



Report on Pilot Project: Use of Rumble Strips on Silverado Trail

Improving Safety with Context-Sensitive Design

Napa County Department of Public Works

January 27, 2026



Why This Matters

- History of crashes on Silverado Trail
- Run-off-road (“lane departure”) crashes are a leading cause of serious injury and fatalities
- Rumble strips and similar are relatively inexpensive treatments that can help mitigate human-error
- Goals for today:
 - Report and Educate
 - Hear public input
 - Obtain Board guidance and potential direction



What Are Rumble Strips?

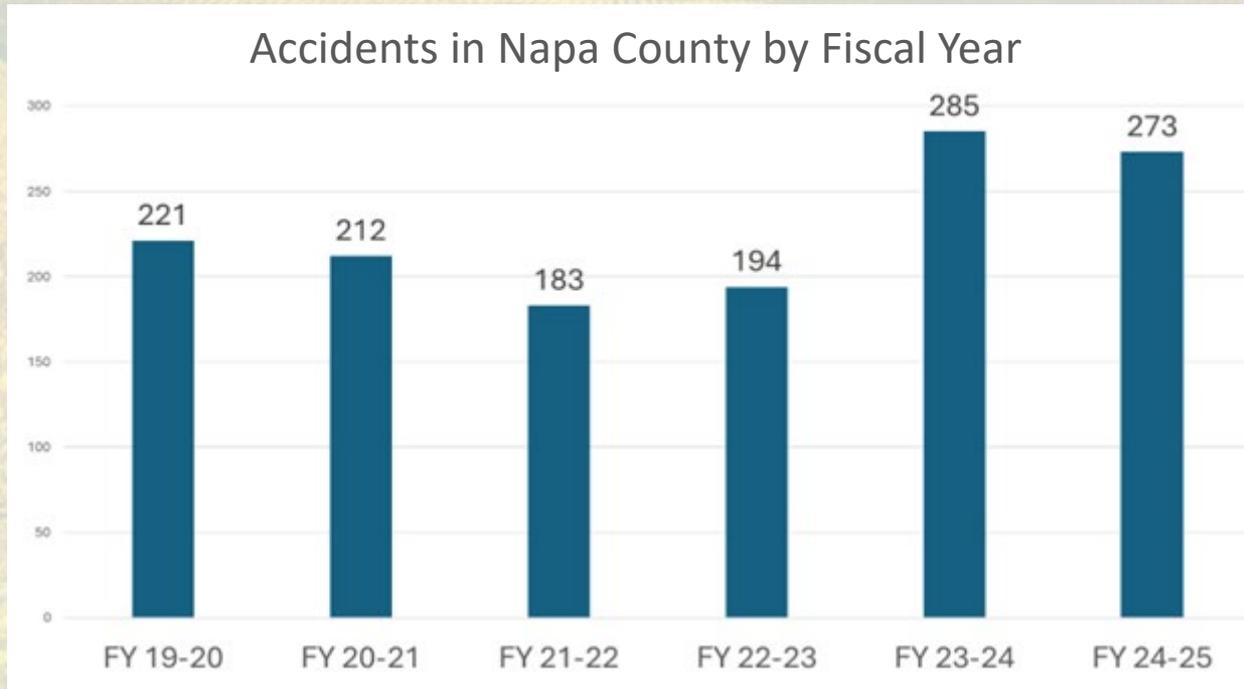
- Multiple types, but essentially they are grooves in pavement that alert drivers when they leave the travel lane
- Provide an audible and tactile warning
- Address driver inattention, fatigue, and impairment
- Low-cost, proven safety countermeasure used nationwide





Safety Benefits Documented Nationwide

- 10–46% reduction in run-off-road crashes
- Up to 16% reduction in fatal crashes on rural freeways
- Up to 58% reduction in fatigue-related crashes
- 21% reduction in alcohol and drug related run-off-road crashes





Neighboring County Use

- Sonoma County
 - Use edgeline and centerline rumble strips to address run-off-road and centerline crossing collisions
 - Sonoma County Recommendations:
 - Install with buffered bike lanes where possible
 - Consider surrounding land uses and noise sensitivity
 - Installation based on collision history
- Solano County
 - Do not use longitudinal rumble strips
 - Use traverse rumble strips as a speed reduction countermeasure and audible warning to alert drivers of road condition changes



What the Research Shows

- Intermittent noise when vehicles contact strips do reduce crashes
- Noise and bicyclist impacts can be reduced through design and placement
- Edge line rumble strips provides the most advanced warning to drivers and a wider buffer between traffic and bicyclists
- Edge line pavement markings over rumble strips improves nighttime marking visibility, particularly in wet conditions, and increases life of marking
- Rumble strips are not appropriate in all land use contexts and require careful, context-sensitive application
- Rumble strips installed on pavement in new or good condition have little effect on the deterioration and cracking of asphalt.



