

Report to Civic Works Committee

To: Chair and Members
Civic Works Committee

From: Kelly Scherr, P.Eng., MBA, FEC, Deputy City Manager,
Environment & Infrastructure

Subject: Bradley Avenue Extension, White Oak Road to Jalna
Boulevard (West Leg)
Municipal Class Environmental Assessment Addendum

Date: September 13, 2022

Recommendation

That on the recommendation of the Deputy City Manager, Environment & Infrastructure, the following actions **BE TAKEN** with respect to the Bradley Avenue Extension (White Oak Road to Jalna Boulevard (West Leg)) - Municipal Class Environmental Assessment Addendum and Notice of Addendum:

- a) The Municipal Class Environmental Assessment Addendum: Bradley Avenue Extension Executive Summary attached as Appendix A, **BE ACCEPTED**;
- b) A Notice of Addendum **BE FILED** with the Municipal Clerk;
- c) The Municipal Class Environmental Assessment Addendum **BE PLACED** on public record for a 30-day review period.

Linkage to the Corporate Strategic Plan

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

The City of London is responsible for a transportation system that promotes the movement of goods and services to strengthen our economic growth and provides for sustainable transportation mobility choices for residents that improves quality of life.

Analysis

1.0 Background Information

1.1 Previous Reports Related to this Matter

- Environment and Transportation Committee – August 2005 – Bradley Avenue Extension, White Oak Road to Bostwick Road – Environmental Study Report
- Civic Works Committee – June 19, 2012 – London 2030 Transportation Master Plan
- Strategic Priorities and Policy Committee – June 23, 2014 – Approval of 2014 Development Charges By-Law and Development Charges Background Study
- Civic Works Committee – December 1, 2015 – Bradley Avenue Extension – Wharncliffe Road South to Wonderland Road South Appointment of Consulting Engineer
- Civic Works Committee – April 24, 2017 – Contract Award: Tender No. 17-57 – 2017 Bradley Avenue West Extension

- Civic Works Committee – June 19, 2018 – Bradley Avenue Extension – Phase 2 Wharncliffe Road South to Jalna Boulevard Detailed Design Appointment of Consulting Engineer
- Strategic Priorities and Policy Committee – October 20, 2020 – 2021 Development Charges Update Covering Report and Proposed By-law

1.2 Purpose

This report provides an overview of the Municipal Class Environmental Assessment (EA) Addendum for the Bradley Avenue extension, between White Oak Road and Jalna Boulevard (west leg) and seeks approval to finalize the study and post it for the 30-day public review period. This addendum is required to extend the EA limits to match the planned 2023 construction project as identified in the Development Charges Background Study and Growth Management Implementation Strategy.

The EA Addendum recommends the preferred alternative for Bradley Avenue, between White Oak Road and Jalna Boulevard (west leg), to be constructed to a four-lane cross section, with cycling facilities, localized turning lanes, and urbanized with curbs, sidewalks, illumination, and landscape features.

1.3 Context

In 2005, the City completed a Municipal Class EA to determine the preferred alignment to extend Bradley Avenue between Bostwick Road and White Oak Road. This new Urban Thoroughfare/Civic Boulevard connection has long been envisioned in the City's Official Plan and surrounding developments have been coordinated with the connection. The preferred alternative in the 2005 EA recommended that the Bradley Avenue extension, between Wharncliffe Road South and White Oak Road, be constructed to a four-lane cross-section, with bicycle facilities, localized turning lanes and urbanized with curbs, sidewalks, and illumination. A Part II Order pertaining to a localized landowner issue was received associated with the 2005 Municipal Class EA and was subsequently resolved in 2007. The section between Wonderland Road and Wharncliffe Road was constructed in 2017. The next phase planned for implementation is between Wharncliffe Road and White Oak Road and can be seen below in Figure 1, labelled as "Bradley Ave (Future)". The project, which includes continuity improvements on the east limit is currently in the detailed design stage.

