Noise Management Guideline

Issue 1

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Disclaimer

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Contents

1. *Overview*

This Noise Management Guideline (Guideline) together with the CMPA's Work Safely Reference Manual aims to support members in meeting the requirements of the Victorian Occupational Health and Safety Act 2004 and the Victorian Environment Protection Act 1970.

In doing so, the CMPA endeavours to:

- Provide members with appropriate management practices required to minimise potential health risks or environmental impacts associated with noise arising from construction materials industry operations
- Assist members in establishing and maintaining a Work Plan that defines operational activity so as to obtain and sustain an Extractive Industry Work Authority

2. *Scope*

This Noise Management Guideline covers the health risks and environmental impacts and their associated controls from both a workplace and a community perspective.

3. *Relevant Legislation, Policy and Resource Materials*

Relevant Legislation

- Victorian Occupational Health and Safety Act 2004 (Victorian OHS Act 2004)
- Victorian Occupational Health and Safety Regulations 2007 (Victorian OHS regulations 2007)
- Environment Protection Act 1970
- State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1)

References and Guidance Materials;

- Noise from industry in regional Victoria (NIRV) (publication 1411)
- Noise Control Guidelines – EPA publication 1254
- Environmental guidelines for major construction sites – EPA publication 480
- Noise from large residential subdivision or urban development sites – EPA publication 1264
- A Guide to the Measurement and Management of Noise EPA Victoria, EPA publication 280
- WorkSafe Guidance Note "Audiometric (hearing) testing 2013"
- AS/NZS 1269.4:2005 - Occupational noise management - Auditory assessment
- Managing Noise and Preventing Hearing Loss at Work, Safe Work Australia Code of Practice
- AS/NZS 1269 Occupational Noise Management
- Noise Measurement Manual Queensland Department of Environment and Heritage Protection - Version 4 2013
- Control of noise in quarries Health and Safety Executive (UK)

http://www.conserve-energy-future.com

http://www.explainthatstuff.com

4. *Introduction to Noise*

What is Noise?

Noise is a sound that is not wanted by the receiver because it may be unpleasant, loud, interfere with their hearing, disturb their concentration or impact negatively on their way of living.

This results in the subjective discretion between sound and noise, where any sound may be considered noise, depending on the receiver.

Noise pollution takes place when there is either an excessive amount of noise or an unpleasant sound that causes temporary or permanent disruption in the natural background noise and may result in harm to human hearing or animal life. This definition is usually applicable to sounds or noises that are unnatural in either their volume or their production and are often generated by industry. Background noise may be less in rural areas in comparison to cities or towns.

What is Sound?

Sound is the energy things produce when they vibrate forcing the air all around it to vibrate as well. As the air moves it carries energy in all directions. Eventually even the air inside your ears starts vibrating and that is when you begin to perceive energy as a sound. In short, there are two different aspects to sound. There is a physical process that produces sound energy to start with and sends it shooting through the air, and there is a separate psychological process that happens inside our ears and brains, which convert the incoming sound energy into sensations we interpret as noises, speech, and music.

Sound travels out from a definite source (such as a noisy machine), and has to have something to travel through (known as a medium), such as air, water, glass, or metal.

The first person to discover that sound needs a medium was an English scientist Robert Boyle (1627–1691). He carried out a classic experiment where he set an alarm clock ringing, placed it inside a large glass jar, and while the clock was still ringing, sucked all the air out with a pump. As the air gradually disappeared, the sound died out because there was nothing left in the jar for it to travel through.

Sound Carriage

Sound waves lose energy as they travel. That is why we can only hear things so far and why sounds travel less well on blustery days when the wind dissipates their energy than on calm days.

The speed of sound in air (at sea level) is about 1220 km/h (340 metres per second). Compared to light waves, sound waves creep along at a snail's pace—about a million times slower. You see lightning much sooner than you hear it because the light waves reach you pretty much instantly, while the sound waves take about 5 seconds to cover each 1.6 km.

