



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 Wharnclyffe 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)

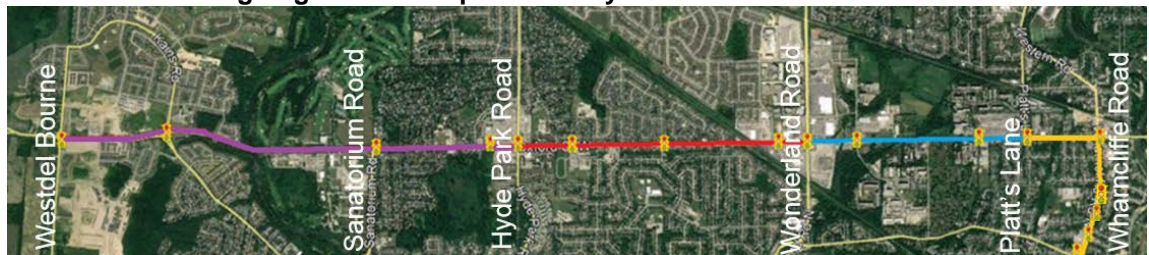
	North	East	South	West
Peak Rapid Transit Ridership in the Peak Direction during the Peak Hour	1450	1350	650	600
Rapid Transit Peak Hour Capacity	840 to 1320	840 to 1320	420 to 660	420 to 660

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

Options Development

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

- 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 Wharnccliffe 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:

- 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.
- 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)

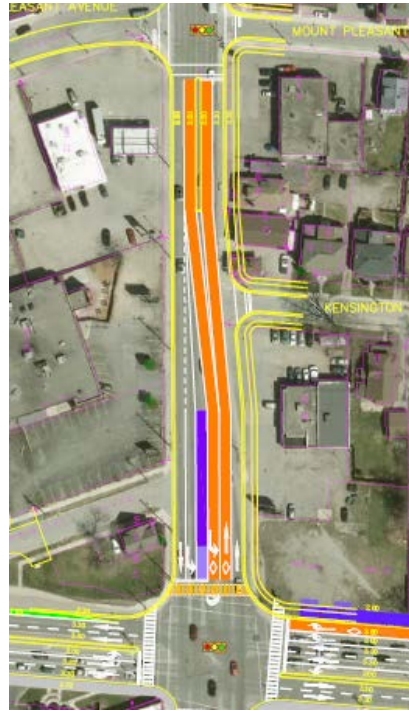


Exhibit 7: Widen to Add 2 Dedicated Transit Lanes (6-lanes) (Option 3)

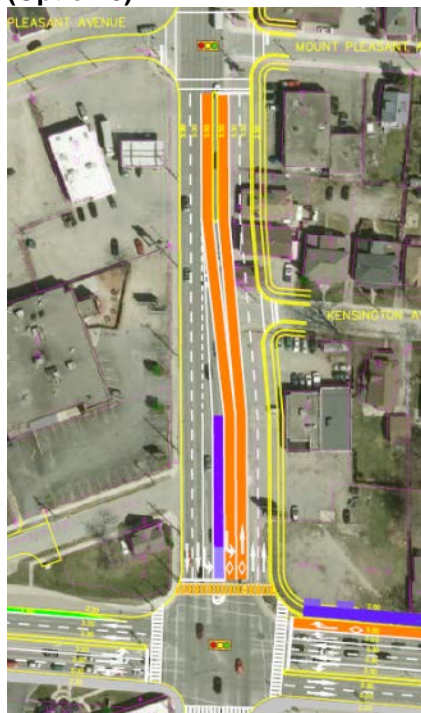


Exhibit 8: Transit Signal Priority (Option 4)



Legend:

- PLATFORM/RAMP
- RAWDAY
- TRAFFIC LANES
- BIKE LANE/MULTI-USE PATH
- PARKING LINE
- CURB SIDEWALK
- CROSS WALK
- POTENTIAL ISLAND LANDSCAPING
- POTENTIAL REQUIREMENT (EXCLUDING UTILITIES)
- POTENTIAL REQUIREMENT (TOP OF SLOPE)
- EX RIGHT OF WAY
- POTENTIAL NOISE MITIGATION MEASURE
- RETAINING WALL > 1.2 m
- RETAINING WALL < 1.2 m
- EX TREES
- EX HYBRID POLE

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.

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 9: Blackfriars-Petersville Heritage Conservation District



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/Heritage-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.

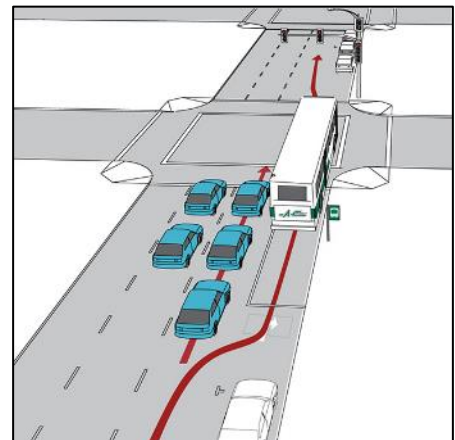
Option 1 is also sensitive to the existing floodplain limits in the area, with a minimal increase to impermeable surface area. Finally, Option 1 was recommended as part of the EPR, and there are no Environmental Assessment implications and the segment could proceed to detail design.

