

Sound Intensity Survey - Beavercreek, Ohio



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A proposed single-family housing development was being considered in 2002 which had Interstate 675 as its northern most boundary to the property being considered. The developer of the project was concerned about the noise levels that Interstate 675 would pose on his new development and the owners of the new homes that be built. For this reason, CBC Engineers & Associates, Ltd. were retained to perform a Sound Intensity Survey on the subject property to determine the effect if any the vehicle noise from the interstate will have on the proposed subdivision, as well as to propose insight into possible abatement measures if needed.



AS BACKGROUND INFORMATION: Community planning with respect to noise abatement and control must be initiated with noise exposure measurements which take into account the subjective factors relating to loudness and annoyance. Many of these factors are affected by people's psychological response to noise. Such factors might be the Overall Noise Level, Pure tones and Impulsive Noise, Time of Day or Year, Relevance to Community Life, Attitudinal-Physiological Factors and Socioeconomic Status of the the Community. So, overall, a community's response to noise depends strongly on their values, beliefs and attitudes and the aforementioned factors are often more important that the characteristics of the noise.

At the request of the developer CBC Engineers & Associates began taking field intensity readings using a Quest Model 2700 Sound Intensity Device, on Tuesday, November 26th 2002. The purpose of taking these readings was to determine the sound intensity of the ambient noise level at all site location shown in the table below as well as determine the magnitude of various sound "peaks". A sample of the resulting reading are listed in the following table. This tabulation represents the "peak" intensity levels at each location.

Results of Field Sound Intensity Testing on Tuesday, November 26, 2002

Locations of Meas-	Sta #	Time	dB Level	Source of Sound	Range, Feet	Remarks
+ 150' North	1	7:45	80.6	Semi-Truck	50	Traffic I-675
+ 150' North	2	7:50	83.3	Semi-Truck	50	Traffic I-675
+ 150' North	3	8:00	85.5	3 Semi-Trucks	50	Traffic I-675
+ 150' North	4	8:07	84.4	Semi- Trucks	50	Traffic I-675
+ 200' East	5	8:15	78.1	Engine Brake	250	Traffic I-675
+ 200' East	6	8:35	83.1	Semi-Truck	250	Traffic I-675
+ 200' East	7	8:40	79.7	Car Traffic	250	Traffic I-675
+ 200' East	8	8:50	80.7	Multiple	250	Traffic I-675
+ 200' East	9	9:00	78.8	Semi Truck	450	Traffic I-675
+ 200' East	10	9:08	79.1	Highway	450	Traffic I-675
+ 200' East	11	9:15	78.8	Highway	450	Traffic I-675
+ 200' East	12	9:25	78.3	Highway	450	Traffic I-675
+ 200' East	13	10:40	71.9	Highway	650	Traffic I-675
+ 200' East	14	10:45	73.2	Traffic	650	Traffic I-675
+ 200' East	15	10:55	73.4	Semi-Truck	650	Traffic I-675
+ 200' East	16	11:00	70.3	Normal Back-	650	Traffic I-675
+ 150' East	17	11:05	70.4	Normal	800	Traffic I-675

CBC Engineers & Associates, Ltd. performed a literature review relative to the general sound magnitudes relative to decibel level, degree, and perceived loudness of various sources:

- Deafening = 250 Decibels = 12" Cannon Ball @ 12 ft. in Front and Below
- Deafening = 140 Decibels = Jet Aircraft
- Very Loud = 100 Decibels = Home Lawn Mower
- Very Loud = 90 Decibels = Symphonic Band
- Loud = 80 Decibels = Inside High Speed Car, Police Whistle
- Loud = 70 Decibels = Average Radio, Normal Street Noise
- Moderate = 60 Decibels = Normal Conversation, Close up
- Moderate = 50 Decibels = Normal Office Noise, Quiet Stream
- Faint = 40 Decibels = Residential Neighborhood, No Cars
- Very Faint = 20 Decibels = Ticking of a Watch

The collected data from CBC Engineers and Associates so that the lots closest to I-675 would be affected by the louder Peak Sound Intensities as expected. However the value according to information above is equivalent to "Loud" or a police whistle. this sound would have to be cut in half to have a "quiet residential neighborhood", which was not going to happen, however if the Peak Sound Intensity could be lowered 10 to 15 decibels, the levels could fall from Loud to Moderate or normal street noise, which was a more practical expectations for these closest lots.

Recommendations to Lower I-675 Noise

In order to accomplish a reduction in noise many solutions are used like Privacy Fences to Noise Barriers. However the best solution to get the most sound reduction plus provide a backdrop that would improve the human side of noise as discussed earlier, was to suggest a "Earthen Berm" with planted vegetation. This Berm should be at 10 feet tall with trees at least 15 feet tall along with dense vegetation planted to fill in between the trees. This vegetation would start of the I-675 side of the Berm and wrap over the top. The picture above shows the final constructed Berm with vegetation growing in on the I-675 side. The residential community has been build and the "Natural Berm" solution is working quite well.

For more information On this project please contact our Director of Environmental & Land Development Services - [Ed Galaska](#) @ 937-428-6150.