TO:	**CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON JUNE 19, 2018**
FROM:	**KELLY SCHERR, P. ENG., MBA, FEC MANAGING DIRECTOR, ENVIRONMENTAL & ENGINEERING SERVICES AND CITY ENGINEER**
SUBJECT:	**VICTORIA BRIDGE ENVIRONMENTAL STUDY REPORT**

RECOMMENDATION

That, on the recommendation of the Managing Director, Environmental & Engineering Services and City Engineer, the following actions **BE TAKEN** with respect to the Victoria Bridge Environmental Assessment:

(a) Victoria Bridge Municipal Class Environmental Study Report **BE ACCEPTED**;

(b) A Notice of Completion for the project **BE FILED** with the Municipal Clerk;

(c) The Environmental Study Report **BE PLACED** on public record for a 30 day review period; and,

(d) The Victoria Bridge Replacement **BE CONSIDERED** in future multi-year capital budget developments.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

- Strategic Priorities and Policy Committee – January 28, 2016 – Downtown Infrastructure Planning and Coordination
- Civic Works Committee – November 1, 2016 – Environmental Assessment Appointment of Consulting Engineer
- Strategic Priorities and Policy Committee – November 21, 2017 – Downtown Infrastructure Construction Project Coordination

2015-19 STRATEGIC PLAN

The following report supports the Strategic Plan through the strategic focus area of *Building a Sustainable City* by implementing and enhancing safe and convenient mobility choices for transit, automobile users, pedestrians, and cyclists and creating beautiful places and spaces. The completed Environmental Assessment has identified a solution to the aging Victoria Bridge, recommending a full replacement structure which will address connectivity issues for all users while providing a distinctive unique design for the replacement structure that will enhance the Thames River Corridor.

BACKGROUND

Purpose

This report provides Committee and Council with an overview of the Municipal Class Schedule C Environmental Assessment (EA) for Victoria Bridge and seeks approval to finalize the study. The EA process was thorough and responsive to the feedback received. The completed Environmental Study Report (ESR) documents the preferred course of action for the Victoria Bridge. The ESR recommendation considers the deteriorated condition of the structure combined with opportunities for better transportation mobility provided by a replacement structure.

Background

Victoria Bridge (6-BR-19) is located on Ridout Street South and spans the south branch of the Thames River, just south of Horton Street as shown on Figure 1. The current two-span, seven panel modified Warren steel pony truss bridge was constructed in 1926 and is the fourth bridge at this location. The structure is 78 m long, with cantilevered sidewalks and railings on the outside of the trusses bring the overall width of the structure to 14.8 m.

Figure 1: Site Photo

Historic records indicate the pre-existing 1875 bridge abutments and pier were retained during the 1926 construction and concrete extensions were constructed on the west side to accommodate the new wider structure. Remaining portions of the stone masonry substructure from the previous bridge (built in 1875) were concrete encased. A 1956 rehabilitation of the structure saw the south abutment and wingwalls fully replaced with reinforced concrete founded on H-piles. The original centre pier and north abutment remain as originally constructed in 1875 and subsequently widened.

Victoria Bridge is experiencing extensive deterioration resulting in ongoing and escalating maintenance repairs including emergency repairs to address deck delaminations, a major full perforation of the truss in one location near the road surface, removal of loose concrete from the underside of the bridge, expansion joint replacement

and emergency repairs to concrete encase the severely corroded deck stringers at the abutments. Other recommended work required in the near term includes additional structural steel repairs, recoating of the steel, full deck replacement, replacement of the bearings and expansion joints, and foundation strengthening. As a result, a major lifecycle renewal investment to either replace or rehabilitate the structure is warranted. Due to the age of the structure, a Schedule 'C' Municipal Class EA and preliminary design must be completed to determine the planning and design solution for the structure. The EA process undertakes technical study combined with the input from a variety of stakeholders to determine the best course of action for renewal.

Context

Ridout Street South is a neighbourhood connector street (formerly primary collector) which accommodates an average of 12,000 vehicles per day connecting Old South London to the downtown across the south branch of the Thames River. Ridout Street is also a major north south corridor in the City's Cycling Master Plan. Bicycle lanes exist to the south of the structure, but the truss on the existing bridge has prevented the extension of the bicycle lanes across the river.

The Thames Valley Pathway (TVP) passes under the north end of the bridge adjacent to the river. The existing path crossing is of substandard width with compromised sightlines. Plans to upgrade this pathway system are currently on hold pending the resolution of this EA. Thames Park is located to the southwest of the bridge.

The area northwest of the bridge is historically known for coal tar deposits with containment and monitoring facilities in the area. The area north-east of the bridge where London Hydro is located has long been used for industrial purposes. London Hydro has an access driveway on the north east side of the bridge that must be maintained for emergency ingress and egress.

There are various utilities suspended beneath this structure including watermain, sanitary sewer, Bell Canada and Union Gas. Also there are storm outlets to the river in the near vicinity of the bridge, and a sanitary forcemain that carries flows from the Thames Park facility southwest of the bridge to a sanitary sewer on Ridout Street South - approximately 20 m south of the bridge's south expansion joint.

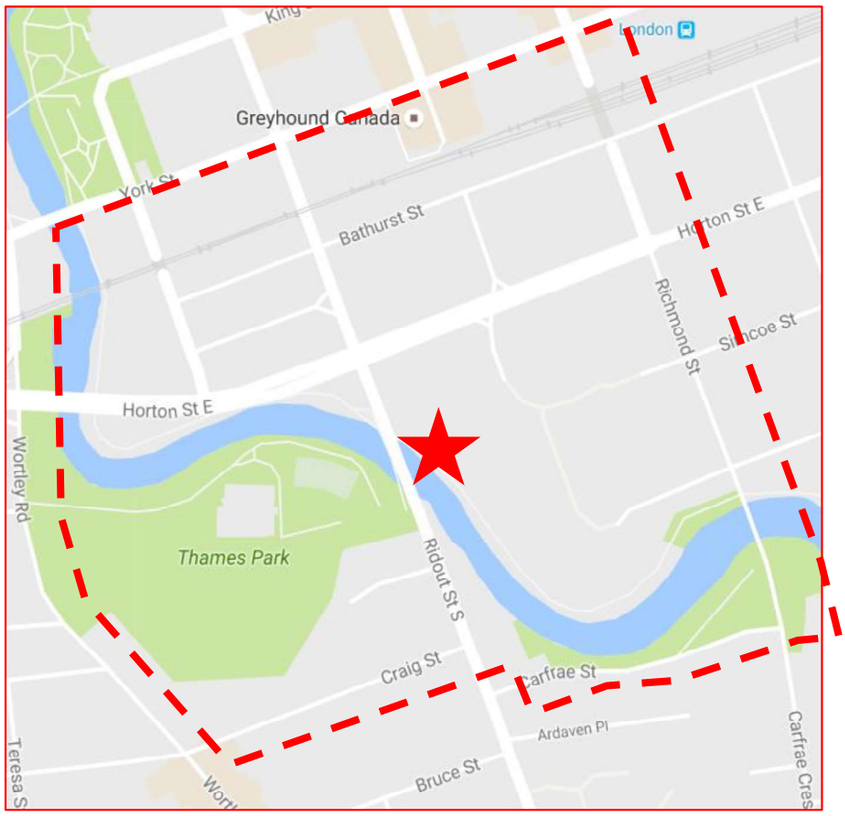
While Victoria Bridge demonstrates cultural heritage, it is not designated under the Ontario Heritage Act. The *City of London Inventory of Heritage Resources* includes the following properties within or adjacent to the study area:

- Wortley Village – Old South Heritage Conservation District South of the bridge, Ridout Street serves as the eastern boundary to the Wortley Village/Old South Heritage Conservation District (HDC).
- 37 Ridout Street S - designated under Part IV and Part V of the *Ontario Heritage Act.*

DISCUSSION

The Victoria Bridge Class EA Study was carried out in accordance with Schedule 'C' of the Municipal Class Environmental Assessment (Class EA) document (October 2000, amended 2007, 2011, and 2015). The Class EA process is approved under the Ontario Environmental Assessment Act and outlines the process whereby municipalities can comply with the requirements of the Ontario Environmental Assessment Act.