In order to manage continued growth in the City's southwest and to provide corridor lane continuity between the future four lane configuration on Bradley Avenue, west of White Oak Road, and the existing four lane configuration east of Jalna Boulevard (west leg), the current Transportation Master Plan identified the need for a four lane configuration for the short section in between, on Bradley Avenue from White Oak Road to Jalna Boulevard (west leg). This section on the east side of White Oak Road was identified as part of the next phase of the Bradley Avenue projects in the Transportation Development Charges Background Study and Growth Management Implementation Strategy. This section can be seen below in Figure 1, labelled as "Study Area", and is the subject of this EA Addendum.

The Bradley Avenue Environmental Study Report (ESR) did not include the section of Bradley Avenue from White Oak Road easterly to Jalna Boulevard (west leg). However, through consultation with the Ministry of Environment, Conservation, and Parks (MECP), it was determined that there was no need to revisit the previous EA study area and instead the City could proceed with preparing an EA Addendum for the study area between White Oak Road and Jalna Boulevard.

The City of London has undertaken this EA Addendum study for improvements to Bradley Avenue from White Oak Road to Jalna Boulevard (west leg). This report provides an overview of the EA Addendum and seeks approval to finalize the study and proceed with public review.



Figure 1 – Study area of the EA Addendum for Bradley Avenue, between White Oak Road and Jalna Boulevard (west leg)

2.0 Discussion and Considerations

2.1 Preferred Alternative

During the EA Addendum process, alternative design concepts were developed and evaluated using evaluation criteria that was developed to address a range of environmental issues and potential avoidance or mitigation of negative effects and also reflect the concerns of the City and various stakeholders. The following cross section alternatives were considered for the improvements Bradley Avenue from White Oak Road to Jalna Boulevard (west leg):

Alternative 1: Widen Bradley Avenue along the centreline (both north and south);

Alternative 2: Widen Bradley Avenue along the north side;

Alternative 3: Widen Bradley Avenue along the south side;

Based on the results of the evaluation process, Alternative 1: Widen Bradley Avenue symmetrically along the centerline (both north and south) was chosen as the Preferred Alternative. This option facilitates construction of the roadway cross section including continuous four lanes of traffic and active transportation facilities that can be built within the existing right-of-way on both sides of the roadway. This means there are no additional property acquisitions anticipated with this alternative. The recommendations also include urbanizing the corridor with curbs, sidewalks, illumination, and landscape features. Making the corridor improvements continuous will avoid a future bottleneck and discontinuity of complete streets amenities.

The Preferred Alternative was selected based on safety, geometric considerations (ability to maintain the existing centreline) and the lowest cost alternative. The construction timing will need to be coordinated with the adjacent Bradley Avenue extension from Wharncliffe Road South to White Oak Road scheduled in 2023 and will

be determined based upon securing necessary approvals, completion of design, utility relocations and funding.

A Notice of Commencement and Public Information Centre (PIC) was issued in November 2020. The City held an online PIC on November 19, 2020. This was held online due to the COVID-19 pandemic, which required all non-essential activities to be held remotely. The PIC was advertised via the City of London project webpage, publication of the notice in The Londoner newspaper, and both mailing and emailing the notice to the project mailing List (property owners, residents, agencies, and businesses).

A slide deck, explaining the study was posted on the project website. In total, 20 responses were received, two of which were received directly via email and one via phone call. The remaining 17 responses were received via Microsoft Forms link on the project website. 15 responses were prepared and sent. The five remaining comments did not provide contact information for a response.

At the time of the Notice of Commencement and PIC, City of London Advisory Committees were not holding regular meetings due to the COVID-19 pandemic. The Advisory Committees will be notified of the upcoming study completion and invited to review the EA Addendum during the upcoming public review period.

