

**WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
DESIGN DIRECTIVE**

**DD-253  
(FORMERLY DESIGN DIRECTIVE 207)  
NOISE ANALYSIS AND ABATEMENT GUIDELINES**  
*July 1, 2006*

Attached is the West Virginia Department of Transportation, Division of Highways, Noise Analysis and Abatement Guidelines. It shall be used on all applicable projects.

Attachment

## NOISE ANALYSIS AND ABATEMENT GUIDELINES

### 1. SCOPE OF COVERAGE

The Noise Analysis and Abatement Guidelines is intended to supplement Title 23, Part 772, Code of Federal Regulations, and Federal Highway Administration (FHWA) memorandum dated June 12, 1995, which addresses traffic generated noise impacts. This guideline, which is applicable to Type I projects, provides the basis for statewide uniformity in consideration of noise abatement. WVDOH does not have a Type II program.

### 2. ANALYSIS LOCATION

WVDOH Type I highway projects shall have a noise analysis performed when potentially impacted receivers are present. Traffic noise analysis will be done for developed lands and undeveloped lands if development is planned, designed and programmed. Development will be deemed to be planned, designed and programmed if a noise sensitive land, such as a residence, school, church, hospital, library, etc., has received a building permit from the local agency with jurisdiction at the time of the noise analysis. Analysis, whether by nomograph, current FHWA highway traffic noise prediction model or narrative, should be done even if potential abatement may not be feasible or reasonable.

Analysis will be performed at representative receiver locations. Future development known at the time of the preparation of the Environmental Assessment (EA) or Draft Environmental Impact Statement (DEIS) analysis will be considered in the Finding of No Significant Impact (FONSI) or Record of Decision (ROD).

After the approval of the FONSI or ROD, the WVDOH is still responsible for analyzing changes in traffic noise impacts, when appropriate, but the WVDOH is no longer responsible for providing noise abatement for new development which occurs adjacent to the proposed highway project.

### 3. DETERMINATION OF EXISTING NOISE LEVELS

Existing noise levels will be determined using FHWA's measurement procedures, e.g. "Sound Procedures for Measuring Highway Noise, Final Report," as a guide.

### 4. PREDICTION OF FUTURE NOISE LEVELS

Future noise level predictions will be determined using the current FHWA highway traffic noise prediction model as a guide.

## 5. IDENTIFICATION OF TRAFFIC NOISE IMPACTS

A traffic noise impact occurs when the predicted levels approach the NAC or when predicted traffic noise levels substantially exceed the existing noise level, even though the predicted levels may not exceed the NAC. "Approach" shall mean within 1 dBA ( $L_{eq}$ ) of the NAC and "substantially exceed the existing noise levels" shall mean an increase of at least 16 dBA.

## 6. CONSIDERATION OF TRAFFIC NOISE ABATEMENT

Noise abatement measures must be reasonable and feasible. Feasibility deals primarily with engineering considerations (e.g., can a barrier be built given the topography of the location; can a substantial noise reduction be achieved given certain access, drainage, snow, safety or maintenance requirements; are other noise sources present in the area, etc.). Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment were applied in arriving at a decision.

Reasonableness criteria shall include, but not be limited to, the following:

### 6.1 Amount of noise reduction provided.

Noise abatement measures will not be implemented unless noise levels can be attenuated a minimum of 7 dBA.

### 6.2 Residences should include all dwelling units, i.e., owner occupied, rental units, mobile homes, etc.

When counting residences to determine reasonableness, all "benefited" residences should be included, regardless of whether or not they were identified as impacted. Each unit in a multi-family building should be counted as one residence in determining both impacts and benefits.

The threshold of noise reduction which determines a "benefited" residence is 5 dBA.

### 6.3 Cost of abatement.

An acceptable cost/residence index should be \$15,000/residence or less.

### 6.4 Views of affected residents.

During the environmental analysis phase of project development, the reasonableness and feasibility of noise abatement measures will be considered. The views of the public, including potentially affected residents, shall be determined through the normal NEPA public involvement process. If, during final design, noise abatement measures such as the erection of noise barriers are

considered to be reasonable and feasible, the views of affected residents will be a part of the decision-making process.

- 6.5 Design-year noise levels.  
WVDOH will give greater consideration to residential areas where traffic noise levels are expected to be greater than 70 dBA, or where increases greater than 20 dBA over existing noise levels are anticipated.

## **7. COORDINATION WITH LOCAL OFFICIALS**

The results of traffic noise analyses are available in environmental documents such as Environmental Impact Statements or Environmental Assessments, copies of which are routinely furnished to local government offices. The WVDOH encourages, but cannot mandate, local communities and developers to practice noise compatible development.

Highway traffic noise should be reduced through a program of shared responsibility. Local governments should use their power to regulate land development in such a way that noise sensitive land uses are either prohibited from being located adjacent to a highway or that the developments are planned, designed and constructed in such a way that noise impacts are minimized.

## **8. EXTENUATING CIRCUMSTANCES**

There may be extenuating circumstances where unique or unusual conditions warrant special consideration of highway traffic noise impacts and/or implementation of noise abatement measures. Extenuating circumstances will be considered on an individual project basis.

## **9. DEFINITIONS**

- 9.1 Decibels (dB). Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels (dB). The decibel is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. It has been found that the A-scale on a sound-level meter best approximates the frequency response of the human ear. Sound pressure levels measured on the A-scale of a sound meter are abbreviated dBA.
- 9.2 Abatement. Abatement means measures used to reduce traffic noise levels. Under normal circumstances, abatement measures will be implemented only where noise reduction will be more than 7 dBA.
- 9.3  $L_{eq}$ .  $L_{eq}$  is the equivalent steady state sound level which, in a stated period of time, contains the same acoustic energy as the time varying sound level during the same time period.
- 9.4  $L_{eq}(h)$ .  $L_{eq}(h)$  is the hourly value of  $L_{eq}$ .

- 9.5 NAC. NAC is the Noise Abatement Criteria as shown on Table 1 of these guidelines.
- 9.6 Receivers. Receivers are locations where highway traffic noise may affect frequent human activities as shown in the NAC. (Some typical locations are patios, swimming pools, playgrounds, front porches, and balconies). If no frequent outdoor active use areas are present, interior living or work areas may be considered.
- 9.7 Type I Projects. Type I Projects are proposed federal or federal aid highway projects for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through traffic lanes.
- 9.8 Type II Projects. Type II Projects are proposed state, federal or federal aid highway projects for noise abatement on an existing highway which is not associated with any Type I improvement in the latest approved Statewide Transportation Improvement Program (STIP).

<b>TABLE 1</b>			
<b>Noise Abatement Criteria (NAC)</b>			
<b>Hourly A-Weighted Sound Level in Decibels (dBA)*</b>			
<b>Activity Category</b>	<b>L<sub>eq</sub>(h)</b>	<b>L<sub>10</sub>(h)</b>	<b>Description of Activity Category</b>
A	57	60	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, play grounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

\* Either L<sub>eq</sub>(h) or L<sub>10</sub>(h) (but not both) may be used on a project.