This Class EA study provided a comprehensive, environmentally sound planning process with public participation and facilitated dialogue. This Environmental Study Report (ESR) documents the decision making process carried out during the Victoria Bridge Class EA study. See below for a map illustrating the study limits.



Victoria Bridge EA Study Limits Map

Evaluation

The Problem / Opportunity Statement developed for the EA is as follows:

> Constructed in 1926, Victoria Bridge is located on Ridout Street over the South Branch of the Thames River in the City of London. Ridout Street is an important link to downtown and a designated north-south bicycle route. However, Victoria Bridge does not have sufficient width to accommodate dedicated bicycle lanes which is a safety concern. Recent bridge inspections also identified ongoing issues of deterioration which may reduce the structural capacity of the bridge. Given the age of the bridge, existing conditions, functional deck width, structural capacity, potential heritage value and other considerations, the Class EA study shall identify a solution to address structural deficiencies and accommodate all users through bridge rehabilitation or replacement.

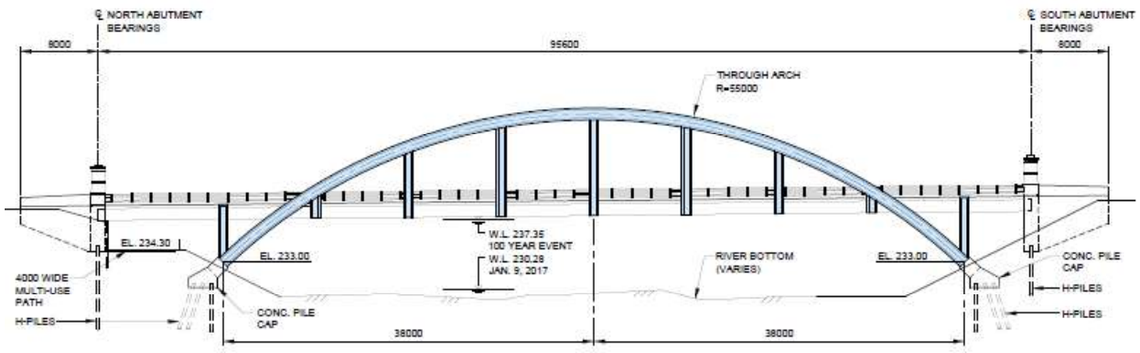
In accordance with the process, the EA evaluated the following alternatives:

- Do Nothing (not a viable alternative)
- Major Rehabilitation of the existing bridge with improved accommodation of pedestrians and cyclists
- Keep the bridge, re-purpose for active transportation and build a new bridge downstream (west side)
- Remove the existing bridge and build new bridge on existing alignment
- Remove the existing bridge and build new bridge on new alignment downstream (west side)

The evaluation of the alternatives was based on the criteria of Social/Cultural Environment, Socio-Economic Environment, Natural Environment, Technical Environment and Economic Environment. Within the Social/Cultural Environment category, the Ontario Heritage Bridge Guidelines (Interim 2008) hierarchy of heritage conservation actions to be considered during rehabilitation were considered within the Heritage Impact Statement.

Preferred Alternative

The preferred alternative recommended through the EA is to completely remove the existing structure and replace it with a new Through Arch bridge on the existing alignment. The preferred alternative will address the lifecycle renewal needs of the aging structure and will provide improved functionality with space to accommodate improved cycling and walking facilities. The attractive design is sympathetic to the design qualities of the original bridge and its setting. A bridge replacement can also provide improved climate change protection by raising the clearance of the bridge above the river and removing the centre pier which blocks debris and impedes river flows.

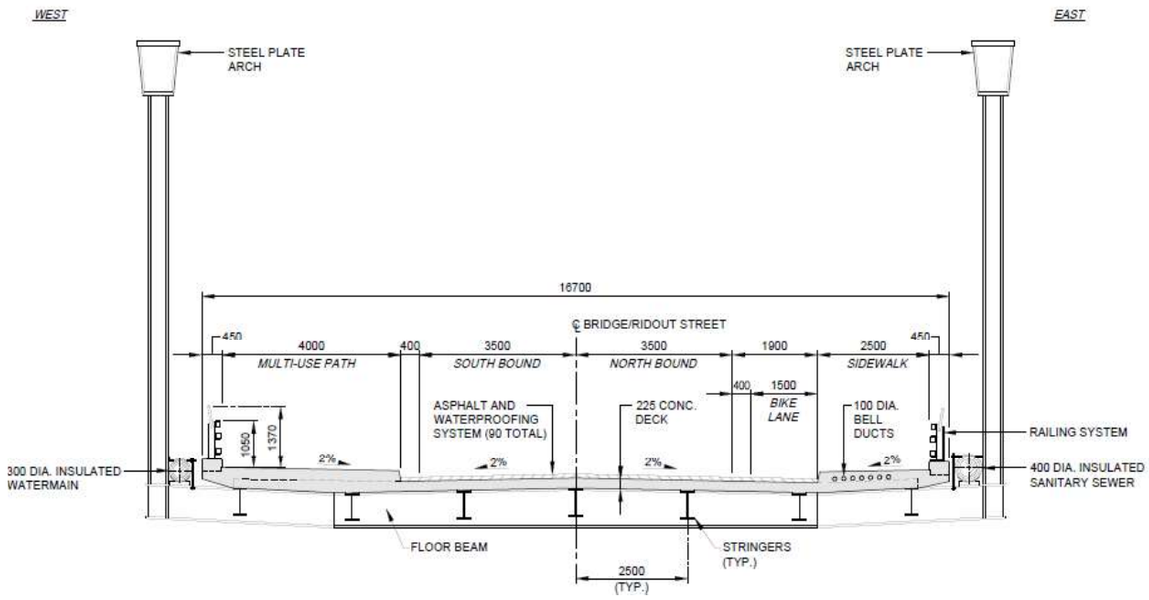


WEST ELEVATION

Proposed Through Arch Bridge Design

The new bridge will be wide enough to have two through vehicle lanes and much better active transportation facilities. A 2.5 m wide sidewalk and a dedicated northbound on-street buffered cycle lane will be on the east side of the bridge. A 4.0 m multi-use pathway is proposed on the west side of the bridge. The 4.0 m multi-use pathway will provide southbound connectivity for cyclists across the bridge as well as allow northbound cyclists from the Thames Park to cross the river and access the TVP on the north side of the river without having to enter the Ridout Street traffic. The multi-use path will extend to Horton Street and connect to the TVP as illustrated in Figure ES.7 in Appendix A.

The bridge replacement also enables significant improvement to the existing TVP crossing beneath the north end of the bridge. A new wider crossing with improved clearance will be created.



Proposed Bridge Cross-Section

Consultation

The EA process included a public consultation process with input from relevant agencies, affected landowners, First Nations communities and members of the public. A Notice of Study Commencement was mailed out to the relevant agencies and study area property owners/residents on January 19th, 2017 and an advertisement was placed in 'The Londoner' on January 19th, 2017 and January 26th, 2017. Direct correspondence and some meetings were held with the First Nation communities, Department of Fisheries and Oceans (DFO), Ministry of the Environment and Climate Change (MOECC), Ministry of Natural Resources and Forestry (MNRF), Ministry of Tourism, Culture and Sport (MTCS), Upper Thames River Conservation Authority (UTRCA), and London Hydro.

In accordance with the Schedule 'C' EA process, Public Information Centre (PIC) No. 1 was held on April 26, 2017 at St. James Westminster Anglican Church located at 115 Askin Street. Mail out notifications were sent to the residents on April 10th, 2017, and published in The Londoner on April 13th 2017 and April 20th, 2017. This PIC presented the preferred design solution for the Victoria Bridge project including identifying approach works for input and comment. 17 people attended the PIC, and/or submitted comments throughout the process. Comments were generally favourable in nature, with concerns being expressed about traffic management/detours during construction.