Workplace Noise

Noise is a common hazard across all industry that has the potential to adversely affect the health of receivers, e.g. the workers.

The construction materials industry has the potential, without effective controls being in place, to generate hazardous noise levels through many processes inclusive of the operation of fixed plant, mobile equipment and road trucks as well as the blasting of hard rock.

Environmental Noise

Environmental noise is emitted from industry to receivers in the community, e.g. neighbours, and is often mixed with other noise sources, e.g., road traffic, railways and civil works that increases the overall noise level heard by the receiver.

Workplace noise can easily transmit to environmental noise and is influenced by many factors such as workplace layout, workplace controls and weather conditions that may assist in carrying the noise to the receiver.

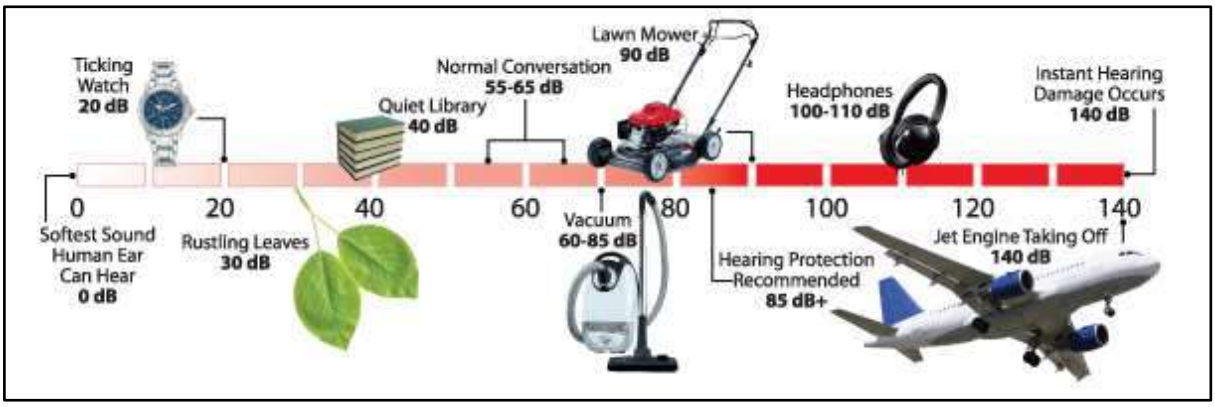
Working quarries are known to be a repository for wildlife and, as has been done so by quarries in the past, consideration should be given, where practicable, to wildlife such as nesting birds.

Understanding the Decibel Scale

The decibel (dB) scale is a logarithmic scale and it works in a different way to the scale on a ruler, which is a linear scale. On a ruler, a distance of 20 cm is twice as long as a distance of 10 cm.

The logarithmic decibel scale goes up in powers of ten: every increase of 10 dB on the scale is equivalent to a 10-fold increase in sound intensity which broadly corresponds with a doubling in loudness. This means that a sound of 20 dB is 10 times more intense than a sound of 10 dB and a 30 dB sound is 100 times more intense.

Sounds high up the decibel scale from about 85–200 dB are a major cause for concern as the sound waves carry so much energy that damage to your hearing shall occur.



Decibel Scale

Potential Impacts associated with Hazardous Noise

Personal Health– THIS MEANS YOU!

Hazardous noise affects the functioning of the inner ear, which may cause temporary hearing loss. After a period of time away from noise, hearing may be restored. With further exposure to hazardous noise, the ear will gradually lose its ability to recover and the hearing loss will become permanent.

Permanent hearing loss can also occur suddenly if a person is exposed to very loud impact or explosive sounds.

Permanent hearing loss results from the destruction of hair cells in the inner ear. These cells cannot be replaced or repaired by any presently known medical treatments or technology.