Eight Indigenous communities were notified of the study commencement and PIC via individualized emails and phone calls and were provided with opportunities to provide input and identify any issues or concerns; Aamjiwnaang First Nation, Bkejwanong Territory (Walpole Island), Caldwell First Nation, Kettle and Stony Point First Nation, Chippewas of the Thames First Nation, Munsee-Delaware Nation, Delaware Nation at Moraviantown and Oneida Nation of the Thames. Chippewas of the Thames First Nation noted minimal concerns with the project, however requested to be involved in any further archaeological assessment required during detailed design and construction. The Notice of Addendum will also be sent to all Indigenous communities.

2.2 Construction Traffic and Access

It is anticipated that pedestrian, bicycle, transit and vehicular traffic will be able to be maintained during most construction activities for the recommended improvements. Localized closures may be required for short term activities. There will be a periodic increase in local traffic due to delivery of materials and equipment to this site as well as construction staff vehicles during the construction phase of the project. Construction signage will be posted in the neighbourhood to inform motorists and pedestrians of the potential for construction related traffic impacts. Access will be maintained as much as possible.

2.3 Climate Change Considerations

The climate change impacts to this project are considered minimal as the improvements are occurring within an existing corridor. Removal of any naturalized vegetation within the corridor can result in a reduction of carbon sequestration capacity which has been taken into consideration for this study. Climate change mitigation has also been considered in the preliminary scoping of stormwater management features. Improvements to active transportation facilities produce positive benefits to air quality and climate change effects by reducing automobile reliance. As such, improving active transportation facilities such as paved bicycle facilities and sidewalks has been considered and incorporated into the design alternatives for this study. New cycle tracks will connect with cycling facilities planned for near-term implementation on Bradley

Avenue beyond both ends of the EA study limits.

This project has been reviewed with the Transportation Planning and Design Climate Lens Process's Climate Emergency Screening Tool and the preferred alternative is expected to provide a sustainable approach to inclusion of complete street elements that will promote active transportation and transit use while reducing congestion and improving safety. The new infrastructure will also be designed to provide improved resiliency over the existing conditions. Creating contiguous complete streets amenities maximizes the use of an existing and developing corridor.

2.4 Next Steps

The following steps will be taken to finalize the Bradley Avenue Extension (White Oak Road to Jalna Boulevard (West Leg)) - Municipal Class Environmental Assessment Addendum

1. Upon acceptance by Council, the project team will commence the 30-day review period:

A "Notice of Addendum" will then be issued to all interested parties, property owners, residents, agencies, and businesses. A Notice of Addendum will be published identifying that the study report is available for public review for the mandatory 30 calendar days. A Notice of Addendum will be advertised in the local newspaper, The Londoner, in accordance with the requirements of the Municipal Class EA process. During the upcoming public review period, the EA Addendum study report will be made available on the City of London website, at City Hall, and at the Library (Jalna Branch).

During the upcoming public review period, if a member of the public or agency chooses, they may make a request to the MECF to review the status of the project under Section 16 of the amended *EA Act*. These requests will be considered only based on impacts to Indigenous and Treaty Rights.

2. Detailed design and construction of the Preferred Alternative:

Subject to comments received and the receipt of necessary approvals, the City intends to proceed with detailed design and advance works such as utility relocations. Permits and approvals for the proposed works will be obtained at the detailed design stage from the appropriate regulatory authorities.

3.0 Financial Considerations

A preliminary construction cost estimate for the preferred alternative identified in the EA Addendum (Bradley Avenue, White Oak Road to Jalna Boulevard (west leg)) has been prepared. The total preliminary construction estimate for the EA Addendum preferred alternative is \$4,950,000. The EA Addendum cost estimate is based on the current costs of similar projects and reflects recent extraordinary inflationary increases in construction material prices, and labour market conditions. The cost estimate also includes necessary stormwater improvement within the White Oaks Drain corridor.

