

5. Phase 5 – Implementation of the Preferred Solution

5.1 Description of the Improvements and Proposed Improvements

This phase involves completing contract drawings and tender documents as well as incorporating the recommended solution and any associated mitigation measures identified during the first two phases of the process. Once contracts are awarded, construction can take place and the project can be implemented. Any monitoring programs identified during the Class EA shall be undertaken to ensure that the environmental provisions and commitments made during the process are fulfilled and effective.

As previously mentioned, the preferred alternative involves full rehabilitation of the bridge, which would include replacement of the deck and handrails and the repair or reinforcement of other bridge components (i.e. top chords, bottom chords, vertical hangers, wingwalls, etc.). Upon completion, exposed bridge components would be coated with a coloured sealant in order to create a uniform appearance for the rehabilitated structure. Restoration would be sympathetic to the existing bridge design and efforts would be taken to preserve any original bridge features, where possible.

At this time Detailed Design of the bridge has not been determined as this will take place once the Class EA is accepted by Council and is put on Public Display for 30-calendar days. As such, the proposed improvements are described at a high level and the implementation schedule and project costs are estimates completed at the time of this Class EA and are subject to change, depending on who the contract is ultimately awarded to.

5.2 Implementation of the Project

5.2.1 Estimated Project Cost

The estimated project costs to implement the Preferred Solution at the Humber Bridge Trail Bridge is summarized below:

Description	Estimated Cost
Mobilization and Demobilization	\$10,000
Site Preparation	\$20,000
Removal and Disposal of Existing Concrete Deck and Curbs	\$70,000
Access to Work Area, Work Platform and Scaffolding	\$50,000
Removal of Concrete from Floor Beams - Partial Depth	\$10,000
Repair and Reinforcement of Floor Beams	\$48,000
Concrete in Deck and Curbs	\$48,000
Dowels into Concrete	\$3,300
Concrete in Substructure at Semi-Integral Ends	\$12,000
Reconstruct Handrails	\$42,000
Patch Repair Arch - Top Chords	\$15,000
Reinforcement of Arch Bottom Chords	\$50,000
Reface Arch Bottom Chords	\$37,500
Reconstruct Arch Vertical Hangers	\$10,000
Patch Repair Wingwalls	\$3,000
Restore Northeast and Southeast Embankments	\$5,000
Rock Protection	\$10,000

Humber Bridge Trail Bowstring Arch Bridge Class Environmental Assessment

Description	Estimated Cost
Waterproof Deck Top	\$4,900
Hot Mix Asphalt	\$4,500
Approaches	\$30,000
Guide Rail on Approaches	\$39,800
Temporary Vehicular Crossing	\$100,000
SUBTOTAL	\$623,000
Contingencies	\$62,000
Engineering and Resident Inspection	\$137,000
TOTAL	\$822,000

5.2.2 Summary of the Potential Effects and Recommended Mitigation Measures

As part of implementing this project, monitoring and maintenance will be conducted during construction to ensure that:

- a) individual mitigating measures are providing the expected control and / or protection continuously throughout the construction period;
- b) the mitigating measures are adequate to minimize or eliminate adverse effects;
- c) additional mitigating measures are provided if required to address any unanticipated environmental adverse effects which arise during construction, and;
- d) adequate information is available for the assessment of the mitigation measures.

Environmental monitoring is to include periodic site visits and inspections throughout the course of the work by the Contract Administrator (CA), the City's representative, to administer the environmental control aspects of the Contract and to ensure their application and effectiveness. In the event that the CA determines that the controls are unacceptable, the Contractor will be requested to cease those operations, as identified by the CA, which are causing the issue of concern.

The following mitigation measures to avoid, minimize or negate the potential adverse effects associated with implementing the recommended solution, including monitoring are presented in **Table 5.1** below.

