: Convert 2 lanes to dedicated transit lanes (4-lanes) (Option 2)

Legend

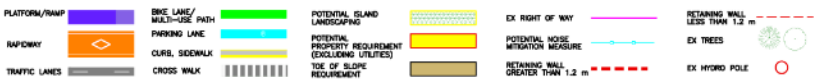
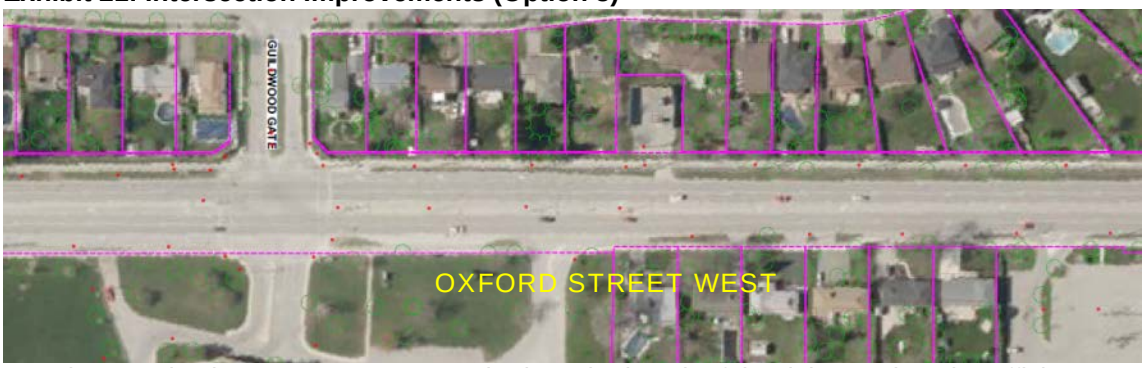


Exhibit 21: Intersection Improvements (Option 3)*



*No intersection improvements are required, as the length of the right-turn lane is sufficient to accommodate forecasted volumes in 2034.

Exhibit 22: Transit Signal Priority (Option 4)

In this segment of the West Leg, key indicators included consistency with the City's policy objectives, transit ridership, impacts to trees and utilities, and environmental assessment implications.

Options 3 and 4 are most consistent with the London Plan's intensification policies.

The majority of the segment is designated Neighbourhoods or Green Space. These Place Types are not intended to support high-density development.

Options 3 and 4 are most consistent with the City's policy objectives. While some medium and high-density development exists at the east and west ends, near Wonderland Road and Hyde Park Road, the majority of the corridor is abutted by stable, residential neighbourhoods or green space. Some infrastructure investment may be appropriate to improve transit reliability. However, the investment proposed in Options 1 and 2 is better suited to intensification corridors.

Options 3 and 4 provide appropriate transit capacity based on expected ridership.

The density of residents and jobs provide an indication of ridership potential near transit, and are important considerations when planning transit service. MTO's Transit Supportive Guidelines[3] suggest minimum density thresholds for areas within a 5 to 10 minute walk of transit for different types of transit service, specifically:

- 50 residents and jobs per hectare for basic transit service (a bus every 30 minutes or better); and

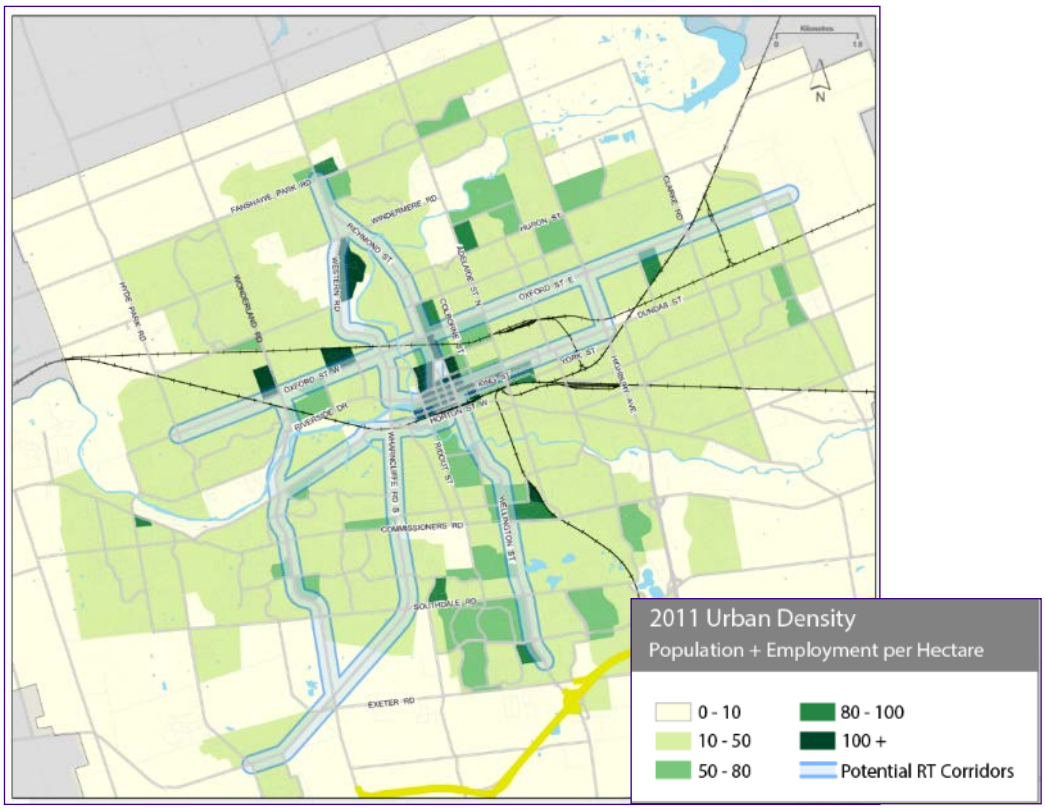
[3] MTO's Transit Supportive Guidelines (2012) http://www.mto.gov.on.ca/english/transit/supportive-guideline/index.shtml

- 80 residents and jobs per hectare for frequent transit service (a bus every 15 minutes or better).