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:

PLATFORM/RAMP	BIKE LANE/ MULTI-USE PATH	POTENTIAL ISLAND LANDSCAPING	EX RIGHT OF WAY	RETAINING WALL LESS THAN 1.2 m
RAPIDWAY	PARKING LANE	POTENTIAL PROPERTY REQUIREMENT (EXCLUDING UTILITIES)	POTENTIAL NOISE MITIGATION MEASURE	EX TREES
TRAFFIC LANES	CURB, SIDEWALK	TOE OF SLOPE REQUIREMENT	RETAINING WALL GREATER THAN 1.2 m	EX HYDRO POLE
	CROSS WALK			

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

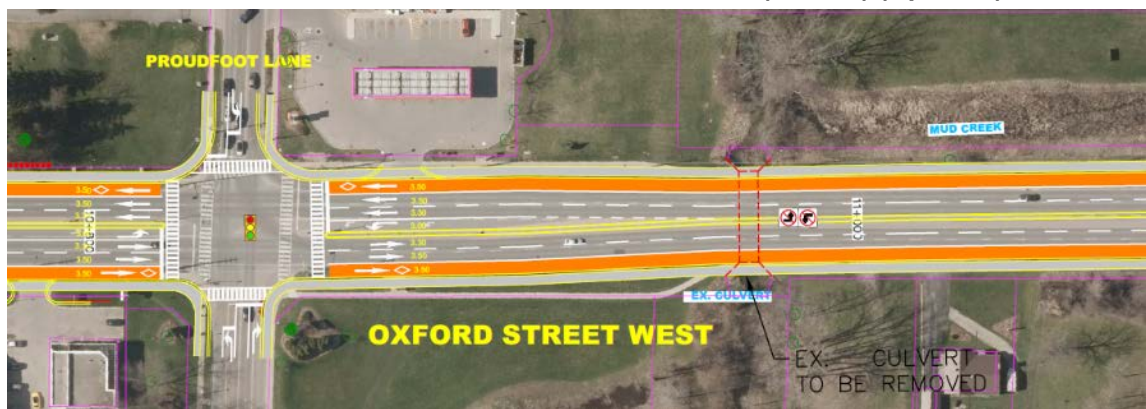


Exhibit 16: Intersection Improvements (Option 3)



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

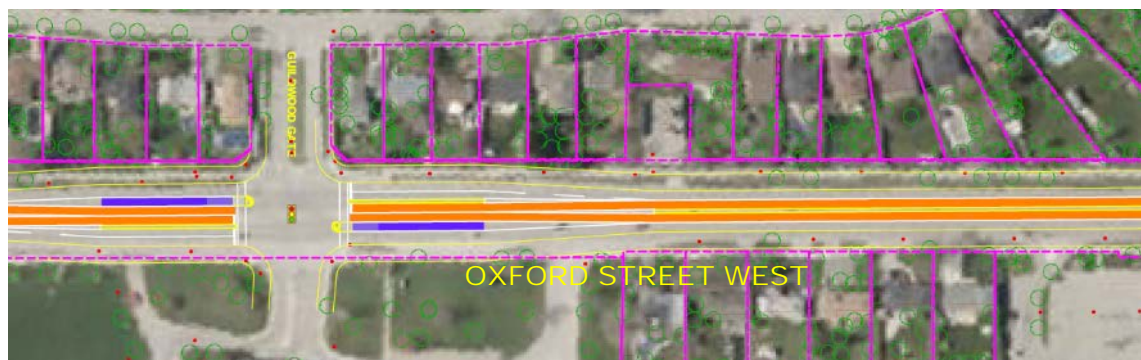
Four options were short-listed for Segment 3. This segment is beyond the study area of the Transit Project Assessment Process.

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

PLATFORM/RAMP	BIKE LANE/ MULTI-USE PATH	POTENTIAL ISLAND LANDSCAPING	EX RIGHT OF WAY	RETAINING WALL LESS THAN 1.2 m
RAFDWAY	PARKING LANE	POTENTIAL PROPERTY REQUIREMENT (EXCLUDING UTILITIES)	POTENTIAL NOISE MITIGATION MEASURE	EX TREES
TRAFFIC LANES	CURB, SIDEWALK	USE OF SLOPE REQUIREMENT	RETAINING WALL GREATER THAN 1.2 m	EX HYDRANT POLE
	CROSS WALK			

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 Guidelines³ 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

