Soundwalls 101

History

In 1968, California built what are believed to be the first soundwalls along modern highways. Barriers were placed on Highway 101 in San Francisco and Interstate 680 north of San Jose to shield residential communities from traffic noise. Within four years, the federal government adopted regulations requiring the state to attenuate noise impacts to sensitive receptors (i.e., schools, hospitals, residences, etc.) when federal funds are used to construct new highways or expansion of an existing highway facility.

There are three types of soundwall projects defined by the Federal Highway Administration (FHWA).

- Type I is for the construction of a highway on a new location, or the physical alteration of an existing highway where there is substantial horizontal or substantial vertical alteration.
- Type II involves construction of noise abatement on an existing highway with no changes to highway capacity or alignment.
- Type III is a project that does not meet either of the first two classifications, and do not require a noise analysis. Below are criteria pertaining to Type I projects.

Soundwall Facts

- Caltrans/FHWA standards determine the location of soundwalls. Homes, businesses or other noise-sensitive land uses is evaluated for worst-case projected future traffic noise impacts. Those areas approaching or exceeding the Noise Abatement Criteria (NAC) are further evaluated for soundwall consideration.

- If a new or expanded road will produce noise at 67 decibels (dBA) or above (generally measured outdoors and at locations with frequent human use), the protocol reserves for an increase of 12 dBA. Per Caltrans protocol, a soundwall that provides a noise reduction of 5 dBA would be considered feasible with a design goal reduction of 7 dBA on at least one receptor, as a first requirement of abatement consideration for noise abatement.

- A vacuum cleaner is 70 dBA, while a jackhammer is about 100 dBA. With 67 dBA of ambient noise, the protocol seeks at least a 5 dBA reduction that can be easily noticed by the average person.

- In order for a soundwall to be considered reasonable or cost effective, the 7 dBA design goal must be achieved at one or more benefited receptors. A benefited receptor is a dwelling unit that is predicted to receive at least 5 dBA noise reductions from the proposed noise abatement measure. This goal applies to any receptor and is not limited to impacted receptors.

- Cost-effective considerations in determining noise abatement are based on $55,000 per *benefited receptor (in 2011).* A receptor can be a benefited receptor even if it is not subject to a traffic noise impact. The soundwall is not required to reduce noise levels to below the NAC for any noise sensitive land use. For more information see http://www.dot.ca.gov/hq/env/noise/index.htm

- A “bounce effect” can also occur when soundwalls are constructed on both sides of a freeway. Noise is reflected back and forth between the two walls, which actually decreases their effectiveness. Caltrans institutes a width-to-height ratio of at least 15:1 for parallel soundwalls along a freeway to improve their effectiveness. This means a pair of parallel soundwalls 10-feet high must be at least 150 feet apart to prevent reflection.

- Thick shrubs and trees along freeways do not help with noise abatement. According to a traffic-noise expert at Vanderbilt University, vegetation, such as evergreen trees with dense undergrowth, would have to be 100-feet wide and dense and completely obstruct a visual path to reduce the sound.

- Construction of a soundwall is usually concurrent with freeway construction. It is unusual for a soundwall to be constructed prior to the commencement of freeway improvement construction work.

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