



Environmental Noise and the NSW minerals industry

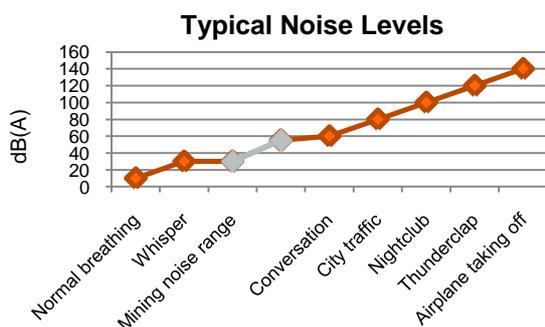
Noise is part of everyday life. Mining operations generate noise that can be heard in the surrounding community.

There are measures in place to regulate noise and to minimise noise from the state's mines in the community.

This fact sheet explains what generates this sound, how these activities are regulated and how they are managed.

What is noise?

Noise consists of sounds that travel through the air as a series of waves. Different sounds have different characteristics which change based on their loudness and pitch. We are able to distinguish between sources of noise by the character of the noise, and by the extent to which it exceeds the background level. The figure below shows a range of noise levels that we experience in daily life.



We are able to sense the general direction of a noise and whether the sound has low or high pitch. Some noise can be annoying and intrusive.

Where does noise from mining operations come from?

Mining operations are complex sites involving many different activities that produce different types of noise. They will vary at different times of the day based on the type and location of the mining operation.

Mining operations typically involve a transport fleet, which can include dump-trucks and large earth moving equipment, road and rail activity, draglines, blasting, conveyors, crushing, screening and process plants.

Mines typically operate 24 hours a day, seven days a week. There are also other noise sources in the communities where mines operate, for example other industries, roads, railway and domestic activities.

The key question is what an acceptable level of noise is when all of these noise sources are accounted for and how it impacts daily life in the community.

How does the mining industry manage noise?

By understanding the potential noise impacts of an operation, selected practices can be applied to address specific noise issues at a mine site. Typical methods of noise management are documented in Noise Management Plans and include:

- Plant and equipment design and selection
- House crushing plants within buildings
- Using acoustic silencers on noisy equipment
- Enclosing conveyor systems
- Reducing impact noise by lining chutes with hard wearing rubber and polyurethane materials
- Using terrain to acoustically shield the operations
- Placing noisy equipment behind noise barriers
- Operational procedures such as speed limits on roads on site
- Alternate safety systems on mobile equipment to replace reversing alarms and horns
- Monitoring systems to reduce the impact of weather conditions
- Replacing older equipment with new technology that is often quieter.

Regular monitoring also occurs.

How is noise measured?

Sound Level Meters measure the change in pressure associated with sound waves and frequency range. This type of measurement also involves an adjustment to simulate the response of the human ear. While noise has been measured for many years and is a well understood science, environmental noise measurement in the field is complex and requires specialist training.

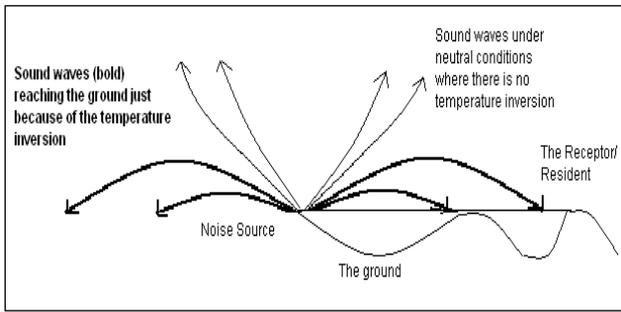
Can weather affect noise?

Yes it can. Because noise travels through the air, meteorological conditions can increase or decrease the level of noise. Temperature, wind speed and direction, humidity and cloud cover all affect the level of the noise we hear in the area surrounding a mine.

Temperature inversions can potentially increase the impacts of noise. Temperature inversions occur at different heights above the earth's surface and reflect sound waves back to ground level due to a layer of warm air sitting above the cold air closer to the ground. There is a greater chance of hearing sound from a distant source when there is a temperature inversion.

The impact of a temperature inversion on sound waves is illustrated below. Distant traffic, rail lines and noise sources which are not usually audible become louder. Wind in the direction from a source to a residential area will also increase the level of noise. The impact of wind is more

significant at low wind speeds. These factors are described as noise enhancing and need to be considered when managing noise for a mining operation.



Is noise regulated by government?

Yes, it is. Governments over many years have introduced policies and regulations to manage noise. They balance our society's need for industrial activity with the need to minimise noise impacts on the community. Relevant laws include:

- *NSW Road Noise Policy*, administered by Environment Protection Authority (EPA)
- *Environmental Planning and Assessment Act 1979*, administered by Department of Planning and Infrastructure (DP&I)
- *Industrial Noise Policy (INP)*, administered by DECCW
- *Mining Act 1992*, administered by Industry & Investment NSW (I&I NSW)
- *Protection of the Environment Operations Act 1997*, administered by EPA.

Mine sites can also be required to have control strategies for operational noise in their Mining Operations Plan, especially for mines near populated areas. They report on environmental performance annually to Industry & Investment NSW within the Annual Environmental Management Report as required under the Mining Act 1992 and to the Environment Protection Authority (EPA) under their Environment Protection Licence.

How do we arrive at a satisfactory level of noise from a mining operation?

For new mining projects, the EPA's Industrial Noise Policy is used to determine acceptable levels of noise which can be generated from a development, taking into account specific factors to protect the amenity of the community. Future mining operations are able to predict the likely levels of noise with reliable accuracy. You can see the noise limits for a mining operation in the EPA's Environment Protection Licence and DP&I's Notice of Determination (see *Further information* for links).

Noise prediction models are used to calculate the potential level of noise from a mine site, facilitating appropriate practices to minimise noise impacts on the community. These models use the terrain effects, the weather conditions and a large number of noise sources to predict the potential level of noise from an operation.

Noise limits vary amongst mine sites. Typical limits can vary between 30 – 55dB(A), depending on the location of the operation, existing background levels, type of noise monitoring device, time of day and day of the week. Noise levels below approved limits are often audible to the community.

Consultation with the community

Mine operators work with stakeholders to ensure the amenity of the community is recognised and taken into account by the mining operation.

Glossary of Terms

Ambient Level: the background level free of the noise emissions from the operations being assessed.

Amplitude: the height of a sound wave.

A-weighting (dB(A)): an adjustment made to sound level measurement to better approximate the response of the human ear.

Decibel (dB): a unit of sound measurement which quantifies pressure fluctuations associated with noise and overpressure.

Frequency: the number of waves per second. A wave with a low frequency has a greater distance between waves compared with a high frequency wave.

Noise: the combined level of sound that we hear in everyday life from numerous sources.

Sound: any pressure variation that the ear can detect; a series of waves that travel through the air.

Sound Level Meter: an instrument that measures sound pressure levels in decibels.

Further information:

EPA, *NSW Road Noise Policy*:

www.environment.nsw.gov.au/resources/noise/2011236nswroadnoisepolicy.pdf

EPA, Environment Protection Licence:

www.environment.nsw.gov.au/licensing/index.htm

EPA, *Industrial Noise Policy (INP)*:

www.environment.nsw.gov.au

Department of Planning & Infrastructure:

www.planning.nsw.gov.au

Protection of the Environment Operations Act (POEO Act): www.legislation.nsw.gov.au

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