

October 22, 2013

TO: C. Lavra  
SR 520 Floating Bridge and Landings, NB82-99

FROM: J. R. Struthers / T.M. Allen  
Geotechnical Office 47365

SUBJECT: SR-520, I-5 to Medina: Bridge Replacement and HOV  
Vibration Impacts on Existing Slopes  
Geotechnical Review and Evaluation

As you requested, our office has performed a review of existing information and prepared this opinion regarding the potential slope stability impacts of project construction and operational vibrations on identified sensitive slopes. It is our understanding that the need for this review originates with the project's Section 106 Programmatic Agreement, Item G 3.

Our evaluation include reviewing "*Final Construction Noise and Vibration Report, SR520, I-5 to Medina: Bridge Replacement and HOV Project*" by ATC Consulting (ATC, 2013). This report provides an analysis of both noise and vibrations anticipated during the construction of the project. The project, as defined in the report, extends from the intersection of Interstate 5 and SR-520 east to the western approach to the new SR-520 floating bridge. Activities anticipated during construction include demolition of the existing structure, pile driving for support of excavation and new construction, and standard bridge construction activities, including use of haul routes.

Geotechnical evaluations performed for preliminary project design identify the presence of a preexisting landslide in the east-facing slope to the west of Portage Bay. At this location, historic grading activity has resulted in localized reactivation of the slide mass. Based on the work performed to date, no additional areas of historic slope instability were identified.

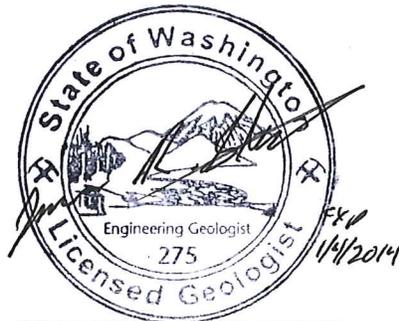
In the area to the west of Portage Bay, the *Final Construction Noise and Vibration Report* predicts that the largest construction vibrations will be associated with the demolition of the Portage Bay Bridge. The report predicts that vibrations, measured at a distance of 30 feet from the demolition activity, will be on the order of 0.713 inches per second peak particle velocity (PPV). This vibration is predicted to attenuate to a value of 0.155 in/sec PPV within 120 feet, indicating that strong in-ground vibration from this activity is anticipated to be fairly localized.

Although predicted vibration levels of this magnitude are well within the range that is noticeable to people, they are levels of shaking that are many times lower than those typically used in engineering design of structures and permanent slopes. For example, slopes which support new construction or contain bridge foundations for this project will be design to remain stable under earthquake loading that exceeds 40% of the force of

gravity; a level of vibration many times greater than that anticipated during construction activities. Similarly, vibration associated with construction traffic is unlikely to have an impact on the stability of existing slopes because the load imposed by the anticipated vibration is lower than that imposed by the weight traffic for which the road is already designed.

In summary, vibrations associated with the construction of this project area are within the range that would be considered typical for bridge construction and, provided standard of care procedures are used in design, are not anticipated to impact the stability of permanent slopes and structures.

If you have questions or require further information, please contact Tony Allen at (360) 709-5450 or James Struthers at (360) 709-5409.



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cc: S. Archer, Environmental Services Office, Megaprojects, NB82-230