Taking the input received at PIC No. 1 into account, and factoring in the evaluation criteria (Cultural Heritage Significance, Transportation Environment, Socio-Economic Environment, Aesthetics, Technical Consideration, Natural Environment and Costs Implications) the preferred design alternative was established. A second PIC was held on November 15, 2017, again at St. James Westminster Anglican Church, to present the preferred design alternative to the public. Similar to PIC No. 1, mail outs to the residents were issued on November 1st 2017 with publications in The Londoner on November 2nd 2017 and November 9th, 2017. Attendance was similar to PIC No. 1 with approximately 18 attendees. The feedback was supportive of the preferred design alternative but indicated a desire for a unique design with more character. The project team considered this input in the further development of the recommendation of the through arch truss design.

Presentation of the DRAFT Heritage Impact Statement was made to the London Advisory Committee on Heritage (LACH) on April 12th, 2017. While LACH would prefer to retain the existing structure, a new bridge design constructed on the existing alignment could provide an opportunity for sympathetic design, and LACH supported the HIA as presented.

A presentation to the Cycling Advisory Committee (CAC) for active transportation impacts was made on January 17th, 2018 and presented the proposed changes to the TVP and cycle lanes on Ridout Street South and Victoria Bridge. The feedback provided from the CAC was used to develop the cycling facility arrangement including the improved connection to the TVP.

A presentation to the Transportation Advisory Committee (TAC) was made on January 23rd, 2018 with the details focused on the changes to the bridge and impacts to Ridout Street and Horton Street. The information provided was received with no issues raised by the committee.

In accordance with the City of London Official Plan, an Environmental Impact Study (EIS) was prepared and presented to the Environmental and Ecological Planning Advisory Committee for review/comments on March 15th, 2018. The information provided was received with no issues raised by the committee.

Multiple discussions have been held with London Hydro (LH) to address the impacts to their entrance off of Ridout Street South. With a road profile raise of approximately 1.0 m this entrance will need to be modified to allow safe ingress and egress of LH and emergency vehicles. A design solution has been agreed upon which satisfies the needs of all parties.

UTRCA has been consulted as a major stakeholder through the entire EA process. Their concerns to date have been addressed, and they will continue to be an involved partner in future stages of this project.

Following the PICs and stakeholder review and responses, the preferred design and ESR were finalized. A copy of the executive summary for the ESR is contained in Appendix A.

Implementation

Approach Works

The new bridge will result in a profile raise for Ridout Street South of about one metre to account for improved level of safety associated with the design flows in the Thames River. The new profile will match back into existing at Horton Street on the north end and just prior to the stone and mortar retaining wall associated with the heritage designated property located at 37 Ridout Street South on the south end. This grade raise will result in modifications to the entrances of London Hydro on the north side of the river and the Thames Park on the south side of the river.

This work will require the temporary closure of the Thames Park and London Hydro entrances for a period of time. At Thames Park, the entrance will need to be regraded and repaved to accommodate the grade changes. This work will be timed to occur during the off-season to minimize disturbance of access to the facility. Revised ramping and retaining walls will be required at the London Hydro entrance in order to maintain this access while transitioning down to the existing building and parking levels. Emergency access will be maintained at all times at the London Hydro access, but

general ingress and egress may be impacted for the duration of the construction project. The main access point into the Hydro property from Talbot Street will be open at all times.

Lighting levels on and near the bridge will be reviewed and adjusted as necessary.

There are no requirements for permanent property acquisition related to the preferred alternative.

Construction Impacts

Full Road Closure during Construction

As the existing bridge is being removed and replaced, the motor vehicle connectivity on Ridout Street across the South Branch of the Thames River cannot be maintained during construction. A road closure for a duration in the order of a year is necessary. The official signed detour routes for motor vehicles will be Wharncliffe Road and Wellington Road in the north-south direction, with Horton Street and Commissioners Road in the east-west direction.

Temporary Bridge

The existing bridge supports a sanitary sewer and Bell Canada cables. Provision of a temporary bridge to support these utilities during construction can also provide a temporary crossing for pedestrians and cyclists. The temporary structure will be installed on the west side of the existing structure with temporary connections and way finding signage installed as necessary. Rental of a temporary crossing and associated installation costs is estimated to be in the order of $450,000.

Construction laydown areas will be required. These will be identified during detailed design. On the south side of the river, part of the Thames Park and potentially one of the tennis courts will be impacted for the construction season. On the north side, the laydown area is expected to be on the northwest corner.

Thames Valley Parkway

The TVP runs underneath the existing bridge along the north side of the river from Horton Street easterly. The project will create a much improved path crossing. The TVP between Horton and Richmond Streets would need to be closed for the duration of the construction work. Detours for the TVP would be established through the local road network with way finding signage installed as necessary.

Thames Park

The entrance to will need to be closed to accommodate the road works required on the south side. This closure will be timed to occur after the peak season for Thames Park (i.e. after October 1st), so that usage of the park can be maintained as normal through the spring/summer season.

The work may impact the use of one of the tennis courts for the duration of the construction, as the area may be required for the temporary bridge and/or contractor laydown area.

London Hydro

The Ridout Street South entrance to the London Hydro Lands on the north side of the river will be impacted during the construction. It may be closed for the full construction season, though language in the contract will be included to allow for emergency access, etc. as needed if a flood event or similar situation should occur.

Temporary Detour Routes

Concerns have been raised about cut-through traffic in Old South during the construction period. With the grid pattern of local streets in Old South but no direct connection between Wortley Road and Richmond Street, encouraging through traffic to use the signed detours on higher order roads as shown on Figure ES.8 in Appendix A will be difficult. Temporary traffic calming measures to discourage traffic and control speeds on local streets in the area (Carfrae Street, Craig Street and others) will be investigated during the detailed design phase and installed prior to the start of construction.

Environmental Impact and Mitigation Measures

The work involved in removing the existing structure and installing the new structure will result in minor in-water works, and temporary disturbance to wildlife and wildlife habitat, disturbance of fish and mussel species and their habitat.

Mitigation measures will be developed and implemented to minimize the effects of construction. These could include:

- A plan to relocate fish and mussels encountered within the construction footprint;
- Species at Risk habitat to be compensated and/or enhanced;
- An invasive species control program; and,
- A detailed restoration plan utilizing native plantings and seed mixes.

Discussions and any necessary permits/approvals from the Upper Thames River Conservation Authority, MNRF, and DFO will be obtained during detailed design phase. Monitoring of the construction will be ongoing to measure effectiveness of the mitigation strategies.

The area northwest of the site is known historically for its coal tar contamination. The proposed alternative will have minimal impact on the area. Additional geoenvironmental testing will be completed during detailed design to identify with mitigation measures identified for the contract. Measures could include dewatering treatment from excavations and appropriate containment and disposal of any contaminated materials. Additional effort and review are required during detailed design and construction to ensure the existing containment and collection system along the north edge of the river is not compromised.

Financial Impacts

A preliminary construction cost for the Victoria Bridge Replacement is $14.14 M. The cost estimate includes removal of the existing steel truss structure, abutments and central pier (located in the river), construction of the new replacement bridge, roadway modifications north and south of the new bridge, modifications to the London Hydro entrance on the east side of Ridout Street, temporary relocation/support of existing sanitary sewer and Bell Canada plant currently suspended from the existing bridge, provision of a temporary bridge crossing to support these utilities during construction, and provide connectivity for pedestrians and cyclists, landscaping, traffic control,

staging, and includes allowance for detailed design and contract administration through the construction phase.

The preliminary estimate for the project is summarized below. This value will be considered in future capital budget development. The Development Charges Background Study development will also consider funding the additional bridge width to provide cycling network connectivity.

