Subject: OPD 23-32 - Kinsmen Pedestrian Bridge Detailed Design - Option 4
Report Number: OPD 23-32
Department: Operations and Development Department
Submitted by: Jonathon Graham, Director of Operations and Development
Meeting Type: Council Meeting
Meeting Date: Monday, August 14, 2023

RECOMMENDATION

A. THAT Council direct Staff and Planmac Engineering Inc. to engineer and design the replacement of the Kinsman Pedestrian Bridge reflective of *Option 4* a *Prefabricated Pedestrian Bridge*; and

B. THAT Town Staff be directed to refine and continue to report back to Council cost estimate(s) that are to be evaluated and presented through the Town's annual budget process.

BACKGROUND

The Kinsmen Bridge is a nine-span wood deck on steel plate girder structure with a southwest-northeast orientation and a substructure that features cut stone masonry block piers and abutments. The bridge was constructed in 1888 to carry GWR CAL railway over Stoney Creek, and was converted to a pedestrian bridge following the abandonment of the railway in the 1990's.

From the October 25, 2021 Council meeting the following motions was discussed and carried:

> ***15.6.1 OPD 21-46 Kinsmen Pedestrian Bridge***
> ***Resolution # 2021-505***
> ***Moved By:*** *Councillor Gilvesy*
> ***Seconded By:*** *Councillor Parker*
>
> *THAT report OPD 21-46 Kinsmen Pedestrian Bridge be received as information and be deferred until the following information has been made available to both Council and the Public.*
>
> 1. *Pros and cons of a heritage designation on the Kinsmen Bridge;*
> 2. *Potential funding available for Options 2, 3 and 4 with Option 2 including any potential funding with or without the heritage designation;*

3. *Cost per household added to tax bills to fund Options 2, 3; and*
4. *Photos of examples of Option 4, new bridges.*

AND THAT once all information is compiled an open house presenting all options, costing, funding, tax increase and potential heritage designation take place to inform and allow the public to have input on this significant historical Town asset.

AND THAT all the above information be forwarded to appropriate committees and service groups, in particular the Kinsmen Club for comment and review.

Carried

To satisfy the above, Town Staff took the approach of providing Public Information Centre (PICs) presentations spanning over the last year and half, inclusive of a municipal election. Subsequently the following committees and special interest groups where consulted:

- Accessibility Advisory Committee
- Transit Advisory Committee
- Museum, Cultural, Heritage and Special Awards Committee
- Parks, Beautification and Cemeteries Advisory Committee
- Baldwin Place Community Centre
- Hickory Hills Community
- Kinsmen Club

Generally the feedback received through said PICs reflected the following:

Q: “How long will the bridge be down/decommissioned”
A: Subject to timing (i.e. the tender award and construction season) and Council’s approval a prefabricated bridge could be constructed and reinstalled in 2-4 months.

Q: “Will heritage aspects of the bridge be salvaged”
A: Staff will make every effort to preserve as much heritage value insofar as salvaging materials to be repurposed all subject to cost.

Q: “The bridge is currently too narrow for pedestrians, scooters, bikes, etc... to pass in a safe manner and/or at the same time via opposing directions”
A: Staff are proposing an AODA standard of 3.5m in width to be used that would relieve this issue.

Through the evaluation of the feedback and in review of the proposals/options to date a prefabricated bridge would best serve the bridge's replacement whereby having minimal impact/disruption to Town residents. Subsequently and in review of costing vs life expectancy Option 4, being a prefabricated pedestrian bridge, is recommended by Town Staff and the Planmac Engineering Inc.

DISCUSSION

As part of the Council resolution it was requested to provide the pros and cons if the Kinsmen Bridge were to receive a heritage designation.

If the bridge were to receive the designation it would come with restrictions on what could be done with the bridge. Restrictions could result in higher costs and a lower level of service in maintaining said heritage designation.