In 2011, density within this segment was largely between 10 to 50 residents and jobs per hectare (**Exhibit 23**). A small portion of the segment near the intersection of Wonderland Road and Oxford Street West had a density over 100 residents and jobs per hectare. Land use density is not expected to increase to levels that support frequent transit service. Land use is designated Neighbourhood and Green Space land use along Oxford Street West, from Wonderland Road to Hyde Park Road.

The infrastructure investment proposed in Options 3 and 4 may be appropriate to improve transit reliability given the future expected land use and associated expected ridership. The infrastructure investment associated with Options 1 and 2 accommodate more transit capacity than appropriate within the London Plan timeline.

Exhibit 23: London's Rapid Transit Master Plan (2017), Exhibit 2-6



Increasing transit service west of Wonderland Road will require additional fleet for LTC. All Options require one (1) additional bus to increase transit service in this segment.

Options 3 and 4 reduce impacts to trees and utilities.

Option 4 does not require any widening, therefore there are no impacts to trees or utilities. Option 3 widens Oxford Street at signalized intersections to add Queue Jump Lanes. Potential locations identified for this evaluation include: eastbound at Capulet Lane, eastbound at Juniper Street, and westbound at Hyde Park Road. Options 1 and 2 would have the most tree and utility impacts with road widening to add dedicated transit lanes and stop infrastructure between Wonderland Road and Hyde Park Road. A summary of the impacts for each of the options is provided in **Exhibit 24**.

Exhibit 24: Summary of Tree and Utility Impacts

Option	Trees	Utilities
1. Widen to six lanes	285	Impacts all poles. Relocations would be required.
2. Maintain four lanes	150	Impacts majority of north and south poles. Relocations would be required.
3. Intersection improvements	10	Impacts poles at Hyde Park Road. Relocations would be required.
4. Transit Signal Priority	0	No impacts.

Options 3 and 4 do not have any Environmental Assessment implications.

The majority of this segment is outside of the original study area. Options 1 and 2 propose implementing dedicated transit lanes west of Capulet Walk which would require additional environmental assessment study and an addendum to the EPR. A number of studies would be required to evaluate the impacts of widening, including but not limited to:

- Traffic
- Natural environment
- Stormwater
- Structural
- Archaeology
- Cultural heritage
- Utilities

It is anticipated that an addendum to the EPR would take, at minimum, one year to complete. Timing is dependent on when the various studies take place, noting that some studies can only be completed at certain times of year. For example, the natural environment study would have to be completed over a number of months to document existing conditions at different times of the year.

Options 3 and 4 do not have any Environmental Assessment implications. Option 3 proposes constructing intersection improvements. Option 4 proposes installing and constructing traffic control devices. Both undertakings are pre-approved under the Municipal Class Environmental Assessment.

Options 1 and 2 and 3 propose extending dedicated lanes for transit, and increased transit service, to Hyde Park Road. This would shift the turnaround location proposed in the Original Design from Capulet Lane to a location near Hyde Park Road. Buses could potentially turn around by turning right onto Royal York Road, turning right onto Hyde Park Road, and then left onto Oxford Street West. A bus operator rest facility along with layover space would need be constructed either in the public right-of-way, or on the private lands on the south side of Royal York Road. Land acquisition costs have not been investigated to accommodate a bus operator facility and layover space. In Option 4, the bus operator rest facility would remain on the south side of Capulet Walk near Capulet Lane.

Options 3 and 4 have the lowest capital costs.

Option 4 requires upgrades to the City's existing traffic signal technology. The upgrades are fully funded and the option does not include any road reconstruction, which results in the lowest capital costs. Option 3 involves widening and reconstruction at intersections only, limiting the cost. Options 1 and 2 both involve road widening to construct transit-only lanes and rapid transit stops in the centre of the road. Option 1 has higher capital costs because the option proposes more widening than Option 2, which requires more property acquisition and utility relocations. Capital cost estimates for each of the options is provided in **Exhibit 25**.

Exhibit 25: Range of Capital Cost Estimates for Segment 3 Options

Segment 3 Options	Low Estimate	High Estimate
1. Widen to six lanes	$23 million	$33 million
2. Maintain four lanes	$20 million	$27 million
3. Intersection improvements	$8 million	$12 million
4. Transit Signal Priority**	$0	$0

**Option 4 signal costs are included in TIMMS.

Option 3 is recommended for Oxford Street West from Wonderland Road to Hyde Park Road: intersection improvements adding or extending right-turn lanes to operate as queue jump lanes for buses (e.g. right-turn lane, buses excepted).

Option 3 is most consistent with the City's policy objectives. This level of infrastructure investment is considered appropriate given the limited intensification expected in the majority of the segment. Option 3 has minimal impacts to the surrounding stable residential neighbourhoods, trees and utilities. Finally, Option 3 does not have any Environmental Assessment implications and is ready to proceed to detail design.

Segment 4: Oxford Street West from Hyde Park Road to Westdel Bourne

Four options were short-listed for Segment 4. This segment is beyond the study area of the Transit Project Assessment Process.:

1. Widen to six lanes: maintain four lanes for general traffic and widen to add two dedicated lanes either curbside or centre-running transit lanes east of Sanatorium Road (**Exhibit 26**) and maintain two lanes from Sanatorium to Westdel Bourne;
2. Maintain four lanes: maintain two lanes for general traffic and convert two general traffic lanes to dedicated curbside or centre-running transit lanes east of Sanatorium Road and maintain two lanes from Sanatorium to Westdel Bourne (**Exhibit 27**);
3. Intersection improvements : adding or extending right-turn lanes to operate as queue jump lanes for buses (e.g. right-turn lane, buses excepted) (**Exhibit 28**); and
4. Transit Signal Priority: operate express transit service in mixed traffic with smart traffic signals that improve transit travel times with no change to road infrastructure (**Exhibit 29**).

