vicroads

Traffic noise

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What is noise?

Noise is generally defined as unwanted sound; what is noise to one person may not be experienced the same way by another person. Noise is measured on a scale of units called decibels, or dB for short. Noise measurements are usually adjusted to reflect how noise is perceived by the human ear, giving a noise unit called 'A' weighted decibels, or dB(A). This is the unit used to measure traffic noise.

Traffic noise

Traffic noise depends on a variety of factors including:

- traffic volume, speed, and number of trucks
- whether the road is elevated or in a cutting
- gradient of road
- surrounding terrain—hills or valleys
- whether there is soft soil or hard pavement between the road and the receiver
- distance from the road
- shielding by structures such as noise barriers or houses.

Some facts about noise

- Doubling of the traffic volume increases noise by 3 dB(A) if the speed does not change.
- Doubling the distance from the road reduces the traffic noise by 3 dB(A).
- An increase of 10 dB(A) doubles the perceived loudness of noise.
- Reducing traffic speed from 100 km/h to 80 km/h reduces traffic noise by roughly 1.5 dB(A), if the traffic volume remains the same.

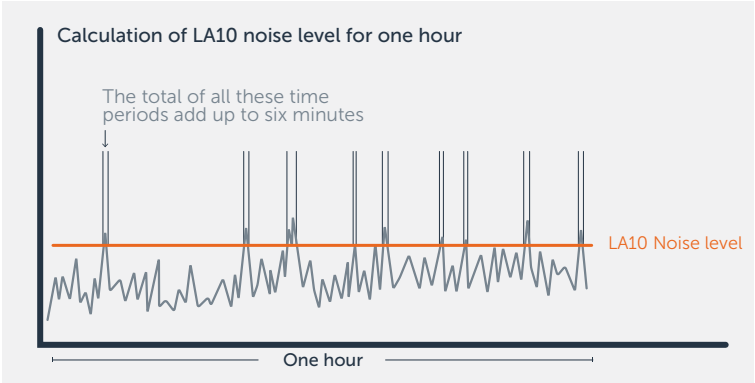
Weather conditions which can significantly change traffic noise levels include:

- wind coming from the road (increases noise)
- wind going toward the road (reduces noise)
- temperature inversion, when cold air sinks to the ground on a cold night (increases noise)
- rain on the road (increases noise)

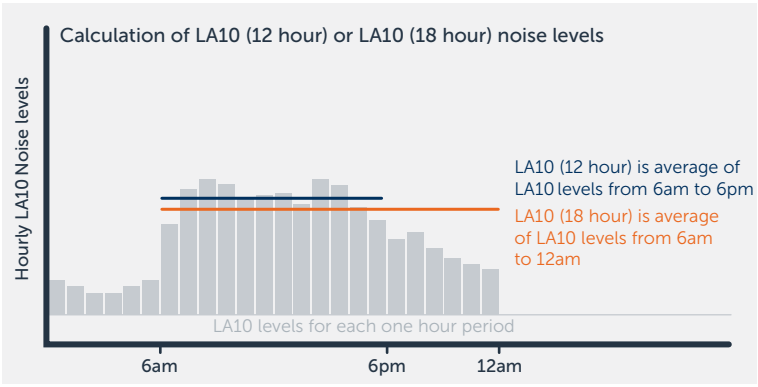
The first three conditions play a significant role at locations more than 100 metres from the road.

Traffic noise measurement

Traffic noise level varies over time, both from second to second, and from day to night. The term LA10 is used to describe the noise level which is exceeded for 10% of a measurement period, usually six minutes in an hour. LA10 is sometimes called the 'average maximum' noise level. The figure below provides an understanding of how LA10 is calculated.



VicRoads specifies noise levels over an 18-hour period for residential buildings, and over a 12-hour period for other noise sensitive buildings such as schools. The 18-hour measure, called LA10(18-hour), is the average of the LA10 noise levels for each hour from 6am to midnight. Extensive noise test data indicates that traffic noise in the 6-hours after midnight is generally 5dB(A) less than the traffic noise in the period from 6am to midnight. Measures taken by VicRoads to reduce traffic noise in the 18-hour period will also reduce noise in the other 6-hours. The 12-hour measure is the average of the LA10 levels from 6am to 6pm and is referred to as LA10(12-hour) as represented in the figure below.



In order to record accurate and consistent noise measurements, VicRoads only measures traffic noise:

- during week days other than holidays
- during periods of little to no wind
- at residential dwellings and noise sensitive community buildings judged to be representative of those worst affected by traffic noise in the area
- at addresses where the measurements are least likely to be affected by other noises such as trains, barking dogs, and traffic from local roads
- one metre outside the most exposed window on the lowest habitable floor of a building.

