Possible Benefits

WSDOT has calculated that perceived noise could be reduced by 13 to 19 decibels (reducing noise by two-thirds of what people hear today), with the use of noise walls alongside both bridge decks and with horizontal panels fitted to the ceiling of the express lane deck.

Although the system works best when all the sections are together, each section provides independent benefits. This would allow the system to be constructed in phases over time, while providing increasing benefit with each phase completed.

Construction of the noise walls and panels could provide an improved outdoor environment for over 4,000 residents in parts of the surrounding neighborhoods. The neighborhoods of Wallingford, Eastlake, Portage Bay, and the University District along with all the people who walk, jog, bicycle, boat, or relax outdoors in this waterfront area would benefit.

The mid-section of the I-5 Ship Canal Bridge, with University Bridge in the background.

Future Plans

If dollars became available to allow the project to move forward, the design and environmental phase could happen 2-3 years from now, and construction could start in the fourth or fifth year.

This project could greatly affect the character of the bridge and views from the bridge. Because of this, both the neighborhoods and the general public will continue to be involved in the process.

WSDOT will pursue the use of the materials considered in this study as noise reduction options and will develop projected costs based on additional environmental, engineering, material, and maintenance evaluations. This information will be presented to elected officials and representatives, the Washington State Transportation Commission, and other members of WSDOT.

The most updated information regarding this project can be found on the project website at

www.wsdot.wa.gov/projects/I5_ShipCanalBridge.

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Washington State Department of Transportation

I-5 Ship Canal Noise Study

Community Interest Sparks Research on Ship Canal Bridge

Since I-5's construction in the 1960s, Seattle communities Portage Bay/Roanoke Park and Eastlake have experienced high levels of freeway noise everyday. In 2003, WSDOT responded to requests from these communities and their elected representatives, and began a detailed study of traffic noise from the Ship Canal Bridge.

WSDOT found that a majority of the bridge's noise radiates from the express lane deck. The thousands of residents in the surrounding communities experience noise levels ranging from 64 to 89 decibels; levels noise experts consider quite loud (see figure below).

Technological advances have helped WSDOT model this complex noise environment and to begin evaluating a variety of lightweight noise absorbing materials. Options to decrease traffic noise could include building noise walls and hanging absorptive panels (see inside for details).

Noise programs in Washington

WSDOT created its traffic noise retrofit program in 1977. Today, this program works to reduce traffic noise for affected neighborhoods built on or before May 1976. Identified neighborhoods are prioritized, and noise reduction projects are built as funding becomes available.

Neighborhoods built after May 1976 were addressed under the federal regulation, Procedures For Abatement Of Highway Traffic Noise And Construction Noise. This requires WSDOT to evaluate noise impacts in neighborhoods from projects that add new roadways, add lanes to existing roadways, or substantially move the roadway. The Ship Canal Bridge has been an "area of interest" since the program's startup in 1977 and now ranks 10th out of 72 noise retrofit locations statewide.

A noise abatement criteria of 66 decibels has been established as a threshold for freeways and highways.

▶ *How We Hear Decibel Changes (dB)*

3 dB = The minimum change in noise noticed by the average human ear

10 dB = A reduction of 10 dB will sound half as loud to the human ear; a 10 dB increase will be twice as loud.

▶ *Real World Decibel Levels*

20 dB = Quiet whisper

30 dB = Soft music

45 dB = Inside a home

65 dB = Inside a factory

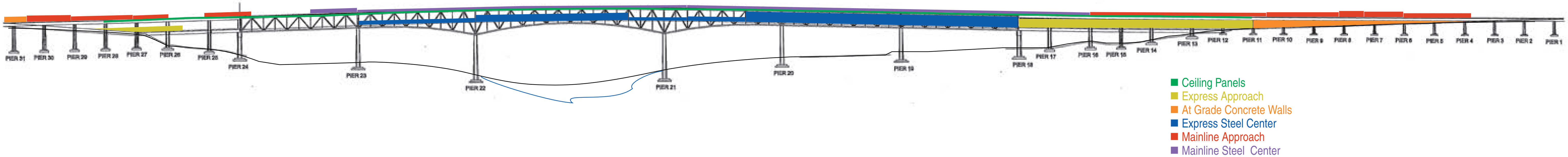
100 dB = Rock concert

120 dB = Aircraft engine

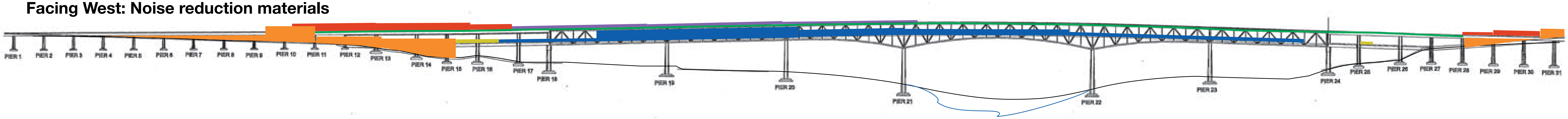
130 dB = Pain threshold

Phased Options for I-5 Ship Canal Bridge Noise Mitigation

Facing East: Noise reduction materials



Facing West: Noise reduction materials



Looking down on the I-5 Ship Canal Bridge during a 1990s repair job. The University of Washington is in the immediate background. The communities of Wallingford and Eastlake are on the left and right, respectively.

Project Component	Expected Noise Reduction *	Number of homes benefited **	Estimated Cost Range ***	Timing (as separate projects)
Initial Bridge Engineering, Design and Testing			$4-7 million	3.5 years
Partial Bridge Rehabilitation (needed to accommodate first three options below)			$4-5 million	Concurrent with first phase of construction
Ceiling Panels	0-10 decibels (dBA)	1,064	$6-7 million	4.25 years
Express Approach	0-13 decibels (dBA)	791	$9.5-10.5 million	3.25 years
At-Grade Concrete Walls	0-9 decibels (dBA)	565	$6.5-7 million	2.75 years
Add'l Bridge Rehab (needed before next three options can be built)			$4-5 million	3 years
Exp. Lanes, Ctr.	0-8 decibels (dBA)	922	$15.5-16.5 million	2.75 years
Mainline Approach	0-5 decibels (dBA)	348	$10-11 million	3.25 years
Mainline, Ctr.	0-3 decibels (dBA)	209	$19.5-20.5 million	2.75 years
		Total Cost Range	$79-89.5 million	

* Assumes use of opaque, noise-absorbing materials.
** Benefited homes are not directly additive with each section of the bridge. (Benefited = Home receiving 3 or more dBA of reduction)
*** Reported cost ranges based on uncertainties of timing, use of new materials, material choices, and cost risk analysis.

Washington State Department of Transportation