Municipal Class Environmental Assessment Addendum: Bradley Avenue Extension

Bradley Avenue (Between White Oak Road and Jalna Boulevard – West Leg), City of London
Project No. TPB186089

Prepared for:

The Corporation of the City of London

300 Dufferin Avenue, London, ON N6A 4L9

March 2023

Municipal Class Environmental Assessment Addendum: Bradley Avenue Extension

Bradley Avenue (Between White Oak Road and Jalna Boulevard – West Leg), City of London
Project No. TPB186089

Prepared for:

The Corporation of the City of London
300 Dufferin Avenue, London, ON N6A 4L9

Prepared by:

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
3450 Harvester Road, Suite 100
Burlington, ON L7N 3W5
Canada
T: (905) 335-2353
Date: March 2, 2023

Copyright and non-disclosure notice

The contents and layout of this report are subject to copyright owned by Wood (© Wood Environment & Infrastructure Solutions a Division of Wood Canada Limited). save to the extent that copyright has been legally assigned by us to another party or is used by Wood under license. To the extent that we own the copyright in this report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of Wood. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to the Third Party Disclaimer set out below.

Third-party disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Wood at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. Wood excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

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.

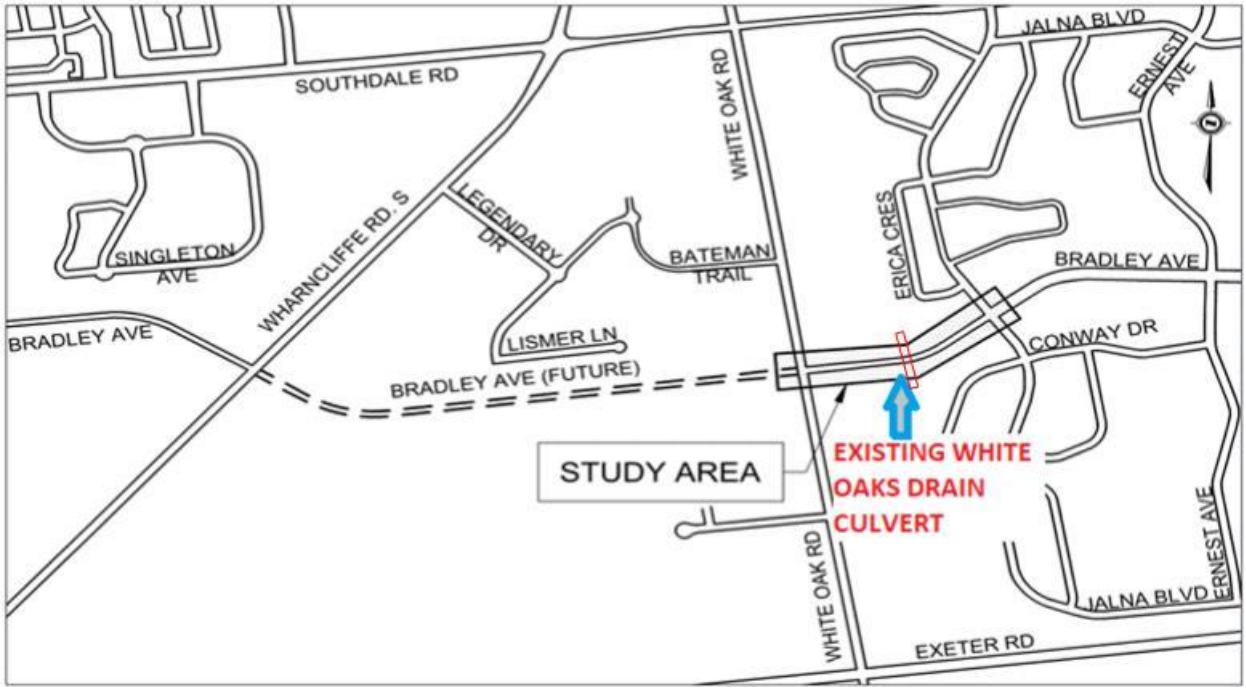


Figure A: Study Area – Key Plan

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 utilities, property, landscape design, traffic management and transportation design. These disciplines are further discussed below in Section 3.

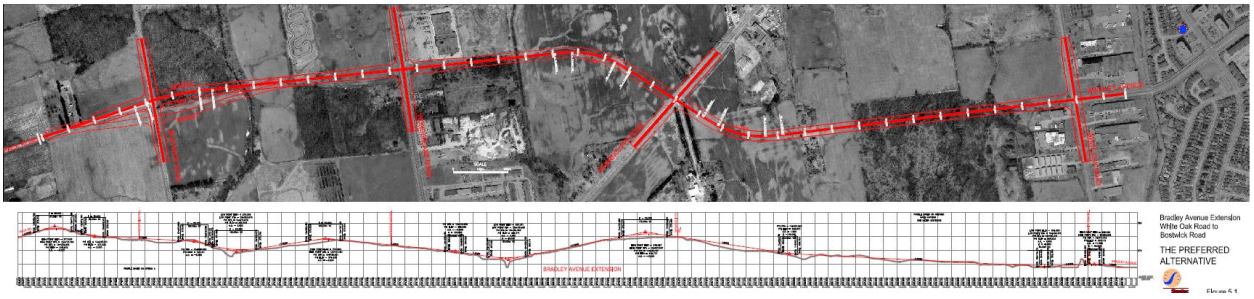


Figure B: Bradley Avenue Extension – White Oak Road to Bostwick Road Class EA (2005) – Preferred Alternative

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	Newspaper Advertisement (Londoner): October 6, 2022 and October 13, 2022 Notice of Completion Period: October 13, 2022 - November 14, 2022

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
- 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: Do Nothing

Alternative 2: Widen Bradley Avenue symmetrically along the Centerline (both North and South).

Alternative 3: Widen Bradley Avenue along North Side.

Alternative 4: Widen Bradley Avenue along the South Side.

Based on the results of the evaluation process, Alternative 2: 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 Wharncliffe 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 Natural Resources and Forestry	Work Permit	Any in-water works will require an application for a Work Permit under the Public Lands Act.
Ministry of the Environment, Conservation and Parks	Management of Excess Soil O. Reg. 406/19	Management of excess soil (including excavation, transportation, temporary storage, and disposal) will be completed in accordance with O. Reg. 406/19 and the ministry's current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014). The amount of excavated soil and/or imported soil will be determined during detailed design phase through the development of a Soil Management and Fill Management Plan.
Ministry of Citizenship and Multiculturalism	Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18	Any Stage subsequent archaeological studies need to be completed and entered into the Ontario Public Register of Archaeological Reports.

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.

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.

Where archaeological resources are impacted by EA project work, MCM will be notified by contacting archaeology@ontario.ca. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the Standards and Guidelines for Consultant Archaeologists.

If human remains are encountered, all activities must cease immediately, and the local police and coroner must be contacted. In situations where human remains are associated with archaeological resources, MCM should also be notified (at archaeology@ontario.ca) to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

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.

Table of Contents

1.0 Introduction and Background 1
1.1 Introduction 1
1.2 Environmental Assessment 2
1.2.1 Purpose of the Class EA Project Addendum 2
1.2.2 Overview of the Addendum Process 3
1.2.3 Class EA Process 3
1.2.4 Filing of the ESR 5
1.2.5 Section 16 Order Request 6
1.3 Project Organization 6
1.4 Progress Since Completion of Class EA 6
2.0 Stakeholder and Agency Consultation 8
2.1 Project Mailing List 8
2.2 Agency Consultation 8
2.2.1 Meetings 8
2.2.2 Utilities 8
2.3 Public Consultation 9
2.3.1 Online Public Information Centre 9
2.4 Indigenous Engagement 9
2.4.1 Identification of Indigenous Communities 9
3.0 Existing and Future Conditions 11
3.1 Study Area 11
3.2 Land Use 11
3.2.1 Existing Land Use Context 11
3.2.2 *The London Plan* - City of London Official Plan (Consolidated November 2019) 11
3.2.3 London Complete Streets Design Manual (2018) 14
3.2.4 Provincial Land Use Planning Initiatives 14
3.2.4.1 Provincial Policy Statement (2020) 14
3.2.4.2 A Made-in-Ontario Environment Plan (2018) 16
3.3 Existing Transportation 16
3.3.1 Existing Roadway Network 16
3.3.2 Existing Traffic Conditions and Operations 16
3.3.3 Future Traffic Conditions 17
3.3.4 Existing Active Transportation 17
3.3.5 Public Transit 17
3.4 Natural Environment 18
3.5 Noise 19
3.6 Drainage and Hydrology 19
3.7 Cultural Heritage Resources 19
3.7.1 Archaeological Resources 19
3.8 Source Water Protection 20
4.0 Development and Evaluation of Alternative Planning Solutions 21
4.1 Problem and Opportunity Definition 21
4.2 Identification of Planning Alternatives 21
5.0 Alternatives Design Concepts and Assessments 23
5.1 Evaluation Criteria 25

6.0 Description of Preferred Design 28
6.1 Major Features of the Recommended Plan 28
6.1.1 Design Criteria 28
6.1.2 Horizontal Alignment 29
6.1.3 Vertical Alignment 29
6.1.4 Active Transportation 29
6.1.5 Construction Schedule 30
6.1.6 Property Requirements 30
6.1.7 Construction Traffic and Access 30
6.1.8 Utilities 30
6.1.9 Preliminary Cost Estimate 30
6.1.10 Agency Approvals 31
6.2 Environmental Impacts and Commitments 32
6.2.1 Natural Environment 32
6.2.2 Noise 33
6.2.3 Air Quality 33
6.2.4 Drainage and Hydrology 34
6.2.5 Archaeology 35
6.2.6 Source Water Protection 35
6.2.7 Climate Change Considerations 35
7.0 Summary of Environmental Effects, Proposed Mitigation, Commitment to Further Work 37
7.1 Monitoring 38
7.2 Commitments to Further Investigations 38

List of Figures

Figure 1-1: Study Area – Key Plan
Figure 1-2: Municipal Class Environmental Assessment Addendum Process
Figure 1-3: Bradley Avenue Extension – White Oak Road to Bostwick Road Class EA (2005) – Preferred Alternative
Figure 3-1: Bradley Avenue at White Oaks Drain Flood Hazard
Figure 5-1: Alternative 2 - Widen Bradley Avenue Symmetrically Along the Centreline (both North and South)
Figure 5-2: Alternative 3 - Widen Bradley Avenue along North Side
Figure 5-3: Alternative 4 - Widen Bradley Avenue along the South Side

List of Tables

Table 2-1: Consultation Schedule
Table 3-1: Policies from the Provincial Policy Statement Relevant to the Study
Table 3-2: Summary of Turning Movement Counts
Table 3-3: Summary of Existing Pavement Structure
Table 5-1: Evaluation Criteria for Design Alternatives
Table 5-2: Assessment of Design Alternative

Table 6-1: Design Criteria
Table 6-2: Preliminary Cost Estimate
Table 6-3: Required Agency Approvals / Permitting Requirements
Table 7-1: Summary of Environmental Effects, Proposed Mitigation and Commitment to Further Work

List of Appendices

Appendix A	Public and Agency Consultation
Appendix B	Indigenous Consultation
Appendix C	Utility Consultation
Appendix D	Criteria for Evaluation Potential for Built and Cultural Heritage Landscapes: A Checklist for the Non-Specialist
Appendix E	Noise Report
Appendix F	Design Drawings
Appendix G	2030 TMP
Appendix H	Stage 1 Archaeological Assessment

