

Bastion Bridge Options Analysis



Date: November 14, 2016

Bastion Bridge



History



Constructed in 1936



Reconstructed in 1978/ 1979



2014 inspection revealed
significant maintenance required

Seismic Capability

- Does not address many of the seismic provisions included in the current Bridge Code, CSA S6, Canadian Highway Bridge Design Code, 2014
- The design seismic event would likely cause permanent damage to the bridge, potentially resulting in a partial or full collapse of the bridge.



Options

- 1. Rehabilitation and Seismic Retrofit***
- 2. Rehabilitation Only***
- 3. Bridge Replacement***
- 4. Bridge Replacement in 10 years***



Option 1 (Recommended Option)

Rehabilitation and Seismic Retrofit

- Recommended option in the June 20, 2016 Council Report
- Implements rehabilitation recommendations for the bridge
- Upgrade to a “Safety 1” Seismic designation
- Cost of \$1,850,000 in 2017
- Future maintenance upgrade after 20 years (2036) and replacement after 30 years (2046)

Option 2

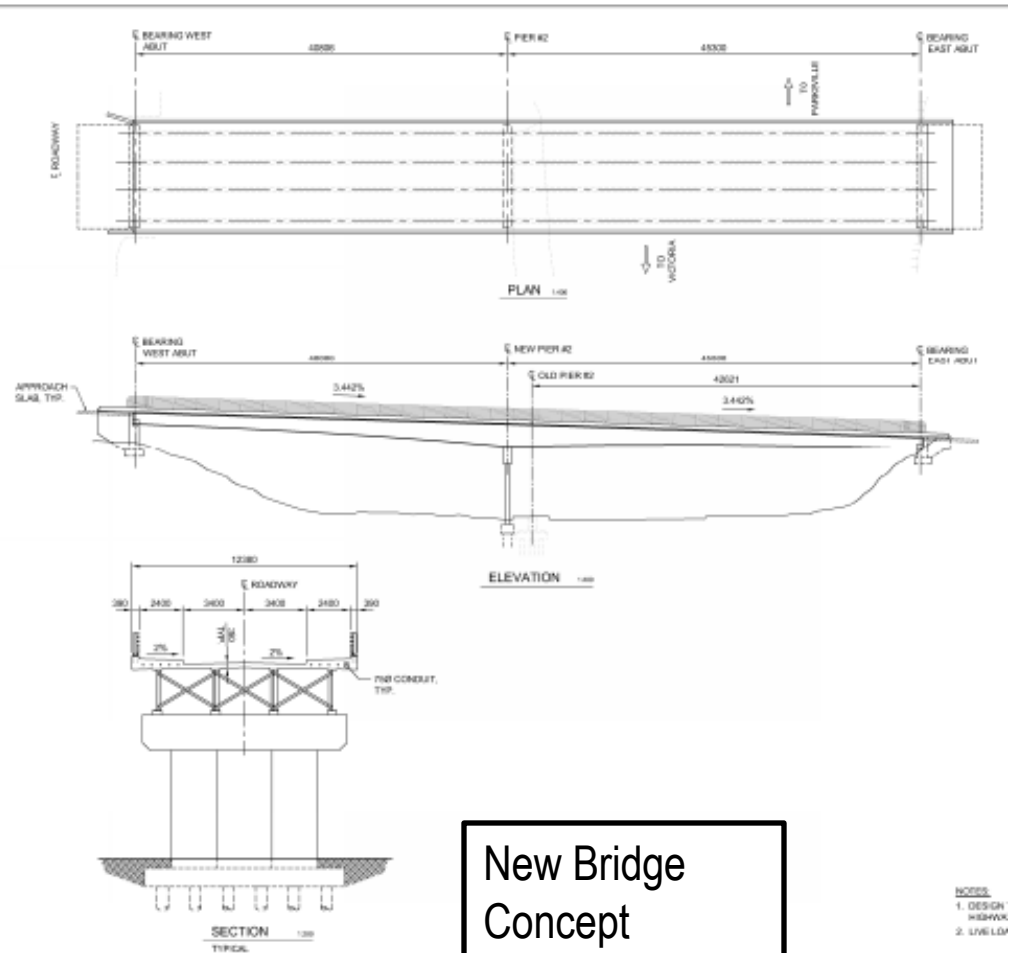
Rehabilitation

- Implements rehabilitation recommendations for the bridge
- Does not address seismic vulnerabilities
- Cost of \$670,000 in 2017
- Future maintenance upgrade after 20 years (2036) and replacement after 30 years (2046)

Bastion Bridge

Option 3 *Bridge Replacement*

- Construct new bridge to current standards
- Cost of \$5,945,000 in 2017



New Bridge
Concept

Option 4

Bridge Replacement in 10 years

- Undertake only essential maintenance within the next 10 years approximately \$50,000.
- Construct new bridge to current standards in 10 years with a cost of \$5,945,000 in 2026.
- Retains seismic risk for 10 years.