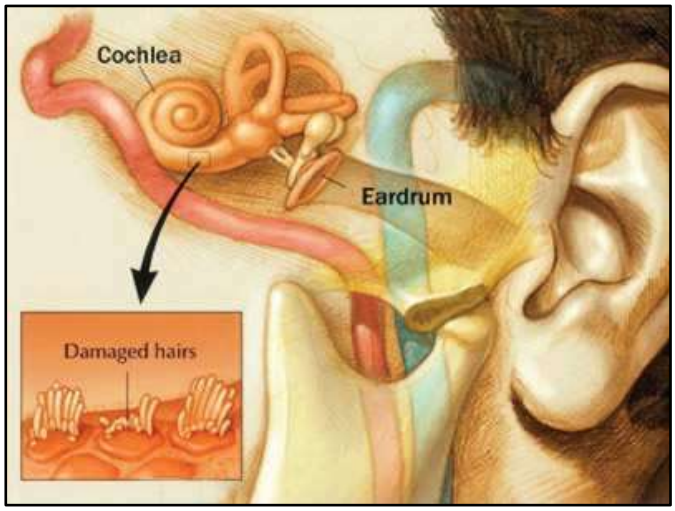
Usually, hazardous noise first affects the ability to hear high-frequency (high-pitched) sounds. This means that even though a person can still hear some sounds, conversation will start to sound 'muffled' and a person may find it difficult to understand what is being said.

Communication difficulties occur especially when there are competing background noises. Modern hearing aids may improve the ability to hear speech but they are unable to completely restore the clarity of the full hearing function.

Workers exposed to hazardous noise may also experience tinnitus, which could become permanent. Tinnitus is a physical condition, experienced as noises or ringing in the ears or head when no such external physical noise is present. When severe, it may disrupt sleep, reduce concentration, make people extremely irritable and lead to depression.

The degree of hearing loss that occurs is dependent on how loud the noise is, how long someone is exposed to it and, to some extent, individual susceptibility. The frequency or pitch can also have some effect on hearing loss, since high-pitched sounds are more damaging than low-pitched ones.

In summary, noise induced hearing loss is an irreversible condition that can have a terrible impact on a person's life. If you are exposed to loud noise continually over a period of time (including, for example, personal electronic devices and rock concerts), the nerve receptors in your inner ear may eventually die, and once that damage occurs it cannot be repaired. Hearing loss can also result from exposure to sudden loud noises, such as explosions, gun shots or heavy hammering. These types of noises are commonly referred to as impact noises and, if loud enough, can cause immediate, permanent damage. Permanent hearing loss may also be accompanied by tinnitus.



Outer and Inner Ear

Community and Environmental Health

Environmental noise can have a negative effect on the receiver including hearing impairment, hypertension, elevated stress levels, general annoyance and sleep disturbance. Some studies conclude that environmental noise at night can also effect directly or indirectly the health of the cardiovascular system of persons exposed.

Community health is not only extremely important to the community as it can have a direct impact on their lifestyle and general ambience but it is also vital to the sustainability of our industry. Working quarries are known to be a repository for wildlife and, as has been done so by quarries in the past, consideration should be where practicable given to wildlife such as nesting birds.

The communities we reside in as an industry allow us a “social license to operate” and can easily reject that license if we do not respect their rights by adhering to legislative requirements.

Hard Rock Quarry within close proximity to a Community

5. *Noise Legislation*

Workplace Legislation

Workplace noise is regulated through the Victorian OHS Act 2004 and specifically the Victorian OHS Regulations 2007, part 3.2.

The guidance document titled "Your Health and Safety Guide to Noise Edition No. 1 June 2007" issued by WorkSafe Victoria can assist in controlling noise in the workplace.

Employers

An employer's primary duty under the regulations is to ensure, so far as is reasonably practicable, that workers and other persons are not exposed to health and safety risks arising from exposure to noise hazards in the workplace.

Employers must ensure that;

- The noise a worker is exposed to at the workplace does not exceed the exposure standard for noise;
- They consult with relevant workers when making decisions in regards to noise control that may affect those workers; and
- They provide ongoing audiometric testing to a worker who is frequently required to use personal hearing protectors to protect the worker from hearing loss associated with noise that exceeds the exposure standard.