Existing lane configurations vary in this segment. From Hyde Park Road to Sanatorium Road, Oxford Street West has two general traffic lanes per direction, plus turning lanes at most intersections. From Sanatorium Road to Westdel Bourne, Oxford Street West has one general traffic lane per direction, plus turning lanes at intersections.

The 2019 Development Charges Background Study identified timings for future road widenings:

- 2025: planned widening of Oxford Street West to four lanes (two general traffic lanes per direction) from Commissioners Road to Westdel Bourne;
- 2031: planned widening of Oxford Street West to four lanes (two general traffic lanes per direction) from Sanatorium Road to Commissioners Road.

Exhibit 26: Widen to add 2 dedicated transit lanes (6-lanes) (Option 1)

Legend:

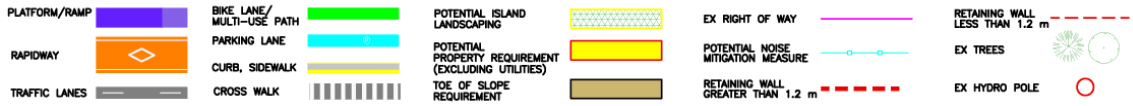


Exhibit 27: Convert 2 lanes to dedicated transit lanes (4-lanes) (Option 2)

Exhibit 28: Intersection Improvements (Option 3)

Exhibit 29: Transit Signal Priority (Option 4)

In this segment of the West Leg, key indicators included consistency with the City's policy objectives, transit ridership, impacts to trees and utilities, and environmental assessment implications.

Options 3 and 4 are most consistent with the London Plan's intensification policies.

The majority of the segment is designated Neighbourhoods or Green Space. These Place Types are not intended to support high-density development. A portion of the segment, west of Sanatorium, is located outside the Urban Growth Boundary.

Options 3 and 4 are most consistent with the City's policy objectives. While some medium and high-density development is proposed at the west end of the segment, near Westdel Bourne, the majority of the corridor is abutted by stable, residential neighbourhoods or green space. Some infrastructure investment may be appropriate to improve transit reliability. However, the investment proposed in Options 1 and 2 are better suited to intensification corridors.

Option 4 provides appropriate transit capacity based on expected ridership.

The density of residents and jobs provide an indication of ridership potential near transit, and are important considerations when planning transit service. MTO's Transit Supportive Guidelines[3] suggest minimum density thresholds for areas within a 5 to 10 minute walk of transit for different types of transit service, specifically:

- 50 residents and jobs per hectare for basic transit service (a bus every 30 minutes or better); and
- 80 residents and jobs per hectare for frequent transit service (a bus every 15 minutes or better).

In 2011, density within this segment was between 0 to 50 residents and jobs per hectare (**Exhibit 23)**. While development is occurring around the intersection of Westdel Bourne, most of the corridor is designated Neighbourhood and Green Space, and land use density is not expected to increase to levels that support frequent transit service.

The infrastructure investment in Option 4 is appropriate given the future expected land use and associated ridership generated. The infrastructure investment associated with Options 1, 2 and 3 accommodate more transit capacity than appropriate within the London Plan timeline.

Increasing transit service from Hyde Park Road to Westdel Bourne will require additional fleet for LTC. All Options require two (2) additional buses to increase transit service in this segment.

Options 3 and 4 reduce impacts to trees and utilities.

Option 4 does not require any widening, therefore there are no impacts to trees or utilities. Option 3 widens Oxford Street at signalized intersections to add Queue Jump Lanes. Potential locations identified for this evaluation include: eastbound at Hyde Park Road, eastbound at the Commercial Access west of Hyde Park Road, eastbound at Sanatorium Road, westbound at Kains Road, and eastbound and westbound at Westdel Bourne. Options 1 and 2 would have the most tree and utility impacts with road widening to add dedicated transit lanes and stop infrastructure between Hyde Park Road and Sanatorium Road. A summary of the impacts for each of the options is provided in **Exhibit 30**.

Exhibit 30: Summary of Tree and Utility Impacts

Option	Trees	Utilities
1. Widen to six lanes	130	Impacts all poles. Relocations would be required.
2. Maintain four lanes	75	Impacts majority of north and south poles. Relocations would be required.
3. Intersection improvements	4	Impacts poles at Sanatorium. Relocations would be required.
4. Transit Signal Priority	0	No impacts.

Options 3 and 4 do not have any Environmental Assessment implications.

This segment is outside of the original study area. Options 1 and 2 propose implementing dedicated transit lanes outside of the original study area, which would require additional environmental assessment study and an addendum to the EPR. A number of studies would be required to evaluate the impacts of widening, including but not limited to:

- Traffic
- Natural environment
- Stormwater
- Structural
- Archaeology
- Cultural heritage
- Utilities

It is anticipated that an addendum to the EPR would take, at minimum, one year to complete. Timing is dependent on when the various studies take place, noting that some studies can only be completed at certain times of year. For example, the natural environment study would have to be completed over a number of months to document existing conditions at different times of the year.

Options 3 and 4 do not have any Environmental Assessment implications. Option 3 proposes constructing intersection improvements. Option 4 proposes installing and constructing traffic control devices. Both undertakings are pre-approved under the Municipal Class Environmental Assessment.

Options 3 and 4 have the lowest capital costs.

Option 4 requires upgrades to the City's existing traffic signal technology. The upgrades are fully funded and the option does not include any road reconstruction, which results in the lowest capital costs. Option 3 involves widening and reconstruction at intersections only, limiting the cost. Options 1 and 2 both involve road widening to construct transit-only lanes and rapid transit stops in the centre of the road. Option 1 has higher capital costs because the option proposes

more widening than Option 2, which requires more property acquisition and utility relocations. Capital cost estimates for each of the options is provided in **Exhibit 31**.

