Sound Walls

Historically, sound walls have not been utilized around freight facilities. Sound walls were mostly used around highways and transit facilities. Airports restrict the use of any mitigation measures that may have height implications to ensure that the flight navigation path is kept free of any encroachments.

Freight groups (especially the private sector railroads) have often been reluctant to build sound walls because:

- Admission that sound was being created above federally set levels could lead to lawsuits
- Did not want to create a precedent setting standard
- Costs

The FHWA, FTA, and FRA have developed noise-manuals that have discussed the use and costs surrounding sound walls. Federal requirements for noise barriers may be found in Title 23 of the U.S. Code of Federal Regulations, Part 772 Procedures for Abatement of Highway Traffic Noise and Construction Noise.

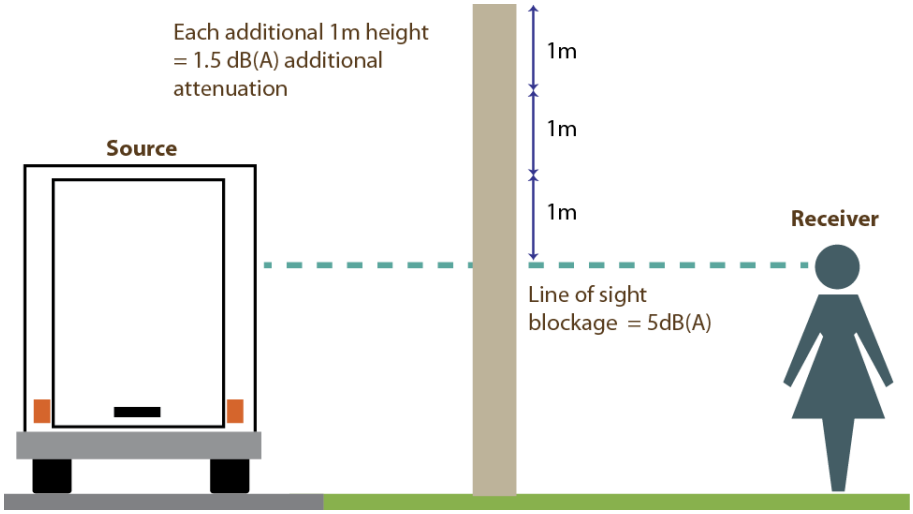
TABLE 1: US DOT MANUALS

FRA	http://www.fra.dot.gov/Pages/253.shtml
FTA	http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf
FHWA	http://www.fhwa.dot.gov/environment/keepdown.htm

HOW SOUND WALLS WORK

Noise barriers reduce the sound which enters a community from a transportation facility or highway by either absorbing the sound, transmitting it, or reflecting it back across a freight corridor (e.g. highway), or forcing it to take a longer path over and around the barrier. A noise barrier must be tall enough and long enough to block the view of the transportation facility from the area that is to be protected (the receiver).

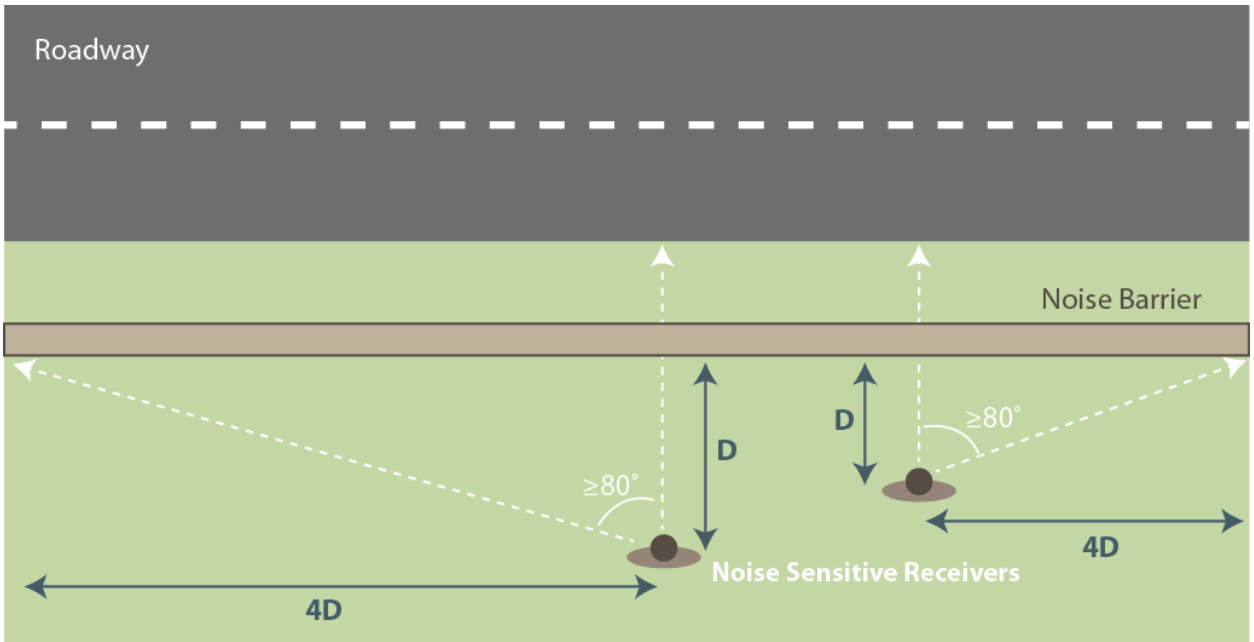
FIGURE 1



The FHWA notes that noise barriers provide very little benefit for homes on a hillside overlooking a highway or for buildings that rise above the barrier. A noise barrier can achieve a 5 dB noise level reduction when it is tall enough to break the line-of-sight from the highway to the home or receiver. Above the line-of-sight, a sound wall can achieve approximately 1.5dB of additional noise level reduction.

