Noise Reflection

March 27, 2007

Dear Mayor, City Staff, and Members of the City Council,

Executive Summary:

- Experts claim landscaping will not prevent noise reflection.
- Wal-Mart has installed absorptive sound barriers at other locations.
- Absorptive sound barriers should be installed in Cedar Hills for the following reasons:
  1. Close proximity of existing homes (20-30 feet from the property line)
  2. Multiple noise sources will combine to be more than 50dBA even without reflection
  3. As a compromise for proposing high density land use on land designated as medium density use in our guidelines

In my report *Preserving the Quality of Life In Cedar Hills*, I raised the issue of noise reflection in the current Wal-Mart site plan. I referred you to an article “Sound Walls: Absorptive vs. Reflective Design and Effectiveness” that explains the potential problem. I have included the full article for your convenience.

At the City Council meeting on March 20, 2007, a brief discussion occurred on the topic of noise reflection. It was stated that reflection is not an issue in the current design, at least on the north side of the building, because the landscaping next to the north wall will prevent reflection.

This sounded like a plausible solution to me. However, I have spent some time searching for an outside source to confirm for me that the proposed solution is valid. I have not found any source to confirm the claim. Instead, I discovered evidence that contradicts the claim.

**Experts Discount the Effectiveness of Vegetation**

I contacted the authors of the sound wall article to ask them about the effectiveness of landscaping in preventing reflection as described in their article. I asked them the following:

I shared your article Absorptive versus Reflective Noise Barriers with members of our City Council who are about to approve a Wal-Mart store right next to a residential neighborhood. The design of the store is exactly as you outlined in Section 3 of the article; a store is near the homes with a proposed sound wall, and delivery trucks will drive between the store and the wall. The wall height is equal to the height of semi trailers. I believe sound reflection will be a problem, and no one accounted for it in the noise study.

The design specifies landscaping (trees, shrubs) next to the wall, so the response to me was that reflection will not be a problem because the landscaping will absorb the
noise. How effective is landscaping next to the wall at reducing the effects of noise reflection?

Here is the response I received via e-mail on March 26, 2007.

Hello Kent, and thank you for your interest in our LSE Absorptive Noise Barriers.

In fact, we have designed barriers for two new Wal-Mart stores and a Home Depot store since that paper was published last year (see photos below).

To answer your questions:

1) **Landscaping is basically totally ineffective as a noise attenuation tool.** Sometimes “out of sight, out of mind” plays a role, but in terms of reducing noise, it will have no effect.

2) **Again, you will not see any noise reduction from the landscaping.** The highest level of noise reduction will be realized when you use an absorptive barrier on the perimeter of the loading facilities (between the properties), and an absorptive material attached to the surface of the Wal-Mart building itself. Usually, the absorptive peripheral barrier suffices, but in some extremely contentious noise situations, the absorptive material is also needed on the building.

Thank you again Kent, and let me know if you have further questions.

*Murray Stacy*

**Murray Stacy**  
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I mentioned to Mr. Stacy that some might be skeptical regarding his response. Since he markets absorptive sound walls, one would naturally want to verify his claims.

Mr. Stacy responded to my concerns as follows:

“*It is well documented.*”

“*But any acoustical engineer will reinforce the fact that even the thickest vegetation, over significant distances, does little to attenuate noise. I have contacted a well-known acoustical firm in Dallas for their thoughts on this, but will not likely have a response from them for a few days.*”

I located two other sources that confirm what Mr. Stacy reports.
The federal highway administration says the following about the use of vegetation to reduce noise levels. (see http://www.fhwa.dot.gov/environment/noise/3.htm)

“Shielding by trees and other such vegetation typically only have an "out of sight, out of mind" effect. That is, the perception of highway traffic noise impact tends to decrease when vegetation blocks the line-of-sight to nearby residents (i.e., "out of sight, out of mind"). However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 5 m (15 ft) in height, 30 m (100 ft) wide and dense enough to completely obstruct the line-of-sight between the source and the receiver. This size of vegetation area may provide up to 5 dB(A) of noise reduction. Taller, wider, and denser areas of vegetation may provide even greater noise reduction. The maximum reduction that can be achieved is approximately 10 dB(A).”

Mr. Stacy referred me to the city of Saskatoon’s web site.

http://www.saskatoon.ca/org/municipal_engineering/attenuation/type_barriers.asp

Can Trees be planted as noise barriers?

“In excess of 30 metres of dense coniferous tree growth is required to achieve a 3 to 4 dBA reduction. However, it is not feasible to plant enough trees and other vegetation along major city arterials to achieve such a reduction. Trees and other vegetation can be planted for psychological relief but not to physically lessen noise levels.”

Based on this new information, I request that the city council revisit the issue of noise reflection with the Wal-Mart sound engineer. Can he provide any evidence that suggests the vegetation on the north wall will effectively prevent increased noise levels to nearby residents due to reflection, especially when delivery trucks drive past the wall?

Also, Mr. Stacy tells me that his company, Sound Fighter Systems (see http://www.soundfighter.com/), has installed absorptive sound walls at four Wal-Mart locations in Chula Vista, CA; McAllen, TX; Lake Charles, LA; and Shreveport, LA. It would be interesting to learn more about the configuration of these stores and what motivated Wal-Mart to install absorptive sound barriers. I can’t imagine another configuration where residents are any more vulnerable to noise than the nearby residents in Cedar Hills who have homes about 20 feet from the property line and homes directly to the northeast that have line-of-sight view to noise sources.
I encourage you to contact Mr. Stacy at the following email address (mstacy@soundfighter.com) or at the phone number listed above in his email message to me. He would be happy to tell you more details about his products and discuss the issue of noise reflection.

I also request that you discuss the issue of noise reflection at length with Wal-Mart, explain the concerns of nearby residents using the evidence I have provided, and solve the issue of noise reflection before you grant preliminary approval, since no changes can be made to the site plan once preliminary approval is granted.

Thank you for listening to my concerns,

Kent Seamons