Noise Mitigation

- Use alternative methods in sensitive areas
- When a problem is identified, terminate rumble strips near problem area (e.g. residences, businesses, etc.)
- Rule of thumb from Caltrans is to terminate 200 m (656 ft) from identified area.

Table 1: Noise Levels Before and After Rumble Strip Installation

Rumble Strip Depth, inches	Pavement Type	Measured Noise Level Before (dB, ambient traffic)	Measured Noise Level After (dB, while driving on rumble strip)	Comparison Noise Level*
0.25	Chip seal	73.3	77.5	Before: Bathtub filling After: Reception or lobby area
0.50	Chip seal	74.5	83.3	Before: Bathtub filling After: Television at 10 feet
0.38	Hot mix asphalt	69.0	76.4	Before: Garbage disposal at 2 feet After: Violin at 5 feet
0.56	Hot mix asphalt	69.9	84.4	Before: Garbage disposal at 2 feet After: City traffic (inside car)

*Acoustical Solutions, Inc., "Noise Level Chart" web page. Available at: <http://www.acousticalsolutions.com/noise-level-chart>



“Mumble” Strips

- Alternative and effective treatment to milled rumble strips
- Provide similar internal vehicular noise and vibration
- Reduced external noises for noise-sensitive nearby land use
- Used and studied by Caltrans for the past 5+ years, however effectiveness data is not as robust





Bicyclist Accommodations

- Minimum of 5-ft clear shoulder beyond rumble strip
- Bicycle crossing gaps (12-ft gaps every 48-ft)
- Buffered bike lane when the shoulder width is 6.5-ft or more
- Install edge line rumble strips, not shoulder rumble strips





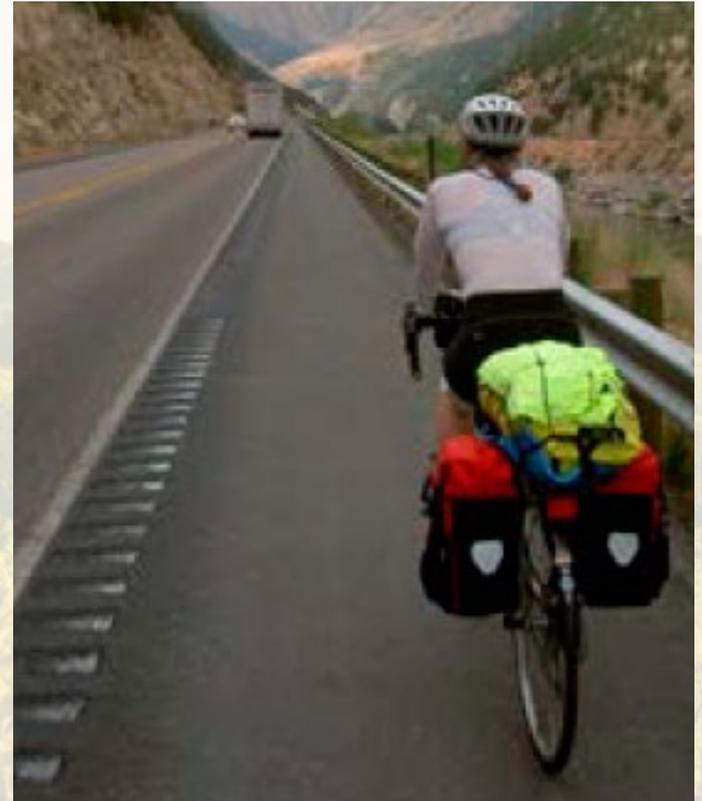
Environmental Factors

- Caltrans typically finds rumble strips are a “less than significant impact”
- Wildlife in roadside habitat already exposed to vehicle noise, rumble strips do not provide a substantial change
- CEQA Mitigation only in extreme circumstances
- Mitigation Efforts include gaps or alternative designs