Item	Estimated Cost (2018 $)
Civil Works	1,405,400
Utility Work	728,000
Environmental Work	350,000
Temporary Work	1,150,000
Bridge Work	6,873,600
Miscellaneous	203,000
Preliminary Estimating Contingency (10%)	1,071,000
Construction Contingency (10%)	1,071,000
Engineering (12%)	1,286,000
TOTAL	**14,140,000**

Utility cost sharing has been taken into account within the estimates. The watermain and sewer costs represent life cycle renewal investments that will be funded out of sewer and water rate accounts. Accounting for these sources identifies a $13.5 M transportation budget need for the Victoria Bridge Replacement Project.

As reported to Civic Works Committee on May 28th, 2018 in the Smart Moves Transportation Master Plan Accomplishments report, the near-term demands on the Major Bridge Upgrades capital account exceed the asset management needs of the City's inventory of aging structures.

Construction Timing

The existing bridge is showing increasing areas of structural deterioration and implementation of this bridge replacement is needed in the near-term. However implementation is dictated by funding and coordination with other area projects including the Wharncliffe Road / CN Grade Separation the Wharncliffe Rd/Horton/CN Rail Overpass, the rehabilitation of Wharncliffe Road Bridge over Thames River and Shift Rapid Transit needs on the Kensington Bridge and the Queen's Bridge. The project is not expected to proceed to construction until fall of 2021/winter of 2022. Annual inspections will need to occur with additional funds spent on maintenance/emergency repair issues as they arise.

CONCLUSION

The Victoria Bridge is reaching the end of its service life. The superstructure is showing advanced deterioration including full perforations of the truss members and the 1875 capped stone masonry abutment and pier present concern. The provincial Environmental Assessment Act requires the completion of an EA for projects of this scope. The solution identified in this EA will help fulfill the Strategic Plan Area of Focus

of Building a Sustainable City by providing convenient and connected mobility choices for all Londoners.

A Municipal Class Environmental Assessment (EA) was undertaken. The ESR is ready for final public review. The ESR was prepared with input from external agencies, utilities, emergency service providers, and other stakeholders, as well as First Nations and property owners in proximity to the study.

The EA recommendation provides for the replacement of the existing deteriorated structure with a new structure that provides an improved cycling and walking experience, climate change adaption and an attractive design that is sympathetic to the heritage value of the existing truss bridge. Specifically, the preferred plan includes the following aspects:

- The removal of the existing structure including all abutments and central pier;
- The construction of a new through arch bridge with lower life-cycle costs;
- Active transportation improvements including wider sidewalks and cycling facilities;
- Upgrades to road approach and lighting; and,
- Upgrades to the TVP.

Pending Council approval, a Notice of Completion will be filed, and the ESR will be placed on public record for a 30-day review period. Stakeholders and the public are encouraged to provide input and comments regarding the study during this time period. Should the public and stakeholders feel that the EA process has not been adequately addressed, they may provide written notification within the 30-day review period to the Minister of the Environment requesting a Part II Order. If no requests for a Part II Order are received, the project will be in an immediate position to move forward to implementation in accordance with the recommendations of the study.

Construction is possible in the three to five-year horizon subject to on coordination with other project schedules as they are further developed. This timing is subject to capital budget affordability recognizing that there is a major bridge upgrade infrastructure gap based on current identified asset management needs.

Acknowledgements

This report was prepared with the assistance of Jane Fullick, C.E.T. Senior Technologist and Karl Grabowski, P. Eng., Transportation Design Engineer of the Transportation Planning & Design Division.

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RECOMMENDED BY:	
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Attachment: Appendix A – Environmental Study Report Executive Summary

cc. J. Pucchio, AECOM Canada Inc.

APPENDIX A

Executive Summary

1. Introduction

The City of London (the City) has completed a Municipal Class Environmental Assessment (Class EA) study for Victoria Bridge on Ridout Street South. The Class EA has determined that the bridge should be replaced and the new structure should include dedicated bicycle lanes for increased rider safety. The study area (**Figure ES.1**) is located in the City's core in close proximity to the downtown area.

The Class EA study was completed in accordance with the Ontario *Environmental Assessment Act* (EAA), and followed the Municipal Engineers Association (MEA) process for Schedule 'C' projects (as amended in 2007, 2011 and 2015).

Figure ES.1: Study Area

2. Background

Victoria Bridge crosses the South Branch of the Thames River in the City of London and is a two-span, riveted-steel pony truss bridge constructed in 1926 (**Photo ES.1**). Portions of the stone masonry substructure still exist from the previous bridge constructed in 1875. The bridge carries two lanes of traffic on Ridout Street South and pedestrians on cantilevered sidewalks located on each side of the bridge outside of the trusses. There are no separated dedicated bicycle lanes on the bridge structure. The superstructure has an overall span of approximately 77.9 m and an overall width of 14.76 m. A view of the bridge (facing north) is provided below.

Ridout Street South is an important link to downtown and Old South/Wortley Village. It carries approximately 12,000 vehicles daily and is served by public transit. Sharrows on the approaches to the bridge and the bridge itself identify shared lanes for bicycle and vehicle use. Intersections are signalized at Ridout Street South/Horton Street and Ridout Street South/Grand Avenue.

The Cultural Heritage Evaluation Report identified Victoria Bridge as having cultural heritage value or interest under Ontario Regulation 9/06. However, the bridge does not currently appear in any municipal, provincial, and federal heritage registers or inventories.

3. Problem/Opportunity Statement

The Class EA Problem/Opportunity Statement provides the basis for the need and justification for this project and is presented below:

> *Constructed in 1926, Victoria Bridge is located on Ridout Street South over the South Branch of the Thames River in the City of London. Ridout Street South is an important*

link to downtown and a designated north-south bicycle route. However, Victoria Bridge does not have sufficient width to accommodate dedicated bicycle lanes which is a safety concern. Recent bridge inspections also identified ongoing issues of deterioration which may reduce the structural capacity of the bridge. Given the age of the bridge, existing conditions, functional deck width, structural capacity, potential heritage value and other considerations, the Class EA study should identify a solution to address structural deficiencies and accommodate all users through bridge rehabilitation or replacement.

4. Alternative Planning Concepts

The evaluation of planning alternatives was completed in two steps. The initial step considered conservation strategies as identified in the Ontario Heritage Bridge Guidelines. Four alternatives were considered that could implement the conservation strategies were carried forward (**Figure ES.2**).

The second step was to evaluate the alternatives based on the environmental factors that included socio-economic, cultural heritage, natural heritage, technical, transportation and cost. Alternative A (Rehabilitation) and Alternative C (Replacement) were ranked highest among the four alternatives carried forward. Additional criteria was added to the evaluation (pedestrian and bicycle functionality, Thames Valley Pathway (TVP), structural considerations, aesthetics) and costs were further refined. As a result, **Alternative C (remove existing bridge and build a new bridge on existing alignment)** was selected as the preferred planning solution for the following reasons:

Function

- Replacement satisfies all geometric and safety design standards for vehicles, pedestrians, and cyclists.
- Removal of centre pier will improve river flow and reduce debris build up.
- There is potential to improve Thames Valley Parkway alignment for active transportation.

Structure

- The replacement bridge will be designed to current material and code standards.
- The new structure will have a service life of approximately 100 years.

Aesthetics

- Special design elements (such as decorative lighting, railing systems and end post) can be incorporated into the new bridge.

Cost

- New construction has a higher initial cost, but lower life cycle and lower maintenance costs than rehabilitation.