This EA Addendum section of Bradley Avenue, between White Oak Road and Jalna Boulevard (west leg), is a component of the capital account for the overall Bradley Avenue extension project, that extends from Wharncliffe Road to Jalna Boulevard (west leg). The capital account for the overall Bradley Avenue extension project has an approved budget of \$11,924,000. The Bradley Avenue extension project, between Wharncliffe Road and Jalna Boulevard (west leg) is anticipated for construction in 2023,

as identified in the Development Charges Background Study. The capital account for the Bradley Avenue extension project would require additional funds of approximately \$8,100,000 to support higher cost of construction, property acquisition, and consulting fees. The above cost estimate will inform a business case to amend the Bradley Avenue extension project account during the 2023 budget update process.

Conclusion

This report provides an overview of the Municipal Class Environmental Assessment (EA) Addendum for the Bradley Avenue extension, between White Oak Road and Jalna Boulevard (west leg), and seeks approval to finalize the study and post it for the 30-day public review period. The EA Addendum recommends the preferred alternative for Bradley Avenue, between White Oak Road to Jalna Boulevard (west leg), to be constructed to a four-lane cross section, with cycling facilities, localized turning lanes, and urbanized with curbs, sidewalks, illumination, and landscape features. It is an important connection to serve residential, commercial, and industrial transportation needs in London.

The Preferred Alternative was selected based on safety, geometric considerations (ability to maintain the existing centreline), and the lowest cost alternative. The construction timing will need to be coordinated with the adjacent Bradley Avenue extension from Wharnccliffe Road South to White Oak Road scheduled in 2023 and will be determined based upon securing necessary approvals, completion of design, utility relocations and funding.

No private properties will be required for the improvements to Bradley Avenue within the EA Addendum study area. All works will be contained within the road right-of-way.

Consultation was a key component of this study. The EA Addendum was prepared with input from Indigenous communities, public, advisory committees, agencies, utilities, and property owners in proximity to the study.

Pending Council approval and agency consultation, a Notice of Addendum will be issued, and the EA Addendum study report will be placed on public record for a 30-day review period. Stakeholders and the public are encouraged to provide input and comments regarding the study during this time. Requests for a higher level of study or conditions may be submitted by the public to the MECP based on impacts to constitutionally protected Aboriginal and treaty rights.

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Submitted by: Doug MacRae, P. Eng., MPA, Director, Transportation & Mobility

Recommended by: Kelly Scherr, P. Eng., MBA, FEC, Deputy City Manager, Environment & Infrastructure

Attach: Appendix A: Municipal Class Environmental Assessment Addendum: Bradley Avenue Extension

c: Michelle Morris, City of London
Jiten Patel, City of London
Felix Wong, Wood Canada Inc.



Executive Summary

Study Introduction

The City of London (hereinafter referred to as “the City”) has initiated an addendum to a Municipal Class Environmental Assessment (Class EA) for Bradley Avenue between White Oak Road and Jalna Boulevard (west leg). Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood), was retained by the City to complete the Study.

The current Mobility Transportation Master Plan for London - 2030 Transportation Master Plan: SmartMoves (2030 TMP), identified the need for extension of Bradley Avenue, from Bostwick Road east to White Oak Road and widening of Bradley Avenue from White Oak Road to Jalna Boulevard (west leg), to manage continued growth in the City’s southwest. This was also identified in order to reprioritize growth management implementation strategy for transportation projects. Transportation Development Charges Background Study recommended to construct the subject segment of Bradley Avenue. This satisfied Phase 1 and 2 of the Municipal Class Environmental Assessment Process.

In 2005, the City completed a Municipal Class EA to determine the preferred alignment to extend Bradley Avenue between White Oak Road and Bostwick Road. The preferred alternative recommended that this phase of Bradley Avenue Extension, between Wharncliffe Road South and White Oak Road, be constructed to a four (4) lane cross-section, with bicycle facility, localized turning lanes and urbanized with curbs, sidewalks, illumination and noise attenuation where warranted. A Part II Order pertaining to a localized landowner issue was received associated with the 2005 Municipal Class EA and was subsequently resolved in 2007. The section between Wonderland Road and Wharncliffe Road was constructed in 2017. The next phase planned for implementation is between Wharncliffe Road South and White Oak Road and can be seen below in Figure A, labelled as “Bradley Ave (Future)”. The project, which includes continuity improvements on the east limit is currently in the detailed design stage.

