WSDOT

December 1, 2022

I-5 STUDY PROVISO – SSB 5975, SECTION 209:

Seismic Recommendations and Funding Request: Executive Summary

The 2022 Legislature passed the historic Move Ahead Washington transportation package that directed WSDOT to submit a recommended approach and funding request to:

- Assess the seismic risk of the I-5 causeway from Boeing Field to Lake City Way
- Recommend future work to mitigate seismic risk on the causeway, including estimated costs

WSDOT is providing this Executive Summary to meet the December 1 proviso deadline and will submit a final report to the Joint Transportation Committee before the end of December 2022. A comprehensive funding request will accompany the final report. The funding request will include efforts to advance seismic resiliency and continue HOV efficiency and corridor planning work initiated by SSB 5975, Section 209.

Study Purpose

As directed by SSB 5975, Section 209, WSDOT:

- Conducted a seismic risk assessment of approximately 150 structures within a vital and complex section of I-5;
- Developed detailed recommendations to complete a seismic vulnerability analysis in the next study phase; and
- Developed a funding request for next steps in the retrofit process.

Final Report Chapters

Study Limits

Structures

153 structures were assessed, as follows:

Bridges/Tunnels/Lids

123

- **27** Mainline I-5 Recovery Bridges
- **2** Key Recovery Tunnels
- **13** Key Recovery On/Off Ramps
- **4** Lid-type Structures
- **23** Ordinary Overcrossings
- **50** Other Ordinary On/Off Ramps and HOV Bridges
- **4** Other Ordinary Tunnels

30 Significant Retaining Walls

Significant walls are those that, if they fail during a seismic event, will block several lanes of I-5, reducing it to one or no lanes in either direction or will block a Recovery access ramp.

Performance Criteria

WSDOT has designated I-405 and much of I-5 and I-90 as lifeline routes in the central Puget Sound area. The study segment of I-5 is not currently included as part of a lifeline route. However, WSDOT's recently adopted resiliency goal and the critical role this segment plays in moving people and goods in the region led the study to plan for a quick recovery of the area following a seismic event. Two performance standards were used to evaluate bridges for resiliency in a significant earthquake:

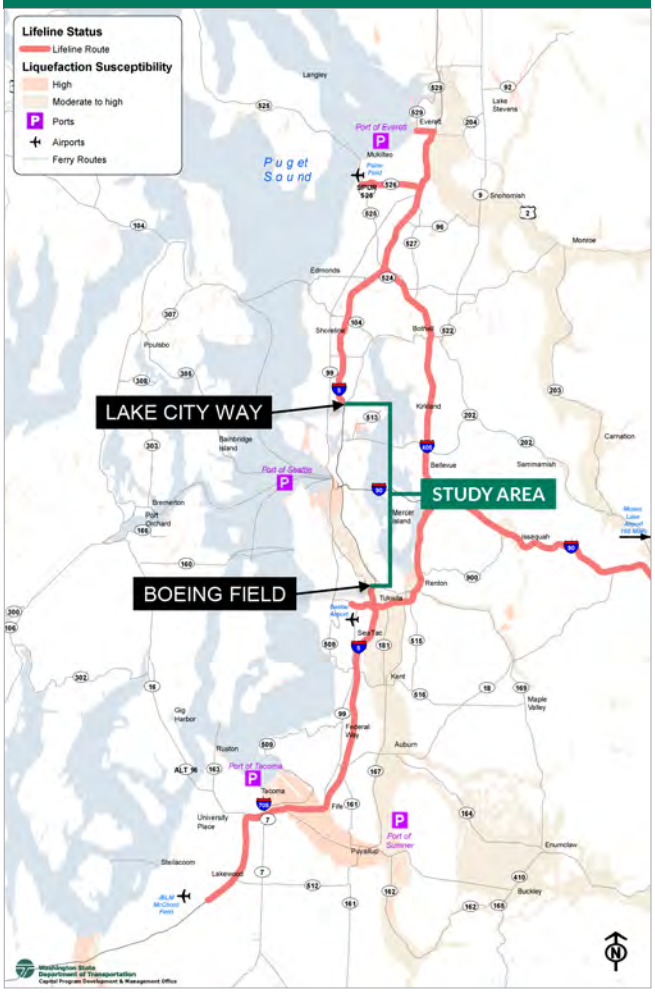
- Recovery Bridges serve as vital links for rebuilding damaged areas and provide access to the public shortly after an earthquake.
- Ordinary Bridges are intended to meet life-safety requirements that focus on preventing collapse. Damage to these structures may be significant and could render them unusable after an event. Allowing more damage to these bridges greatly reduces construction costs.

For this study, Recovery Bridges include:

- All bridges carrying mainline I-5 in either direction
- On/Off ramps that maintain access and connectivity to population centers and other important facilities (emergency medical facilities, Port of Seattle, Colman Dock, etc.)

All other structures (overcrossings, on/off ramps, etc.) are designated Ordinary.

Currently, this study area on I-5 is not designated as a lifeline route



Methodology

Typically, there are three phases in a seismic upgrade process that build on one another to clearly define next steps and associated costs. The current study prepares for the first phase.

The current risk assessment determined the level of effort to complete the Vulnerability Analysis Phase. The team reviewed relevant structures and identified specific characteristics that impact each future seismic design. For example, multi-level (double decker) bridges require a more labor-intensive analysis to capture the geometry and analyze the behavior of the columns, girders, and integral crossbeams compared to a single level bridge. This type of information was used to develop a systematic approach to estimate the effort necessary to conduct the seismic vulnerability analysis. It was applied to approximately 90-95% of the bridges in the study.

The remaining structures are unique and required a customized approach to estimate the level of effort. Lake Union Ship Canal Bridge is an example of a unique structure. Its long spans, multi-level bridge decks and other elements make it dissimilar to other bridges in the study area. Conducting the vulnerability analysis will require an exceptional effort with specialized expertise.

Planning

- Step 1: Seismic Risk Assessment (current study)
- Step 2: Lifeline Designation Determination, Screening, Packaging, Phasing

Vulnerability Analysis Phase

- Retrofit versus replacement scenarios are better understood, enabling informed design decisions

Design Phase

- A retrofit or a replacement option is selected for each bridge
- Plans, specifications and estimates are produced

Construction Phase

- Construction contracts advertised and awarded
- Construction begins

I-5 Study Website

https://wsdot.wa.gov/construction-planning/search-studies/i-5-study

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August 2022

I-5 Study Timeline