Humber Bridge Trail Bowstring Arch Bridge Class Environmental Assessment

Table 5.1 Summary of Environmental Effects and Recommended Mitigation

Potential Negative Effects/Concerns	Mitigative / Enhancement Measures	Net Effects
Natural Environment Considerations		
Disturbances to Terrestrial Features	<ul style="list-style-type: none"> ▶ Construction will require removal of some vegetation within the area of the existing bridge. Detailed design will quantify tree losses where preservation is not possible and a compensation plan will be implemented. ▶ Where trees can be preserved, tree protection measures (i.e., protective fencing) will be employed. 	<ul style="list-style-type: none"> ▶ Any trees identified for removal at the detailed design stage will be compensated by implementing a planting ratio and species composition plan, to be negotiated with the appropriate planning authorities.
Disturbance to Area Watercourses	<ul style="list-style-type: none"> ▶ Include appropriate Best Management Practices for protecting aquatic habitat in the detailed design package for limiting soil mobilization and trapping sediment as close to the source as possible. These sedimentation and erosion protection measures are to reflect these principles: minimize the duration of soil exposure, retain existing vegetation where feasible, encourage re-vegetation, divert runoff away from exposed soil, and keep runoff velocities low. ▶ Maintain the integrity of all sediment trapping devices through regular monitoring. In the event that it is determined that that controls are unacceptable, the Contractor shall cease those operations, as identified, which are causing the entry of deleterious material to watercourses. Such operations shall remain suspended until otherwise directed in writing. Such structures should be removed only after the soils of the construction areas have been stabilized and then only after the trapped sediments have been removed. ▶ Environmental monitoring should include periodic site visits by the CA to confirm proper adherence to confirmed mitigation measures. 	<ul style="list-style-type: none"> ▶ Construction related effects to area watercourses will be minimized through implementing appropriate mitigation measures.
Temporary Construction Related Effects on Groundwater	<ul style="list-style-type: none"> ▶ Contractor will not allow refuelling of vehicles or equipment within 50 metre of any waterbodies. ▶ Contractor to have a Spill Action Plan in place throughout construction to address the potential for spills, and actions to be taken if a spill occurs. 	<ul style="list-style-type: none"> ▶ Construction related effects to groundwater will be minimized through the Spill Action Plan.
Social / Cultural Considerations		
Temporary Access to Private Property	<ul style="list-style-type: none"> ▶ In terms of temporary construction related impacts on adjacent private property, the following measures will be implemented: <ul style="list-style-type: none"> ▪ Provide a temporary vehicular crossing for the property on the east side of Humber River ▪ Minimize impacts on adjacent properties by confining all construction activities to the working area and not entering upon or occupying any private property outside of the working area for any purpose unless written permission from the landowner has been obtained in advance. ▪ Where possible, temporary easements shall be taken from the property owner. ▪ Take photographs of areas to be disturbed prior to construction operations. ▪ Restore private property to its original condition or better following construction operations. The Contract Administrator will be the sole judge of whether the disturbed areas are restored to a satisfactory condition. 	<ul style="list-style-type: none"> ▶ Short-term construction related effects on private property would only occur with land owner permission and be fully restored following construction.
Temporary Construction Related Nuisance Effects (i.e., Noise, Vibration, Dust, Odours and Fumes)	<ul style="list-style-type: none"> ▶ Carry out the following mitigation measures for minimizing temporary noise and vibration effects during construction: <ul style="list-style-type: none"> ▪ Comply with Region of York and Town of King noise control by-laws. ▪ Prevent unnecessary noise by maintaining equipment in proper operating condition, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts. ▪ Restrict use of equipment to the minimum necessary to perform the specified work. Do not allow excessive idling. ▶ Environmental monitoring should include periodic site visits by the CA to confirm proper adherence to confirmed mitigation measures. 	<ul style="list-style-type: none"> ▶ Temporary construction related effects on adjacent residents will be minimized.

Humber Bridge Trail Bowstring Arch Bridge Class Environmental Assessment

Table 5.1 Summary of Environmental Effects and Recommended Mitigation

Potential Negative Effects/Concerns	Mitigative / Enhancement Measures	Net Effects
	<ul style="list-style-type: none"> ▶ Noise complaints will be addressed and additional mitigative measures implemented as feasible. ▶ Implement the following standard mitigation measures during construction to minimize dust: <ul style="list-style-type: none"> ▪ Undertake dust/debris control measures as necessary. ▪ Use low dust generating construction techniques/equipment. ▪ Maintain equipment in proper working order and operate only as required (no excessive idling) to reduce engine emissions. ▶ Dust and odour complaints will be addressed and additional mitigative measures implemented as feasible. 	
Temporary Modifications to Driveway Access and Boulevards	<ul style="list-style-type: none"> ▶ Contact property owners and notify them of the temporary modifications to their driveways and any potential for temporary disruptions to their access in advance of commencing such activities. ▶ Restore with topsoil and re-sod any damaged boulevards. 	▶ Driveway access disruptions will be minimized.
Temporary Disruption of Traffic on Roads	<ul style="list-style-type: none"> ▶ Utilize a traffic management plan and standard traffic control measures on the project to safely co-ordinate traffic flow. 	▶ Temporary construction related effects on roadway users will be minimized.
Temporary Effects on Work Area Aesthetics	<ul style="list-style-type: none"> ▶ Maintain the work area in a tidy condition free from the accumulation of debris, waste, rubble, etc. in order to minimize the visual impact of the work area. ▶ Group sheds, site offices, other temporary structures and storage areas for materials and equipment in a compact manner and maintain in a neat and orderly condition at all times. 	▶ Construction area will be maintained in a neat and orderly manner at all times.
Generation of Excess Materials	<ul style="list-style-type: none"> ▶ Utilize material identification and management measures both inside and outside the construction area during construction. ▶ Manage all excess and unsuitable materials generated during construction appropriately, including potential for wind erosion on stockpiles. The materials may be reused as a construction material or managed as engineered fill. Materials may also be temporarily stockpiled in preparation for these uses or removed from the site if required. ▶ Take all contaminated wastes that cannot be reused or meet constraints to an approved waste disposal site and transport by a licensed waste disposal carrier. The Contractor will be required to manage all waste materials generated by construction activities in accordance with all provincial and federal regulations/approval requirements. A copy of all approvals and agreements will be provided to the CA, including waste manifests. 	▶ Proper utilization / disposal of excess waste materials would occur.
Encountering Deeply Buried Archaeological Resources	<ul style="list-style-type: none"> ▶ Contact the office of the Regulatory & Operations Group, Ministry of Culture immediately in the event that deeply buried archaeological remains are encountered during construction activities. 	▶ Disturbance to archaeological resources will be avoided.
Encountering Human Remains	<ul style="list-style-type: none"> ▶ Stop work immediately in the affected area ▶ Contact both the Ministry of Culture, and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Business Services immediately in the event that human remains are encountered during construction. 	▶ Disturbance to human remains will be avoided.
Permitting		
	<ul style="list-style-type: none"> ▶ The bridge lies within the regulated area (under Ontario Regulation 166/06 of the <i>Conservation Authorities Act</i>) ▶ Consultation with the TRCA regarding permitting requirements will be necessary during Detail Design once the final grading has been established. 	▶ TRCA permitting requirements will be addressed.

