

# Entering the... Quiet Zone

## Controlling Noise

There are two way to permanently control ALL highway noise:

- ✓ Erecting barriers (sound walls or berms).
- ✓ Distancing the noise generators (cars, trucks, etc.) from the highway abutters (homes, businesses, etc.).

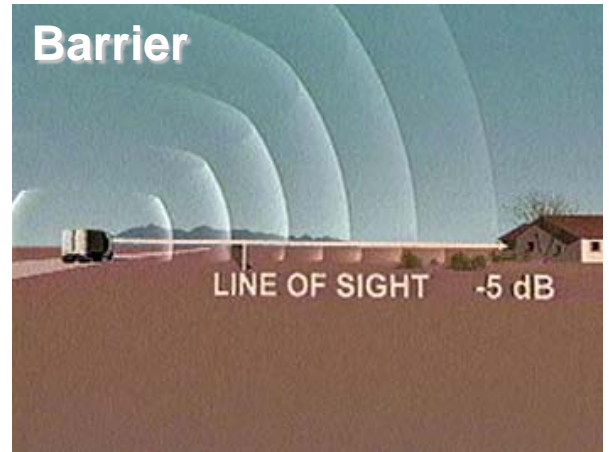
These two solutions are the basis of the Federal Highway Administration's (FHWA) Environmental Policy.

## Source Control of Tire/Road Noise

Interest in reducing noise at the source, such as with pavement texturing, has grown recently. This form of noise control only influences tire/pavement generated noise (i.e. does not effect engine noise, etc.). Pavement surfaces (especially asphalt surfaces) must be renewed periodically as the acoustic and structural properties of the pavement change over time. Source control of noise is not a permanent noise solution and will likely not negate the need for permanent solutions, like noise walls.

## Noise Walls Are For More Than Tire/Road Noise

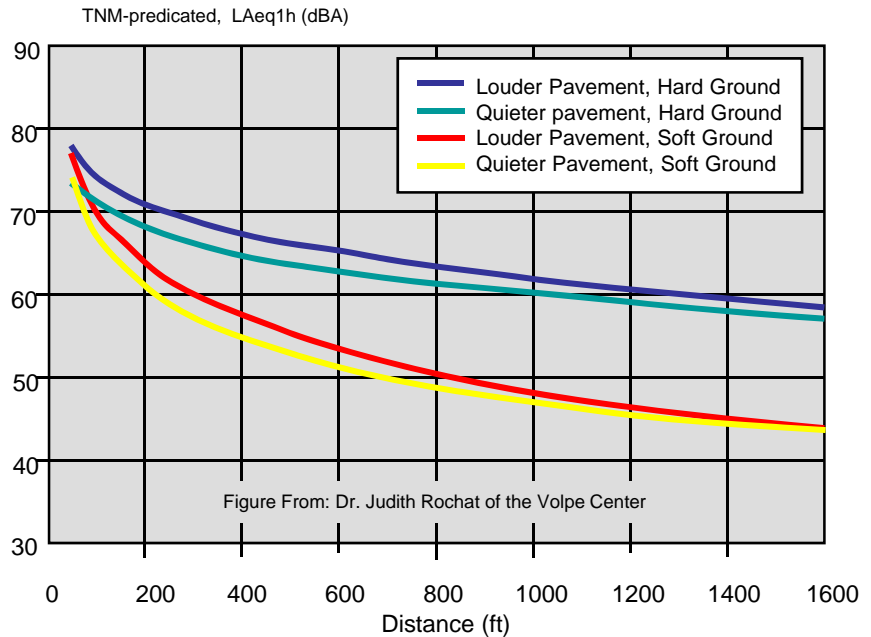
Sometimes noise walls may seem too high for the prevailing traffic levels. However, on routes with truck traffic, walls control more than tire/road noise. Noise barrier design is predicated upon the concept of breaking the line of sight to the noise generator. For commercial trucks, exhaust stacks contribute significantly to overall traffic noise. These exhaust stacks are often 10-12 feet above ground, well above the sound initiation point of a car. Highway agencies must address truck noise along with all other noise sources on a roadway. The California Department of Transportation (Caltrans), for example, uses a minimum barrier height of 11 feet to ensure that truck noise is intercepted.



## Can You Hear Me Now?

One of the most important factors is how noise propagates from its source. The figure to the right shows the predicted noise levels at various distances from the traffic stream. The example includes a noisy (loud) pavement and a quiet pavement. The farther from the source, the less affect pavement type or texture has on overall noise levels alongside a highway. At several hundred feet, the noise difference between the loud and quiet pavements is indistinguishable (<3 dBA).

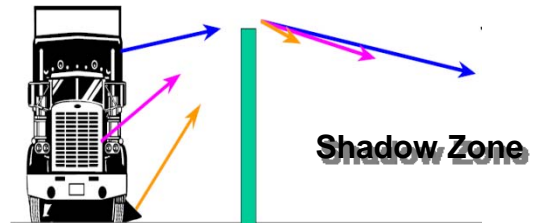
## Sound Pressure Level Over Distance



Since thin noise surfaces (like asphalt rubber friction courses) typically lose their acoustic effectiveness over time, this difference becomes even smaller over time. This is why the FHWA has not allowed pavement surfaces as noise mitigating factors in their Environmental Policy. Property owners need to be assured that they are getting permanent solutions and not just short term solutions that lose their effectiveness after several years.

## In the Shadow Zone

Where sound walls are in place, as in most modern urban communities, noise is blocked by the walls for a distance of several hundred feet (~500ft). In these situations, using pavement type for noise mitigation becomes almost meaningless to the highway abutters (homes, businesses, etc.).



### NOISE CONTROL FACTOIDS

- ✓ Doubling the distance from source to receiver reduces ALL noise by 3 dBA
- ✓ Breaking the line of sight with a wall reduces ALL noise 5 dBA
- ✓ Reducing noise at the pavement (source) affects only tire noise
- ✓ Truck noise is as important as tire/road noise for routes with significant truck traffic.