A heritage designation would allow the Town to retain a large historical feature of the community but would result in the following constrains:

PRO	CON
- Maintain the historical feature/value	- Higher Cost (i.e. replacing like for like, etc…)
	- Lower Level of Service (i.e. design and construction constrains such as keeping the current bridge width)

Below is a summary of each option where at the time of writing this report 8,453 residential units was used to estimate the per household cost (this is subject to change over time due to growth, etc..). An updated concept detail is available/attached in the PowerPoint presentation for Option 4.

<u>Option 1 – Do Nothing</u>

If the Town of Tillsonburg were to do nothing to the bridge, lacking the desire to implement a major rehabilitation within the noted time frame of less than five (5) years as per the remaining estimated useful life, it is anticipated that the structure will require closure or removal. Furthermore residents whom use the bridge would be required to walk down Baldwin or Concession Street in order to get to the downtown core or use other modes of transportation. An estimated cost of $25,000 would be required for the closure and removal is estimated to cost $1,344,500. Furthermore the following constrains may be considered:

PRO	CON
- Lowest cost solution of $1,369,500	- Removal of a key pedestrian access point to the downtown core
- No Schedule EA required	- Removal of a noticeable feature within the Town of Tillsonburg

	- $162 per household and/or $21 per household per year (over 7.5 years)

Option 2 – Bridge Rehabilitation

The bridge rehabilitation option consists of rehabilitation of the existing structure to extend its service life, and ensure the structure meets provincial and federal structural codes. The bridge rehabilitation option includes isolated structural steel member replacement, steel coating and new bridge deck for the implementation of an updated pedestrian barrier. Again the following constrains may be considered:

PRO	CON
- Key pedestrian access point to the downtown core is maintained	- Cost of $5,240,000
- Noticeable feature within the Town of Tillsonburg is maintained to current look	- Schedule C Environmental Assessment required (Depending on Heritage Impact Assessment, HIA)
- Addresses need for updated pedestrian barrier	- Estimated service life of 25-30 years.
	- Equating to $618 per household and/or $21 per household per year (over 30 years)

Option 3 - Bridge Superstructure Reconstruction (Like-for-Like Replacement)

Option 3 consists of reconstructing the existing steel superstructure like-for-like. Like-for –like represents demolishing the existing steel components of the bridge, but then reconstructing a new steel structure that's looks almost identical as the current bridge complete with new bridge deck for the implementation of an updated pedestrian barrier. To keep cost down the existing concrete piers would be left intact. Again the following constrains may be considered:

PRO	CON
- Key pedestrian access point to the downtown core is maintained	- Cost of $6,602,000
- New structure that mimics current look	- Schedule C Environmental Assessment required (Depending on HIA)
- Addresses need for updated pedestrian barrier	- Estimated service life of 50-60 years if concrete piers left.
	- Equating to $779 per household and/or $16 per household per year (over 50 years)

Option 4 – Bridge Replacement (Prefabricated Pedestrian Bridge)

This option consists total replacement of the steel structures and abutments while leaving the stone piers whereby providing a new prefabricated pedestrian bridge at the same elevation as the existing bridge. Again the following constrains may be considered:

PRO	CON
- Key pedestrian access point to the downtown core is maintained	- Cost of $5,800,000 ○ Inclusive of $1,500,000 maintenance costs over the service life.
- New Structure designed to current needs	- Schedule C Environmental Assessment required (Depending on HIA)
- Addresses need for updated pedestrian barrier	- Estimated service life of 75-80 years
- Potential for new park like features	- Equating to $684 per household and/or $9 per household per year (over 75 years)

Option 5 – Bridge Replacement (Prefabricated Pedestrian Bridge with Piers)

This option consists of the replacement of the bridge in its entirety including superstructure, piers, abutments, and existing foundations with a new prefabricated pedestrian bridge at the same elevation as the existing bridge, complete with reinforced concrete piers (2) and abutments. This option allows for new designs that has potential for new park like features. Again the following constrains may be considered:

PRO	CON
- Key pedestrian access point to the downtown core is maintained	- Cost of $6,250,000
- New Structure designed to current needs	- Schedule C Environmental Assessment required (Depending on HIA)
- Addresses need for updated pedestrian barrier	- Estimated service life of 75-80 years
- Potential for new park like features	- Equating to $737 per household and/or $9.20 per household per year (over 80 years)

CONSULTATION

Director of Operations and Development, Manager of Public works, Accessibility Advisory Committee, Transit Advisory Committee, Museum, Cultural, Heritage and Special Awards Committee, Parks, Beautification and Cemeteries Advisory Committee, Baldwin Place Community Centre, Hickory Hills Community and the Kinsmen Club were consulted.

FINANCIAL IMPACT/FUNDING SOURCE

Please note that per the current cost allocation, $101,980 remains of the $192,100 budget allocated for the purposes of engineering and design.

Option 1 - Do Nothing cost estimate is $1,245,000

Option 2 - Bridge Rehabilitation cost estimate is $4,820,000

Option 3 - Bridge Superstructure Reconstruction cost estimate is $6,602,000

Option 4 - Bridge Replacement cost estimate is $4,250,000 excluding maintenance costs.

Option 5 - Bridge Replacement with Piers cost estimate is $6,250,000.

Staff are actively looking for provincial and federal funding options where the majority of funding options require a “shovel ready” project (i.e. completed engineering and design). Direction is requested to refine and continue to report back to Council cost estimate(s) that are to be evaluated and presented through the Town’s annual budget process.

CORPORATE GOALS

How does this report support the corporate goals identified in the Community Strategic Plan?

☒ Lifestyle and amenities
☐ Customer service, communication and engagement
☐ Business attraction, retention and expansion
☐ Community growth
☐ Connectivity and transportation
☐ Not Applicable

Does this report relate to a specific strategic direction or project identified in the Community Strategic Plan? Please indicate section number and/or any priority projects identified in the plan.

Goal – Within the community, Tillsonburg will strive to offer residents the amenities, services and attractions they require to enjoy balanced lifestyles.

Strategic Direction – Provide an expanded, accessible network of parks and trails.

Priority Project – *Medium Term* - Feasibility study for increased/enhanced cultural amenities.

ATTACHMENTS

Appendix A – Public Information Centre (PIC) material/PowerPoint

Design Presentation

Engineering Services for the Replacement of Kinsmen Bridge

Design, Construction Tendering & Contract Administration

Introduction

- To discuss the replacement/rehabilitation of the Kinsmen Pedestrian Bridge
- Following the Public Information Consultation reaching out to committees and local groups for further consultation and data collection
- If you have any comments please reach out to Jonathon Graham jgraham@tillsonburg.ca or at 519-688-3009
- Any comments received will be collected and considered in further design steps, personal information will not be recorded.

Why are we here?

“Following an engineering assessment of the Kinsmen Bridge it was determined that the Kinsmen Bridge has many deficiencies such as delamination of the steel girders and significant corrosion on majority of the structural steel components. The deficiencies are required to be addressed in order to maintain public safety”

Existing Site Conditions/Constraints

- The existing structure was initially constructed in 1888 for use as a railroad bridge and was later converted to a pedestrian bridge. This bridge is heavily used by pedestrian traffic to access downtown shopping areas by residents west of the Stoney Creek Ravine. The 2019 Enhanced OSIM and 2021 OSIM inspections determined that, the bridge is in urgent need of repairs within five (5) years, and that the bridge had only ten years of service life remaining at the time of inspection.

- The existing abutments and stone foundations were constructed to support the loads and stresses of a train bridge, and their good condition permits that they can be retained for the new pedestrian bridge with only minor repairs.