List of Acronyms

2031 TMP	Mobility Transportation Master Plan for London - 2030 Transportation Master Plan: SmartMoves
AADT	Average Annual Daily Traffic
AFN	Aamjiwnaang First Nation
CFN	Caldwell First Nation
CKSPFN	Chippewas of Kettle and Stony Point First Nation
CTFN	Chippewas of the Thames First Nation
DNM	Delaware Nation at Moraviantown
EA	Environmental Assessment
ESR	Environmental Study Report
GMIS	Growth Management Implementation Strategy
LPAT	Local Planning Appeal Tribunal
m	Metre
MDN	Munsee-Delaware Nation
MECP	Minister of the Environment, Conservation and Parks
MCM	Ministry of Citizenship and Multiculturalism
MNRF	Ministry of Natural Resources and Forestry
MTO	Ministry of Transportation
Municipal Class EA	Municipal Class Environmental Assessment
ONT	Oneida Nation of the Thames
PIC	Public Information Centre
PPS	Provinicial Policy Statement
ROW	Right-of-Way
SWMF P2	Stormwater Management Facility, Pond 2

TAC	Transportation Association of Canada
TMP	Transportation Master Plan
UTRCA	Upper Thames River Conservation Authority
WIFN	Walpole Island First Nation (Bkejwanong Territory)

1.0 Introduction and Background

1.1 Introduction

The City of London (herinafter referred to as "the City") has completed an addendum to a Schedule C Municipal Class Environmental Assessment (Class EA) for Bradley Avenue between White Oak Road and Jalna Boulevard (west leg). 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 1, labelled as "Bradley Ave (Future)". This phase is currently in the detailed design stage. The Bradley Avenue Extension Municipal Class EA did not include the widening of Bradley Avenue from White Oak Road easterly to Jalna Boulevard (west leg). Refer to Figure 1-1 for the study area.

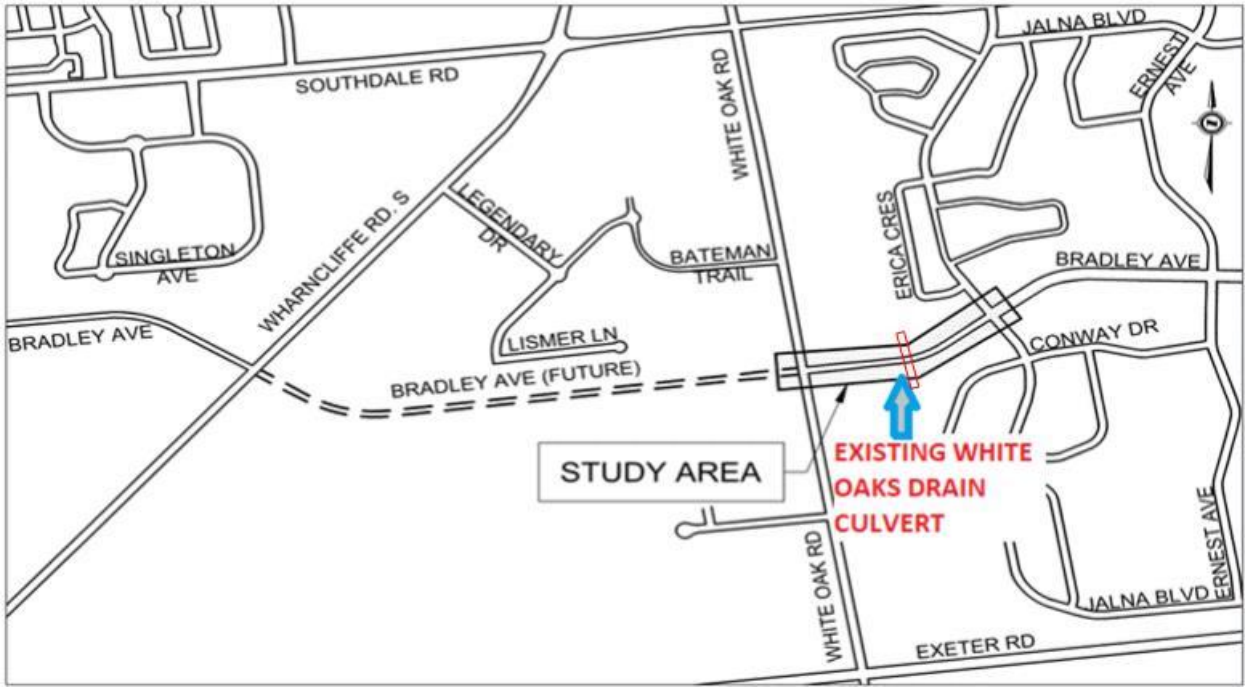


Figure 1-1: Study Area – Key Plan

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood), was retained by the City to complete the Study.

1.2 Environmental Assessment

The Ontario *Environmental Assessment Act* (R.S.O. 1990, c. E.18; *EA Act*) was put into place to provide for the protection, conservation and wise management of the environment within the province. The Act applies to all projects being undertaken by provincial, municipal or other public bodies within the province (unless explicitly exempted). It defines the environmental assessment works that must be completed prior to commencement of any undertaking, as well as the proponent's obligations to consult with all affected and / or interested parties.

No undertaking that falls under the scope of the *EA Act* can proceed until the Ministry of Environment, Conservation and Parks (MECP) provides approval of the submitted EA documentation. This includes resolution of public appeals made in accordance with section 7.2 (3) of the Act.

1.2.1 Purpose of the Class EA Project Addendum

The requirements of the Municipal Class EA indicate that any significant modifications proposed to the project after the Environmental Study Report (ESR) is filed requires an addendum to be written by the proponent. In addition to reviewing the new changes and the environmental impacts (includes the social, economic, and natural environments), the proponent is required to provide public notification of the addendum and its changes. Addendums can also be completed due to a lapse in time, (time lapse of at

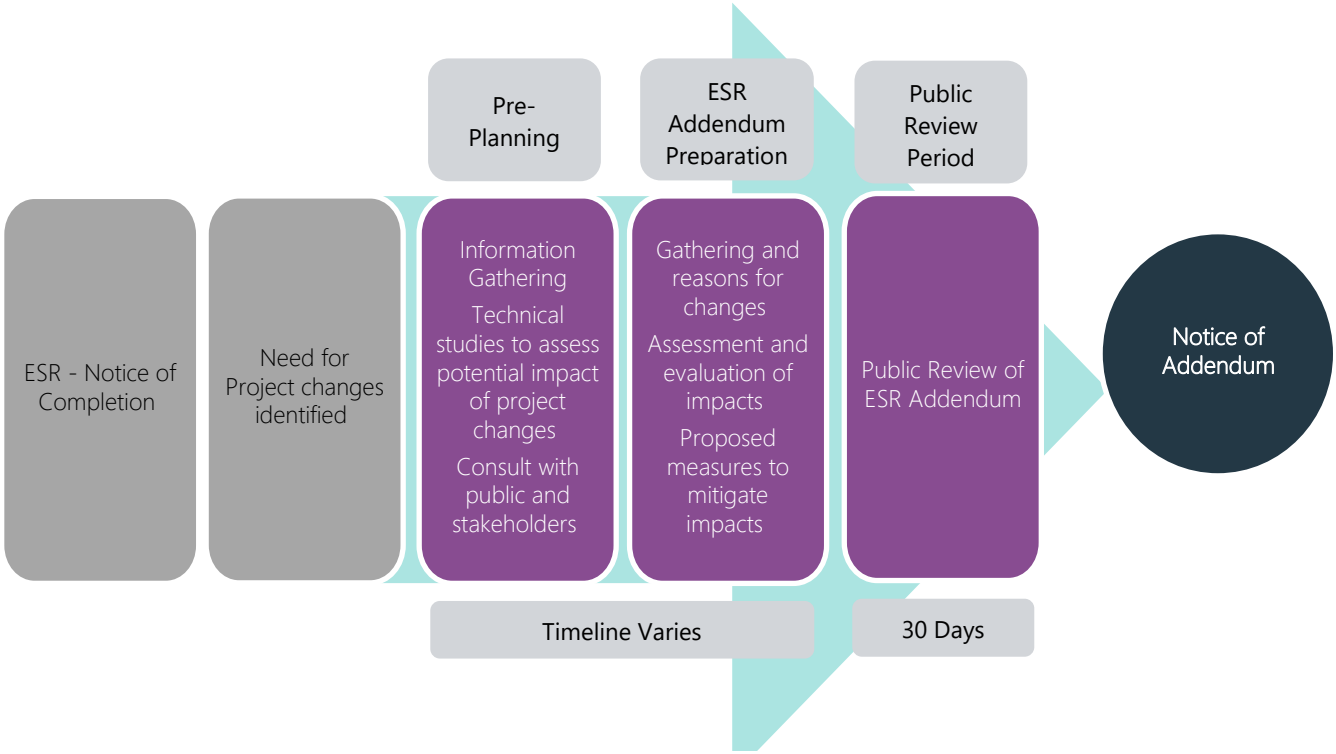


Figure 1-2: Municipal Class Environmental Assessment Addendum Process

least ten years) between the filing of the original ESR and the implementation and construction of the project.

The addendum's purpose is in keeping with the original principles of the Ontario *Environmental Assessment Act* (R.S.O. 1990, c. E.18; *EA Act*). This includes evaluating net environmental effects to all aspects of the environment and providing clear and complete documentation of the process.

The cause of this addendum was due to the fact that the original 2005 Class EA ESR did not include the addendum study area and did not explore the need to widen Bradley Avenue from White Oak Road to Jalna Boulevard (west leg). 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.

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.

1.2.2 Overview of the Addendum Process

In order to comply with the Class EA, this addendum has been prepared to review the proposed changes to the project and its potential impacts on the environment. This review documents:

- Identifying the circumstances necessitating the change;
- Determining potential environmental implications of the proposed changes along with any measures to mitigate potential adverse environmental effects; and
- Filing the addendum for a period of 30 calendar days, with a Notice of Filing of Addendum issued to potentially affected members of the public, review agencies, and those who were notified during the preparation of the ESR.

1.2.3 Class EA Process

The Class EA process is a mechanism by which planning, and approval of municipal infrastructure is provided in an efficient, timely, economical and environmentally responsible manner. It represents a consistent, streamlined and easily understood process for planning and implementing municipal infrastructure projects. Under the EA Act, projects are classified as approved, subject to screening, subject to a Class EA, or subject to a full Environmental Assessment. This addendum is classified as being subject to the Class EA process. It is being conducted according to the requirements outlined in the Municipal Engineers Association document titled *Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 & 2015)*.

Consistent with the Class EA, the Study approach has been designed to meet the following objectives:

1. Protection of the environment, including natural, social and economic components of the environment.

2. Participation of a broad range of stakeholders in the study process to allow for sharing of ideas, education, testing of creative solutions and developing alternatives.

3. Documentation of the study process in compliance with all phases of the Class EA process.

The Class EA process classifies projects according to their level of complexity and potential environmental impacts. These are termed "Schedules" and are summarized below:

- ***Schedules A and A+*** includes projects that involve minor modifications to existing facilities. Environmental effects of these projects are generally small; therefore, the projects are considered pre-approved.

- ***Schedule B*** includes project that involve improvements and minor expansion to existing facilities. There is a potential for some adverse environmental impacts and, therefore, the proponent is required to proceed through a screening process, including consultation with those affected. Schedule B projects are required to proceed through Phases 1, 2 and 5 of the Municipal Class EA process.

