Razing Seattle's viaduct doesn't guarantee nightmare commutes, model says

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The Alaskan Way Viaduct is slated for demolition for seismic reasons. Credit: Washington State Department of Transportation

Debate about how to replace Seattle's deteriorating waterfront highway has centered on uncertainties in the project's price tag. Drilling a deep-bore tunnel and building an underground highway is estimated to cost around $4 billion, but some worry the final price could be higher, as it was for Boston's infamous Big Dig.

University of Washington statisticians have, for the first time, explored a different subject of uncertainty, namely surrounding how much commuters might benefit from the project. They found that relying on surface streets would likely have less impact on travel times than previously reported, and that different options' effects on commute

times are not well known.

The research, conducted in 2009, was originally intended as an academic exercise looking at how to assess uncertainties in travel-time projections from urban transportation and land-use models. But the paper is being published amid renewed debate about the future of Seattle's waterfront thoroughfare.

"In early 2009 it was decided there would be a tunnel, and we said, 'Well, the issue is settled but it's still of academic interest,'" said co-author Adrian Raftery, a UW statistics professor. "Now it has all bubbled up again."

The study was cited last month in a report by the Seattle Department of Transportation reviewing the tunnel's impact. It is now available online, and will be published in an upcoming issue of the journal Transportation Research*: Part A*.

Researchers looked at eight routes that currently include the Alaskan Way Viaduct. Credit: University of Washington

The UW authors considered 22 commuter routes, eight of which currently include the viaduct. They compared a business-as-usual scenario, where a new elevated highway or a tunnel carries all existing traffic, against a worst-case scenario in which the viaduct is removed and no measures are taken to increase public transportation or otherwise mitigate the effects.

The study found that simply erasing the structure in 2010 would increase travel times a decade later for the eight routes that currently include the viaduct by 1.5 minutes to 9.2 minutes, with an average increase of 6 minutes. The uncertainty was fairly large, with zero change within the 95 percent confidence range for all the viaduct routes, and more than 20 minutes increase as a reasonable projection in a few cases. In the short term some routes along Interstate 5 were slightly slower, but by 2020 the travel times returned to today's levels.

"This indicates that over time removing the structure would increase commute times for people who use the viaduct by about six minutes, although there's quite a bit of uncertainty about exactly how much," Raftery said. "In the rest of the region, on I-5, there's no indication that it would increase commute times at all."

The study also considered the effects on 14 routes, shown here, that do not include the viaduct. Credit: University of Washington

The Washington State Department of Transportation had used a computer model in 2008 to explore travel times under various project scenarios. It found that the peak morning commute across downtown would be 10 minutes longer if the state relied on surface transportation. Shortly thereafter state and city leaders decided to build a tunnel.

The UW team in late 2009 ran the same travel model but added an urban land-use component that allows people and businesses to adapt over time – for instance by moving, switching jobs or relocating businesses. It also included a statistical method that puts error bars around the travel-time projections.

"There is a big interest among transportation planners in putting an uncertainty range around modeling results," said co-author Hana Sevcikova, a UW research scientist who ran the model.

"Often in policy discussions there's interest in either one end or the other of an interval: How bad could things be if we don't make an investment, or if we do make an investment, are we sure that it's necessary?" Raftery said. "The ends of the interval can give you a sense of that."

The UW study used a method called Bayesian statistics to combine computer models with actual data. Researchers used 2000 and 2005 land-use data and 2005 commute travel times to fine-tune the model. Bayesian statistics improves the model's accuracy and provides an uncertainty range around the model's projections.

The study used UrbanSim, an urban simulation model developed by co-author and former UW faculty member Paul Waddell, now a professor at the University of California, Berkeley. The model starts running in the year 2000, the viaduct is taken down in 2010 and the study focuses on peak morning commutes in the year 2020.

Despite renewed discussion, the authors are not taking a position on the debate.

"This is a scientific assessment. People could well say that six minutes is a lot, and it's worth whatever it takes [to avoid it]," Raftery said. "To some extent it comes down to a value judgment, factoring in the economic and environmental impacts."

Provided by University of Washington