Company directors, have a duty to exercise due diligence to ensure that the business complies with the OHS Act and Regulations;

This includes taking reasonable steps to ensure that the business has and uses appropriate resources and processes to eliminate or minimise risks that arise from noise.

Workers

Workers have a duty to take reasonable care for their own health and safety and that they do not adversely affect the health and safety of other persons.

Workers must comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to health and safety at the workplace.

For example, if personal hearing protectors are provided by the person conducting the business the worker must use them in accordance with the information, instruction and training provided.

Designers, Manufactures, Suppliers & Installers

Designers, manufacturers, suppliers, importers and installers of plant or structures that could be used for work must:

- Ensure the plant is designed and manufactured so that its noise emission is as low as reasonably practicable; and
- Provide information about the noise emission values of the plant and any conditions necessary for minimising the risk of hearing loss and other harm.

What does as far as is Reasonably Practicable mean?

Section 20 of the Victorian Occupational Health and Safety Act 2004 sets out what is meant by "so far as is reasonably practicable" and lists five matters that require consideration and must be taken into account:

a. The likelihood of a person being exposed to harm;
b. The potential seriousness of that harm;
c. What is known, or ought to be known, about the risk;
d. How to eliminate the risk, and
e. The availability, suitability and the cost of eliminating or reducing the risk.

What is the Workplace Exposure Standard?

Victoria's workplace noise exposure standard is a level of 85 decibels (A-weighted) averaged over an eight-hour period, and a peak level of 140 decibels (C-weighted). The standard relates to noise measured at the worker's ear and doesn't account for any protection which may be provided by personal hearing protectors.

Higher noise levels are allowable for short exposure durations and conversely lower noise levels are acceptable for longer exposure periods. The table below shows daily noise exposures that will be the equivalent to 85 dBA, LAeq continuous exposure for 8 hours, provided the remainder of the shift will be spent exposed to noise levels below 75 dBA LAeq.

Equivalent 8-hour Exposure Noise Levels	
Duration of Exposure (in hours)	**LAeq Noise Level, in dBA**
12	83
10	84
8	85
4	88
2	91
1	94
0.5	97
0.25	100

Noise levels well above 85 dBA are acceptable under the OH&S (Noise) Regulations as long as the duration of the noise at the worker's ears is sufficiently short and hearing protection devices are being used. However, to be prudent it is recommended that workers should not be exposed to noise levels greater than 85 dBA, LAeq for any length of time.

Environmental Legislation

Environmental noise in Victoria is regulated through the Environment Protection Act 1970 and the State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1).

The following publications provide guidance to meeting obligations in controlling environmental noise;

- Noise from Industry in Regional Victoria (NIRV) (publication 1411);
- SEPP N-1 and NIRV Explanatory Notes (EPA publication 1412 — 'The Explanatory Notes' Applying NIRV to proposed and existing industry (EPA publication 1413 — 'the Applying NIRV guide');
- Noise Control Guidelines – EPA publication 1254;
- Environmental guidelines for major construction sites – EPA publication 480;
- Noise from large residential subdivision or urban development sites – EPA publication 1264; and
- A Guide to the Measurement and Management of Noise EPA Victoria, EPA publication 280