- ***Schedule C*** includes projects that involve construction of new facilities and major expansion of existing facilities. These projects proceed through the environmental assessment planning process outlined in the Municipal Class EA document. These projects are required to fulfill the requirements of all five (5) phases of the Municipal Class EA process.

This Study is being completed under the requirements of a Schedule C Municipal Class EA. The following Schedule C trigger, as noted in the Municipal Engineers Association's Municipal Class EA Document (*October 2000, as amended in 2007, 2011 & 2015*), apply to this Project:

- Reconstruction or widening where the reconstructed road or other linear paved facilities (e.g., High Occupancy Vehicles (HOV) lanes) will not be for the same purpose, use, capacity or at the same location (e.g., additional motor vehicle lanes, continuous centre turn lane) (Description 20) and Construction of new roads or other linear paved facilities (e.g. HOV lanes) (Description 21) where the estimated cost is greater than $2.4 million *(Adjusted for inflation in 2019 to $2,600,000)*.

The following Class EA planning phases apply:

- ***Phase 1*** – Identify the problem (deficiency) or opportunity.

- ***Phase 2*** – Identify and evaluate alternative solutions to address the problem or opportunity by taking into consideration the existing environment and establish the preferred solution considering public and review agency input.

- ***Phase 3*** – Identify Alternative Design Concepts for the preferred solution implementation by taking into consideration the existing environment and establish the preferred design concept by considering public and review agency input.

- ***Phase 4*** – Document the Environmental Assessment including the design and consultation process in an Environmental Study Report (ESR) for public review.

- ***Phase 5*** – Complete contract drawings and documents and proceed to construction and operation. Monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facility.

The Class EA requires notification of, and consultation with, relevant stakeholders. The Project Team has ensured stakeholders are notified early in the planning process and throughout the Study. Should stakeholders raise issues that cannot be resolved through discussion, these concerns will be referred to the MECP for resolution. This process is further detailed in Section 1.2.4 and 1.2.5.

Requirements of Phases 1 and 2 for the current study were met through completion of the 2030 TMP and the Transportation Development Charges Background Study. Once approved, this Schedule C Class EA will prove that requirements of Phases 3 and 4 of the process was met.

1.2.4 Filing of the ESR

Prior to filing the Notice of Addendum and beginning the 30-day public review period, the ESR is shared with the Civic Works Committee, as well as City Council. City Staff request the Committee and Council to access the addendum and proceeding with filing. The Committee and Council reports are available to the public.

All parties having expressed an interest in the ESR will be notified by letter, regarding the Notice of Addendum. The Notice of Addendum will be placed in the Londoner, in accordance with the requirements of the Municipal Class EA process.

Copies of the Addendum will be made available at the following locations:

London City Hall
300 Dufferin Ave,
London, ON N6A 4L9
Phone: 519-661-2489

Hours:
Monday - Friday: 8:30 am to 4:30 pm

City of London's website
https://getinvolved.london.ca/bradley-ave

London Public Library, Jalna Branch
1119 Jalna Blvd,
London, ON N6E 3B3
Phone: (519) 685-6465
https://www.londonpubliclibrary.ca/

Hours:
Tuesday – Thursday: 9:00 am – 9:00 pm
Friday: 10:00 am – 6:00 pm
Saturday: 9:00 am – 5:00 pm
Sunday – Monday: Closed

A review period of not less than thirty (30) days will be provided, during which comments will be received from stakeholders and agencies. If members of the public, interest groups and/or government agencies feel that their concerns have not been addressed through the Addendum process, a person or party may request the Minister of the MECP to make an order for the project to comply with Section 16 of the *EA Act* (referred to as an Order Request). This request can be made only on the basis of impacts to Indigenous and Treaty Rights. More information on Order requests is provide in Section 1.2.4; however, it is anticipated that all concerns will be resolved through discussion between the City and the concerned party(ies). If no requests are receiving during the filling period, the Addendum will be considered final and the City will be able to proceed to implementation and construction.

1.2.5 Section 16 Order Request

The Municipal Class EA process provides an opportunity for the public and other stakeholders to appeal the Municipal Class EA process undertaken by the Project Team. Under the provisions of Section 16 of the amended *EA Act*, there is an opportunity under the Municipal Class EA planning process for the Minister to review the status of a project. Members of the public, interest groups and review agencies may request the Minister to require a proponent to comply with Section 16 of the *EA Act*, before proceeding with a proposed undertaking. This is known as a "Order" (formerly called "Bump-Up Request"). The procedure for dealing with concerns on the basis of impacts to Indigenous and Treaty Rights that may result in the Minister, by order, requiring the proponent to comply with Section 16 of the *EA Act* is outlined in the Municipal Class EA document. It is anticipated that all concerns will be resolved through discussion between the City and the concerned party(ies).

Any Order requests in concerning potentially adverse impacts to constitutionally protected Indigenous and Treaty Rights are to be made to the Minister with copies sent to the Director of the MECP's Environmental Approvals Branch and to the City's Project Manager at the following addresses:

Minister
Ministry of the Environment, Conservation and Parks
77 Wellesley Street West, 11th Floor
Toronto, ON M7A 2T5
Fax: 416-314-6748
minister.mecp@ontario.ca

City of London
300 Dufferin Avenue
London, ON N6A 4L9
Phone: 519-661-4500

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

1.3 Project Organization

The Project Team consisted of staff from the following organizations:

Proponent:	**City of London**
	Michelle Morris, Project Manager
	Jiten Patel, Technologist II
Prime Consultant:	**Wood Environment & Infrastructure Solutions**
	Felix Wong, Transportation Engineer

1.4 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 1-3 (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 utilities, property, landscape design, traffic management and transportation design. These disciplines are further discussed below in Section 3.

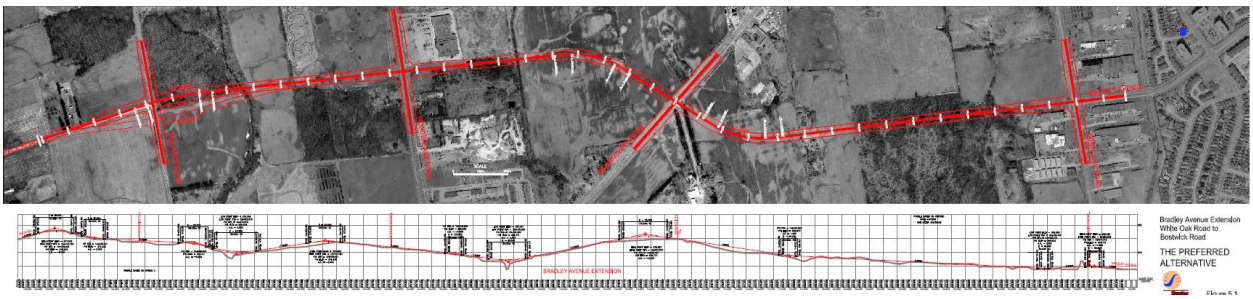


Figure 1-3: Bradley Avenue Extension – White Oak Road to Bostwick Road Class EA (2005) – Preferred Alternative

2.0 Stakeholder and Agency Consultation

Consultation with agencies, public and Indigenous Nations was completed in Phase 3. Table 2-1 presents an overview of the agency, public and Indigenous Nations consultation activities.

Table 2-1: 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	Newspaper Advertisement (Londoner): October 6, 2022 and October 13, 2022 Notice of Completion Period: October 13, 2022 - November 14, 2022

Details regarding the consultation with agencies, public and Indigenous Nations are provided in the following sections. Meeting minutes and agenda with agencies and Project Team can be found in **Appendix A.**

2.1 Project Mailing List

As per Class EA requirements, the mailing list consisted of contacts from the 2005 ESR mailing list. Residents residing within 150 to 200 m radius were included in the mailing list. Additional contacts were added by request, including through the online public meeting. The Project Mailing List can be found in **Appendix A**.

2.2 Agency Consultation

2.2.1 Meetings

A meeting was held with Upper Thames River Conservation Authority (UTRCA) and the City on May 1, 2020. UTRCA shared concerns regarding the White Oak drain crossing.

2.2.2 Utilities

An email was sent on November 15, 2018, to 15 utility companies to request identification of any utility infrastructure within the study area and potential conflicts the Study. A meeting was held on September

24, 2018, March 6, 2019 and November 30, 2021 to discuss utility conflicts for both the addendum area and the section currently in detailed design. The minutes for this meeting can be found in **Appendix C.** Further details can be found in Section 6.1.8.

2.3 Public Consultation

Effective public consultation is an important part of the Class EA process. Feedback from the public is significant as it helps identify gaps and allows the Project Team to understand the design preferences. Public Information Centres (PIC) provide a transparency to the EA process and provides individuals an opportunity to share their views. One online PIC was held in order to provide information about the Study and present the design alternatives. Agencies were provided with a copy of PIC slides and roll plan on October 16, 2020 for review, prior to the PIC. Comments were requested by October 30, 2020, for incorporation into the PIC slides. Details of the PIC are included in Section 2.3.1, including any other comments received from the public before or after the PIC.

2.3.1 Online Public Information Centre

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 website (https://getinvolved.london.ca/bradley-ave), publication of the notice in the Londoner newspaper and emailing the notice to the Project Mailing List (property owners, residents, agencies and businesses), as outlined in Table 2-1.

A pdf of the slide deck, explaining the Study was posted on the Project website. This included 13 slides: Introduction; Project Overview and Objective; Study Area; Overview of the Environmental Assessment Addendum Process; Existing Conditions; Need and Justification; Cross-Sections of Design Alternatives; Evaluation Criteria; Evaluation of Alignment Alternatives; Preferred Alternative; Climate Change Considerations; Next Steps and Concluding Slide.

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

Appendix A includes all comments and responses.

2.4 Indigenous Engagement

Indigenous engagement is a key component of the Class EA process. Since this Class EA is an addendum to the 2005 Class EA, the MECP has already delegated the procedural aspects of the duty to consult to the City of London in its previous 2005 Class EA.

Copies of all Indigenous engagement documents can be found in **Appendix B**.

2.4.1 Identification of Indigenous Communities

The City of London prepared a list of potentially interested Indigenous Nations based on knowledge of the area and past projects. Eight Indigenous Nations were contacted and included the following:

Aamjiwnaang First Nation (AFN), Walpole Island First Nation (Bkejwanong Territory; WIFN), Caldwell First Nation (CFN), Chippewas of Kettle and Stony Point First Nation (CKSPFN), Chippewas of the Thames First Nation (CTFN), Delaware Nation at Moraviantown (DNM), Munsee-Delaware Nation (MDN) and Oneida Nation of the Thames (ONT).

Following understood consultation protocols with these Indigenous Nations, Wood shared community-specific letters, a plain language project summary and joint Notice of Commencement and PIC with AFN, WIFN, CFN, CKSPFN, CTFN, DNM, MDN and ONT on November 4, 2020. Wood followed up by phone with each Nation to determine interests. This included:

- AFN: November 19, 2020 phone call and message left. A follow-up email was sent on November 20.
- WIFN: November 19, 2020 phone call and message left. A follow-up email was sent on November 20.
- CFN: November 19, 2020 phone call and message left. A follow-up email was sent on November 20.
- CKSPFN: November 19, 2020 phone call where the Nation identified that there are no concerns with the Study at this time but would like to be kept informed.
- CTFN: November 19, 2020 phone call and message left. A follow-up email was sent on November 20.
- DNM: November 19, 2020 phone call where the Nation identified that there are no concerns with the Study at this time but would like to be kept informed.
- MDN: November 19, 2020 phone call and message left. A follow-up email was sent on November 20.
- ONT: November 19, 2020 phone call and message left. A follow-up email was sent on November 20.