Exhibit 31: Range of Capital Cost Estimates for Segment 4 Options

Segment 4 Options	Low Estimate	High Estimate
1. Widen to six lanes	$17 million	$25 million
2. Maintain four lanes	$15 million	$21 million
3. Intersection improvements	$13 million	$20 million
4. Transit Signal Priority**	$500,000	$500,000

** 3 out of 5 of the intersections' signal costs are included in TIMMS.

Option 4 is recommended from Hyde Park Road to Westdel Bourne for future implementation through LTC service reviews: Transit Signal Priority: operate express transit service in mixed traffic with smart traffic signals that improve transit travel times with no change to road infrastructure.

Option 4 is most consistent with the City's policy objectives. This level of investment is considered appropriate given the limited intensification expected in the majority of the segment. Option 4 does not require any property and has no impacts to trees or utilities. Finally, Option 4 does not have any Environmental Assessment implications.

Environmental Project Report Addendum

The impacts noted above are based on conceptual designs. Additional environmental assessment study will be required to complete an addendum to the EPR.

The addendum process is included in the TPAP regulation (O.Reg. 231/05). The addendum process is intended to address certain modifications to a transit project, after the Statement of Completion is issued. The requirement for an addendum is proponent-driven and may not require a Notice of Addendum. If the City is of the opinion that the proposed change is not significant, the reasoning behind this opinion can be documented, and a Notice may not be required. If the City is of the opinion that the proposed change is significant, a Notice must be published in a local newspaper and on the website. The Notice must also be provided to the Ministry of the Environment, Conservation and Parks, to every property owner within 30 metres of the site of the change, Indigenous communities, and other interested persons.

Summary

The following represent IBI Group's technical recommendations for the four segments of the West Leg:

1. Segment 1: Wharncliffe Road and Oxford Street West from Riverside Drive to Platt's Lane:

Maintain four general traffic lanes, buses in mixed traffic, plus a westbound dedicated lane on Oxford Street West (Original Design).

2. Segment 2: Oxford Street West from Platt's Lane to Wonderland Road:

Maintain four general traffic lanes and widen to add two dedicated centre transit lanes (Original Design).

3. Segment 3: Oxford Street West from Wonderland Road to Hyde Park Road:

Intersection improvements: adding or extending right-turn lanes to operate as queue jump lanes for buses (e.g. right-turn lane, buses excepted).

4. Segment 4: Oxford Street West from Hyde Park Road to Westdel Bourne:

Transit Signal Priority: operate rapid transit in mixed traffic with smart traffic signals that improve transit travel times with no change to road infrastructure

Cost implications

The resulting range of capital costs for the recommended options are provided in **Exhibit 32**. Segment 1 and 2 estimates have greater certainty, based on the preliminary design completed as part of the Transit Project Assessment Process. Segment 3 and 4 estimates may be refined as the design concept is developed.

Exhibit 32: Range of Capital Cost Estimates for Technically Recommended Segment Options

Segment	Low Estimate	High Estimate
1. Wharncliffe Road from Riverside Drive to Platt's Lane	$29 million	$36 million
2. Oxford Street West from Platt's Lane to Wonderland Road	$27 million	$33 million
3. Oxford Street West from Wonderland Road to Hyde Park Road	$8 million	$12 million
4. Oxford Street West from Hyde Park Road to Westdel Bourne	$500,000	$500,000
Total Estimated Capital Cost	$64.5 million	$81.5 million

IBI GROUP
7th Floor – 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel 416 596 1930 fax 416 596 0644
ibigroup.com