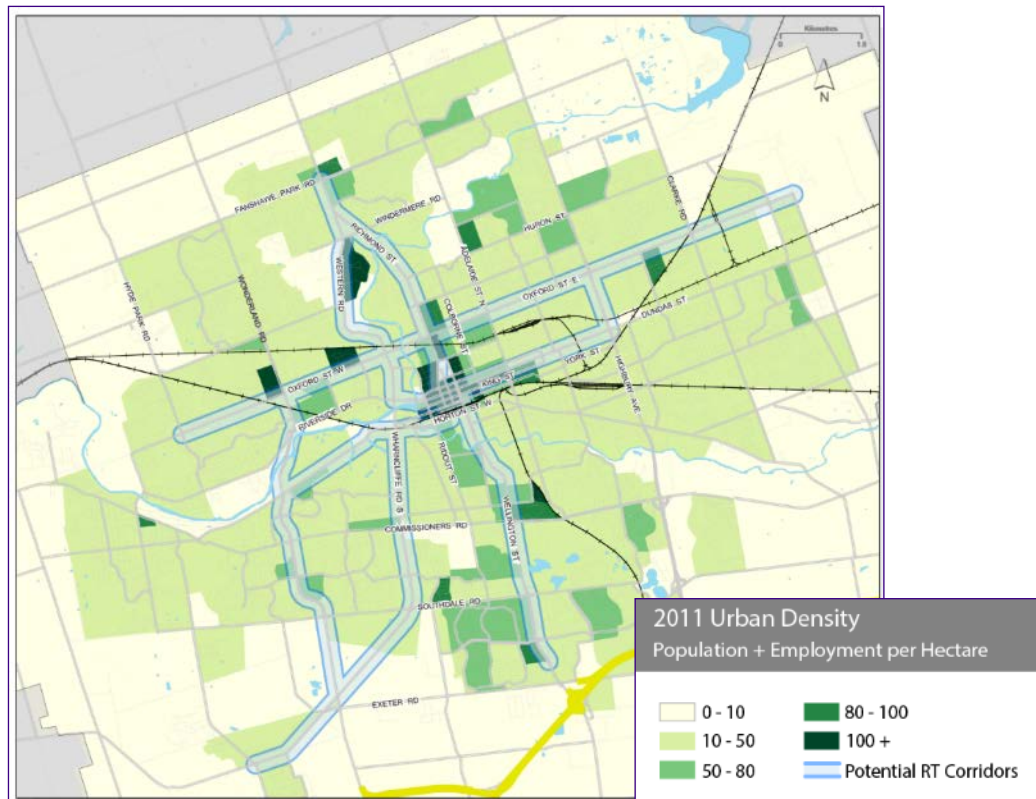
³ MTO's Transit Supportive Guidelines (2012) <http://www.mto.gov.on.ca/english/transit/supportive-guideline/index.shtml>

- 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:

PLATFORM/RAMP		BIKE LANE/ MULTI-USE PATH		POTENTIAL ISLAND LANDSCAPING		EX RIGHT OF WAY		RETAINING WALL LESS THAN 1.2 m	
RAPIDWAY		PARKING LANE		POTENTIAL PROPERTY REQUIREMENT (EXCLUDING UTILITIES)		POTENTIAL NOISE MITIGATION MEASURE		EX TREES	
TRAFFIC LANES		CROSS WALK		TOE OF SLOPE REQUIREMENT		RETAINING WALL GREATER THAN 1.2 m		EX HYDRO POLE	

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

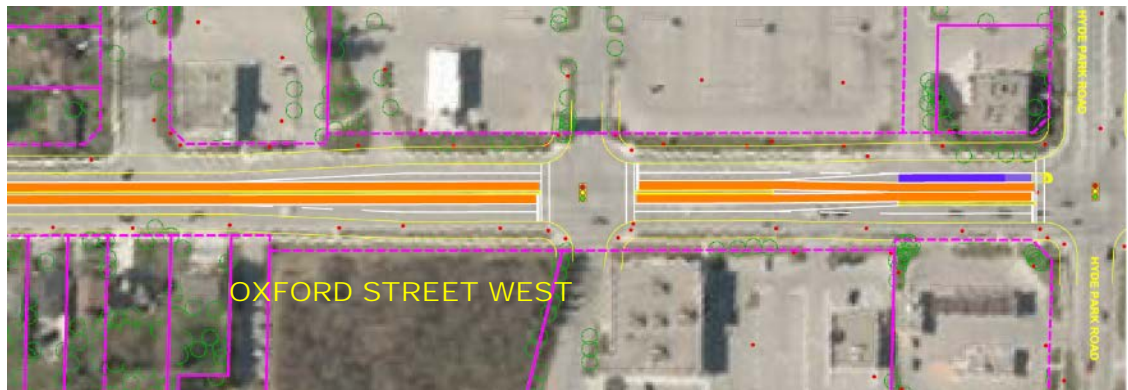


Exhibit 28: Intersection Improvements (Option 3)



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 Guidelines³ 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. Wharnccliffe 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	Wharnclyffe 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 Wharnclyffe.	70 total building impacts. 48 buildings; 1 porch impacted on Wharnclyffe.	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 Wharnclyffe, 2 Riverside).	75 trees impacted. (43 on Oxford, 34 on Wharnclyffe, 2 Riverside).	90 trees impacted. (43 on Oxford, 45 on Wharnclyffe, 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 Wharnclyffe.
	●	○	○	●	
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 Wharnclyffe 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 Wharnclyffe. 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 properties: 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.	Primarily commercial driveways. 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). Non-discriminatory.				Based on City of London Register of Cultural Heritage Resources updated July 2, 2019.
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				✓	