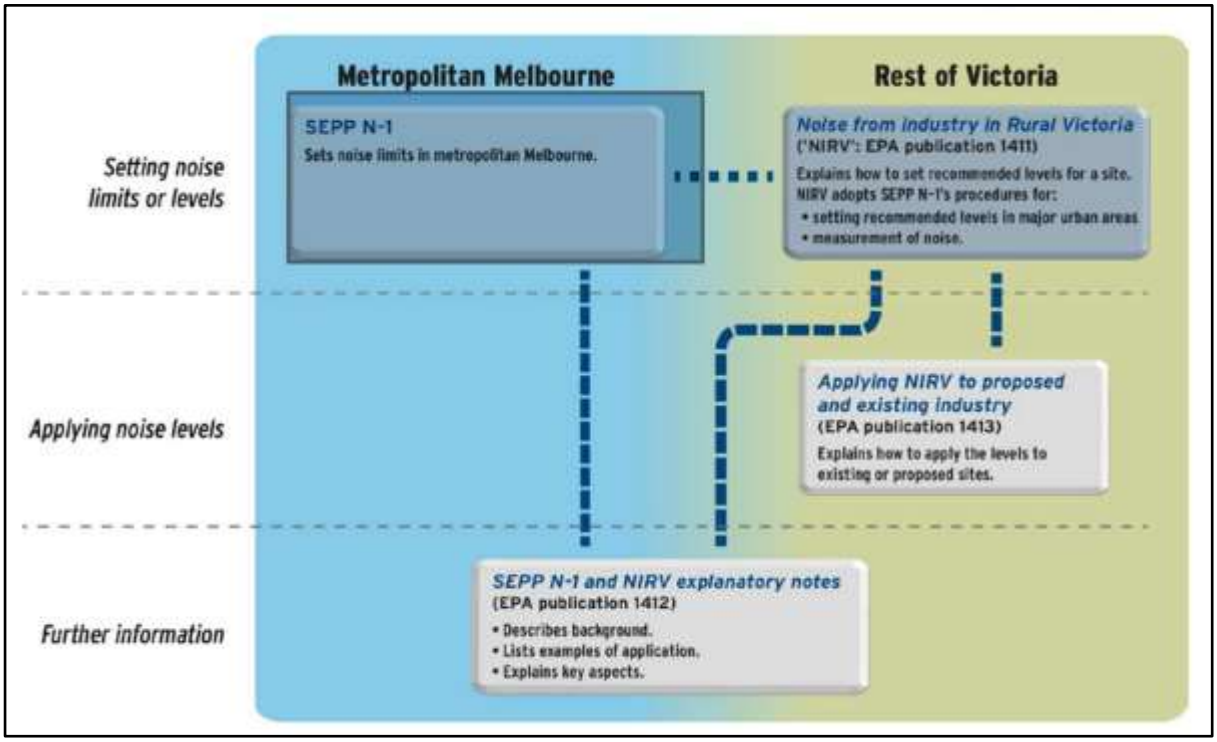


Figure 1 from EPA Publication 1411 Noise from Industry in Regional Victoria

SEPP N-1 sets noise limits for industry in the Melbourne Metropolitan Region. Within the SEPP N-1 area, SEPP N-1 is law and must be used.

Outside the metropolitan region, the EPA publication 1411 Noise from industry in Regional Victoria (NIRV) must be applied.