Indigenous Nations were also consulted on April 14, 2022 related to the Stage 1 Archaeological Assessment. On June 17, 2022, CTFN 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 Filling of Addendum was also sent to all Nations.

3.0 Existing and Future Conditions

3.1 Study Area

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. Refer to Key Plan, Figure 1-1.

3.2 Land Use

3.2.1 Existing Land Use Context

The existing land uses within the study area for the Bradley Avenue Addendum include residential and industrial area. From Jalna Boulevard (west leg) to approximately 250 m southwest, towards White Oak Road is residential. At the northwest corner of the intersection of Bradley Avenue and Jalna Boulevard (west leg) lies an eight-storey residential building. On the southwest corner of the intersection of Bradley Avenue and Jalna Boulevard (west leg) is a church. Approximately 270 m east of White Oak Road is industrial area and consist of a number of industrial buildings. This area is zoned as a light industrial zone.

This area is zoned as differing types of residential zoning:

- North of Bradley Avenue, adjacent to the White Oak Drain: Residential R5 Zone, which permits medium density residential development, such as townhouses. The density provisions in this zone allows 25 units per hectare to 60 units per hectare.
- North of Bradley Avenue, intersection of Bradley Avenue and Jalna Boulevard (west leg): Residential R5 Zone and Residential R9 Zone, which permit medium to high density residential development, such as apartment buildings.
- South of Bradley Avenue, adjacent to the White Oak Drain: Residential R2 Zone, which permits low density residential, such as single detached dwellings, semi-detached dwellings, duplex dwellings and two unit converted dwellings.
- South of Bradley Avenue, adjacent to Residential R2 Zone: Residential R5 Zone and Residential R8 Zone, which permits medium density development, such as low-rise apartment buildings depending on adjacent land use.
- South of Bradley Avenue, intersection of Bradley Avenue and Jalna Boulevard (west leg): Residential R5 Zone and Neighbourhood Facility Zone, which permits public and private facility serving a neighbourhood function. This includes small to medium scale uses with minimal impact on surrounding land uses.

3.2.2 *The London Plan* - City of London Official Plan (Consolidated November 2019)

The London Plan, the City's Official Plan was updated and adopted by Council in 2016 and the consolidated version was released in 2019. The vision for the City is:

"London 2035: Exciting, Exceptional. Connected"

The London Plan includes a number of maps as part of Appendix 1. The following information is presented in the various maps and is relevant to the Project:

- Map 1 – Place Types: The land uses within the study area are a mix of neighbourhoods, light industrial and some green space. (*Map Subject to Local Planning Appeal Tribunal (LPAT) Appeal PL170100*)
- Map 3 – Street Classifications: Bradley Avenue within the study area is classified as *Urban Thoroughfare*. (*Map Subject to LPAT Appeal PL170100*)
- Map 5 – Natural Heritage: A watercourse/pond runs through the middle of the study area. (*Map Subject to LPAT Appeal PL170100*)
- Map 6 – Riverine Erosion Hazard Limit for Confined Systems, Maximum Hazard Line and the Conservation Authority Regulation Limit runs through the middle of the study area. (*Map Subject to LPAT Appeal PL170100*)

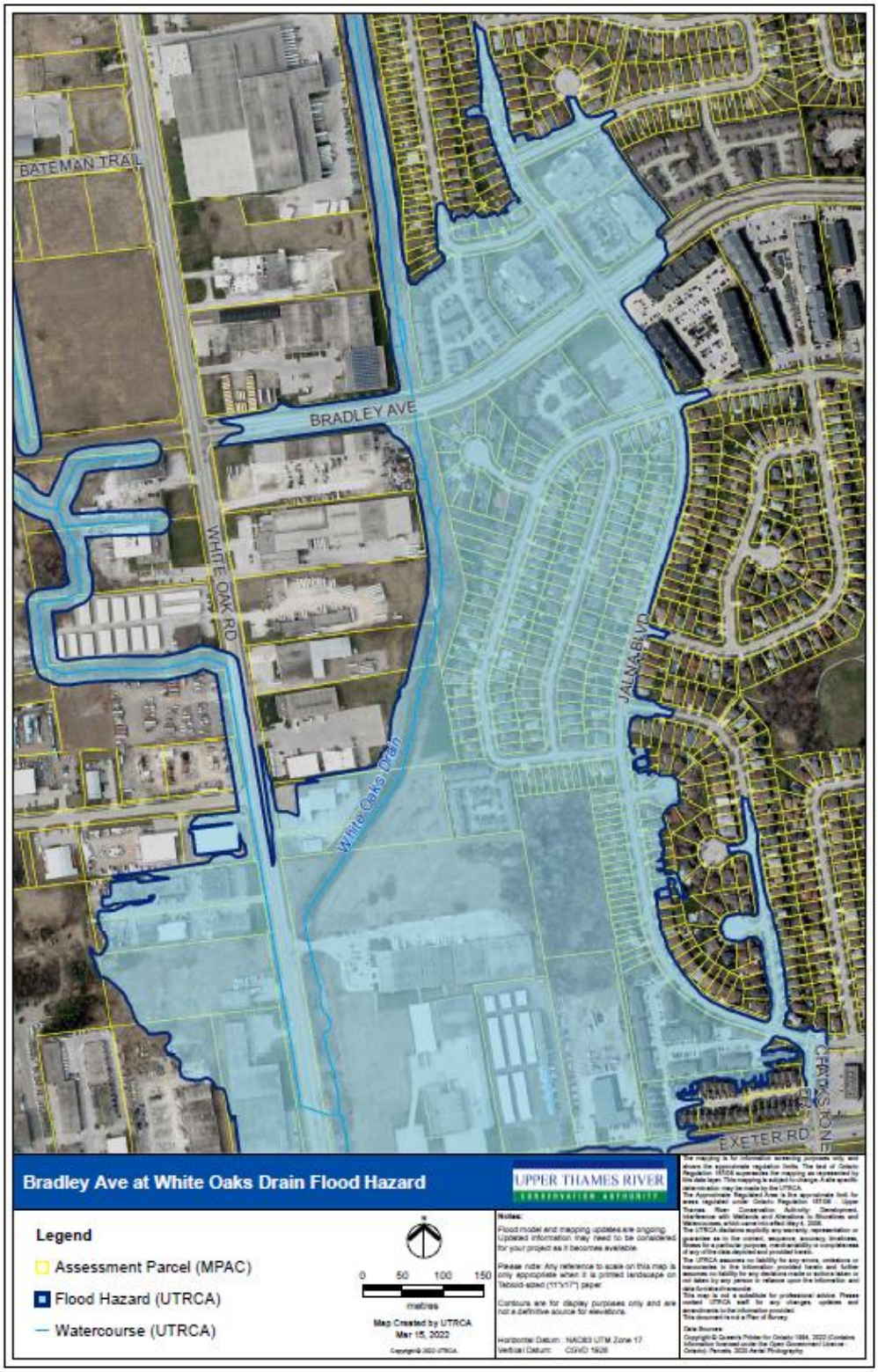


Figure 3-1: Bradley Avenue at White Oaks Drain Flood Hazard

Source: UTRCA

Bradley Avenue is classified as an Urban Thoroughfare Street, based on Map 3. This designation indicates the following:

a. "Priority on through movement of vehicles and freight;

b. Moves high volumes of traffic (pedestrian, cycle and vehicular);

c. High-quality pedestrian realm; and

d. High standard of urban design."

The widening of Bradley Avenue is in align with the objectives of this type of street classification.

3.2.3 London Complete Streets Design Manual (2018)

The City of London released a Complete Streets Design Manual in 2018, which considers the needs of pedestrians, cyclists, transit riders, motorists and streets with road safety in mind. The vision for Complete Streets includes the following:

- "London's streets will be designed and upgraded to be more complete."
- This means that streets in London will meet the needs of a wide range of users as defined by the place type, feature high-quality pedestrian environments, and integrate seamlessly with transit services, cycling networks, and automobile users.
- London's streets will be designed for connectivity and support the use of active and sustainable modes of transportation, and also strongly consider the needs of utility and maintenance providers within the right-of-way.
- With this balance of modes, users, and places in mind, all future construction, reconstruction, and rehabilitation projects for streets – both large and small - in London will be influenced by principles of "completeness" in both planning and design."

The preferred design will consider the principles and elements of the Complete Streets Design Manual. This will be further reviewed during detailed design.

3.2.4 Provincial Land Use Planning Initiatives

3.2.4.1 Provincial Policy Statement (2020)

The *Provincial Policy Statement (2020)* (PPS) issued by the Ministry of Municipal Affairs and Housing calls for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment. The PPS supports improved land use planning and management, which contributes to a more effective and efficient land use planning system. Relevant policies from the PPS that support potential improvements to Bradley Avenue is identified in Table 3-1.

Table 3-1: Policies from the Provincial Policy Statement Relevant to the Study

Section	Policies Relevant to the Study
Section 1.1	
Subsection 1.1.1	"Healthy, livable and safe communities are sustained by: f. Improving accessibility for persons with disabilities and older persons by addressing land use barriers which restrict their full participation in society. g. Ensuring that necessary infrastructure public service facilities are or will be available to meet current and projected needs. h. Preparing for the regional and local impacts of a changing climate."
Section 1.6 - Infrastructure and Public Service Facilities	
Subsection 1.6.1	"Infrastructure and public service facilities shall be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs."
Subsection 1.6.1	"Planning for infrastructure and public service facilities shall be coordinated and integrated with land use planning so that they are: a. Financially viable over their life cycle, which may be demonstrated through asset management planning; and, b. Available to meet current and projected needs."
Subsection 1.6.2	"Planning authorities should promote green infrastructure to complement infrastructure."
Subsection 1.6.3	"Before consideration is given to developing new infrastructure and public service facilities: a. The use of existing infrastructure and public service facilities should be optimized; and, b. Opportunities for adaptive re-use should be considered, wherever feasible."
Subsection 1.6.4	"Infrastructure and public service facilities should be strategically located to support the effective and efficient delivery of emergency management services, and to ensure the protection of public health and safety in accordance with the policies in Section 3.0: Protecting Public Health and Safety."
Section 1.6.7 - Transportation Systems	
Subsection 1.6.7.1	"Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs."
Subsection 1.6.7.2	"Efficient use shall be made of existing and planned infrastructure, including through the use of transportation demand management strategies, where feasible."
Subsection 1.6.7.3	"As part of a multimodal transportation system, connectivity within and among transportation systems and modes should be maintained and, where possible, improved including connections which cross jurisdictional boundaries."
Subsection 1.6.7.4	"A land use pattern, density and mix of uses should be promoted that minimize the length and number of vehicle trips and support current and future use of transit and active transportation."
Section 1.6.8 - Transportation and Infrastructure Corridors	
Subsection 1.6.8.1	"Planning authorities shall plan for and protect corridors and rights-of-way for infrastructure, including transportation, transit and electricity generation facilities and transmission systems to meet current and projected needs."

The proposed improvements discussed in this ESR are consistent with policies included in the PPS.

3.2.4.2 A Made-in-Ontario Environment Plan (2018)

The *A Made-in-Ontario Environment Plan (2018)* issued by the Ministry of the Environment, Conservation and Parks, replacing the *Ontario Climate Action Plan (2016),* calls for various action items to preserve and protect land, air and water, while reducing waste, litter and greenhouse gas emissions. The Plan aims to protect species at risk, conserve and manage parks and greenspaces and determine a plan to address climate change concerns.

