

This tech sheet summarizes the total noise reduction given by the Allan Block Fence barrier as referenced in the Field Performance Study conducted by Patching Associates Acoustical Engineering Ltd. A copy of the full report is available by contacting the AB Engineering Department at (800) 899-5309.

Test Objective

The objective of the study was to test the noise reduction performance of an Allan Block Fence System under normal field conditions. The test result would allow for comparison of the manufactured Allan Block Fence System to products used in the noise barrier market.

Test Method & Procedure

Patching Associates Acoustical Engineering Ltd. was retained to conduct the field performance study on the newly constructed 13 ft (4 m) Allan Block Fence located on the west side of Crowchild Trail South between Glenmore Trail and 50th Avenue in Calgary, Alberta. Vehicle noise was increasing beyond the City of Calgary's specified design noise level (DNL) that may be received at dwelling adjacent to truck (65 dBA) and non-truck routes (60 dBA). Test methods were in compliance with City of Calgary Transportation Noise Policy specifications.

The sound monitoring was conducted on October 16, 2002 from 15:00 to 16:00 with two Brüel & Kjaer 2236 Precision Integrating Sound Level Meters. Each meter was configured to continuously record the one-second L_{eq} , L_{10} and L_{90} values. The meters were equipped with Brüel & Kjaer 4188 microphones that were mounted with windscreens to reduce the potential wind-induce noise. Figure 1 represents a typical microphone set-up connected to a sound level meter.

One microphone was mounted on a tripod adjacent to Crowchild trail, approximately 10-feet (3-meters) from the AB Fence Barrier to record the unaffected traffic noise level. The second microphone was mounted 10 ft (3 m) from the residential dwellings to measure the traffic noise as per the City of Calgary Transportation Noise Policy. The AB Fence was located between the two microphones.



Figure 1: Typical Test Set-up



Noise Barrier Field Study

TABLE 1 – Noise Measurements at 50 Cyprus Villas S.W. on October 16, 2002

Time	Adjacent to Crowchild Trail						Residence Yard	
	L _{eq} (dBA)	L ₁₀ (dBA)	NB Crowchild Trail		SB Crowchild Trail		L _{eq} (dBA)	L ₁₀ (dBA)
			L _{eq} Cont.* (dBA)	L ₁₀ Corr.^ (dBA)	L _{eq} Cont.* (dBA)	L ₁₀ Corr.^ (dBA)		
15:00 - 15:10	72.9	75.3					56.7	58.9
15:10 - 15:20	73.0	75.4					58.2	59.7
15:20 - 15:30	73.1	75.2					57.3	58.9
15:30 - 15:40	73.4	76.0					57.5	59.6
15:40 - 15:50	71.8	74.0					56.9	58.4
15:50 - 16:00	72.3	74.6					57.0	58.8
Total (1 hr)	72.8	75.2	69.4	67.5	73.9	70.4	57.3	59.0

* L₁₀ contribution 3 meters in front of barrier from NB/SB directions given the overall noise level, distance and traffic volume.

^ Corrected L₁₀ level in front of barrier projected to 3 meters from house to account for difference in distance between monitors.

Test Result Interpretation

The results of the noise monitoring are given in Table 1. To obtain the total noise level traveling along north Bound and south Bound Crowchild Trail the individual L₁₀ must be added together. Using:

$$Total\ L_{10}Corr. = 10 \bullet \log(10^{\frac{NBL_{10}}{10}} + 10^{\frac{SBL_{10}}{10}})$$

The total recorded noise results in a corrected L₁₀ value equaling 72.2 dBA. *Therefore, the total noise reduction across the AB Fence barrier is the difference between the total noise recorded adjacent to Crowchild Trail (72.2 dBA) and the noise recorded at the residence's yard (59.0 dBA), or 13.2 dBA.*

Conclusions

Crowchild Trail is classified as a truck route; therefore, the reduction requirement for the project was 5 dBA to obtain the City of Calgary's specified design noise level (DNL) along truck routes of 65 dBA. With the AB Fence in place, the residences along Crowchild Trail are only being exposed to 59 dBA of unwanted noise.

The results of the assessment indicated that the noise reduction given by the manufactured Allan Block Fence System was approximately 13 dBA, which provides superior noise attenuation performance in the field.

Terminology

- Decibels – (dB) Common sound level measurement on a logarithmic scale being proportional to ten times the common logarithm of the sound energy or intensity.
- A-weighted – One of the frequency weighted scales that best represents the sensitivity of human hearing at moderate levels and reflects the low sensitivity to sounds of very high or low frequencies - usually expressed as dBA.
- L_{eq} Value – This is the A-weighted equivalent-continuous sound level. This index is an energy average of the varying sound levels over a specific period of time.
- L₁₀ Value – A measure of the noise level that is exceeding 10% of the time; it is a good measure of frequent noisy occurrences such as steady road traffic.
- L₉₀ Value – A measure of the noise level that is exceeding 90% of the time, and is the background level