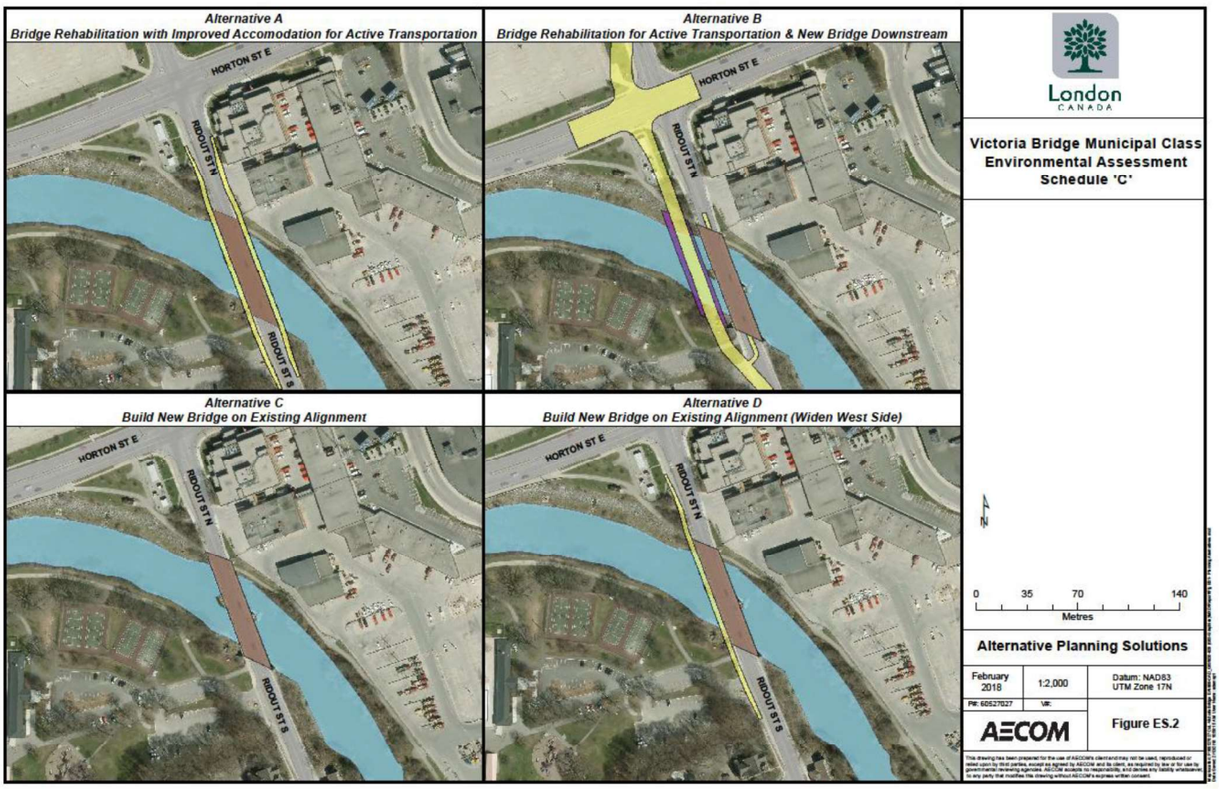

Figure ES.2 Alternative Planning Scenarios

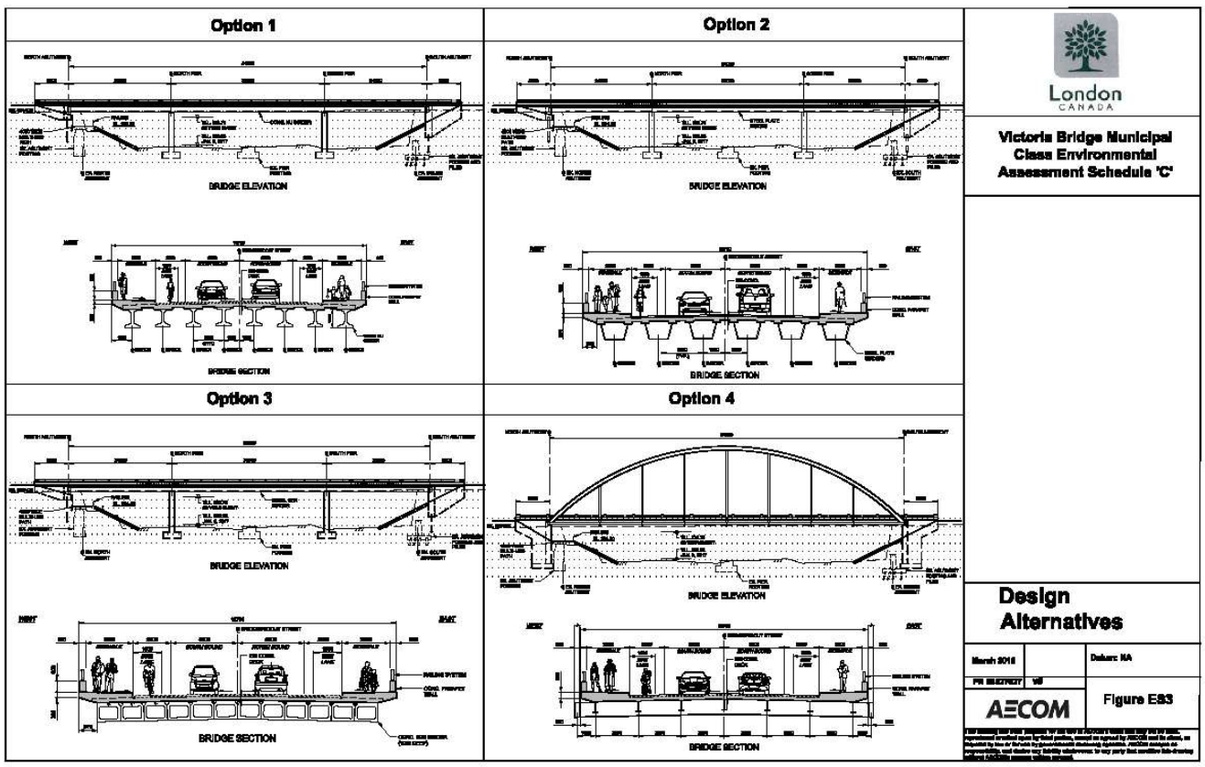

Figure ES.3 Design Alternatives

5. Alternative Design Concepts

Four bridge design concept alternatives were considered to implement the Preferred Planning Solution for replacing the bridge on the existing alignment (**Figure ES.3**). These included Alternative 1: Concrete Girder; Alternative 2: Steel Box Girder; Alternative 3: Concrete Box

Girder; and Alternative 4: Tied Arch. Evaluation of these alternatives was undertaken with the use of a decision matrix and concluded **Alternative 1: Concrete Girder** design to be the recommended alternative. This alternative demonstrated the lowest capital and maintenance costs, high durability, low impact on the natural environment, and the design is conducive to the addition of aesthetic enhancements.

6. Feedback on the Recommended Design Alternative

Comments received from the public at PIC #2 indicated a preference for a bridge design that demonstrated more character and design elements than the concrete girder option, such as the tied arch design. As such, an additional alternative was developed consisting of a Through Arch bridge (Alternative 5) to reflect the comments received (**Figure ES.4**). All alternatives were then re-evaluated to determine a revised Recommended Design Alternative.

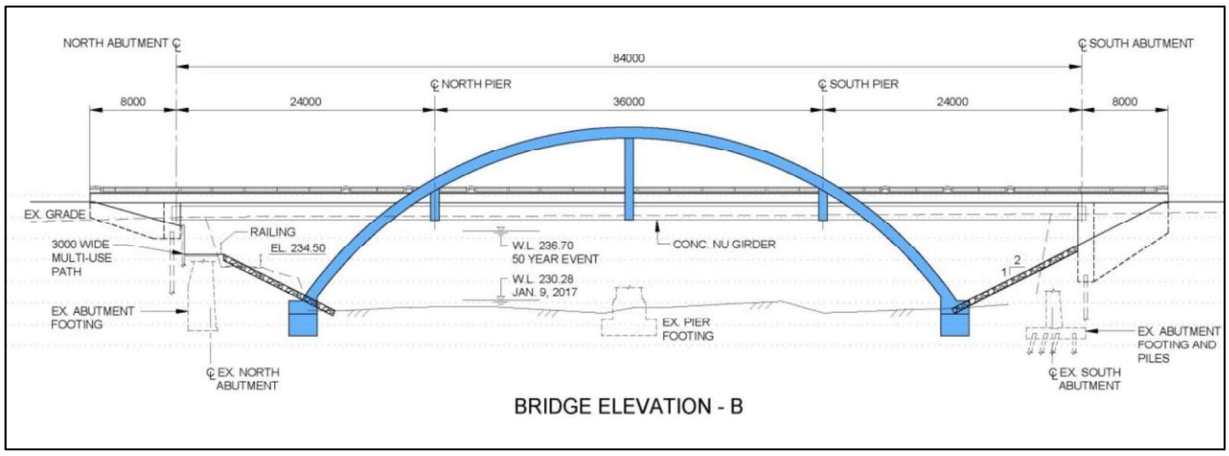

Figure ES.4: Alternative 5 (Through Arch)

Evaluation of the alternatives resulted in **Alternative 5: Through Arch** being selected as the Preferred Design Concept. Details of this alternative are described below.