- There are few environmental constraints for this study area. Since no major excavation will be required, impacts to the natural environment are expected to be minimal, and will require only minor remediation efforts after construction. Short-term impacts during construction will be mitigated through use of common mitigation measures and policies, including erosion control measures and re-seeding efforts. Additionally, during construction, the currently eroding banks beneath the bridge will be stabilized to minimize long-term erosion of the embankments.

Technical Studies Completed

- 2019 Enhanced OSIM Inspection – Standardized structural inspection conducted in Ontario that assess all features of a given structure. This inspection determined the 10-year remaining service life of the structure

- A Heritage Assessment was also completed in 2020. The preference from a heritage perspective is to find a suitable structure type that will be similar to the existing bridge.

- Geotechnical Investigation – No further Geotechnical investigations were required for this project given that minor rehabilitation of the stone foundations will lend them to be reused.

- Environmental studies will be limited to gaining approval from Long Point Region Conservation Authority under O.Reg 178/06, along with development of mitigation measures for construction (e.g. erosion and sediment control measures).

Design Alternatives

- During early design phases, the following alternatives were presented for this project:

- Option 1: Do Nothing – No rehabilitation or replacement. This is used as a baseline if nothing is done to replace or preserve the current structure. Includes decommission (Cost $1,369,500)
- Option 2: Repair – Recommended repairs are conducted on the bridge structure. Repairs would need to be conducted during or before 2024 and would extend the lifespan of the bridge for an additional 25-30 years. (Cost $5,240,000)
- Option 3: Like-for-Like Replacement (Hybrid)– Replacement of only the steel components of the bridge while retaining the abutments and stone piers. The replacement bridge would be designed in a manner that is similar to the existing structure. Lifespan would extend to 50-60 years. (Cost $6,602,000)
- Option 4: Prefabricated Pedestrian Bridge – This alternative would involve the removal of all existing bridge components and replace with a new, prefabricated bridge. The design of the bridge could range from basic, to very modern in design. Lifespan would extend to 75-80 years (Cost $5,750,000)
- Option 5: Prefabricated Pedestrian Bridge – This alternative would be the same as Option 4 but includes removal of the old stone foundations and replacement with new foundations. Lifespan would extend to 75-80 years (Cost $6,250,000)

Recommended Design Alternative

- **Following the PIC meeting in September, 2022 and communication with the Municipality, it was decided that the preferred design alternative would be Option 4:**

