SR 520 Floating Bridge
Expansion Joint Noise

Options	Description of Work	Estimated Cost	Estimated Duration	Benefits	Risks/Cons	Permits Required
Expansion Joint Retrofit	Install sinus plates on existing Mageba expansion joints.	Design & Construction: approx. $10M Loss of toll revenue: $4 – 6 million	Testing: 12 to 18 months Design: 6 to 12 months Fabrication: 4 months Construction: 6 months Construction, including fabrication, would likely take 2 construction seasons. Potential Project Duration: 2.5 to 3.5 years	• Potential noise reduction • Installation of "hump seal" will help keep the gap free of dirt and may reduce noise.	• Significant cost. No work can begin until funding is available, which requires legislative approval. • DB warranty for original joint would no longer be valid. Now a WSDOT risk. • Existing joint beams would need to be removed and field modified (new welding) along with in the drilling of over 4000 holes/joint and fit-up of sinus plates. • The driving surface at the expansion joint would be 20mm higher than existing, requiring the driving surface to be adjusted at each side of the joint, which could impact ride quality and noise. • Any overlay required would not be as quiet as existing pavement. May not result in significant noise reduction. • Shorter life span than joint replacement. High likelihood that the joint may not meet 75-year design life requirement and result in greater maintenance costs and impacts to the public. Additional testing required to account for 3-dimensional movement. • Construction operations are weather sensitive (50+degrees in dry weather). • 2 to 3 weeks of full roadway closures. RSUP closure likely required. Significant Regional traffic impacts. • Difficulty in scheduling summer closure windows with on-going bridge work on I-90. • Significant loss of toll revenue.	• Noise variance from cities of Medina and Seattle • Potential shoreline permit from cities of Medina and Seattle
Expansion Joint Replacement	Replace existing Mageba expansion joints and install sinus plates. Overlay may be required.	Design & Construction: >$10M Loss of toll revenue: $4 – 6 million	Testing: 12 to 18 months Design: 6 to 12 months Fabrication: 6 months Construction: 6 months Construction, including fabrication, would likely take 2 construction seasons. Potential Project Duration: 2.5 to 3.5 years	• Potential noise reduction • Longer life span than joint retrofit.	• Highest cost option. No work can begin until funding is available, which requires legislative approval. • Potential damage to bearing area and rebar. If joint is not placed correctly, it could fail prematurely. DB warranty for original joint would no longer be valid. Now a WSDOT risk. • Additional testing required to account for 3-dimensional movement. • Construction operations are weather sensitive (50+degrees in dry weather). Best in summer to avoid storm/wind events that would impact 3-dimensional rotation. • 14-day continuous full roadway closure required. Need additional closures if bearing seats needs to be modified and if an overlay is required. RSUP closure likely required. Significant Regional traffic impacts. • Difficulty in scheduling summer closure windows with on-going bridge work on I-90. • Significant loss of toll revenue.	• Noise variance from cities of Medina and Seattle • Potential shoreline permit from cities of Medina and Seattle

Recent Projects:

Project Name	Description of Work	Actual Cost	Actual Duration	Benefits	Risks/Cons
I-90 Homer Hadley Bridge Expansion Joint Replacement (completed in 2009)	Replace expansion joints on the I-90 WB and reversible roadway.	Design & Construction: $8M	Design: 1 year (2 years including traffic control/staging) Construction: 2 construction seasons, including 6 to 8 month joint fabrication.	• Replaced failing expansion joints.	• Two 3-week closures • WSDOT has received complaints about expansion joint noise.
Golden Ears Bridge – Noise Abatement (completed in 2011)	Insert filler material to reduce the expansion joint noise. Replace 3m sound wall with 4.5m sound wall.		Research/Testing: >1 year Design & Construction: approx. 2 years	• Noticeable noise reduction	• Potential high maintenance cost. • Significant roadway disruptions and loss of toll revenue.

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