Attachment A - West Leg Evaluation Tables

Indicators	Wharncliffe Road and Oxford Street West from Riverside Drive to Platt's Lane				Notes
	Option 1	Option 2	Option 3	Option 4	Least Preferred to Most Preferred
	EPR Design - Maintain 4 general traffic lanes, buses in mixed traffic, plus WB dedicated lane on Oxford.	Maintain 4-lanes. Maintain 2 lanes for general traffic, convert 2 lanes to dedicated transit lanes (centre-running).	Widen to 6 lanes. Maintain 4 general traffic lanes and add 2 dedicated transit lanes (centre-running).	Operate Express Transit in mixed traffic with Transit Signal Priority.	○◔◑◕●
Benefit to Transit Operations	Buses in mixed traffic would experience delays associated with congestion and right-turning movements.	Centre-running transit is most reliable. Buses not impacted by right-turning movements.	Same as Option 2.	Buses in mixed traffic would experience delays associated with congestion and right-turning movements.	Some local service is to be maintained. Stop at Paul/Blackfriars Street to be maintained (approximately 1500 daily boardings). Stop at Moir to be removed. Local bus frequency of approximately 3 minutes (today). Local service would run in curb lanes for Options 1 and 3.
	◑	●	●	○	
Increase in Ridership	Intersection improvements provide some transit priority, which will help to increase ridership.	Dedicated lanes provide the highest level of transit priority, which will increase ridership.	Dedicated lanes provide the highest level of transit priority, which will increase ridership.	Buses will experience congestion at intersections. Limited increase in ridership expected.	
	◑	●	●	○	
Benefit to Traffic Operations	Maintains existing traffic capacity with dedicated bus lanes at major signalized intersections.	Increased traffic delays with single lane in each direction. Medians restrict left-turns to signalized intersections. New signal to be added at Paul Street.	Maintains existing traffic capacity, plus separates buses from general traffic. Medians restrict left-turns to signalized intersections. New signal to be added at Paul Street.	Maintains existing traffic capacity. Providing priority for transit at intersections may increase delay for east / west traffic at intersections.	
	◑	○	●	◔	
Least Property Impacts	5 total buildings impacts. No widening mid-block.	49 total building impacts. 27 buildings; 4 porches / stairs impacted on Wharncliffe.	70 total building impacts. 48 buildings; 1 porch impacted on Wharncliffe.	No impacts.	Options 2 and 3 assume widening to the east, which impacts the fewest buildings, utilities, and trees. Option 3: 6-lane cross-section on Oxford Street results in 22 building impacts; 20 new, 5 as per EPR design.
	◕	◔	○	●	
Least Cultural Heritage Impacts	2 designated heritage buildings (contributing).	22 designated heritage buildings (21 contributing).	41 designated heritage buildings (38 contributing).	No impacts.	Majority of segment is within the Blackfriars-Petersville Heritage Conservation District. Additional cultural heritage studies required for impacts not assessed in the EPR. Consultation and Permits would be required for direct impacts.
	◕	◔	○	●	
Least Impact on Trees	33 trees impacted (27 Oxford, 4 Wharncliffe, 2 Riverside).	75 trees impacted. (43 on Oxford, 34 on Wharncliffe, 2 Riverside).	90 trees impacted. (43 on Oxford, 45 on Wharncliffe, 2 Riverside).	No impacts.	Options 2 and 3: 6-lanes results in 43 potential tree impacts on Oxford Street. Option 3 has more tree impacts on Wharncliffe.
	◑	○	○	●	
Least Impact on Utilities	Impacts at BRT stop locations and on Oxford and Riverside only.	General utilities impacted, does not impact hydro poles.	General utilities impacted, does not impact hydro poles.	No impacts.	Hydro poles are located on the west side of Wharncliffe Road. Impacts to utilities due to widening to the east.
	◕	◔	◔	●	
Least Impact on Driveways and Access	0 driveway impacts. No access impacts.	Some encroachment into driveways beyond sidewalks. Majority of properties will be able to park one vehicle in driveway. Accesses become right-in / right-out only.	Some encroachment into driveways beyond sidewalks. Majority of properties will be able to park one vehicle in driveway. Accesses become right-in / right-out only.	0 driveway impacts. No access impacts.	If a building is impacted, driveway impacts were not counted.
	●	◕	●	●	
Redevelopment Potential	Does not provide opportunity for redevelopment on Wharncliffe. Potential for density to follow dedicated transit lanes on Oxford.	Limited opportunity for redevelopment on properties with building impacts.	Most opportunity for redevelopment on properties with building impacts.	Does not provide opportunity for redevelopment.	Entire segment is designated Rapid Transit Corridor, but HCD designation limits redevelopment. Removal of buildings provides an opportunity for redevelopment as many parcels can be assembled and lot depths are sufficient. Segment located in floodplain - new development would require CA approval.
	◔	◔	◕	○	
Capital and Operating Costs	$29 to $36 Million	$48 to $55 Million	$59 to $68 Million	$1 Million	
	◕	◑	○	●	
Most Consistent with City's policy objectives	In keeping with the goals and objectives of the Blackfriars-Petersville HCD plan, by conserving heritage resources. Does not fully support the Rapid Transit Corridor designation, as the minimal dedicated transit infrastructure is unlikely to spur the intensification envisioned by the OP.	Supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns. Not in keeping with the goals and objectives of the Blackfriars-Petersville HCD plan, as there are major impacts to cultural heritage resources.	Supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns. Not in keeping with the goals and objectives of the Blackfriars-Petersville HCD plan, as there are major impacts to cultural heritage resources.	In keeping with the goals and objectives of the Blackfriars-Petersville HCD plan, by conserving heritage resources. Not in keeping with the Rapid Transit Corridor designation, as the lack of dedicated transit infrastructure will not spur the intensification envisioned by the OP.	Corridor is designated as a Rapid Transit Corridor. Majority of segment is within the Blackfriars-Petersville HCD. 6.1 - "The designation of the Blackfriars-Petersville Heritage Conservation District does not mean that changes, reinvestment, and redevelopment will not or should not occur. Rather, designation ensures that contributing resources are not demolished without due cause..."
	◕	◑	◑	◔	
Least Environmental Assessment Implications	No implications. Approved design.	Addendum required for widening. CHERs and HIAs required.	Same as Option 2.	No implications. Installation, construction or reconstruction of traffic control device are pre-approved under the Municipal Class Environmental Assessment (<$9.5 m)	
	●	○	○	●	
Recommendation	✓				