The Bradley Avenue Extension Class EA Environmental Study Report (ESR) did not include the widening of Bradley Avenue from White Oak Road easterly to Jalna Boulevard (west leg), i.e., the study area (Figure A). However, through consultation with MECP, it was determined that there was no need to revisit the previous Class EA ESR study area and prepare an addendum for the entire study area, since the construction for a portion of the project (Bradley Avenue extension west of Wharncliffe Road) started before the 10-year mark.



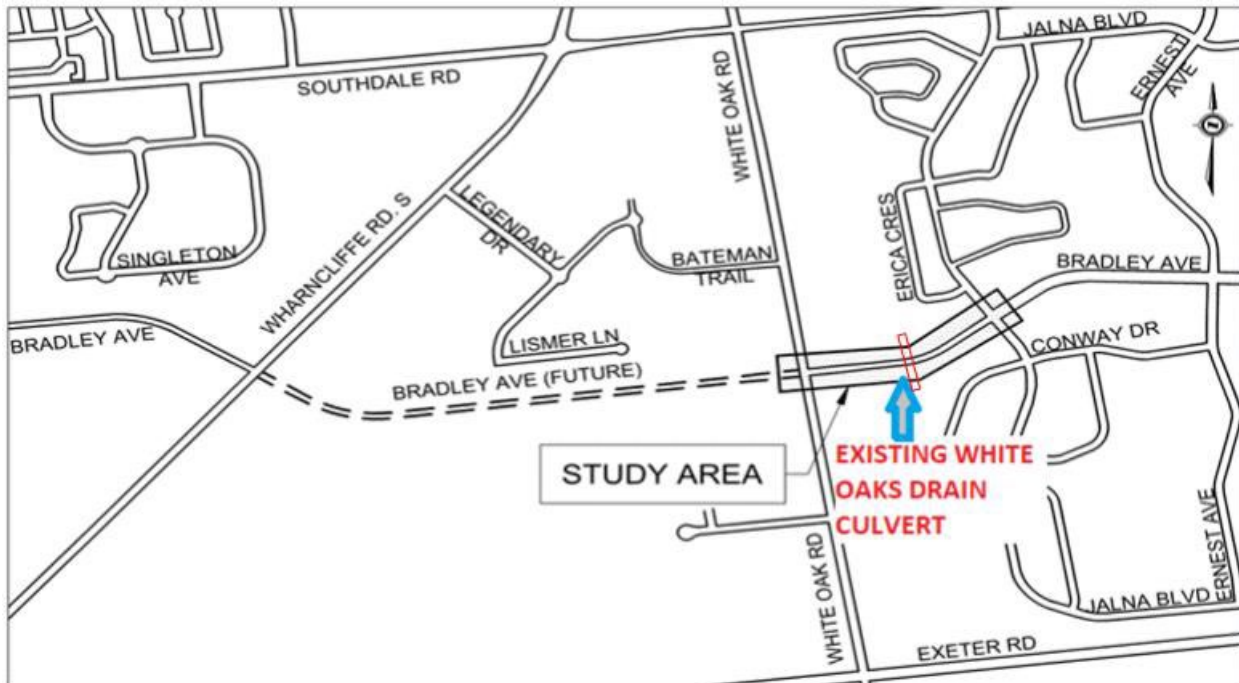


Figure A: Study Area – Key Plan

Through this addendum, the City will review the existing conditions within the study area, consult the affected residents within 150 to 200 metre (m) radius and complete and assessment of the design alternative, followed by an impact assessment and mitigations. At the completion of this addendum, after the public review period, the City will proceed to implementation and construction.