7. Project Details

The proposed bridge consists of a single span steel Through Arch structure with a 76 m arch span and 94 m overall length of the deck structure. A Through Arch is positioned on each side of the deck, with each end founded on a concrete cap and pile system. Located on the river banks, the tops of the concrete caps will extend above the normal water level of the river. Vertical steel members extend from the arch to support transverse steel floor beams. Longitudinal steel stringers are connected to the floor beams and support the 0.225 m thick reinforced concrete deck slab.

The proposed bridge will have the same roadway and bridge centreline profile as the existing. However, the vertical profile will be significantly raised (between the south side of the Horton Street intersection to just south of the Thames Park entrance) to provide clearance for the 100 year flood level. Reconstruction of the London Hydro and Thames Park entrances is also required to accommodate the change in vertical grades. This will include regrading each entrance and construction of concrete retaining walls for adequate transition to the surrounding grades.

Zero skew is proposed between both sides of the arch structure to reduce the high complexity and cost of fabricating a skewed framing system. However, a skew of 19.7 degrees is proposed for the ends of the bridge to reduce conflicts with buried obstructions and reduce the overall deck area. The skew angle may be modified during Detailed Design to optimize the structural

arrangement. The concrete abutments at each end of the bridge are supported on piled foundations.

The concrete deck width of 16.7 m provides sufficient space for two 3.5 m through lanes (one northbound and one southbound) and a 1.5 m bicycle lane on the east (northbound side). There is a 4.0 m wide raised multi-use path on the west side of the deck for pedestrians and bicyclists. On the east side, there is a 2.5 m raised concrete sidewalk. The Through Arch will be located outside of the deck.

A railing height of 1.05 m (for pedestrians) and 1.37 m (for combined pedestrian / cyclist usage) is required for the east and west sides of the bridge respectively. However, a railing height of 1.37 m will be used on both sides of the bridge for aesthetic symmetry. The railing system will conform to a crash tested system, but modified for use with pedestrians and bicycles. A concrete end wall will be placed at each corner for transitioning to the guide rail system.

A temporary modular bridge is proposed across the Thames River on the west side of Ridout Street South for pedestrians and cyclists, as well as support of temporary services for the duration of the construction project (including sanitary sewer and Bell). The temporary bridge will connect the TVP on the north bank to the multi-use pathway (in Thames Park) on the south side. The elevation of the temporary bridge at each end will be at, or slightly above the existing pathway elevations on both sides, with ramps leading to the bridges.

Figures ES.5- ES.6 illustrates the preferred bridge arrangement and cross-section.

Thames Valley Parkway

The existing TVP passes below the north span of bridge, immediately adjacent to the north abutment. The path varies in width, providing a clear width of at least 1.8 m. The following upgrades are proposed:

- Pathway below bridge will be increased to 4 m wide with a 3 m vertical clearance.
- The ramp from the TVP to Ridout Street South will be removed due to the increased vertical profile of the road and associated substandard slope of the path.
- Approximately 6 m east of the bridge, the pathway will transition to the existing path.
- The widened path will extend approximately 65 m to the west of the bridge and transition to the existing pathway. A new northeast ramp will be provided at this location to connect to the new pathway.
- The existing sidewalk situated adjacent to Horton Street will be upgraded to a multi-use path with a 4 m width, extending to Ridout Street South to approximately 100 m west of the bridge where it will join the existing TVP (situated adjacent to Horton Street). This provides connectivity from eastbound cyclists to Ridout Street South.
- A new northeast ramp situated 65 m west of the bridge will be provided to connect to the new multi-use path along Horton Street, effectively connecting westbound bicyclists to Ridout Street South.

See **Figure ES.7: Proposed TVP Connection**.

