Solution to Urban Noise Pollution in a Residential Area

Faculty of Sustainable Design Engineering, University of Prince Edward Island

Introduction

- The increasing growth rate of housing developments has increased the noise levels in residential areas.
- Our client, Connie MacDonald, has had a new housing development parallel to a main road near her property in Sherwood Estate .
- This has caused a need for a noise reduction and control solution in these areas.
- An appropriate noise reduction and control solution may then be developed by the design team to ensure it falls within the projects constraints while achieving the client's objectives.

Requirements and Constraints

- ❑ Allocated budget is $500.
- ❑ Must control noise pollution travelling to client's property and residence; originating from a nearby, busy urban road.
- ❑ Suitable for all climatic seasons.
- ❑ Must reduce the noise pollution level a minimum of 10 dB.
- ❑ Must remain operational at all times throughout the day as the noise pollution remains constant.
- ❑ Must be able to be installed within a property of approximately half an acre in size.
- ❑ Must focus on specific areas within the property, which sound levels are most prominent.

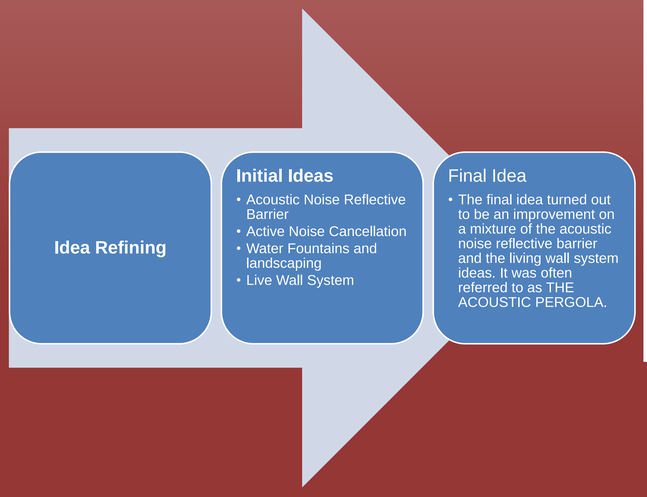

Fig 1 and Fig 2 showing our clients property and Mt. Edward road

Fig 3. Final CAD renderings showing the alternating lumber design on our clients property.

Fig 4. Initial CAD drawing of acoustic pergola.

Acoustic Results by Frequency (dBA)

	700 HZ	900 HZ	1100 HZ	1300 HZ
No Barrier	55.8	54.2	54.9	54.5
Wood - Straight Boards	56.2	49.6	45.2	49.4
Wood - Opposed Boards	50.8	43.8	47.6	41.3
Acoustic - Straight Boards	43.5	48.6	43.7	43.1
Acoustic - Opposed Boards	43.2	50.8	48.4	51.8

Fig 5. Shows the results of the testing carried out on the teams four variations of builds

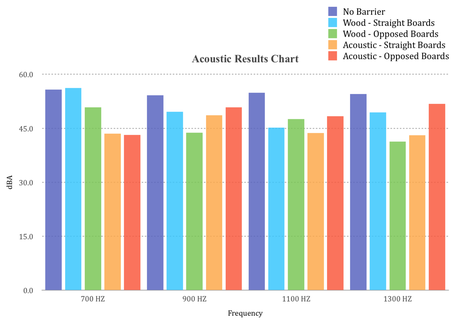

Fig 6. Shows a graphed version of the results from testing.

Testing and Analysis

- ❖ The testing was conducted because the team needed to test the efficiency of two different designs and two different materials.
- ❖ The acoustic pergola layout had to be tested for sound level reduction efficiency. The two layouts tested comprised of a straight pergola setup and a "zig-zag"/alternating pergola setup.
- ❖ The two materials to be tested were lumber and a wood fiber noise insulation material. They were to be tested for noise reduction level as well.
- ❖ The testing was done in a soundproof room in the Robertson Library at UPEI.
- ❖ The testing was also done distributing different frequencies to prove its effects on the amin range of frequencies distributed by traffic noise.(800-1000Hz).However, all frequencies were transmitted at the same sound level and same distance away from the barrier.

Conclusions

- ✓ The results of testing proved that for our clients situation, the lumber with the "zig-zag"/alternating orientation is the best choice.
- ✓ Unfortunately, due to the Covid-19 outbreak/pandemic, the university of prince Edward island faculty of sustainable design and engineering put a stop on all Second year design projects. Therefore, implementation was also halted.

Acknowledgments

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