Progress Since Completion of Class EA

The 2005 Class EA identified the limits of the Bradley Avenue widening extending from Bostwick Road to White Oak Road. Figure B (Figure 5.1 - Preferred Alternative in the 2005 Class EA ESR), shows the limits of the east transition on Bradley Ave extending approximately 200 m east of White Oak Road. Jalna Boulevard (west leg) is approximately 550 m east of White Oak Road. The extension of the limits by an additional 350 m to 550 m east of White Oak Road warranted an addendum to the Class EA.

The supporting sub-disciplines required to assess the extended limits and to identify impacts and mitigation are environmental sub-disciplines including natural environment, drainage and hydrology, traffic noise, tree inventory and assessment, and Stage 1 archaeology, and technical disciplines including geotechnical, utilities, property, landscape design, traffic management and transportation design. These disciplines are further discussed below in Section 3.

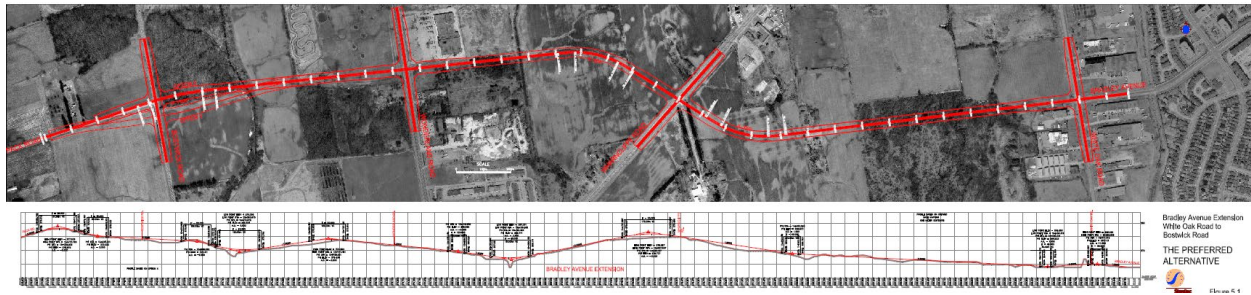


Figure B: Bradley Avenue Extension – White Oak Road to Bostwick Road Class EA (2005) – Preferred Alternative

Consultation

Consultation with agencies, public and Indigenous Nations was completed in Phase 3. The table below presents an overview of the agency, public and Indigenous Nations consultation activities.

Consultation Schedule

Consultation Event	Date
Joint Notice of Commencement and Public Information Centre, published in newspaper and mailed to Project Mailing List	Newspaper Advertisement (Londoner): November 12, 2020 & November 19, 2020 Email Distribution: November 4, 2020
Public Information Centre (Online)	November 19, 2020
Indigenous Engagement	November 4, 2020 Follow up on November 19 and 20, 2020
Agency Consultation Meetings – with Conservation Authorities and Utilities	May 1, 2020 and November 30, 2021
Notice of Completion	XX

Existing and Future Conditions

The study area for the Class EA Addendum is Bradley Avenue from White Oak Road to Jalna Boulevard (west leg), which is approximately 550 m east of White Oak Road.

In order to identify constraints and sensitivities, a review of the following components was undertaken:

- Land Use
- Transportation (Road Network, Traffic and Public Transit)
- Natural Environment
- Geotechnical
- Noise
- Drainage and Hydrology
- Archaeology
- Cultural Heritage
- Source Water Protection

Class EA Addendum - Alternative Design Concepts and Assessments

During the Class EA Addendum process, alternative design concepts were developed and evaluated using evaluation criteria that was developed to address a range of environmental issues and potential avoidance or mitigation of negative effects, and also reflect the concerns of the City and various stakeholders. The



following cross section alternatives were considered for the widening of Bradley Avenue from Jalna Boulevard (west leg) to White Oak Road:

Alternative 1: Widen Bradley Avenue symmetrically along the Centerline (both North and South; Figure 5-1).

