

# Aris-Gurney Residence San Francisco, CA

## Residential elevator noise & vibration isolation

**Client**  
Aris-Gurney residence

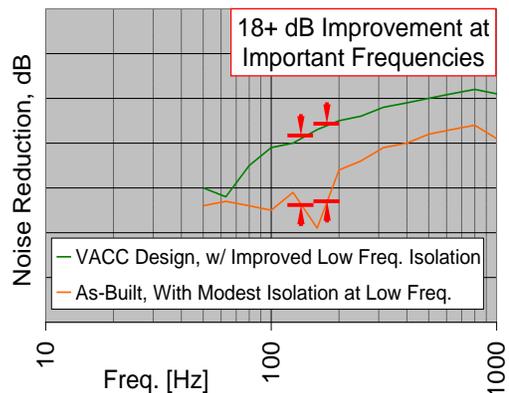
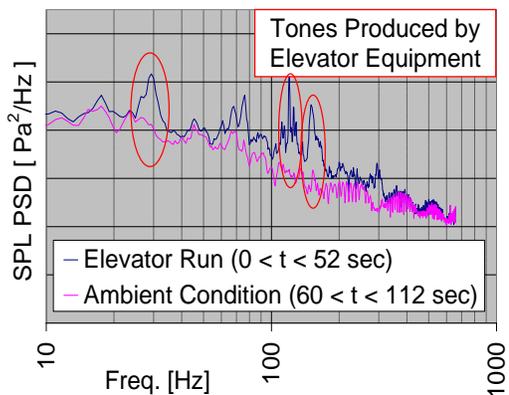
**Mitigation Costs**  
< \$6,000

**Completion**  
2005

**Work Scopes**  
Noise Testing  
Noise Isolation Design

We were asked to characterize the noise environment a home in a residential neighborhood of San Francisco, California. The owner complained of noise impact due to the operation of a residential elevator recently installed to serve a disabled tenant next door.

Initially, the owner contacted us to perform testing in support of litigation against the next-door neighbor. The testing revealed a weak case for seeking damages; in addition, City enforcement officials are typically sympathetic to noise caused by disabled access. We suggested that resources spent in pursuit of the legal case would be better spent in addressing the noise isolation between the two spaces.



We devised two separate mitigation approaches: vibration isolation of the elevator structure itself, and improvements to the walls between the two homes. Detailed acoustical testing indicated that both structure-borne vibrations as well as airborne noise transmission between the two homes was significant. Structure-borne vibrations, due to inadvertent mechanical connections between the two homes dominated at some frequencies. Airborne noise transmission through the (acoustically weak) walls dominated at other frequencies.

Although both transmission paths were significant, it was clear that mitigation via improvements to the walls between the homes would provide the greatest benefit relative to cost. Isolation of the elevator shaft would be very expensive and require disruptive access to the neighbor's home. Improvement to the wall on the owner's side could occur relatively cheaply and without involvement of the neighbor.

Others had previously suggested designs that, while providing a high overall Sound Transmission Class (STC), would not offer relief to the owner. Our testing revealed that the annoyance experienced by the owner was due primarily to noise at several discrete low frequencies. Most very-high-STC designs, such as those employing resilient channels or other "soft" elements provide little to no attenuation at these very low frequencies. While these designs would improve the overall noise isolation between the two homes, they would not improve the noise isolation at the problematic frequencies. Our design was considerably simpler and less expensive to implement, and provided significant attenuation in the problematic very-low-frequency regime. The owner has implemented the changes and expressed his satisfaction.