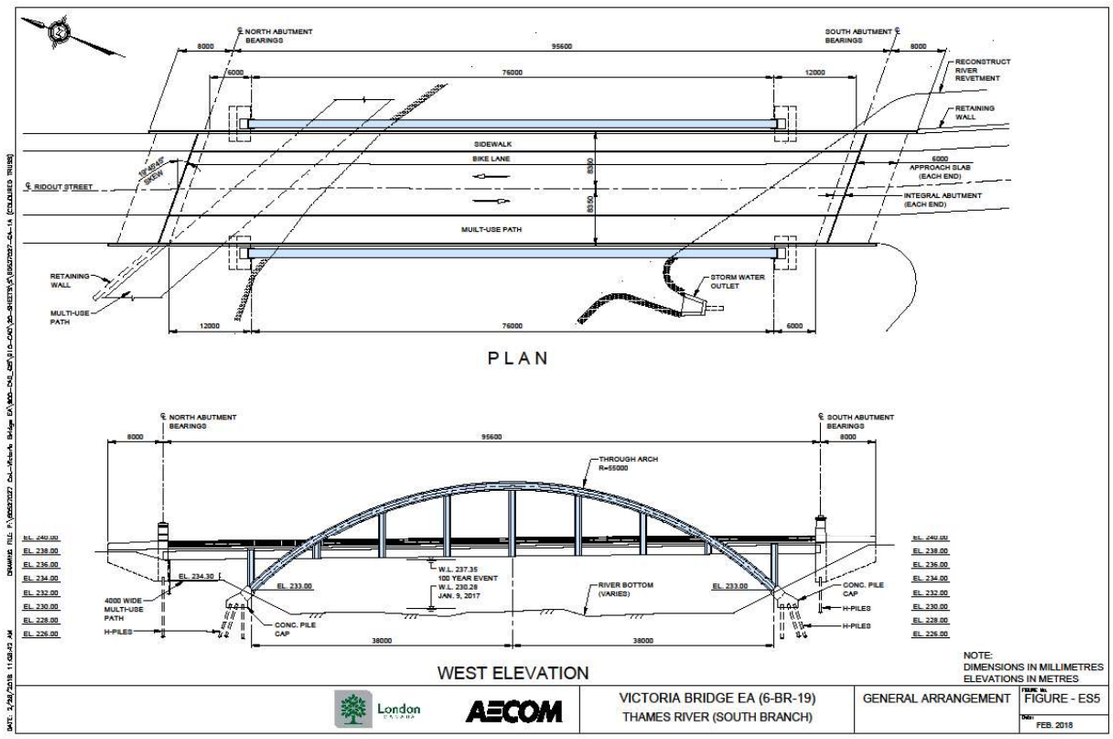

Figure ES.5: Proposed Bridge Arrangement

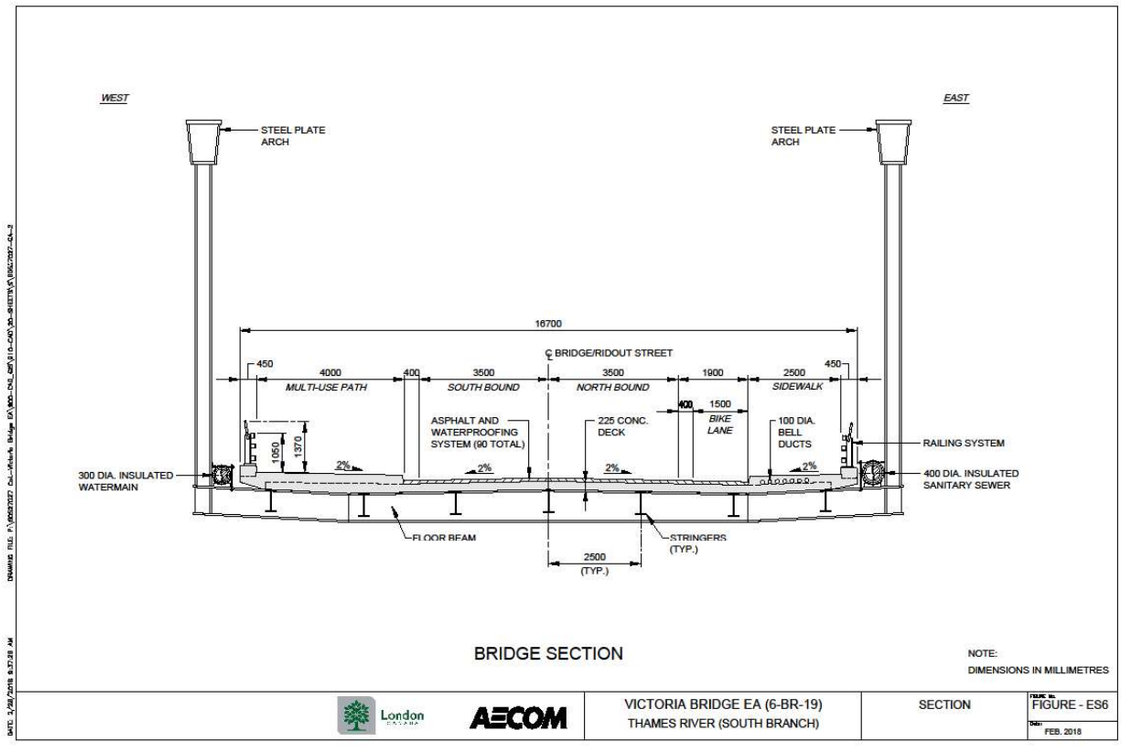

Figure ES.6: Proposed Bridge Cross-Section

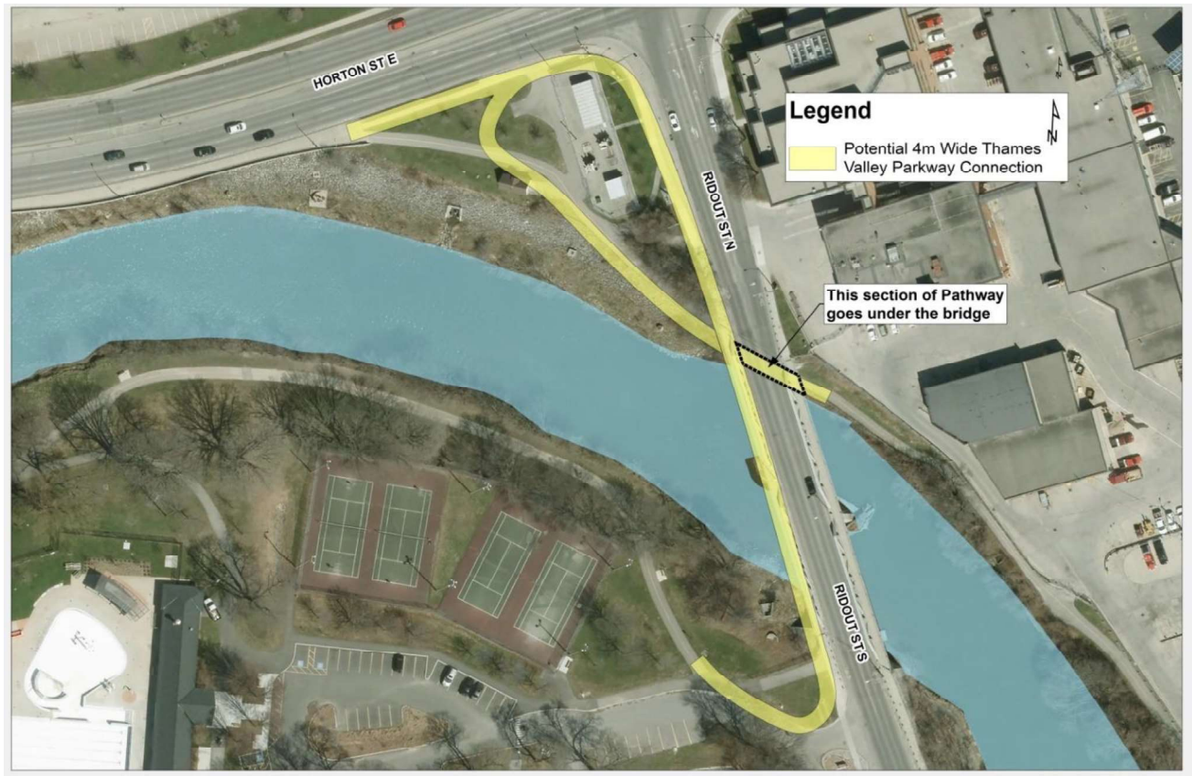

Figure ES.7: Proposed TVP Connection Upgrades

Traffic Management - Vehicular Traffic Detour

- Because of the scale of work required to replace the bridge and limited space, a full road closure will be required on Ridout Street South between Horton Street and the Thames Park entrance. Road closure is expected for a period of up to one year, with the actual road closure defined during Detailed Design.
- Traffic is required to be rerouted to roads capable of carrying the increased volume of traffic. Vehicular traffic will be directed to Wharncliffe Road to the west and Wellington Road to the east for one full construction season. See **Figure ES.8**.
- Temporary traffic calming measures will be incorporated during construction on local streets to reduce traffic cut through.

Traffic Management - Active Transportation Detour

- The impact of construction on active transportation will vary throughout the duration of construction.
- Temporary closure of TVP below the bridge on the north bank of the Thames River (from Richmond Street to Horton Street) is required for the duration of construction.
- A temporary modular bridge will provide access for pedestrians and cyclists across the river during construction.
- Way-finding signage will be incorporated at various locations to direct pathway users to the temporary bridge crossing.