Alternative 2: Widen Bradley Avenue along North Side (Figure 5-2).

Alternative 3: Widen Bradley Avenue along the South Side (Figure 5-3).

Based on the results of the evaluation process, Alternative 1: Widen Bradley Avenue symmetrically along the centerline (both North and South) was chosen as the preferred design as this option facilitates construction of the roadway cross section including the active transportation facilities within the existing ROW on both sides of the roadway.

Description of Preferred Design

The Preferred Alternative was selected based on safety, geometric considerations (ability to maintain the existing centreline) and the lowest cost alternative. The construction timing will need to be coordinated with the adjacent Bradley Avenue extension from Wharnccliffe Road South to White Oak Road and will be determined based upon securing necessary approvals, completion of design, and funding. No private properties will be required for the widening of Bradley Avenue. All works will be contained within the road ROW.

Construction Traffic and Access

It is anticipated that pedestrian, bicycle, transit and vehicular traffic will be able to be maintained during most construction activities for the recommended improvements. There will be no road closures needed for this Study, therefore the impacts to traffic will be limited. There will be a periodic increase in local traffic due to delivery of materials and equipment to this site as well as construction staff vehicles during the construction phase of the Study. Construction signage will be posted in the neighborhood in order to inform motorists and pedestrians of the potential for construction related traffic. Access will be maintained as much as possible.

Utilities

There are various utilities present within the road ROW. It is anticipated that new or updated utility plans will be required along the corridor as development proceeds. The following utility companies have identified existing infrastructure within the Study Area: City of London, Bell Canada, London Hydro, Rogers, Enbridge Gas and Start Communications.

Agency Approvals

Agency approvals are potentially required before construction can begin, to be determined in the Detailed Design Stage, and are summarized in the table below.

Required Agency Approvals / Permitting Requirements

Agency	Approval / Permit Required	Comments
Potentially Required (To be determined in the Detailed Design Stage)		





Ministry of the Environment, Conservation and Parks	Environmental Activity and Sector Registry – Self Registration of Water Taking Activity	For road construction and construction site dewatering.
Ministry of the Environment, Conservation and Parks	Environmental Compliance Approval	For stormwater work (White Oak culvert)
Upper Thames River Conservation Authority	Section 28 permit approval	For works in or near watercourses, valleys, wetlands, or shorelines
Department of Fisheries and Oceans	DFO Approval	To allow for any alteration to a watercourse Per the federal Fisheries Act, DFO approval would be necessary and a Fisheries Habitat Compensation Plan would need to be developed to replace the lost habitat, in accordance with the DFO’s No Net Loss policy
Ministry of Northern Development, Mines, Natural Resources and Forestry	Work Permit	Any in-water works will require an application for a Work Permit under the Public Lands Act

Environmental Issues and Commitments

Natural Environment

The proposed extension requires further investigation to determine if any upgrades are required to the existing culvert. Standard avoidance and mitigation measures will be utilized during detailed design (e.g., Erosion and Sediment Control) to prevent negative impacts to this area, inclusive of respective timing windows. Exact details pertaining to timing shall be further discussed with the Upper Thames River Conservation Authority (UTRCA) as part of the permitting and approval process during detailed design.

Geotechnical

The geotechnical investigation recommends a number of recommendations, including the recommendation that a program of site supervision, inspection and materials testing be implemented during the construction phase of the project to confirm that all design requirements and project specifications are met, and to confirm that the conditions exposed in the excavations are consistent with those encountered in the boreholes.