	Oxford Street West from Platt's Lane to Wonderland Road				Notes
Indicators	Option 1	Option 2	Option 3	Option 4	Least Preferred to Most Preferred
	EPR Design - Widen to 6 lanes. Maintain 4 general traffic lanes and add 2 dedicated centre transit lanes with median.	Widen to 6 lanes. Maintain 4 general traffic lanes and add 2 dedicated curbside transit lanes with median.	Maintain 4 lanes for general traffic, with intersection improvements (e.g. extended right-turn lanes for queue bypass/queue jump operations).	Operate Express Transit in mixed traffic with Transit Signal Priority.	○◔◑◕●
Benefit to Transit Operations	Centre-running transit is most reliable. Buses not impacted by right-turning movements.	Buses impacted by local service and right-turning movements.	Infrastructure improvements provide priority at intersections. Buses are in mixed traffic and would experience delays associated with congestion and right-turning movements.	Buses in mixed traffic would experience delays associated with congestion and right-turning movements.	Local service would operate in the curb lane in all options.
	●	◕	◑	○	
Increase in Ridership	Dedicated lanes provide the highest level of transit priority, which will increase ridership.	Conflicts with right-turning movements will slightly impact transit priority, which may decrease ridership.	Intersection improvements provide some transit priority, which will help to increase ridership.	Buses will experience congestion at intersections. Limited increase in ridership expected.	
	●	◕	◑	○	
Benefit to Traffic Operations	Maintains existing traffic capacity. Medians restrict left-turns to signalized intersections.	Maintains existing traffic capacity. Medians restrict left-turns to signalized intersections. Curbside transit will have conflicts with right-turning movements. U-turns are more difficult with this cross-section.	Maintains existing traffic capacity with right-turn/bus lanes at major signalized intersections. Left-turns are not restricted to signalized intersections. Queues may form behind midblock left-turning vehicles in the through lane. Providing priority for transit at intersections may increase delay for north / south traffic at intersections.	Maintains existing traffic capacity. Left-turns are not restricted to signalized intersections. Queues may form behind midblock left-turning vehicles in the through lane. Providing priority for transit at intersections may increase delay for east / west traffic at intersections.	
	●	◑	◑	◔	
Least Property Impacts	Requires slivers of property through majority of segment. Slightly more property required at intersections for centre-median stops.	Requires slivers of property through majority of segment.	Potential property impacts for EB QJL at Platt's Lane, WB QJL at Cherryhill, and WB QJL at Wonderland. Less impact than EPR design due to smaller footprint.	No impacts.	All options have no building impacts.
	◑	◑	◕	●	
Least Cultural Heritage Impacts	Minor impacts identified to listed cultural heritage properies: 284 Oxford Street W (Eagle Heights PS), 303 Riverside Drive (Mt Pleasant Cemetery), and 665 Proudfoot Lane (Restmount Cemetery). CHER/HIAs recommended for 303 Riverside Drive and 665 Proudfoot Lane.	Same as Option 1.	Does not require any property from listed parcels within this segment.	Same as Option 3.	Within this segment, the following properties are listed: 284 Oxford Street West, 303 Riverside Drive, 390 Oxford Street West, 665 Proudfoot Lane. Based on City of London Register of Cultural Heritage Resources updated July 2, 2019.
	◕	◕	●	●	
Least Impact on Trees	Approximately 58 street trees impacted, plus trees surrounding Mud Creek.	Same as Option 1.	Approximately 27 trees impacted.	No impacts.	Mud Creek culvert done by others in all options.
	◑	◑	◕	●	
Least Impact on Utilities	Requires relocations on north and south sides.	Same as Option 1.	Impacts poles at Platts, Cherry Hill, Beaverbrook, Proudfoot and Wonderland. Relocations would be required.	No impacts.	
	◔	◔	◑	●	
Least Impact on Driveways and Access	Minor driveway impacts, all retain adequate space to park more than one vehicle. All accesses become right-in / right-out.	Minor driveway impacts, all retain adequate space to park more than one vehicle. No access impacts.	Minor driveway impacts, all retain adequate space to park more than one vehicle. No access impacts.	No driveway or access impacts.	Primarirly commercial drvieways. All residential properties maintain adequate space to park more than one vehicle.
	◑	◕	◕	●	

	Oxford Street West from Platt's Lane to Wonderland Road				Notes
Indicators	Option 1	Option 2	Option 3	Option 4	Least Preferred to Most Preferred
	EPR Design - Widen to 6 lanes. Maintain 4 general traffic lanes and add 2 dedicated centre transit lanes with median.	Widen to 6 lanes. Maintain 4 general traffic lanes and add 2 dedicated curbside transit lanes with median.	Maintain 4 lanes for general traffic, with intersection improvements (e.g. extended right-turn lanes for queue bypass/queue jump operations).	Operate Express Transit in mixed traffic with Transit Signal Priority.	○◔◑◕●
Redevelopment Potential	Dedicated transit infrastructure spurs redevelopment.	Same as Option 1.	Does not provide opportunity or incentives for redevelopment.	Same as Option 3.	The majority of the segment is designated Rapid Transit Corridor or Transit Village, which would encourage redevelopment. Areas designated Green Space would not permit development.
	●	●	○	○	
Capital and Operating Costs	$27 to $33 Million	$30 to $40 Million	$13 to $20 Million	$1 Million	
	◔	○	◕	●	
Most Consistent with City's policy objectives	Supports the goals and objectives of London's OP by providing a range of viable transportation options, encouraging sustainable modes of transportation, spurring more compact, efficient forms of development, including TOD, and discouraging sprawling development patterns.	Same as Option 1.	Intersection improvements will not spur the redevelopment envisioned by the Rapid Transit Corridor designation, which encourages more compact and efficient forms of development.	Techonology improvements will not spur the redevelopment envisioned by the Rapid Transit Corridor designation, which encourages more compact and efficient forms of development.	60.3 "Establish a high-quality rapid transit system in London and strategically use it to create an incentive for development along rapid transit corridors and at transit villages and stations"
	●	●	◔	○	
Least Environmental Assessment Implications	No implications. Approved design.	No implications. No widening outside of EPR design footprint.	Construction of operational improvements at specific locations are pre-approved under the Municipal Class Environmental Assessment.	No implications. Installation, construction or reconstruction of traffic control device are pre-approved under the Municipal Class Environmental Assessment (<$9.5 m)	
	●	●	●	●	
Recommendation	✓				

