



# WaveEngineering

Acoustics, Noise & Vibration

July 5, 2019

Ms. Mary Taylor, RLA  
Russell + Mills Studios  
506 S. College Ave., Unit A  
Fort Collins, CO 80524

Re: Left Hand Brewing Amphitheater Phase I – Acoustics Report  
Wave #1761A

Dear Mary,

We have reviewed sound propagation from the proposed Left Hand Brewing Amphitheater Phase I which includes a temporary stage located at the north end of their property along Boston Avenue. This report explains our analysis methodology and projection of sound levels to adjacent properties.

## Analysis

Our analysis was based on the Phase I plan which includes a temporary stage at the north end of the property facing a large green space to the south. We assumed that the sound system would be a rented system with line array loudspeakers in a column on either side of the stage. See Photo 1 below of a typical event from a Left Hand concert in the park. Line arrays provide good control of the directivity of the sound in the vertical direction, which allows the operator to focus more of the sound on the audience and reduce the spread to adjacent properties. However, keep in mind that the control is most effective at mid and high frequencies, and the low frequency sound from subwoofers is still basically omnidirectional. The low frequency bass beat can also generate complaints from neighbors of music venues because it travels farther and passes more easily through the walls and windows of homes.

We analyzed this configuration using EASE acoustical prediction software to calculate the propagation of the sound from the line arrays to the adjacent properties. This software takes into account the placement, directivity, and aiming of the loudspeakers. It does not take into account environmental effects such as weather, wind direction, or ground attenuation, but those effects are very small at distances of a few hundred feet to the nearest neighbors as we have here. Our analysis assumed that the sound level would be adjusted to about 95 dBA at the back of the audience area, which we understand is a typical level used for the current concerts that Left Hand



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hosts in the park. Our past experience with similar venues confirms that this is a typical level for this type of event.



*Photo 1: Typical concert with temporary stage and line arrays*

We understand that there is not a current section of the City of Longmont noise code that applies to music events in a designated facility like this. There are codes for typical noise sources (such as mechanical equipment) based on the zoning category or for special events with permits such as the concerts in the park, but not for this situation. Therefore, we are presenting the calculated sound levels for your information and consideration for working with the City to establish acceptable limits for events of this nature. For reference, Table 1 below lists common sound levels in dBA.

*Table 1: Common sound levels in dBA*

Common Outdoor Sounds	dBA	Common Indoor Sounds	Subjective Evaluation
Auto horn at 10'	100	Printing plant	Deafening
Gas lawn mower at 4' Jackhammer at 50'	90	Auditorium during applause Food blender at 3'	Very Loud
Concrete mixer at 50' Jet flyover at 5000'	80	Telephone ringing at 8' Vacuum cleaner at 5'	
Large dog barking at 50' Large transformer at 50'	70	Electric shaver at 1'	Loud
Automobile at 55 mph at 150'	60	Normal conversation at 3'	
Small town residence	50	Office noise	Moderate
	40	Soft stereo music in residence Library	
Rustling leaves	30	Average bedroom at night Soft whisper at 3'	Faint
Quiet rural nighttime	20	Broadcast and recording studio	
	10	Human breathing	Very Faint
	0	Threshold of hearing (audibility)	

## Results

Figure 1 below shows the predicted sound levels in dBA at various locations around the Left Hand Brewery property from the Phase I temporary stage configuration. Sound levels from concerts vary with time, so these estimates are based on an average level of 95 dBA at the back of the audience, and the short-term levels can go above and below this average.

Along the commercial property line to the east, the highest predicted level is 84 dBA. Along the south property line between Left Hand and the river path, the loudest predicted level is 83 dBA. And across the river at the nearest residences, the highest level is 77 dBA. The level at the residences will fall off as you move south due to distance and to the northwest due to shielding from the brewery building.





*Figure 1: Predicted sound levels*

We understand that some larger concerts could average 100 dBA at the back of the audience, in which case the predicted levels would simply be 5 dBA louder than shown in Figure 1.

Please let me know if you have any questions on this report or would like to discuss it further.

Sincerely,

Ben Seep  
Acoustical Consultant

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