

## Evaluation of New Rumble Strip Designs to Reduce Roadside Noise & Promote Safety

### PROJECT TITLE

**Evaluation of New Rumble Strip Designs to Reduce Roadside Noise and Promote Safety**

### STUDY TIMELINE

May 2017 – May 2018

### INVESTIGATORS

Jim Laughlin, WSDOT  
John Donahue, WSDOT

### AGENCY CONTACTS/CHAMPIONS

Jon Peterson, Research Manager

Jim Laughlin, WSDOT Air Quality,  
Noise, Energy Manager  
laughlj@wsdot.wa.gov

### FURTHER RESOURCES

<https://www.wsdot.wa.gov/research/reports/fullreports/881-1.pdf> - link to final report

### Introduction or Problem Statement

Rumble strips are an effective countermeasure to keep vehicles on the roadway and reduce the frequency of crashes. Drivers are alerted by the noise and vibration within the vehicle caused by the uneven rumble strip surface. Noise related to incidental contact with rumble strips outside the vehicle can be a source of disturbance and the cause of complaints from roadside residents. The objective was to identify a rumble strip design that minimizes external noise while maintaining effectiveness at alerting the driver.



### Methodology or Action Taken

Four potential rumble strip pattern designs were identified and installed at test locations around the state. Patterns tested included three modifications to longstanding milled designs, and one sinusoidal design (above left). Measurements of sound volume and characteristic were collected in both the interior of the test vehicle, as well as at 25 ft and 50 ft distance from the rumble strip (above right). Results were compared and evaluated with respect to national guidance for optimal interior volume required to alert the driver, and a minimum threshold value for external noise quality and volume associated with disturbance at adjacent properties.

### Conclusions or Next Steps

The sinusoidal rumble strip exterior noise level increase above background were found to be between 6 and 11 decibels lower than the standard milled designs tested, while also falling within the targeted level of in cabin noise increase above background. A regression model for developing lower noise standard milled designs was also developed.

### Potential Impacts and Benefits

Although this report does not recommend a specific design, WSDOT has since made the tested sinusoidal design available as a standard for use in projects installing rumble strips in noise sensitive areas.