5.2.3 Notification of Completion

The last step of the Schedule 'B' Class EA process following documentation of the Humber Bridge Trail Bowstring Arch Bridge ESD involves issuing a "Notice of Completion" to review agencies and the public and filing of the ESD for review for a period of 30 calendar days. Following the end of the review period, if there are no outstanding Part II Order Requests, the City may proceed to Phase 5 of the Class EA process to complete the contract drawings and tender documents for the Humber Bridge Trial Bridge, and then move on to construction.

The notices informed stakeholders and the general public of the project's completion, including the preferred solutions, and their rights regarding the Part II Order provisions. **Appendix A** contains a copy of the letter and advertisement.

5.2.4 Proposed Construction Schedule

Assuming that there are no outstanding Part II Order requests at the end of the 30 calendar day review period, construction of the proposed Humber Bridge Trail Bridge rehabilitation is tentatively scheduled as follows:

- End of 30 day review period**Summer 2013**
- Completion of Detailed Design and Receipt of Approvals.....**Fall 2013**
- Commence Construction**Spring 2014**
- Complete Construction**Fall 2014**

6. Summary

In accordance with the Municipal Class EA, the City has followed the process to identify an appropriate solution to address the structural and safety concerns, as well as access issues associated with the 93 year old Bowstring Arch Bridge on Humber Bridge Trail, east of Highway 27. The bridge on Humber Bridge Trail is deteriorating in terms of its structural integrity resulting in increased concern for the safety of bridge users and preserving the heritage aspects of the bridge.

In order to address these issues, alternative were identified for evaluation. A qualitative net-effects assessment with categories and criteria representing the broad definition of the environment as described in the EA Act was applied to evaluate the alternative solutions.

The Alternative Solutions reviewed and evaluated include: Do Nothing; Rehabilitate the Bridge; Remove the Existing Bridge and Build a New Concrete Bowstring Arch Bridge; Remove the Existing Bridge and Build a New Precast Concrete Box Girder Bridge; Remove the Existing Bridge and Build a New Structural Steel Girder Bridge; and Remove the Bridge and Provide an Alternative Access Route to the Home on the Eastern Bank of the Humber River.

The six alternative solutions were comparatively evaluated according to a qualitative assessment, with criteria representing the broad definition of the environment as described in the EA Act. Alternative # 2 was determined to be the Preferred Solution.

A structural investigation established that the Humber Bridge Trail Bridge has a Bridge Condition Index (BCI) of 49.0 (a BCI of below 60 is considered poor based on the Ministry of Transportation methodology). Natural environment investigations determined that the Rapids Clubtail, designated as endangered, has historically occurred within the study area (last recorded in 2005), and that three Butternut specimens, endangered both federally and provincially, are located within 150 metres of the bridge. Nine active water wells were found to occur within 500 metres of the bridge, based on hydrogeologic investigations. Social environment research determined the bridge to be located within the 'Regional Greenlands System' (*York Region Official Plan, 2010*) on land designated 'Natural Area and Countryside,' (*Vaughan Tomorrow, 2010*) and that the bridge is considered to be part of the proposed 'Neighbourhood Signed Bike Route' (*Vaughan Pedestrian and Bicycle Master Plan, 2007*). The Stage 1 Archaeological Assessment determined no archaeological sites have been registered immediately adjacent to the bridge, however 14 sites have been registered within 1 km of it. The cultural heritage investigation established that the bridge scored a 70, according to the OHBP evaluation, under which any bridge scoring higher than 60 points is automatically considered for listing on the OHBP and can be considered to have heritage value.

Consultation with the public and government review agencies was carried out throughout the Class EA process in order to inform stakeholders of the project details and provide all interested parties an opportunity to contribute their input or comments. A notice of commencement was published during the week of September 1, 2010 and notices were subsequently delivered to relevant stakeholders, government agencies, and residents in the vicinity of the bridge. A Public Information Centre, attended by 19 individuals, was held on July 21, 2011, the purpose of which was to present the existing environmental conditions in and around the bridge; provide the results of the comparative evaluation of the alternative solutions; and present the preferred alternative solution. Stakeholder comments were received and responded to throughout the Humber Bridge Trail Bridge Class EA.