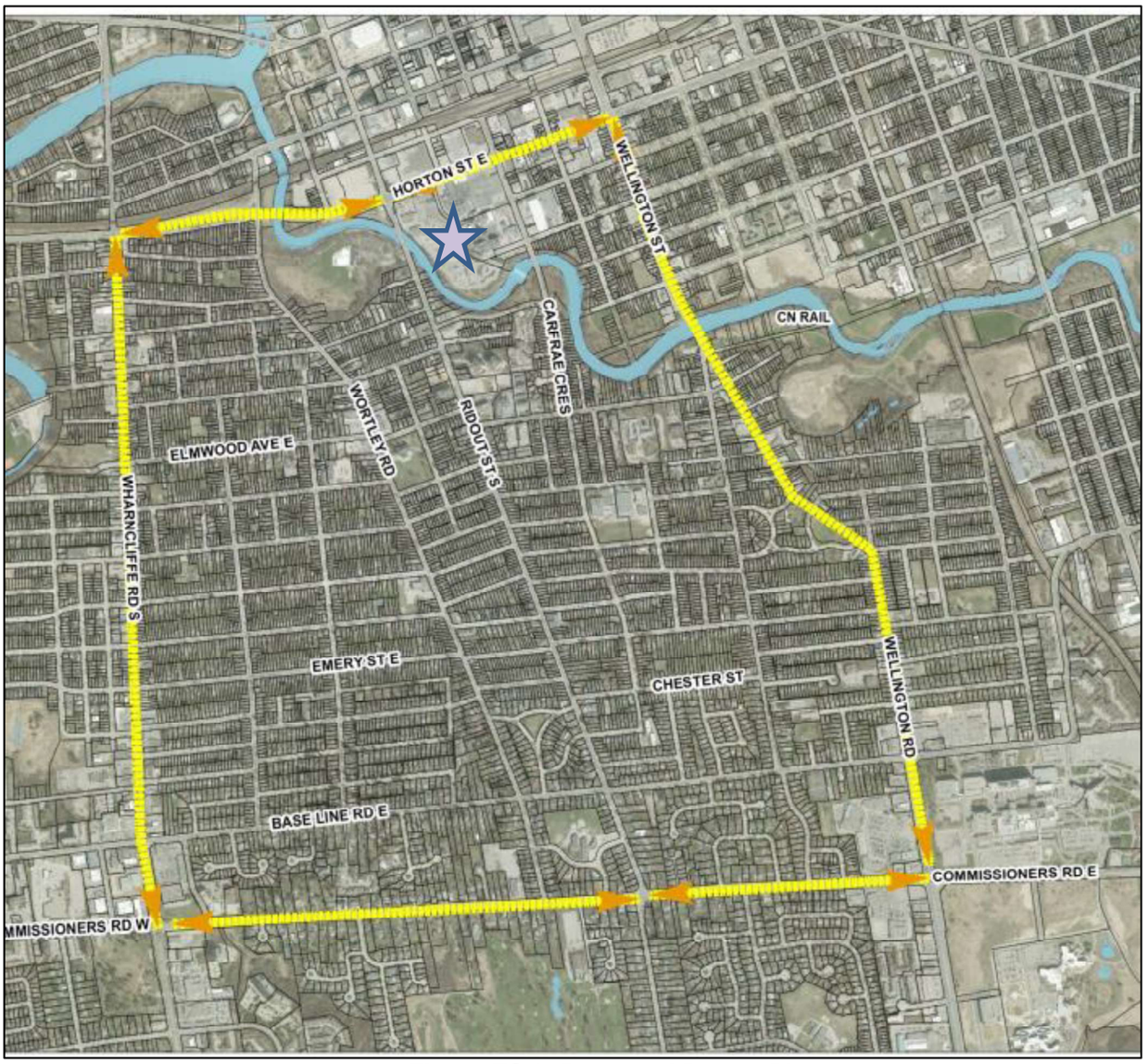

Figure ES.8: Proposed Detour Plan

Environmental Considerations

Testing of groundwater samples indicated that MOECC standards were exceeded for benzene and petroleum hydrocarbons. Excavation dewatering will be required during construction and measures required to treat the water prior to discharge. Measures will be considered during Detailed Design to prevent mobilization of the potential coal tar plume or potentially impacted groundwater into the excavation. Excavation of soil materials at the north side of the bridge will also be disposed of at a licensed facility. No impacts to the coal tar/groundwater collection system at the northwest quadrant of the bridge are anticipated.

Potential habitat for 13 Species at Risk was identified within the study area. Further consultation during Detailed Design is required to determine specific field investigations and permitting. A detailed Species at Risk and Wildlife Handling Protocol will be developed prior to construction.

The Thames River is classified as a warmwater regime. Accordingly, no in-water work is permitted between March 15 and June 26 of the same year. Removal of the bridge structure and vegetation can occur between the months of September to April, which is outside of the typical breeding bird period (April 1 to August 31) within Southern Ontario to avoid contravening the Migratory Birds Act.

Remaining Approvals

- During Detailed Design and prior to the start of construction, all necessary approvals and permits will be obtained. Permitting and approvals may be required from UTRCA, MOECC, MNRF, London Hydro, Bell, and the City of London.

Implementation Schedule

The proposed schedule for Detailed Design and construction of the new bridge is to be determined and will be based on available funding as well as coordination of other City of London infrastructure projects. A preliminary schedule is as follows:

- Detailed Design: 2019 to 2020.
- Tendering and contract award: Fall 2021.
- Construction: 2022.

It is anticipated that some Bell work may be completed in advance of this schedule with some work initiated in Fall 2021.

Estimated Capital Costs

The project cost estimate is $14.14M. The project estimate includes:

- Roadwork.
- Sidewalk and multi-use path.
- Street lighting.
- Utility relocations (as required).
- Temporary work (including modular bridge, site access/staging and relocation of sanitary sewer and Bell infrastructure).
- Allowance for construction adjustments and contingency.

Table 7.1: Estimated Capital Costs

Item	Cost Estimate
Part A - Road Work	$1,405,000
Part B – Utility Work	$ 728,000
Part C – Environmental Work	$ 350,000
Part D – Temporary Work	$1,150,000
Part E – Bridge Work	$6,873,000
Part F – Miscellaneous	$ 203,000
Sub total	**$10,710,000**
Preliminary Estimating Contingency (10%)	$1,071,000
Construction Contingency (10%)	$1,071,000
Engineering (12%)	$1,286,000
Total Estimated Budget Cost	**$14,140,000**

8. Potential Impacts and Recommended Mitigation Measures

Impacts related to construction of the recommended design concept will largely be limited to the duration and location of construction in addition to the loss of a heritage bridge. Based on the recommended preferred solution and proposed construction techniques, construction is expected to have temporary environmental impacts.

As the project moves into the design and construction phases, the construction team will ensure the following:

Natural Environment:

- All regulatory requirements to protect the environment are followed.

- A tree protection and replanting plan is prepared.
- SAR protocols and permitting will be followed.
- Construction occurs outside of the breeding bird window.
- Necessary erosion control measures are implemented.
- Treat effluent water from dewatered excavation, as required.
- Remove and dispose of contaminated fill material from excavations to a designated landfill.

Social Environment:

- A traffic management plan is prepared to minimize disruption during construction.
- Access to existing properties will be maintained during and after construction.
- Infrastructure will be implemented to support healthy lifestyle activities (walking, cycling).

Cultural Heritage and Archaeology:

- Although the Cultural Heritage Evaluation Report indicated the Victoria Bridge has cultural significance, it is not formally recognized/designated under the Ontario Heritage Act or the City of London. Replacement of the bridge will have a significant cultural heritage impact. However, there is an opportunity to provide sympathetic design to convey some historic attributes of the original bridge or era, while connecting with the historic context of the adjacent Heritage Conservation District.
- The feasibility of salvaging and reusing various historic elements of the existing bridge will be further investigated during Detailed Design.
- Documentation and photography of the existing bridge will be undertaken during removals, with methodology to be reviewed during Detailed Design.
- The opportunity for cultural heritage interpretive signage of Victoria Bridge on the TVP will be further explored during Detailed Design.
- Little or no impact is anticipated to existing archaeological resources. However, a Stage 2 archaeological assessment will be undertaken as part of Detailed Design, if necessary. An invitation will be extended to Chippewa of the Thames First Nation to act as observers if a Stage 2 assessment is conducted.

9. Consultation

As part of the Municipal Class EA planning process, several steps were undertaken to inform stakeholders, study area residents, businesses, review agencies and Indigenous communities about the project, and to solicit comments at key stages of the study process. Consultation methods included:

- Publication of newspaper notices for all project milestones, including Notices of Study Commencement, Public Information Centres (PICs), and Study Completion.
- Placement of notices and other materials on the City's website.
- Direct mailing of project milestone notices to stakeholders, study area residents, businesses, review agencies and Indigenous communities.
- Two PICs to engage and obtain input from the public, review agencies, and stakeholders.
- Individual meetings with review agencies and stakeholders as required or as opportunities arose.
- Consultation with Indigenous communities as per the Ministry of Tourism, Culture and Sport and the City of London consultation protocol.

10.Summary

This Municipal Class EA has fulfilled the requirements for a Schedule 'C' project under the MEA Municipal Class EA document. The Municipal Class EA planning process requires an initial

review and analysis for a project of this type, and this review and analysis has not identified any significant impacts that cannot be addressed by incorporating the recommended mitigation measures during construction.

Consultation requirements of the Municipal Class EA have been fulfilled through two PICs, agency consultation, Indigenous consultation, and the submission of the Environmental Study Report for a 30-day review period.