Vehicle noise regulations

New motor vehicles are required to comply with the noise limits specified in *Australian Design Rule (ADR) 83/00*, which is administered by the federal Department of Infrastructure and Transport. The ADR specifies limits of noise from accelerating vehicles, and provides a test method for checking stationary vehicles. Some trucks produce high noise levels from engine brakes. These are not covered by the ADR.

Noise from individual vehicles in service is governed by the *Environmental Protection (Vehicle Emissions) Regulations (2003)*, which is administered by EPA Victoria.

VicRoads traffic noise reduction policy

Since 1979, VicRoads has been installing noise attenuation treatments (barriers, fences or earth mounds) along new freeways and some arterial roads.

The *VicRoads Traffic Noise Reduction Policy (2005)* defines VicRoads' commitments to managing traffic noise in Victoria. The policy requires VicRoads to limit traffic noise as indicated below:

- a limit of 63dB(A) applies to new arterial roads and freeways if the noise level had been less than 63 dB(A) before the road was built. However, if the preceding noise level was 63 dB(A) or more (eg. from local roads), a noise increase of up to 2 dB(A) is allowed
- a limit of 63 dB(A) applies to arterial roads and freeways where two or more traffic lanes are added AND buildings which previously provided shielding from traffic noise are removed.

VicRoads will also consider limiting the increase in traffic noise due to a new road to no more than 12 dB(A) where the pre-existing noise level is less than 50 dB(A).

The noise levels referred to above are LA10 (18 hour) at residential dwellings, aged persons' homes, hospitals, motels, caravan parks and other buildings of a residential nature, and LA10 (12 hour) at schools, kindergartens libraries and other noise-sensitive community buildings.

VicRoads achieves these noise limits by:

- consideration of the location of noise sensitive buildings when planning new roads
- construction of noise barriers
- use of low noise road pavement

VicRoads does not provide noise mitigation for:

- commercial or industrial buildings
- buildings that are non-conforming land uses in the relevant planning schemes (eg a residence in an industrial zone)
- new buildings or subdivisions abutting planned or existing roads (Noise mitigation for these is the responsibility of the property developers)
- farm land, forest or public open space.

Further, this policy does not provide for noise attenuation along existing arterial roads.

Managing noise from existing freeways

In 1985, it was decided that properties which were built along freeways prior to 1979 would be eligible for noise barrier retrofitting.

Subject to certain conditions and available funding, VicRoads may provide new or upgraded noise barriers along existing freeways where traffic noise levels exceed 68 dB(A) LA10 (18 hour) or LA10 (12 hour) depending on the type of building affected. Potential sites for funding are prioritised on the basis of noise levels, the number of building occupants affected, and the anticipated cost.

Even where the LA10 noise levels are under 68dB(A), noise can briefly reach much higher levels as a result of particularly noisy vehicles. Traffic noise attenuation measures, such as the construction of noise barriers or the use of low noise road surface treatment, are not capable of effectively reducing these spikes in traffic noise levels.

Encouraging compatible land use

VicRoads encourages compatible land use next to major roads by working with planning authorities to encourage land uses such as commercial and industrial buildings near major roads. It also encourages the development of building regulations that will take account of the noise impacts of busy roads.

Requirements of property developers

The VicRoads Traffic Noise Reduction Policy (2005) requires developers of residential properties abutting future or existing freeways to ensure that traffic noise at future dwellings will not exceed the noise limits outlined in the Policy. This will usually mean that the developers must construct noise barriers. VicRoads is not always a referral authority for developments which may be affected by traffic noise from major roads. Councils are encouraged to refer planning permit applications to VicRoads in these instances. This will help ensure appropriate conditions are placed on developers to mitigate traffic noise.

A guide to the reduction of traffic noise

There are many things that architects, builders, and residents can do to reduce the impact of traffic noise. These include installing roof insulation, double glazing, and simply sealing gaps around windows and doors. Many of these measures will improve building energy efficiency and save on energy bills as well as reduce noise. VicRoads has prepared a booklet called *A Guide to the Reduction of Traffic Noise*. It may be obtained free from VicRoads, and an electronic version is available on the VicRoads web site.

More information

More information about traffic noise and how it is managed is available on VicRoads web site. Go to **vicroads.vic.gov.au/environment** and click on noise.

For further information please visit
vicroads.vic.gov.au or call **13 11 71**

Information provided in this brochure is correct at the time of printing and may be subject to change.

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