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## 4.7 Highway Noise

No substantive changes have been made to this section since the publication of the Draft Environmental Impact Statement (DEIS).

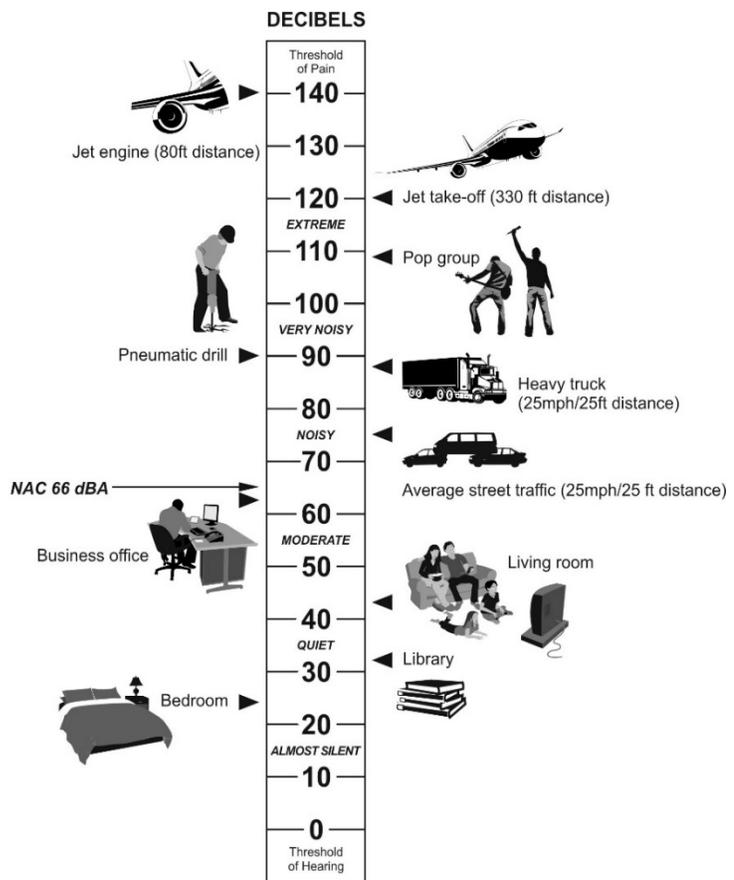
Noise generally is defined as unwanted sound. Vibrational energy causes pressure variations in elastic media such as air or water. The human ear perceives these pressure variations as sound and can discern different levels of loudness as the intensity of the pressure variations fluctuate. These pressure differences are measured in decibels (dB). A level of zero decibels corresponds to the lowest limit of a typical person’s audibility, while a level of 130 to 140 decibels represents the threshold of pain.

**Figure 4.7-1: Common Outdoor and Indoor Sound**

For reference purposes, **Figure 4.7-1** shows common outdoor and indoor sound levels from various everyday sources and the noise abatement criteria (NAC)<sup>1</sup>.

The human ear has non-linear sensitivity to noise. To account for this in noise measurements, electronic weighting scales are used to define the relative loudness of different frequencies. The “A” weighting scale is widely used in environmental work because it closely resembles the non-linearity of human hearing. Therefore, the unit of measurement for an A-weighted noise level is dBA.

Traffic noise is not constant. It varies as each vehicle passes a point. The time-varying characteristics of environmental noise are analyzed statistically to determine the duration and



Adopted from "Environmental Criteria for Road Traffic Noise," Environmental Protection Authority, South Sydney, NSW, May 1999, Page 38.

<sup>1</sup> The FHWA NAC are objective absolute noise levels for varying land use categories that are used to determine if and where traffic noise impacts occur, as defined in 23 CFR 772.5. States must consider noise abatement measures where impacts occur and must include abatement in the project plans, specifications, and estimates if abatement is found to be feasible and reasonable.  
[http://www.fhwa.dot.gov/environment/noise/regulations\\_and\\_guidance/faq\\_nois.cfm#D1](http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/faq_nois.cfm#D1)



intensity of noise exposure. The statistical descriptor used for traffic noise is Leq. It is the constant, average sound level that, over a period of time, contains the same amount of sound energy as the varying levels of the traffic noise. The Leq correlates reasonably well the effects of noise on people. Generally, a 3-dBA Leq change in the traffic noise level is the average minimum change necessary to be perceived by most people in the natural environment, a 5-dBA Leq change is considered noticeable, and a 10-dBA Leq change is twice or half as loud. The time period for traffic noise is 1 hour. Therefore, the unit of measure for traffic noise is Leq(h) dBA.

The INDOT Traffic Noise Analysis Procedure (2017<sup>2</sup>) describes the implementation of 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise. Therefore, all references to noise levels in this document, specific or implied, are in terms of the Leq(h) dBA.

The INDOT Traffic Noise Analysis Procedure and 23 CFR 772 require the determination of existing noise levels along the corridor and the validation of predicted noise levels by comparing the measured noise levels with predicted noise levels.

Existing exterior noise level measurements were conducted on December 15 and 16, 2015, at thirty-seven representative sites of which four were properties that are listed on or eligible for listing on the NRHP. (Site FS 34 was not used.) Properties listed on or eligible for listing on the NRHP were specifically included in order to evaluate impacts to these properties due to proposed noise levels. A 20-minute measurement was taken at each site. The measurements were based on the procedures presented in FHWA's Measurement of Highway-Related Noise (1996). Traffic classification counts were taken concurrently with the noise measurements. The measured noise levels along the existing SR 37/I-465 corridor ranged from 48.2 to 70.1 dBA Leq(h). See **Figure 4.7-2** for the noise monitoring locations.

**Section 5.10** describes the INDOT and FHWA noise abatement criteria, the noise measurements, the validation process, and the noise impact analysis methodology conducted for I-69 Section 6. More detailed information is provided in the Highway Noise Technical Report in **Appendix T**.

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<sup>2</sup> The 2011 INDOT Traffic Noise Analysis Procedure was updated as the I-69 Section 6 noise analysis was underway, with the 2017 version becoming effective on July 1, 2017. Since there were no discernable changes with respect to the elements and processes used in the analysis of I-69 Section 6, this EIS is consistent with both policies (2011 and 2017).

**Figure 4.7-2: Noise Measurement Locations**