Where Rumble Strips Make Sense

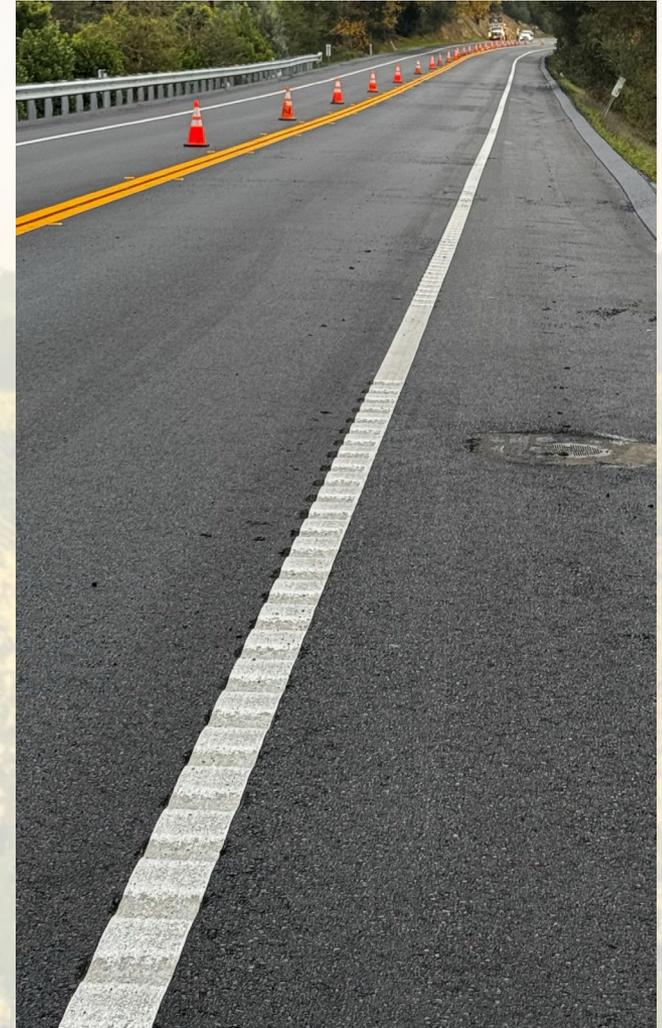
- Rural or agricultural segments
- Low residential density
- Higher operating speeds
- Longer uninterrupted road segments
- Fewer driveways and access points
- Documented run-off-road crash risk
- When posted speed is 50 mph +





Pilot Project: Rumble Strips on Silverado Trail

- In the 2025 Silverado Trail Paving (RDS 25-06) project, Napa County installed rumble strips and bike buffers as a pilot installation.
 - Rumble strips installed between Skellenger Lane and Zinfandel Lane.
 - Bike buffers included to improve cyclist comfort and delineation.
 - Feedback from this pilot has informed evaluation of quieter alternatives, such as sinusoidal (mumble) rumble strips.
 - Approximately 2 dozen letters in support of rumble strips





Community Comments

- Noise near homes (2)
- Impacts to bicyclists:
 - Debris or obstacles in the shoulder
 - Hitting rumble strips and losing control
 - Loss of shoulder space
- Wildlife Impacts
- Pavement quality
- Approx. 2 dozen letters in support, including from the Napa Wine Growers



Where Alternatives Could Be Better

- Heavy Residential (single-family) areas with limited setbacks between the roadway and buildings
- High driveway density
- Intersections
- Town centers and community hubs
- Tight horizontal curves (more likely to produce incidental contact)



Reflective Pavement Markers (RPMs)

- RPMs provide a visible and tactile lane departure warning without pavement milling.
 - December, 2023: Installed RPMs on edge line of Coombsville Rd and First Ave following a lane departure collision.
 - Initial observations indicate a reduction in roadway departures.
 - RPM installation has not generated noise complaints from nearby residences.
 - Not as effective, and require more maintenance, but better than baseline



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Recommended Path Forward

- Include rumble strips as a safety countermeasure in the Local Roadway Safety Plan (LRSP) update; possible locations should be specifically identified in the LRSP and evaluated
- Rumble strips and their alternatives should be considered on future Silverado Trail projects
- Use conventional rumble strips where residential exposure is limited and safety risk is high; Consider mumble strips near noise-sensitive land uses



Recommended Path Forward

- Consider reflective pavement markers or other alternatives when milling is not appropriate (i.e., pavement condition and site-specific issues).
- In conjunction with a planned paving project this summer, replace the rumble strips with an alternative approach in front of the residence where a noise issue has been identified.
- For the HSIP 11 Oak Knoll intersection project, implement alternatives consistent with intersections and residences.