

## CITY OF MEDINA | SR 520 EXPANSION JOINT NOISE Q&A

### TOWN HALL MEETING, AUGUST 10, 2016

Since the completion of the new SR 520 floating bridge, citizens in the City of Medina and surrounding communities have experienced a new and annoying noise emanating from the bridge's expansion joints.

Since receiving noise complaints from residents, the City has been collaborating with the Washington State Department of Transportation (WSDOT) to explore possible remedies for the expansion joint noise problem. On June 20, 2016, the City Council formed a Committee of the Whole (COW), tasked with managing WSDOT collaborations through monthly meetings.

This Q&A offers updated information regarding the City's current understanding of the joint-noise problem and its potential solutions.

#### **What is the "joint-noise" and why is it problematic?**

The "thunk, thunk, thunk" noise that is currently disrupting Medina residents emanates from the large, eastern-most expansion joints on the new SR 520 bridge. The expansion joints are a critical structural component of the bridge; they permit the bridge to expand, contract and twist by approximately six degrees on horizontal and vertical planes with the rise and fall of lake waters, adverse weather conditions, heavy traffic, etc. These particular joints have a "transverse-longitudinal" (a.k.a. "lamella") design and were manufactured by Mageba, Inc., a Swiss company. The transverse-longitudinal design, while exceptionally effective from a structural perspective, has a major noise downside: car tires generate the complained-of "thunking" noise as they traverse the joint's accordion-like surface.

Although it is annoying and disruptive, the noise emanating from the joints does not exceed the 67 dBA maximum for highway noise set by the Federal Highway Administration and implemented by WSDOT. Both the City's noise expert and WSDOT personnel have confirmed this fact through extensive noise measurement and data analysis. Absent an FHWA regulatory violation, WSDOT cannot obtain federal funds to remedy the joint noise.

#### **What are "sinus plates," and can they fix the problem?**

The joint manufacturer, Mageba, offers "sinus plates" as a possible solution. These sinus plates can be attached to the bars that make up the surface of the joint to create a smoother surface for cars to traverse the joint—significantly reducing the "thunking" noise while still allowing the bridge to expand and/or contract as needed. At this time, the City believes the Megaba sinus plates may represent the best, most effective long-term solution to the joint noise problem, though certain technical issues must be addressed.

The effectiveness and viability of the sinus plates depends on the particular characteristics of the bridge in question. Notably, the eastern-most SR 520 joints are quite large and must facilitate an extremely wide range of motion in order to preserve the structural integrity of the bridge. Adding Mageba sinus plates to eastern-most joints may or may not interfere with this critical design feature.

At a July 18<sup>th</sup> Committee of the Whole meeting, WSDOT raised concerns regarding the durability of the joints with sinus plates. Mageba has stated that the sinus plates are durable and have survived fatigue testing. However, cracking in a sinus plate was detected in at least one testing phase.

WSDOT plans to consult with experts in its Bridge Office to determine (1) whether adding sinus plates to the eastern-most joints would interfere with their ability to expand and/or contract to the extent required to preserve the structural integrity of the bridge, and (2) whether the joints with sinus plates meet the requisite durability standards.

Through a public records request, the City has determined that WSDOT was aware of the possibility that the joints would generate noise problems since at least 2012. WSDOT has also been aware of at least one European study and various Mageba publications which support the use of sinus plates as an effective remedial strategy. While the sinus plates were ostensibly not considered during the design phase of the eastern approach (the Floating Bridge and Landings, or “FB&L” project), officials responsible for the west end of the bridge (the West Approach Bridge North, or “WABN” project) *have* considered Mageba sinus plates as part of the west-end design. WSDOT attributes the non-inclusion of the sinus plates on the east approach to the non-availability of testing results demonstrating the durability of the joints with sinus plates at the time the east approach design was finalized.

### **What are the possible solutions that the City and WSDOT have identified to date?**

In addition to the sinus plates, WSDOT and the City have explored the feasibility and effectiveness of other potential solutions. These alternatives include adding noise walls coated in sound-absorptive materials, encapsulating the joints from underneath (WSDOT has already implemented this strategy on the eastern-most 520 joints), and adding sound-absorptive material between the joint-bars. The long term effectiveness and maintainability of each of these strategies is variable. (A thorough description of the various strategies considered thus far can be found in the materials distributed by WSDOT at the July 18, 2016 COW meeting, available on the City’s website.)

At this time, the City and WSDOT are focusing on the addition of sinus plates—either through a retrofit or by replacing the joint altogether—as the most effective potential solution to the joint noise problem. Based on its communications with WSDOT and review of pertinent records, the City believes that retrofitting and/or replacing the joint to include sinus plates is likely the best long-term solution to the noise problem.

Notably, WSDOT has offered preliminary indications that adding the Mageba sinus plates to the joints would entail closing the SR 520 bridge for 2 to 3 weeks: an estimate consistent with feedback from Mageba personnel. Obviously, this fix would come at significant cost, both in terms of replacing and/or retrofitting the joint to include sinus plates and in terms of lost tolls. At the July 18<sup>th</sup> COW meeting, WSDOT estimated that the retrofit alone (not including lost tolls) would cost between 5 and 10 million dollars.

### **What actions has the City taken to address the problem?**

Since receiving noise complaints from residents, the City has engaged in ongoing collaboration with WSDOT in order to better understand the joint noise problem and identify potential solutions. The City has hired a sound engineering firm, BRC Acoustics, to conduct an independent assessment of the noise, made extensive public records requests to WSDOT for all documents pertaining to expansion joint noise, instituted regular technical working groups to formulate strategies, formed a Committee of the Whole to meet with WSDOT on a monthly basis, and begun efforts to retain a lobbying firm to help apply pressure to the State legislature to obtain funding for a fix.

**What are the City's current goals?**

- Continue collaboration with WSDOT for as long as possible in order to identify, assess and implement effective mediation strategies;
- Follow up with WSDOT in future COW meetings regarding the Bridge Office's assessment of the structural feasibility of sinus plates as a remedial measure;
- Assess all available strategies to identify the most effective long-term solution to the joint-noise problem;
- Continue collaboration with state legislators and the Governor's office to maintain support for the City's remedial efforts; and
- Procure and leverage legislative support with assistance from a lobbying firm.

**What are the next steps?**

The COW and Technical Advisory Team will convene again within the next month. The City anticipates receiving updated information regarding the structural viability of the sinus plates as a remedial measure at this upcoming COW meeting. The City will continue to identify and seek answers to specific, solution-driven questions as these meetings progress. The City will continue efforts to gain lobbying assistance to obtain legislative funding and support for its desired solution. The City will also continue its contact with the Governor's office and state representatives to ensure that its concerns are treated with urgency and that collaboration with WSDOT remains fruitful. Finally, the City will continue to review records provided in response to its public records request.