	Oxford Street West from Wonderland Road to Hyde Park Road				Notes
Indicators	Option 1	Option 2	Option 3	Option 4	Least Preferred to Most Preferred
	Widen to 6-lanes. Maintain 4-lanes for general traffic and add 2 dedicated transit lanes (either curbside or centre-running).	Maintain 4-lanes. Maintain 2 lanes for general traffic, convert 2 lanes to dedicated transit lanes (either curbside or centre-running).	Maintain 4 lanes for general traffic, with intersection improvements (e.g. extended right-turn lanes for queue bypass/queue jump operations).	Operate Express Transit in mixed traffic with Transit Signal Priority.	○◔◑◕●
Benefit to Transit Operations	Most reliable with dedicated lanes. Curbside is less reliable than centre-running.	Same as Option 1.	Infrastructure improvements provide priority at intersections. Buses are in mixed traffic and would experience delays associated with congestion.	Buses in mixed traffic would experience delays associated with congestion and right-turning movements.	3 potential BRT / express stops. In Option 3, transit service would operate as express service, sharing the curb lane with local service, but servicing fewer stops.
	●	●	◑	○	
Increase in Ridership	Dedicated lanes provide the highest level of transit priority, which will increase ridership.	Dedicated lanes provide the highest level of transit priority, which will increase ridership.	Intersection improvements provide some transit priority, which will help to increase ridership.	Buses will experience congestion at intersections. Limited increase in ridership expected.	
	●	●	◑	○	
Benefit to Traffic Operations	Maintains existing traffic capacity. Medians would restrict left-turns to signalized intersections.	Reduces traffic capacity. If medians are implemented, left-turns would be restricted to signalized intersections.	Left-turns are not restricted to signalized intersections. Queues may form behind left-turning vehicles in the through lane. Providing priority for transit at intersections may increase delay for north / south traffic at intersections.	Maintains existing traffic capacity. Left-turns are not restricted to signalized intersections. Queues may form behind left-turning vehicles in the through lane.	5 signalized intersections within segment.
	●	○	◑	◔	
Least Property Impacts	Most mid-block property impacts on the south side. Property impacts on both sides at intersections. Impacts to noise walls on the north side near signalized intersections (noise wall on north side only).	No mid-block property impacts. Less property impacts at intersections than Option 1.	Potential property impacts for EB QJL at Juniper Street. Taper would be shortened for EB QJL at Capulet Lane to avoid impacting CN property.	No impacts.	No building impacts.
	◔	◑	◕	●	
Least Cultural Heritage Impacts	No impacts to listed property at 1057 Oxford St West.				Based on City of London Register of Cultural Heritage Resources updated July 2, 2019.
	Non-discriminatory.				
Least Impact on Trees	Approximately 285 trees impacted.	Approximately 150 trees impacted.	Approximately 10 trees impacted.	No impacts.	
	○	◑	◕	●	
Least Impact on Utilities	Impacts all poles. Relocations would be required.	Impacts majority of north and south poles. Relocations would be required.	Impacts poles at Capulet, Juniper and Hyde Park. Relocations would be required.	No impacts.	From Guildwood Gate to Laurel Street - hydro on north and south with mainline north and distribution lines south. Laurel Street to Rail Bridge - hydro on north side only. Rail Bridge to Wonderland Road - hydro on both side.
	○	◔	◕	●	

	Oxford Street West from Wonderland Road to Hyde Park Road				Notes
Indicators	Option 1	Option 2	Option 3	Option 4	Least Preferred to Most Preferred
	Widen to 6-lanes. Maintain 4-lanes for general traffic and add 2 dedicated transit lanes (either curbside or centre-running).	Maintain 4-lanes. Maintain 2 lanes for general traffic, convert 2 lanes to dedicated transit lanes (either curbside or centre-running).	Maintain 4 lanes for general traffic, with intersection improvements (e.g. extended right-turn lanes for queue bypass/queue jump operations).	Operate Express Transit in mixed traffic with Transit Signal Priority.	○◔◑◕●
Least Impact on Driveways and Access	Some encroachment into driveways beyond sidewalk. All driveways to retain adequate space to park more than one vehicle. Access dependent on centre-running or curbside transit operations.	Minor driveway impacts - no encroachment beyond sidewalk. Access dependent on centre-running or curbside transit operations.	Minor driveway impacts - no encroachment beyond sidewalk. No access impacts.	No driveway or access impacts.	All residential properties maintain adequate space to park more than one vehicle.
	◑	◕	●	●	
Redevelopment Potential	No redevelopment potential.				Segment is mostly designated Neighbourhoods, with small portions designated Shopping Area, Green Space, and Transit Village.
	Non-discriminatory.				
Capital and Operating Costs	$23 to $33 Million	$20 to $27 Million	$8 to $12 Million	Signal cost included in TIMMS.	
	○	◔	◕	●	
Most Consistent with City's policy objectives	Majority of segment is designated as Neighbourhoods, which is a Place Type not intended to support high-density development. Infrastructure investment may be better suited to intensification areas. Option supports OP goal to provide well-connected neighbourhoods and convenient, attractive alternatives for mobility.	Same as Option 1.	Option minimizes impacts to stable residential neighbourhoods. Option partially supports OP goal to provide well-connected neighbourhoods and convenient, attractive alternatives for mobility. Infrastructure investment considered most suitable given surrounding densities.	Option minimizes impacts to stable residential neighbourhoods. Option partially supports OP goal to provide well-connected neighbourhoods and convenient, attractive alternatives for mobility. Infrastructure investment considered suitable given surrounding densities.	Segment is partially designated Transit Village. Segment 2 (Platt's to Wonderland) would support the Transit Village area at the intersection of Wonderland and Oxford. Existing AT facilities - no proposed facilities through London ON Bikes.
	◔	◔	◕	◑	
Least Environmental Assessment Implications	Extension of study area requires an addendum to the EPR. Traffic, natural environment, stormwater, structural, archaeology, cultural heritage and utilities are example of studies that would be required to evaluate the impacts of the widening.	Same as Option 1.	Construction of operational improvements at specific locations are pre-approved under the Municipal Class Environmental Assessment.	No implications. Installation, construction or reconstruction of traffic control device are pre-approved under the Municipal Class Environmental Assessment (<$9.5 m)	
	○	○	●	●	
Recommendation			✓		