To effectively reduce the noise coming around its ends, a barrier should be at least eight times as long as the distance from the home or receiver to the barrier.

FIGURE 2



Source: http://www.fhwa.dot.gov/environment/keepdown.htm

COSTS

The FTA's guidance manual on noise estimates that sound walls cost approximately $25 to $35 per square foot of installed noise barrier at grade (not counting design or inspection costs). FHWA notes that there are no special or separate funds for highway traffic noise abatement. State DOT's will include costs of any barriers that may be utilized in the total highway project cost. A consultant from an acoustics company the research team spoke to noted that for *most* rail jobs $60 per square foot "should" cover the costs of design, panels, foundation work, and installation. However, the final cost was also determined by underlying soil conditions and whether other remedial work was needed to put sound walls in place. This estimate does not include costs for any landscaping or other elements that may be required post-installation.

From the case studies reviewed in previous research and throughout this project it is apparent that noise barriers are extremely expensive with many project costs ranging in the millions of dollars for very short stretches of right-of-way. Costs also rise when seismic studies indicate that extra retrofits will be required. Noise barrier efficacy can also come down to a subjective judgment and some projects have been found to be not that effective.

Noise barriers can be constructed from earth, masonry, wood, metal, or other materials. The material must be rigid and sufficiently dense (20 kilograms per square meter).

Source: http://www.fhwa.dot.gov/environment/keepdown.htm

EXAMPLE

One of the largest sound wall projects undertaken adjacent to a freight railroad and highway can be found in Anaheim California. The sound wall was completed in 2006 after twelve years of lobbying by community groups, the BNSF railroad, and the city. The project for this 2.44 mile sound wall was $13 million. The FHWA underwrote the costs. The specifications required the sound wall to absorb the noise of nearly a 100 trains a day, and stop it from ricocheting into the Yorba Linda neighborhood that was on the opposite of Route 91. An earthen berm which was also used to deflect and absorb noise and vibration was also developed at a cost of $2 million. The sound wall's average height is 16 feet above the railroad bed, but varies along the length from 16 feet to 3 feet and is hung on steel uprights.

FIGURE 3 LOCATION OF SOUND WALL IN ANAHEIM CALIFORNIA

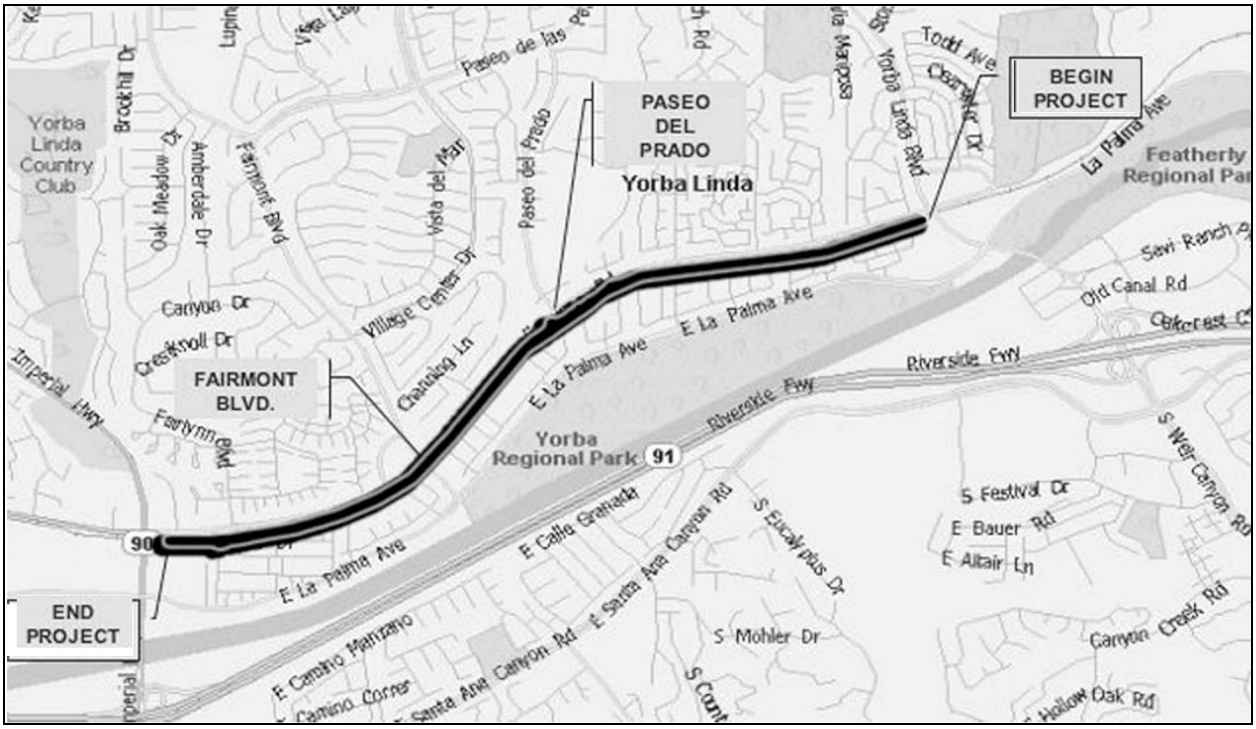


FIGURE 4 SOUND WALL AT ANAHEIM

Thanks to Phil Hooser, IAC Products