The following sections of the Plan are relevant to the Study:

"Work with federal and municipal governments through the green stream of the Investing in Canada Infrastructure Program to invest up to $7 billion in federal, provincial and municipal funding over the next 10 years. Funding could be for projects that lower greenhouse gas emissions, reduce pollution, and help make community infrastructure more resilient. Example investments could include improvements to transit and transportation infrastructure and improved local water, wastewater and stormwater systems."

3.3 Existing Transportation

3.3.1 Existing Roadway Network

Bradley Avenue is an arterial roadway under the jurisdiction of the City of London. It presently functions as a two-lane arterial road serving east/west traffic flows with an Average Annual Daily Traffic (AADT) of approximately 19,390 vehicles per day. The cross-section of Bradley Avenue is a 2-lane cross section within the study area, with a rural cross- section with gravel shoulders, sidewalks and open ditches on both sides between Jalna Boulevard (west leg) and White Oak Road.

Bradley Avenue has a posted speed limit of 60 kilometres per hour along the length of the study corridor. All other study area intersections operate under traffic signal control for the major approaches to Bradley Avenue.

The existing lane configurations and traffic control for the study area, including adjacent intersections are illustrated in **Appendix F**.

3.3.2 Existing Traffic Conditions and Operations

Existing turning movement counts and AADT data were obtained from the City. The turning movement counts for the study area intersections were provided for the weekday AM, Midday, and PM peak periods and a summary is provided in Table 3-2.

Table 3-2: Summary of Turning Movement Counts

Intersection	Control Type	Count Date
Bradley Avenue at Jalna Boulevard (west leg)	Signalized	September 19, 2018
Bradley Avenue at White Oak Road	Signalized	May 30, 2018

The 2022 data provided by the City indicate that the existing AADT on Bradley Avenue between White Oak Road and Jalna Boulevard is approximately 14,500 vehicles per day.

3.3.3 Future Traffic Conditions

The City's current population, as of the 2021 Census is 422,324. According to population growth forecasts, based on the 2021 Development Charges Background Study Update, the City is projected to increase in population to 504,000 people by 2027 and an average annual employment growth from 2016 to 2044 of 2,126, which would increase the number of jobs in the City to 59,528 (City of London, 2020). As per the City of London Long Term Transportation Corridor Protection Study, most of the population growth was projected to be in west and north London with some in central London, and most of the employment growth was projected to be in east and central London and along the Highway 401/402 corridors. At full-build-out, most transportation network deficiencies will occur in the north-south direction in the inner City between Wonderland Road South and Highbury Avenue (City of London, 2001).

As per the 2030 TMP and the 2019 Development Charges Transportation Background Study, Bradley Avenue is projected to increase in traffic and improvements from White Oak Road to Jalna Boulevard (west leg) is recommended to match future lane configurations associated with the Bradley Avenue Extension and provide continuity along the corridor.

3.3.4 Existing Active Transportation

As part of the 2030 TMP and the 2016 Cycling Master Plan, recommendations to improve the cycling and pedestrian facilities throughout the City were made.

Bradley Avenue from White Oak Road to Jalna Boulevard (west leg) is identified as part of the City's Cycling Network. The 2016 Cycling Master Plan identifies a proposed buffered bike lane along the study area to be constructed in the medium term (6-15 years). The City's TMP states that the City will require all proposed developments and infrastructure undertakings at the environmental assessment and planning approval stages, to provide facilities for cycling, including extensions and improvements to the bikeway network in keeping with the provisions of this Policy Plan where feasible. Currently there are no bike facilities along this section of Bradley Avenue.

Pedestrian facilities are provided on the north and south side of Bradley Avenue from White Oak Road to Jalna Boulevard (west leg).

3.3.5 Public Transit

Route 28 (White Oaks Malls - Lambeth) runs along Bradley Avenue, from White Oak Road to Jalna Boulevard (west leg) and Route 93 (White Oaks Mall - Masonville Place) runs along Jalna Boulevard (west leg), within the study area. Route 28 includes a stop at White Oak Road and Bradley Avenue and operates Monday to Friday only. Route 93 has a stop located at Jalna Boulevard and Erica Crescent, 115 m north of the intersection of Jalna Boulevard (west leg) and Bradley Avenue and operates Monday to Friday and Sunday.

3.4 Natural Environment

Bradley Avenue between Jalna Boulevard (west leg) and White Oak Road is heavily urbanized with both residential and industrial land use. There is one pocket of naturalized area associated with a drainage channel that crosses Bradley Avenue in a north south direction that is approximately 285 m west of White Oak Road. During a field reconnaissance exercise conducted on October 10, 2019, this drainage feature contained flowing water with a measured width and depth of 1.3 m and 0.15 m, respectively. Shallow water was present within the adjacent floodplain with a width of 3 m to 4 m on each side of the flowing channel. The drainage feature flows south through two concrete culverts, with depths of 0.05 m measured in the culverts. The floodplain is densely vegetated upstream and downstream of Bradley Avenue, including Cattails, European Reed and herbaceous vegetation. Based on aerial imagery, the drainage feature appears channelized upstream and downstream of Bradley Avenue, with a vegetated floodplain and riparian area, surrounded by urban development. Given the observations made during the October 10, 2019 field reconnaissance, this drainage feature may provide fish habitat, however water levels at various times of the year may limit the habitat potential. Snow fall had occurred two days prior to the field visit, and therefore, water level may have been elevated by snow melt. Through a review of the UTRCA online mapping, the drainage feature is considered regulated under *Ontario Regulation 157/06* made under the *Conservation Authorities Act*, with Upper Thames River Conservation Authority (UTRCA).

There is an existing flood hazard in the vicinity of the Bradley Avenue Extension. Currently the extension (near White Oaks Drain) does not provide safe access during the 250 year storm event.

The modelling suggests that the box culverts (conveying flows from the White Oaks Drain under the road) do not have the capacity to pass the 250 year flow, without over-topping the road. The low spot on the road is farther to the east and could potentially cause spill into a residential area south of Bradley Avenue and East of the Drain. If that were to occur, there is no clear pathway for the water to be directed back to the drain.

Modelling suggests that constraints, including the Bradley Avenue culvert and 'old structure' upstream, are causing flooding in residential areas upstream of Bradley Avenue. Therefore, removing the 'old' structure, to improve the capacity and conveyance of the watercourse, should be considered.

The Dingman Phase 2 EA is currently underway. Depending on the recommendations/results of the EA, this location may be subject to structural recommendations in order to reduce flood risk.

As it pertains to the terrestrial environment, several street trees line the road corridor between Jalna Boulevard (west leg) and White Oak Road, with three open fields; 1) at the southeast corner of Bradley Avenue and White Oak Road, 2) at the northeast corner of Bradley Avenue and White Oak Road, and the third at the southwest corner of Bradley Avenue and Jalna Boulevard. All three fields appear to be manicured/maintained, and therefore do not exhibit any significant habitat characteristics.

Based on a review of the Natural Heritage, there are no Natural Heritage Information Centre 1km square grid that encompass the limits associated with the above noted project. The drainage feature is not illustrated on the Department of Fisheries and Oceans Canada Aquatic Mapping tool.

3.5 Noise

The existing Bradley Avenue lane configuration between White Oak Road and Jalna Boulevard in 2018 consists of a 2-lane cross-section between White Oak Road and Jalna Boulevard with additional turning lanes near road intersections. Existing Daytime (16-hour) noise levels at three receptors in the study area were 64.8 dBA, 63.8 dBA and 59.3 dBA respectively.

Further information on the Road Traffic Noise Impact Study is available in **Appendix E**.

3.6 Drainage and Hydrology

The existing Bradley Avenue right-of-way (ROW) consists of a semi-urban cross-section with ditches along the north and south sides. The ROW conveys the major and minor stormwater flows toward the White Oak Channel, located central to the study area. The White Oak Channel drains north to south and conveys an upstream drainage area of approximately 294 ha (ref. Addendum to the Municipal Class Environmental Assessment "Schedule B" for Storm/Drainage and Stormwater Management Servicing Works for the White Oak Area, prepared by AECOM, dated September 23, 2014) beneath Bradley Avenue via a twin 2.42 m x 1.65 m concrete box culvert crossing.

An existing stormwater management facility (SWMF), Pond 2 (P2), is located north of the proposed Bradley Avenue extension, east of Lismer Lane and west of White Oaks Road. The SWMF P2 discharges to a 1200 mm diameter storm sewer within the future Bradley Avenue right-of way (ROW) and conveys flow easterly to the storm sewer outlet at the White Oaks Channel, located 500 m (+/-) east of the SWMF. The emergency overflow spillway from SWMF P2 drains across the future Bradley Avenue ROW, to a remnant channel south of the Bradley Avenue ROW, through private properties to the west roadside ditch of White Oaks Road. Additionally, an existing ditch located adjacent to and parallel to the east side of SWMF P2 conveys drainage to the remnant channel from the upstream area including, the property at 2911 Bateman Trail, and from the Bateman Trail major drainage system.

3.7 Cultural Heritage Resources

Cultural heritage resources include archaeological resources, built heritage resources and cultural heritage landscapes.

3.7.1 Archaeological Resources

The Stage 1 background research indicated that the study area has general archaeological potential, because of its proximity to various features of archaeological potential. Despite the general archaeological potential of the study area, however, a review of 20th century development within the study area through an examination of historical mapping and aerial photographs demonstrates that the study area has been significantly disturbed by deep and extensive modern grading and development activities. These activities have disturbed the study area sufficiently that the study area is considered to have low to no archaeological potential. This conclusion is consistent with the definition of 'disturbance' presented in Section 1.3.2 of the *Standards and Guidelines for Consultant Archaeologists* (MTCS 2011). In addition, a portion of the study area (0.66 ha) has been previously assessed and recommended for no further archaeological assessment.

The Stage 1 Archaeological Assessment can be found in **Appendix H**.

Built Heritage Resources and Cultural Heritage Landscapes The Ministry of Citizenship and Multiculturalism (MCM) *Criteria for Evaluation Potential for Built and Cultural Heritage Landscapes: A Checklist for the Non-Specialist* was completed and identified no cultural or built heritage resources or landscapes within the Study Area. This checklist can be found in **Appendix D**.

3.8 Source Water Protection

Source Water Protection is a program established by the provincial government to ensure that drinking water supplies are not impacted at its source. The Source Protection Area that the Study Area falls within the Upper Thames River. Based on the Source Water Protection Information Atlas by MECP, Upper Thames River Source Protection Area Assessment Report (2021), the Study Area is not within the Wellhead Protection Area, Intake Protection Zone, Issue Contributing Area, Significant Groundwater Recharge Area, Highly Vulnerable Aquifer or Significant Groundwater Quality Threat Area.

4.0 Development and Evaluation of Alternative Planning Solutions

4.1 Problem and Opportunity Definition

The Class EA Addendum examined the need and feasibility for widening improvements on Bradley Avenue to address the 2030 TMP requirements of:

1. **SMART MOVE 1** - Rethinking Growth to Support the TMP
2. **SMART MOVE 2** - Taking Transit to the Next Level
3. **SMART MOVE 3** – Greater Investment in Cycling and Walking Infrastructure
4. **SMART MOVE 4** – More Actively Managing Transportation Demand
5. **SMART MOVE 5** – More Strategic Program of Road Network Improvements

A. ***Improve traffic operations*** - The improvements are required to ensure lane continuity and improve traffic operations from the existing four lane configuration east of Jalna Boulevard (west leg) and to the future four lane Bradley Avenue, west of White Oak Road.