	Oxford Street West from Hyde Park Road to Westdel Bourne				Notes
Indicators	Option 1	Option 2	Option 3	Option 4	Least Preferred to Most Preferred
	From Hyde Park to Sanatorium: Widen to 6-lanes. Maintain 4-lanes for general traffic and add 2 dedicated transit lanes (either curbside or centre-running). From Sanatorium to Westdel: Maintain 2-lanes and operate buses in mixed traffic.	From Hyde Park to Sanatorium: Maintain 4-lanes. Maintain 2 lanes for general traffic, convert 2 lanes to dedicated transit lanes (either curbside or centre-running). From Sanatorium to Westdel: Maintain 2-lanes and operate buses in mixed traffic.	Maintain 4 lanes for general traffic, with intersection improvements (e.g. extended right-turn lanes for queue bypass/queue jump operations).	Operate Express Transit in mixed traffic with Transit Signal Priority.	○◔◑◕●
Benefit to Transit Operations	Most reliable with dedicated lanes. Curbside is less reliable than centre-running.	Same as Option 1.	Infrastructure improvements provide priority at intersections. Buses are in mixed traffic and would experience delays associated with congestion.	Buses in mixed traffic would experience delays associated with congestion and right-turning movements.	4 potential BRT / express stops. In Option 3, transit service would operate as express service, sharing the curb lane with local service, but servicing fewer stops.
	●	●	◑	○	
Increase in Ridership	Dedicated lanes provide the highest level of transit priority, which will increase ridership.	Dedicated lanes provide the highest level of transit priority, which will increase ridership.	Intersection improvements provide some transit priority, which will help to increase ridership.	Buses will experience congestion at intersections. Limited increase in ridership expected.	
	●	●	◑	○	
Benefit to Traffic Operations	Maintains existing traffic capacity. Medians would restrict left-turns to signalized intersections.	Reduces traffic capacity. If medians are implemented, left-turns would be restricted to signalized intersections.	Left-turns are not restricted to signalized intersections. Queues may form behind left-turning vehicles in the through lane. Providing priority for transit at intersections may increase delay for north / south traffic at intersections.	Maintains existing traffic capacity. Left-turns are not restricted to signalized intersections. Queues may form behind left-turning vehicles in the through lane.	
	●	○	◑	◔	
Least Property Impacts	Potential building (and pool) impact at 711 Old Hunt Road. Property required mid-block and at intersections. North and south noise walls impacted in most locations.	No building impacts. No mid-block property impacts, minor impacts near signalized intersections. Impacts to noise wall at intersections, mostly south.	Potential property impacts at EB QJL for commercial access west of Hyde Park.	No impacts.	
	○	◑	◕	●	
Least Cultural Heritage Impacts	No impact to listed property at 1875 Oxford Street West (Kilbourne Cemetery).				Based on City of London Register of Cultural Heritage Resources updated July 2, 2019.
	Non-discriminatory.				
Least Impact on Trees	Approximately 130 trees impacted.	Approximately 75 tree impacted	Approximately 4 trees impacted.	No impacts.	
	○	◑	◕	●	
Least Impact on Utilities	Impacts all poles. Relocations would be required.	Impacts majority of north and south poles. Relocations would be required.	Impacts poles at Sanatorium. Relocations would be required.	No impacts.	Hydro on south side only.
	○	◔	◕	●	
Least Impact on Driveways and Access	Some encroachment into driveways beyond sidewalk. All driveways to retain adequate space to park more than one vehicle. Access dependent on centre-running or curbside transit operations.	Minor driveway impacts - no encroachment beyond sidewalk. Access dependent on centre-running or curbside transit operations.	Minor driveway impacts - no encroachment beyond sidewalk. No access impacts.	No driveway or access impacts.	All residential properties maintain adequate space to park more than one vehicle.
	◑	◕	●	●	

	Oxford Street West from Hyde Park Road to Westdel Bourne				Notes
Indicators	Option 1	Option 2	Option 3	Option 4	Least Preferred to Most Preferred
	From Hyde Park to Sanatorium: Widen to 6-lanes. Maintain 4-lanes for general traffic and add 2 dedicated transit lanes (either curbside or centre-running). From Sanatorium to Westdel: Maintain 2-lanes and operate buses in mixed traffic.	From Hyde Park to Sanatorium: Maintain 4-lanes. Maintain 2 lanes for general traffic, convert 2 lanes to dedicated transit lanes (either curbside or centre-running). From Sanatorium to Westdel: Maintain 2-lanes and operate buses in mixed traffic.	Maintain 4 lanes for general traffic, with intersection improvements (e.g. extended right-turn lanes for queue bypass/queue jump operations).	Operate Express Transit in mixed traffic with Transit Signal Priority.	○ ◔ ◑ ◕ ●
Redevelopment Potential	No redevelopment potential.				Land uses abutting the corridor are mainly Neighbourhoods and Green Space. The lands designated 'Neighbourhood' are mainly stable, low-density neighbourhoods. The majority of the land designated Green Space is outside of the Urban Growth Boundary. The nodes at Hyde Park and Westdel Bourne are designated Shopping Areas.
	Non-discriminatory.				
Capital and Operating Costs	$17 to $25 Million	$15 to $21 Million	$13 to $20 Million	$500,000. 3 of 5 intersection costs included in TIMMS to Sanatorium.	
	○	◑	◕	●	
Most Consistent with City's policy objectives	AT facilities would be implemented, which is consistent with London on Bikes. Majority of segment is designated as Neighbourhoods or Green Space, with a portion outside the Urban Growth Boundary. Place Type not intended to support high-density development. Infrastructure investment may be better suited to intensification areas.	Same as Option 1.	AT facilities would not be implemented through this option. Option minimizes impacts to stable residential neighbourhoods. Infrastructure investment considered suitable given surrounding densities.	AT facilities would not be implemented through this option. Option minimizes impacts to stable residential neighbourhoods. Infrastructure investment considered most suitable given surrounding densities.	Oxford Street West is planned to be widened from two lanes to four lanes. Commissioners to Westdel Bourne - 2025, Sanatorium to Commissioners - 2031.
	◔	◔	◑	◕	
Least Environmental Assessment Implications	Extension of study area requires an addendum to the EPR. Traffic, natural environment, stormwater, archaeology, cultural heritage and utilities are example of studies that would be required to evaluate the impacts of the widening.	Same as Option 1.	Construction of operational improvements at specific locations are pre-approved under the Municipal Class Environmental Assessment.	No implications. Installation, construction or reconstruction of traffic control device are pre-approved under the Municipal Class Environmental Assessment (<$9.5 m)	
	○	○	●	●	
Recommendation				✓	