How is noise addressed?

Upgrading the Pacific Highway

The Roads and Traffic Authority (RTA) is committed to minimising the potential effects of highway traffic noise on the community through the use of noise reduction or mitigation measures. This fact sheet explains how noise impact is assessed and how it can be reduced.

What is road noise?

Noise consists of pressure fluctuations in the air, which are detected by the human ear. The ear is sensitive enough to detect these fluctuations over a considerable range of both intensity and frequency.

Unlike industrial noise in the workplace, traffic noise is rarely loud enough to cause hearing loss. Its main effects are annoyance. Noise can also cause fatigue through sleep disturbance.

The 'loudness' of the noise is determined by the energy intensity of the air pressure fluctuations and the resulting sound pressure level is measured in decibels (see Figure 1 below). The human ear detects each 10 decibel (dB) increase in noise levels as equal to a perceived doubling in loudness. A doubling of traffic volume will result in an increase in noise level of only 3 decibels.

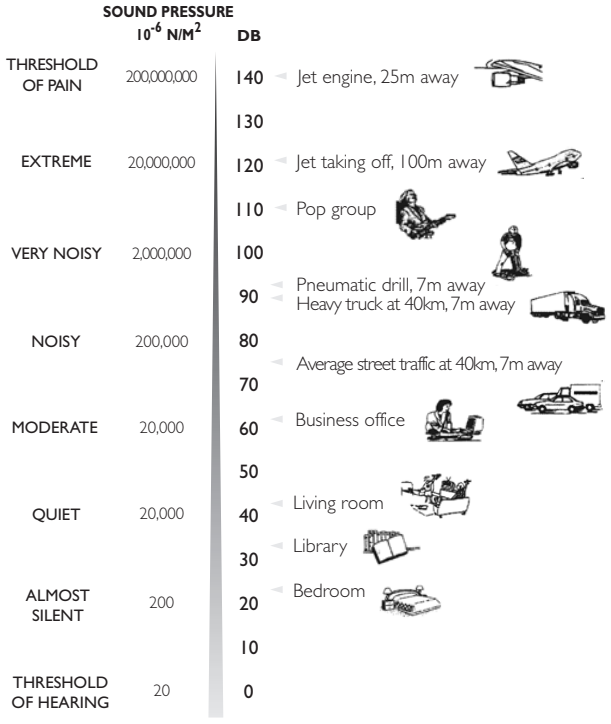

Figure 1. Unweighted sound levels and typical sources

Similarly, doubling the distance between a residence and a road will result in a 3 decibel reduction in noise level due to the way in which traffic noise travels over distance. Further reductions in noise levels can be due to the effects of soft ground, atmospheric absorptions and screening features, such as walls.

Noise wall on the Pacific Highway at Coffs Harbour

How is road noise regulated?

In New South Wales, the guidelines for road traffic noise are documented in the *Environmental Criteria for Road Traffic Noise*) (NSW Environment Protection Authority, 1999). This document is available online at: www.environment.nsw.gov.au/resources/roadnoise.pdf. The RTA's *Environmental Noise Management Manual* also provides guidance on assessing and managing noise and vibration from road construction and operation. The RTA's *Environmental Noise Management Manual* is available online at: www.rta.nsw.gov.au/environment/noise/noise_management_manual.html.

Construction noise from government authorities is regulated by the NSW Department of Environment and Conservation. The various criteria for construction noise and vibration impacts are detailed in the *Environmental Noise Control Manual* (NSW EPA 1994). This manual is currently being reviewed by the Department of Environment and Conservation.

How is road noise assessed?

Noise effects and potential noise mitigation strategies and designs need to be identified and developed throughout the road development process, from the initial planning stages through to construction and project opening. This ensures the development of noise impact control measures as an integrated part of the overall road design process.

Step 1: Measure the existing noise environment

The first step is to measure the existing noise environment.

With most highway upgrade projects there are too many potential noise receivers to place noise monitors at every location. For this reason, noise levels are determined by measuring at several representative locations and then estimating for other areas. Noise levels are calculated in accordance with the Australian Standards (*AS 2702 Acoustic Methods of Measurement of Road Traffic Noise*) and requirements of the Department of Environment and Conservation. Qualified and experienced acoustic practitioners undertake all noise assessments for the RTA.

Step 2: Consider the noise generated by the new road and add this to background noise

When assessing road traffic noise, the following is considered: volume and percentage of heavy and light vehicles for both day and night periods; vehicle speeds; road pavement surface type; topographic features; receivers/source distance and heights; roadside topographic barriers; reflections from buildings or roadside barriers and contributions of noise from other traffic sources likely to influence the overall noise environment.

Type	Criteria		
	Day (7am-10pm) dB(A)	Night (10pm-7am) dB(A)	Where criteria are already exceeded
New freeway or arterial road corridor	LAeq (15hr) 55	LAeq (9hr) 50	The new road should be designed so as not to increase existing noise levels by more than 0.5dB. Where feasible and reasonable, noise levels from existing roads should be reduced to meet the noise criteria.
Redevelopment of existing freeway or arterial road	LAeq (15hr) 60	LAeq (9hr) 55	In all cases, the redevelopment should be designed so as not to increase existing noise levels by more than 2dB. Where feasible and reasonable, noise levels should be reduced to meet the noise criteria.

Figure 2. Environmental criteria for road traffic noise.

Step 3: Consider the new noise level against guidelines

The Department of Environment and Conservation sets the road traffic noise level goals for the RTA (Figure 2). The RTA must try to achieve these goals 10 years after opening a project to traffic.

Step 4: Installing measures to reduce noise volumes

Potential noise effects are considered early in the route options selection process for highway upgrade projects. Potential measures to reduce noise examined at this stage include:

- Locating routes away from noise sensitive areas (where feasible). This is difficult to achieve in all cases.
- Using existing hills and ridges to help shield from noise impacts.
- Minimising road slope (grades) that need more energy from vehicles. Also providing a buffer area, or 'setback' on either side of the road. These areas are often where noise mounds are located.

The most suitable types and locations for noise reducing measures such as noise walls/mounds, low noise pavement and acoustic treatments are examined at the detailed design stage. Consultation with the community forms an important part of this process. Practicality, technical feasibility, visual impact, cost and community preferences all need to be taken into account. Information on the type and nature of the proposed noise mitigation treatments are provided in the project environmental assessment documents.

During construction

While noise-reducing measures are taken, some noise disturbance may be unavoidable during the construction of highway upgrade projects. The most appropriate noise-reducing measures and their locations are decided after the preferred route has been chosen. The RTA's *Environmental Noise Management Manual* describes the steps to manage construction noise.

After construction

Following construction, the RTA undertakes noise assessments to record the actual level of noise being experienced. These checks help the RTA to assess the accuracy of noise predictions, the effectiveness of the noise-reducing measures adopted, and the need to implement further noise-reducing measures.

For further information, contact the NSW Roads and Traffic Authority, Pacific Highway Office on:
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