B. ***Provide continuous pedestrian and cyclists facilities*** **-** Existing and future residential development in the area will generate both cyclist and pedestrian traffic along the road corridor. The section of Bradley Avenue from White Oak Road to Jalna Boulevard (west leg) is identified as part of the City's 2016 Cycling Master Plan and through consultation, a need was identified for continuous pedestrian and cyclist facilities along the balance of the corridor.

C. ***Improve traffic, pedestrian and cyclist safety –*** As per the City's 2030 TMP roadway improvements labelled as "Optimization/Transit Priority", a need to optimize intersection improvements at White Oak Road and Bradley Avenue is identified.

D. ***Improve pavement condition*** **-** A pavement investigation was completed and determined that the road is in need of repair. Improvements are needed to address the poor existing pavement conditions.

E. ***Accommodate future municipal services and utilities within the ultimate ROW*** **-** Impacts to existing utilities are anticipated with the proposed work and relocation strategies are to be determined. Future municipal services will need to be accommodated.

4.2 Identification of Planning Alternatives

Based on Phase 2 of the 2030 TMP, the following planning alternatives were identified for consideration in addressing the problems and opportunities discussed above:

Scenario 1 (Sustain Existing Levels): 1% Annual Growth / 22% Intensification / 10% Transit Shares
Least expensive and easiest to achieve but does not do enough to increase transportation choice.

Scenario 2 (More Balanced): 1% Annual Growth / 40% Intensification / 15% Transit Shares
More choice, more inclusive, reduces pollution and improves health, but may not be enough to get people out of cars.

Scenario 3 (Transit Focused): 2% Annual Growth / 40% Intensification / 20% Transit Shares
More choice, more inclusive, increases transit ridership and promotes a transit culture, but requires a large investment and growth may not be sufficient to support it. Preliminary Screening of Alternatives

Scenario 1 is essentially the "Do Nothing" alternative to provide a benchmark for comparison to other planning alternatives. Scenario 1 was deemed unacceptable as it does not support rapid transit, downtown growth and is unsustainable for the City's long-term vision. A combination of Scenarios 2 and 3 were chosen as the preferred planning solution as this combined scenario from flexibility in plan implementation This also allows the City to invest appropriately in the required infrastructure to accommodate the expect growth. The 2030 TMP provides further details about the scenarios and the 2030 TMP Executive Summary is included in Appendix G.

5.0 Alternatives Design Concepts and Assessments

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

Alternative 1: Do nothing

Alternative 2: Widen Bradley Avenue along the Centerline (both North and South; Figure 5-1).

Alternative 3: Widen Bradley Avenue along North Side (Figure 5-2).

Alternative 4: Widen Bradley Avenue along the South Side (Figure 5-3).

After considering all issues in relation to each other, Alternative 2: Widen Bradley Avenue symmetrically along the centerline is the preferred solution. This option facilitates construction of the roadway cross section including the active transportation facilities within the existing ROW on both sides of the roadway. A detailed assessment of the alternatives can be found in Table 5-2.

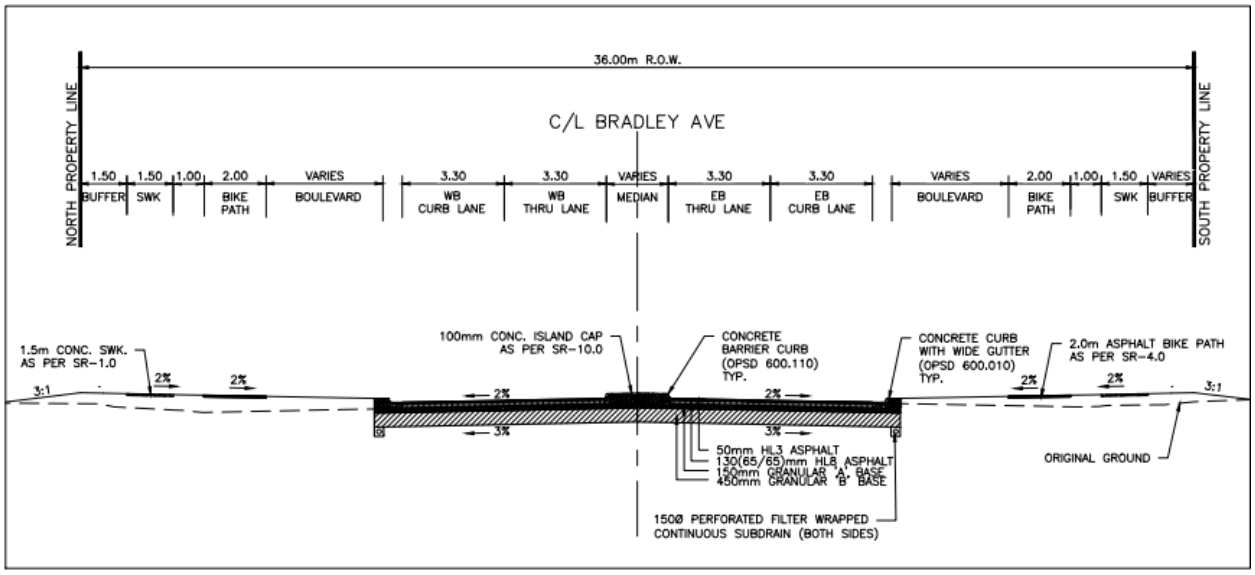


Figure 5-1: Alternative 2 - Widen Bradley Avenue Along Symmetrically the Centreline (both North and South) - Preferred

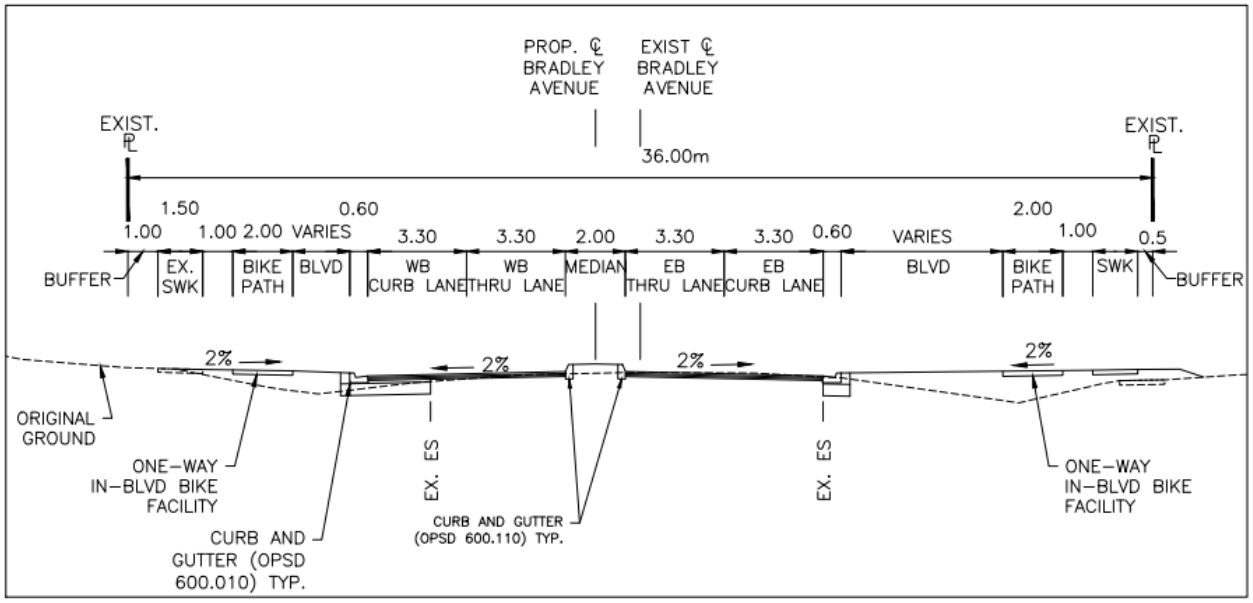


Figure 5-2: Alternative 3 - Widen Bradley Avenue along North Side

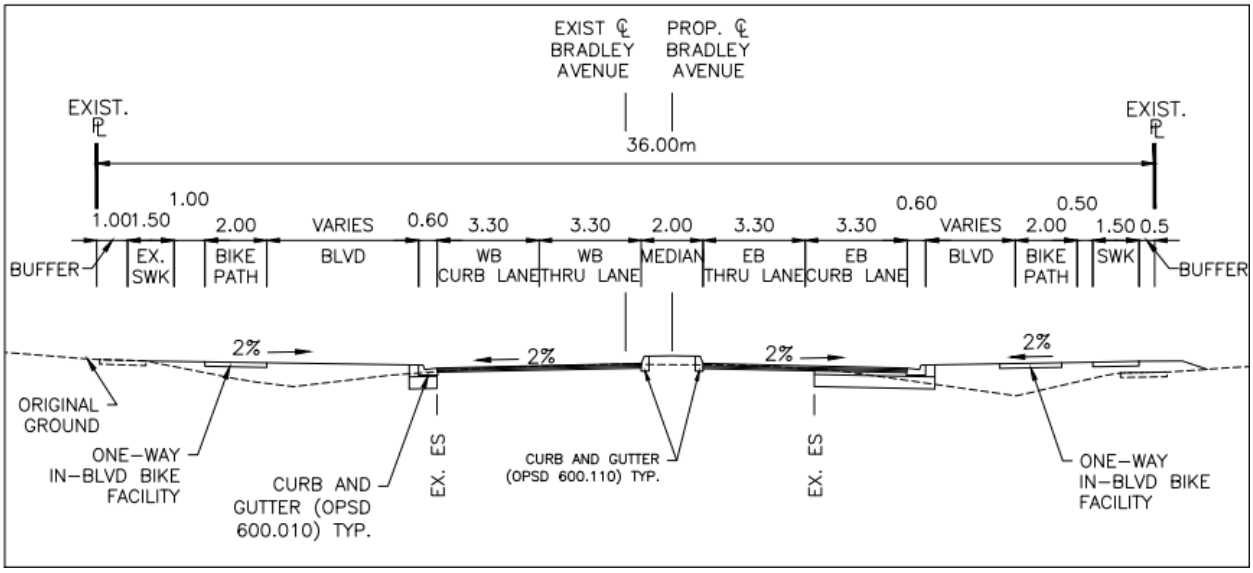


Figure 5-3: Alternative 4 - Widen Bradley Avenue along the South Side

In assessing the design alternatives, a range of environmental issues have been addressed and potential avoidance or mitigation of negative effects considered. As a key part of assessing design alternatives, this study has identified an evaluation criterion in Section 5.1 that reflect the concerns of the City and various important stakeholders. Table 5-2 provides an assessment of the design alternatives based on these criteria.