Bastion Bridge



Costs Summary

Option	2017	2026	2036	2046
<i>Option 1 – Rehabilitation and Seismic Retrofit *</i> (Recommended Option)	\$1,850,000	\$0	\$250,000	\$5,945,000
<i>Option 2- Rehabilitation Only</i>	\$670,000	\$0	\$250,000	\$5,945,000
<i>Option 3- Bridge Replacement</i>	\$5,945,000	\$0	\$0	\$0
<i>Option 4- Bridge Replacement in 10 years</i>	\$50,000	\$5,945,000	\$0	\$0

**Long term financial analysis indicates that Option 1 is the best value over time*

Bastion Bridge



Construction Impact

Options 1 & 2

- *Construction duration of 6 months*
- *Bridge closure of 6-8 weeks*



Options 3 & 4

- *Construction duration & bridge closure of 6 -8 months*



Risk

Option1 - Rehabilitation and Seismic Retrofit

- ✓ *Addresses Seismic Safety Risk*
- *Some seismic Damage Risk*
- ✓ *Low construction Risk*

Option 2 - Rehabilitation Only

- ✗ *Exposed to Seismic Safety Risk*
- ✗ *Exposed to Seismic Damage Risk*
- ✓ *Low construction Risk*



Risk

Option 3 - Bridge Replacement

- ✓ *Addresses seismic Safety Risk*
- ✓ *Addresses seismic Damage Risk*
- ✗ *Construction Risk*
 - ✗ Contaminated soils in the area
 - ✗ Poor geotechnical conditions



Risk

Option 4 - Bridge Replacement in 10 years

- ✓ *Retains seismic Safety Risk for 10 years*
- ✓ *Retains seismic Damage Risk for 10 years*
- ✗ *Construction Risk*
 - ✗ Contaminated soils in the area
 - ✗ Poor geotechnical conditions



Bastion Bridge



Other Opportunities

Old City Quarter Gateway

- Retrofit options - \$70,000
- New Bridge - \$50,000



Original Gateway Concept

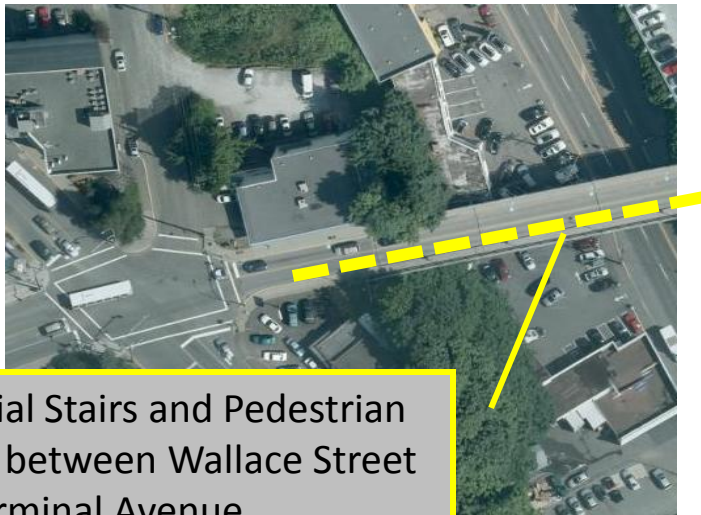
Bastion Bridge



Other Opportunities

Transportation Network Improvements (new bridge only)

- Pedestrian connection between Wallace St and Terminal Ave
- Relocation of column on Terminal Avenue



Potential Stairs and Pedestrian Access between Wallace Street and Terminal Avenue



Potential Column location for a new bridge.

Other Opportunities

Aesthetics

Retrofit Scenarios

Potential for:

- Incorporating additional lighting features
- Providing a space for public art.

Significant changes to the look and feel of the bridge are unlikely.

Other Opportunities

Aesthetics

New Bridge

- Opportunity to create a structure which is both aesthetically pleasing and functional.
- Cost estimate is are based on a fairly basic and functional bridge and significant architectural detailing or features can increase the cost of a structure substantially.
- Public input and consultation required.







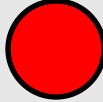





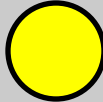



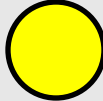
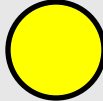


Bastion Bridge



Summary – Cost

Option	2017	2026	2036	2046
<i>Rehabilitation and Seismic Retrofit</i>	\$1,850,000	\$0	\$250,000	\$5,945,000
<i>Rehabilitation Only</i>	\$670,000	\$0	\$250,000	\$5,945,000
<i>Bridge Replacement</i>	\$5,945,000	\$0	\$0	\$0
<i>Bridge Replacement in 10 years</i>	\$50,000	\$5,945,000	\$0	\$0

Bastion Bridge

Option	Seismic Safety Risk	Seismic Damage Risk	Construction Risk	Value	Construction Impact
<i>Rehabilitation and Seismic Retrofit</i>					
<i>Rehabilitation Only</i>					
<i>Bridge Replacement</i>					
<i>Bridge Replacement in 10 years</i>					

Bastion Bridge



Recommendation

Option 1: Rehabilitation and Seismic Retrofit

- Completes maintenance requirements
- Reduces Seismic Safety & Damage Risk
- Low construction risk
- Moderate immediate cost (\$1,850,000) defers large expenditure (\$5,945,000) for 30 years

Bastion Bridge



Questions?