Noise

The noise impacts of the widening of existing Bradley Avenue between White Oak Road and Jalna Boulevard are predicted to be less than 5 dB for three receptors in the study area when comparing the Future “build” 2030 and Future “no-build” 2030 scenarios. Specifically, a 1-dB increase (when rounded to the nearest whole number) is predicted at three receptors as a result of the project. Therefore, in accordance with the MOEE/MTO protocol consideration of noise mitigation is not required at these locations. Construction noise impacts are temporary and largely unavoidable. However, the construction contract should include provisions relating to the adequate control of noise, compliance with related laws including adherence to the City of London Sound By-Law and MECP Publication NPC-115, establishment of a complaints process and outline the responsibilities with respect to investigations of noise up to and including remedial measures.





Air Quality

The widening of Bradley Avenue, from White Oak Road to Jalna Boulevard (west leg) will result in increased traffic volume. This will contribute to air quality impacts on adjacent residents. Construction related air emissions can also be expected, including dust from various material handling operations and combustion emissions from construction equipment, which is typically powered by diesel engines. Such emissions will be of a temporary nature and the impact is not predicted to move far from the immediate vicinity of the construction activities along the major roads. Best management practices will be utilized to mitigate any air quality impacts caused by construction dust (i.e., use of non-chloride dust suppressants) in the construction phase, such as using minimal number of vehicles / machinery, equipped with emissions controls, in one area. The roads will be designed to operate at a level of service to minimize congestion and the potential for a reduction in air quality contaminants produced – by stagnated traffic.

Drainage and Hydrology

Based on the P2 SWM facility, storm sewer and culvert assessment, it was concluded that the proposed widening of the Bradley Avenue roadway will increase impervious areas, cut off the existing connection between the emergency overflow spillway and the remnant channel, and therefore increase stormwater runoff peak flows and volumes. The following recommendations were provided to the City:

1. Reconfigure the pond and outlet to meet the 100-year freeboard criteria and the 250-year overtopping criteria;
2. Three (3) storm sewer systems were preliminarily sized for the Bradley Avenue extension using the Rational Method. The City's depth of cover criteria of 1.5 m has not been achieved and frost protection will be required where necessary;
3. Two (2) EF010 OGS units to provide a treatment train approach to treat the runoff from the Bradley Avenue area between Paul Peel Avenue and White Oaks Road thereby providing pre-treatment for the two (2) Bradley Avenue drainage areas that are conveyed to the main cell of the P2 SWM facility;
4. Countersink culvert and channel, due to limited cover, resulting in a 500 mm available rise of the culvert. Additional assessment will be necessary to confirm the freeboard and clearance. A culvert with a greater span could also be implemented to reduce the headwater depth, with additional determinations by developers for the proposed channel width.

The grading of the Bradley Avenue ROW east of White Oak Road is proposed to remain as per existing conditions; therefore, the increased peak flows and volumes resulting from the road improvements will be directed toward the existing White Oak Channel. As such and based on UTRCA determining the roadway overtops for the 250 year event, the conveyance capacity of the existing twin 2.42 m x 1.65 m concrete box culvert crossing should be assessed at the detailed design stage, and upgraded, if necessary, to ensure compliance with applicable City of London and MTO hydraulic criteria and if required Ministry of Natural Resources and Forestry's (MNRF) vehicle ingress and egress in flood water criteria. UTRCA will also be consulted during detailed design regarding the capacity of the White Oak Drain. Therefore, local stormwater quantity controls are not required.

Cultural Environment - Archaeological Resources

The entire study area is considered to be previously disturbed or has been previously assessed, and no portion of the study area is recommended for further archaeological assessment.

Source Water Protection



None of the activities in the study area will result in drinking water threats.

Climate Change Considerations

The climate change impacts to this project are considered minimal as the improvements are occurring within an existing corridor. Removal of any naturalized vegetation within the corridor can result in a reduction of carbon sequestration capacity which has been taken into consideration for this study. Climate change mitigation has also been considered in the preliminary scoping of stormwater management features. Improvements to active transportation facilities produce positive benefits to air quality and climate change effects by reducing automobile reliance. As such, improving active transportation facilities such as paved boulevard bike paths and sidewalks has been considered and incorporated into the design alternatives for this study.