5.1 Evaluation Criteria

As part of the initial phases of this study the following preliminary evaluation criteria were developed to reflect the concerns of various stakeholders. Table 5-1 provides a description of the evaluation criteria used in subsequent phases of the study:

Table 5-1: Evaluation Criteria for Design Alternatives

Component	Evaluation Criteria	Description
Social / Land Use / Cultural Environment	Impacts to Existing Property	Potential impact to existing properties within the Study Area (i.e., property value impacts)
	Compatibility with City Plans and Policies	Presence, number and characteristics of residences, community facilities, public parks, institutions, or businesses within or adjacent to the Study Area.
	Construction Disruptions	Potential impacts to traffic patterns and dust as a result of construction.
	Archaeological and Cultural Heritage Impacts	Potential adverse effects on archaeological and cultural heritage features.
	Noise Impacts	Impact on noise levels at noise sensitive receivers during construction and during operation.
	Air Quality	Ability to reduce emissions associated with transportation within the Study Area.
Natural Environment	Vegetation	Potential adverse effects on terrestrial species and habitats.
	Wildlife	Potential adverse effects on existing wildlife due to disturbance or loss of habitat.
	Fish and Aquatic Habitat	Potential to minimize impact on aquatic features.
	Surface Water Quality and Quantity	Potential adverse effect on surface water quality and flood potential.
Transportation and Technical	Access Considerations	Potential impacts to existing private property entrances.
	Travel Delay / Traffic Capacity	Potential impacts to traffic
	Geometrics & Safety	Ability to improve vehicular and active transportation safety.
	Active Transportation	Ability to contribute to the active transportation network throughout the corridor including consideration of active transportation type and design and access to destinations along the corridor.
	Utility Relocation	Ability to minimize effects on existing and proposed utilities.
Costs	Capital Cost (Including Maintenance/Life Cycle Cost)	Capital costs of the proposed improvements and maintenance costs.

Table 5-2: Assessment of Design Alternative

Component	Evaluation Criteria	Alternative 1: Do Nothing	Alternative 2: Widen Bradley Avenue Symmetrically Along the Centerline (both North and South)	Alternative 3: Widen Bradley Avenue Along the South Side	Alternative 4: Widen Bradley Avenue Along the North Side
Social / Land Use / Cultural Environment	Impacts to Existing Property	No impacts to existing property.	The widening is contained within the City's ROW.	The widening is contained within the City's ROW. There may be temporary grading impacts outside the ROW.	The widening is contained within the City's ROW. There may be temporary grading impacts outside the ROW.
	Compatibility with City Plans and Policies	Not compatible with the recommendations of the 2030 TMP.	Widening in accordance with the recommendations of the 2030 TMP.	Widening in accordance with the recommendations of the 2030 TMP.	Widening in accordance with the recommendations of the 2030 TMP.
	Construction Disruptions	No construction disruption.	Nuisance impacts (noise, dust and vibration).	Nuisance impacts (noise, dust and vibration).	Nuisance impacts (noise, dust and vibration).
	Archaeology and Cultural Heritage	No archaeology and cultural heritage impacts.	No archaeology and cultural heritage impacts.	No archaeology and cultural heritage impacts.	No archaeology and cultural heritage impacts.
	Noise Impacts	No noise impacts.	Noise impacts during construction. Anticipated minor noise increase with the new roadway extension west of	Noise impacts during construction. Anticipated minor noise increase with the new roadway extension west of	Noise impacts during construction. Anticipated minor noise increase with the new roadway extension west of
	Air Quality	No air quality impacts.	Potential for incremental increase in emissions.	Potential for incremental increase in emissions.	Potential for incremental increase in emissions.
Natural Environment	Vegetation	No impacts to vegetation.	Reduction in the available green space adjacent to the road, due to the addition of a bike lane and widening of road.	Reduction in the available green space adjacent to the road, due to the addition of a bike lane and widening of road.	Reduction in the available green space adjacent to the road, due to the addition of a bike lane and widening of road.
	Wildlife	No impacts.	No impacts.	No impacts.	No impacts.
	Fish and Aquatic	No impacts.	No impacts.	No impacts.	No impacts.
	Surface Water Quality and Quantity	No impacts.	Increased impervious area and therefore increased stormwater runoff peak flows and volumes. No grading impacts to the White Oak Drain crossing.	Increased impervious area and therefore increased stormwater runoff peak flows and volumes. Potential grading impacts to White Oak Drain crossing along the north side.	Increased impervious area and therefore increased stormwater runoff peak flows and volumes. Potential grading impacts to White Oak Drain crossing along the south side.
Transportation and Technical	Access Considerations	No impact to existing entrances.	No impact to existing entrances.	No impact to existing entrances.	No impact to existing entrances.
	Travel Delay / Traffic Capacity	Existing two lanes may cause a bottleneck and traffic congestion, as Bradley Avenue is four lanes on either side of the intersections.	Temporary lane closures may be required during construction.	Temporary lane closures may be required during construction.	Temporary lane closures may be required during construction.
	Geometric & Safety	No improvements to geometry and safety.	Maintain existing roadway centreline alignment with widening on both sides to accommodate additional through lanes.	Shifting existing roadway alignment northerly and widen on north side only to accommodate additional through lanes.	Shifting existing roadway alignment southerly and widen on south side only to accommodate additional through lanes.
	Active Transportation	Currently there are no active transportation facilities and do nothing would result in no improvement.	Opportunity to provide active transportation. Bike lanes and sidewalks proposed. This alternative provides the greatest separation between active transportation users and vehicles on both sides of the	Opportunity to provide active transportation. Bike lanes and sidewalks proposed.	Opportunity to provide active transportation. Bike lanes and sidewalks proposed.
	Utility Relocation	No relocation required.	Relocation of existing hydro poles required. Boulevard available on both sides for utility relocations.	Relocation of existing hydro poles required. Boulevard available on south side only for utility relocations.	Relocation of existing hydro poles required. Boulevard available on north side only for utility relocations.
Costs	Capital Cost	No cost.	Lowest capital cost	Increase cost due to additional asphalt padding for crossfall correction for alignment shift.	Increase cost due to additional asphalt padding for crossfall correction for alignment shift.

Component	Evaluation Criteria	Alternative 1: Do Nothing	Alternative 2: Widen Bradley Avenue Symmetrically Along the Centerline (both North and South)	Alternative 3: Widen Bradley Avenue Along the South Side	Alternative 4: Widen Bradley Avenue Along the North Side
			Alternative 2: Widen Bradley Avenue Along the Centerline (both North and South) - <u>Preferred</u>		

Legend | **Most Preferred** | | **Neutral** | | **Least Preferred**

6.0 Description of Preferred Design

6.1 Major Features of the Recommended Plan

The Preferred Alternative was selected based on safety, geometric considerations (ability to maintain the existing centreline) and the lowest cost alternative. The preferred alternative is located in **Appendix F**.

6.1.1 Design Criteria

The design criteria is provided in Table 6-1.

Table 6-1: Design Criteria

Criteria	Existing Conditions	Design Standards	Proposed Standards	Reference
Roadway Classification	Arterial	Major Arterial	Major Arterial Divided	
Number of Through Lanes	2	2	2	
Design Speed (Kph)	70	70	70	
Posted Speed (Kph)	60	60	60	
Minimum Stopping Sight Distance (M)	105	105	105	Table 2.5.2 TAC 2017
Minimum 'K' Factor	Crest – NA Sag - 80	Crest – 17 Sag - 23	Crest – NA Sag – 80	TAC Table 3.3.2, 3.3.4 & 3.3.5
Road Grade Maximum	6.0%	6.0%	6.0%	TAC Section 3.3.1
Road Grade Minimum	0.5%	0.50%	0.50%	TAC Section 3.3.2.5
Minimum Radius (M)	230	200 4% emax (Superelevation) 190 6% emax (Superelevation)	250	TAC Table 3.2.4
Lane Widths Through Lanes (M)	3.75	3.3	3.3	City of London Roadway Standards
RT Lanes (M)	3.0	3.0	3.0	City of London Roadway Standards
LT Lanes (M)	3.0	3.0	3.0	City of London Roadway Standards
Curb Lanes (M)	3.75	3.3	3.3	City of London Roadway Standards
Lane Tapers (m) RT Lanes (Without Auxiliary lanes)	NA	63	63	TAC Table 9.14.1 & Table 9.14.2 & Table 9.17.1

Criteria	Existing Conditions	Design Standards	Proposed Standards	Reference
RT Lanes (With Parallel Deceleration lanes) Parallel lane length design domain	NA NA	51-60 50-110	51-60 50-110	
LT Lanes	NA	45-126	45-126	
Sidewalks (m)	1.5	1.5 (At Boulevard) 1.8 (At curb-face)	1.5 (At Boulevard)	City of London Roadway Standard 2.1.16
Active Transportation/Multi-use Path (m)	NA	Unidirectional 1.5 – 3.0(Practical Limit) Bidirectional 2.4 – 4.0 (Practical Limit)	Unidirectional 2.0	TAC Table 5.3.4
Row Width (m)	36	36	36	City of London Roadway Standards
Shoulder Width (m)	1.8	NA – Urban Design	NA – Urban Design	City of London Roadway Standards 2.1.5

TAC – Transportation Association of Canada

6.1.2 Horizontal Alignment

The existing road centerline was determined to minimize impacts and will generally be maintained.

6.1.3 Vertical Alignment

The vertical alignment was set based on the proposed geometric design standards outlined in the design criteria above. The vertical profile has also been set to match constraints including intersecting sideroads and entrances.

6.1.4 Active Transportation

The preliminary preferred alternative will include a bike lane and a sidewalk on either side of Bradley Avenue within the Study Area.

6.1.5 Construction Schedule

The construction timing will need to be coordinated with the adjacent Bradley Avenue extension from Wharncliffe Road South to White Oak Road (anticipated for construction in 2023) and will be determined based upon securing necessary approvals, completion of design, and funding.

6.1.6 Property Requirements

No private properties will be required for the widening of Bradley Avenue. All works will be contained within the road ROW.

6.1.7 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.

6.1.8 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. Further coordination will be required during detailed design to determine any conflicts with proposed work. The existing utilities are identified on the preliminary design drawings.

6.1.9 Preliminary Cost Estimate

The preliminary cost estimate is provided in Table 6-2. It should be noted that the preliminary cost estimate may change once the detailed design phase is completed.

Table 6-2: Preliminary Cost Estimate

Item No.	Item	Quantity	Unit	Unit Price	Total
	Section A - Roadway				
1	Bonding	1	LS	$ 50,000.00	$ 20,000.00
2	Mobilziation and Demobilization	1	LS	$ 50,000.00	$ 20,000.00
3	Traffic Control and Construction Staging	1	LS	$ 50,000.00	$ 50,000.00
4	Construction Layout	1	LS	$ 20,000.00	$ 20,000.00
5	Field Office	1	LS	$ 20,000.00	$ 10,000.00
6	Removal of Asphalt Pavement (Full Depth)	7700	m2	$ 10.00	$ 77,000.00
7	Removal of Concret Curb and Gutter	250	m2	$ 20.00	$ 5,000.00
8	Removal of Concrete Sidewalk	130	m2	$ 25.00	$ 3,250.00
9	Removal of Manholes, Catchbasins and Ditch Inlets	4	each	$ 650.00	$ 2,600.00
10	Removal of Pipe Sewers	25	m	$ 70.00	$ 1,750.00
11	Earth Excavation	6290	m3	$ 25.00	$ 157,250.00
12	Hot Mix Asphalt HL3 (50mm)	900	t	$ 150.00	$ 135,000.00
13	Hot Mix Asphalt HL8 (130mm)	2330	t	$ 125.00	$ 291,250.00
14	Granular A (150mm)	2330	t	$ 30.00	$ 69,900.00
15	Granular B (450 mm)	5820	t	$ 25.00	$ 145,500.00
16	Curb and Gutter OPSD 600.010	960	m	$ 65.00	$ 62,400.00
17	Curb and Gutter OPSD 600.110	960	m	$ 65.00	$ 62,400.00
18	Concrete Sidewalk	1440	m2	$ 100.00	$ 144,000.00
19	Asphalt Bike Path	1920	m2	$ 90.00	$ 172,800.00
20	Subdrain - 150mm Diameter	960	m	$ 40.00	$ 38,400.00
21	600x600 Side Inlet Catchbasin	6	each	$ 5,550.00	$ 33,300.00
22	600x1200 Side Inlet Double Catchbasin	2	each	$ 6,500.00	$ 13,000.00
23	250mm Diameter Catchbasin Lead	80	m	$ 315.00	$ 25,200.00
	Total Section A - Roadway				**$ 1,560,000.00**
	Section B - Structural				
1	White Oaks Drain Culvert Replacement	1	LS	$ 2,000,000.00	$ 2,000,000.00
	Total Section B - Structural				**$ 2,000,000.00**
	Section C - Electrical				
1	Traffic Signals	1	LS	$ 300,000.00	$ 300,000.00
2	Roadway Illumination	1	LS	$ 100,000.00	$ 100,000.00
	Total Section C - Electrical				**$ 400,000.00**
	SUMMARY				
	Total Section A - Roadway				$ 1,560,000.00
	Total Section B - Structural				$ 2,000,000.00
	Total Section C - Electrical				$ 400,000.00
	Subtotal				$ 3,960,000.00
	Minor Items and Contingencies (25% - Rounded)				$ 990,000.00
	TOTAL				**$ 4,950,000.00**

6.1.10 Agency Approvals

Agency approvals are required before construction can begin. Approval requirements are summarized in Table 6-3.