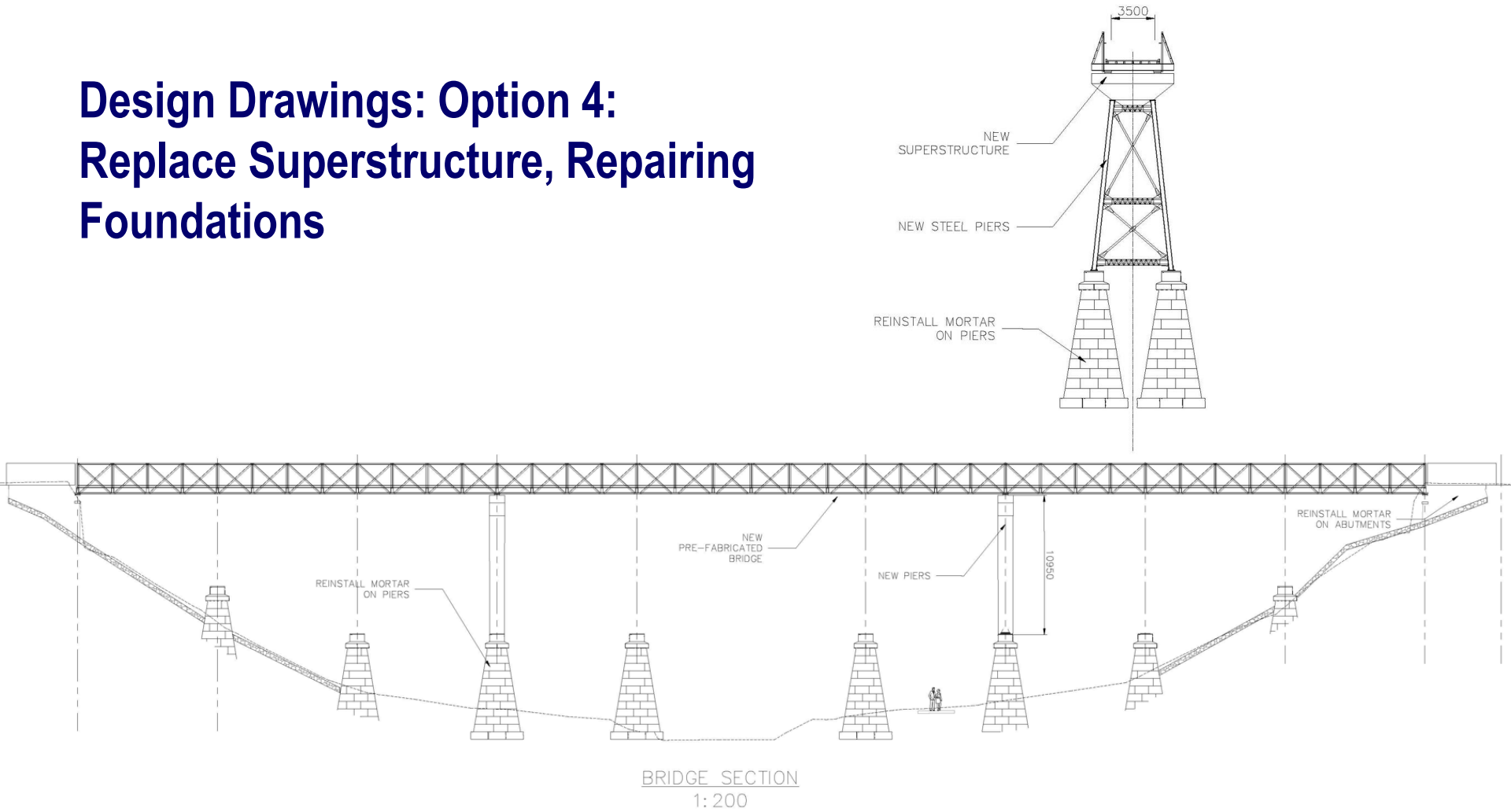
- This option will refresh the look and feel of the area/bridge, while ensuring the safety and accessibility of all pedestrians. This will be achieved through replacement of the heavily corroded old bridge and fencing with a new steel replacement structure supported on existing foundations.
- Option 4 will allow more improvements to sediment retention.
- Option 4 will also be the most environmentally friendly, due to not needing to excavate and replace the footings. This option will use the least overall new materials in bridge replacement.

Option 4: Replace Superstructure, Repairing Foundations

(Estimated $5,750,000 over 75-80 Years Service Life)

Pros	Cons
Optimized cost	Different Aesthetic Design – May change look and feel of the park area
No Earth or In-Water works required	
Long Service Life	
Shortest Construction time	
Lowest overall environmental impact/emissions	
Creative space in the design process – Bridges could range from basic to modern designs	

Design Drawings: Option 4: Replace Superstructure, Repairing Foundations



Design/Construction Considerations

- Fortification of the embankments will be necessary for the long term viability of the bridge.
- Environmental impacts will be taken into consideration through implementation of construction methods and procedures to minimize impact on several different aspects of the study area. This includes considering the impact on vegetation, erosion and sediment control and soil contamination.
- All applicable legal regulations pertaining to engineering design and environmental impact mitigation will be followed during the design and pre-construction process.

Next Steps

- Start Detail Design
- Obtain funding
- Prepare Construction Tender Document.
- Receive permitting from Long Point Region Conservation Authority and complete the Detailed Design.