Table 6-3: Required Agency Approvals / Permitting Requirements

Agency	Approval / Permit Required	Comments
Potentially Required (To be confirmed in the Detailed Design stage)		

Agency	Approval / Permit Required	Comments
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 Natural Resources and Forestry	Work Permit	Any in-water works will require an application for a Work Permit under the Public Lands Act
Ministry of the Environment, Conservation and Parks	Management of Excess Soil O. Reg. 406/19	Management of excess soil (including excavation, transportation, temporary storage, and disposal) will be completed in accordance with O. Reg. 406/19 and the ministry's current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014). The amount of excavated soil and/or imported soil will be determined during detailed design phase through the development of a Soil Management and Fill Management Plan.
Ministry of Citizenship and Multiculturalism	Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18	Any Stage subsequent archaeological studies need to be completed and entered into the Ontario Public Register of Archaeological Reports.

6.2 Environmental Impacts and Commitments

6.2.1 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.

6.2.2 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[1].

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 Ministry of Environment/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.

Further information on the Road Traffic Noise Impact Study is available in **Appendix E**.

6.2.3 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. 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.

Typical mitigation measures include the control of air quality impacts from dust releases around the construction sites and construction equipment and includes the following:

1 The Future 'build' 2030 scenario consists of proposed Bradley Avenue extension between Wharncliffe Road South and White Oak Road, and the widening of existing Bradley Avenue between White Oak Road and Jalna Boulevard.

The Future 'no-build' 2030 scenario consists of same lane configurations as the existing Bradley Avenue lane configuration in 2018 (a 2-lane cross-section between White Oak Road and Jalna Boulevard with additional turning lanes near road intersections) but with increased traffic volumes due to forecasted population and employment growth.

- During construction, vehicles / machinery and equipment will be in good repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements.
- A minimal number of machines operating in any one area shall be carefully considered during construction activities.
- Water and dust suppressants (non-chloride) will be applied during construction to protect air quality due to dust.

6.2.4 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, increase stormwater runoff peak flows and volumes contributing to the P2 SWM facility and eliminate the drainage existing connection between the P2 SWM facility emergency overflow spillway and the remnant channel.

The proposed conditions drainage area is less than the 161.70 ha (+/-) that the SWM facility had initially been designed for. The performance criteria for the SWM facility includes maintaining 30 cm of freeboard from the 100 year water surface elevation to the emergency overflow elevation and not overtopping during the 250 year storm event. The P2 SWM facility performance results indicate that the 100 year water surface elevation would exceed the 30 cm freeboard for the 6 hour Chicago and 24 hour SCS storm event distributions while the 250 year water surface elevation would overtop the emergency spillway for those same storm event distributions.

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.

Stormwater quality controls are required to treat the increased impervious areas within the study area. As per the 2014 Municipal Class EA Addendum report (ref. AECOM, 2014), 70% total suspended solids removal (i.e., MECP Normal Level) water quality controls are required. Water Quality controls are recommended to be provided in the form of Low Impact Development Best Management Practices. A long list of Low Impact Development Best Management Practices should be evaluated at the detailed design stage.

The capacity of SWMF P2 was assessed with consideration of the proposed Bradley Avenue ROW profile, a review of the SWMF P2 outlet structure, and SWM quality control for the Bradley Avenue extension. 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. This includes lowering the permanent pool depth from 1.35 m to 1 m and

configure the east side of the pond to eliminate the interim by-pass channel to provide additional storage volume for the pond, thereby increasing the total storage volume from the permanent pool water surface elevation to the emergency overflow elevation, while still providing Level 1 (Enhanced) water quality treatment for the contributing drainage area. The outlet structure would also have to be reconfigured to address the revised storage volume and associated head implications;

2. Three (3) storm sewer systems were preliminarily sized for the Bradley Avenue extension using the Rational Method. One (1) storm sewer, sized for the 5 year storm event, will discharge to the existing Paulpeel Avenue storm sewer and ultimately to the P2 SWM facility, while two (2) storm sewers, sized for the 250 year storm event, will discharge directly to the P2 SWM facility. 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 oil-grit separator 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. A single 5486 mm x 1524 mm box culvert was preliminarily sized with a rise of 500 mm to provide conveyance for the controlled 50 and 100 year storm event peak flow rates and the uncontrolled 250 year storm event peak flow rate for the channel located near Station 10+620. 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.

6.2.5 Archaeology

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.

Where archaeological resources are impacted by EA project work, MCM will be notified by contacting archaeology@ontario.ca. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the Standards and Guidelines for Consultant Archaeologists.

If human remains are encountered, all activities must cease immediately, and the local police and coroner must be contacted. In situations where human remains are associated with archaeological resources, MCM should also be notified (at archaeology@ontario.ca) to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

The Stage 1 Archaeological Assessment can be found in **Appendix H**.

6.2.6 Source Water Protection

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

6.2.7 Climate Change Considerations

The MECP requires all Municipal Class EA's to consider climate change. On April 23, 2019, the City declared a climate emergency for the purposes of naming, framing and deepening its commitment to

protecting its economy, ecosystems and its communities from climate change. Two approaches for considering and addressing climate change include:

- Reducing a project's effect on climate change (climate change mitigation).
- Increasing the projects and local ecosystem's resilience to climate change (climate change adaptation).

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. 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. Climate change mitigation has been considered in the preliminary scoping of stormwater management features.

7.0 Summary of Environmental Effects, Proposed Mitigation, Commitment to Further Work

Table 7-1: Summary of Environmental Effects, Proposed Mitigation and Commitment to Further Work

Category	Expressed By	Details
Natural Environment	MECP, UTRCA, MNRF	Standard avoidance and mitigation measures to be developed during detailed design, inclusive of respective timing windows.
		Exact details pertaining to timing to be discussed with the UTRCA as part of the permitting and approval process during detailed design.
Geotechnical	MECP	A Geotechnical Report was conducted during the Class EA Addendum, however, was not finalized at the time of completion of the Class EA Addendum. As such, further work is required in detailed design to finalize the Geotechnical Report and undertake/implement the recommendations from the Report.
Noise	MECP	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	MECP	During construction, vehicles / machinery and equipment will be in good repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements.
		A minimal number of machines operating in any one area shall be carefully considered during construction activities.
		Water and dust suppressants (non-chloride) will be applied during construction to protect air quality due to dust.
Drainage and Hydrology	City of London, UTRCA	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 MNRF vehicle ingress and egress in flood water criteria.
		Water Quality controls are recommended to be provided in the form of Low Impact Development Best Management Practices. A long list of Low Impact Development Best Management Practices should be evaluated at the detailed design stage.
		UTRCA will also be consulted during detailed design regarding the possibility of upgrading the White Oak Drain.
Excess Soil	MECP	Management of excess soil (including excavation, transportation, temporary storage, and disposal) will be completed in accordance with O. Reg. 406/19 and the ministry's current guidance document titled

Category	Expressed By	Details
		"Management of Excess Soil – A Guide for Best Management Practices" (2014). The amount of excavated soil and/or imported soil will be determined during detailed design phase through the development of a Soil Management and Fill Management Plan.

7.1 Monitoring

A monitoring program will be established to ensure that the mitigation measures specified in Table 7-1 are undertaken. The key impacts to the environment are the short-term impacts that require monitoring during construction. The construction of this project will be monitored on site by city representatives (Contract Administrator) to ensure that the Contractor is implementing standard construction practices. This will include erosion and sedimentation control, dust and noise control, protection of existing vegetation, assurance of traffic safety and maintenance of traffic flow without causing unnecessary delays, etc. The overall performance and effectiveness of the environmental mitigating measures specified to be monitored and assessed during and subsequent to the construction of the project.

The environmental impacts outlined in this section are considered as normal impacts associated with roads construction, the established standard construction practices outlined as the mitigating measures will be incorporated in the contract documents. The Contract Administrator is to ensure that these mitigating measures are undertaken during construction. Should unforeseen environmental concerns and/or issues arise during the construction period, the appropriate ministry and agencies will be contacted, and appropriate measures will be taken to mitigate the environmental concerns / issues.

7.2 Commitments to Further Investigations

Commitments to further investigation during detailed design stage are:

- Utilities coordination and possible sub-surface utility engineering to determine types, location, and depths of the existing and any new facilities;
- Detailed Stormwater Management design and coordination with agencies;
- Completion of the Geotechnical Report;
- Construction Phases/implementation;
- Evaluate options to reduce flood risk and provide dry access on Bradley Avenue; and
- Construction Staging & Detour.

Additional investigations identified by agencies (Refer **Appendix A – '**Agency Consultation' for details).

Appendix A

Public and Agency Consultation

Appendix B

Indigenous Consultation

Appendix C

Utility Consultation

Appendix D

Criteria for Evaluation Potential for Built and Cultural Heritage Landscapes: A Checklist for the Non-Specialist

Appendix E

Noise Report

Appendix F

Design Drawings

Appendix G

2030 TMP

Appendix H

Stage 1 Archaeological Assessment

Limitations

Limitations

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
    a. The Standard Terms and Conditions which form a part of our Professional Services Contract;
    b. The Scope of Services;
    c. Time and Budgetary limitations as described in our Contract; and
    d. The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The conclusions presented in this report were based, in part, on visual observations of the Site and attendant structures. Our conclusions cannot and are not extended to include those portions of the Site or structures, which are not reasonably available, in Wood's opinion, for direct observation.
4. The environmental conditions at the Site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the Site with any applicable local, provincial or federal bylaws, orders-in-council, legislative enactments and regulations was not performed.
5. The Site history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on-site and may be revealed by different or other testing not provided for in our contract.
7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, Wood must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
8. The utilization of Wood's services during the implementation of any remedial measures will allow Wood to observe compliance with the conclusions and recommendations contained in the report. Wood's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Wood accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of Wood.
11. Provided that the report is still reliable, and less than 12 months old, Wood will issue a third-party reliance letter to parties that the client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on Wood's report, by such reliance agree to be bound by our proposal and Wood's standard reliance letter. Wood's standard reliance letter indicates that in no event shall Wood be liable for any damages, howsoever arising, relating to third-party reliance on Wood's report. No reliance by any party is permitted without such agreement.