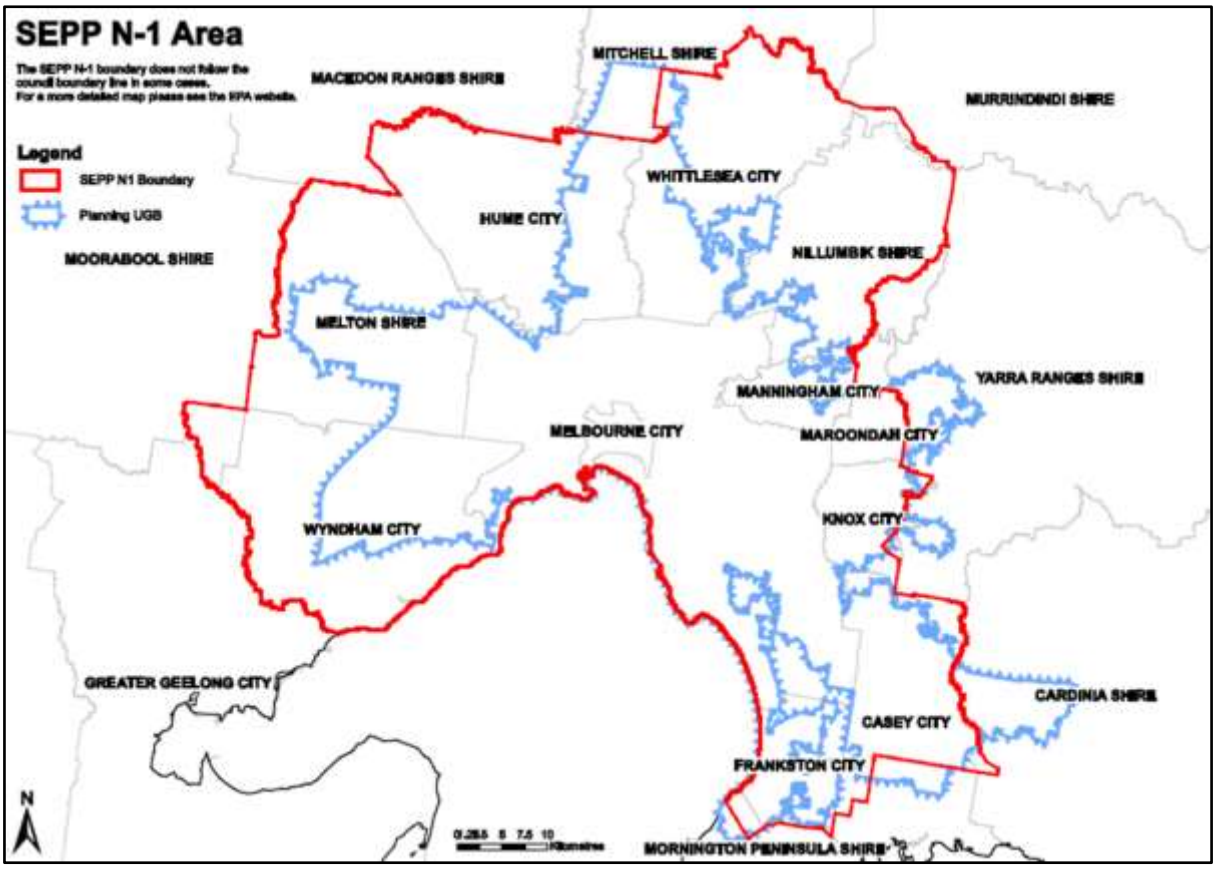


Figure 2 from EPA Publication 1411 Noise from industry in regional Victoria

SEPP N-1 sets noise limits at residential premises and there are separate limits for the day, evening, night, weekends, as defined in the Policy and included in the below table.

SEPP N-1 Definitions of daytime, evening and night-time periods		
Period	**Day**	**Time**
Daytime	Monday to Friday Saturday	7 am to 6 pm 7 am to 1 pm
Evening	Monday to Friday Saturday Sunday and public holidays	6 pm to 10 pm 1 pm to 10 pm 7 am to 10 pm
Night time	Monday to Sunday	10 pm to 7 am

Under SEPP N-1 noise limits are based on the land-use zoning of the area surrounding the residence, as defined by the relevant authority, and on the measured background noise levels at the residence when those levels are especially high or low.

Noise limits apply to any part of the land that is within the boundary of the potentially affected property but no further than 10 m from the external wall of the dwelling.

The measured noise from commercial, industrial or trade sites are adjusted for character, including tonality, intermittency, and duration. The adjusted noise level is compared with the noise limit to determine whether or not the premises complies with SEPP N-1.

Noise from Industry in Regional Victoria (NIRV) Publication 1411

This publication has been provided by the EPA to determine recommended maximum noise levels for industries in regional Victoria. It uses land use zonings as a basis for establishing recommended noise levels at residential receivers (sensitive receptors).

NIRV allows for adjustments to be applied to the recommended noise level where high background noise levels, or multiple industries are present. Further adjustments can be applied based on the distance between the receiver and the industry zone and where the industry is an extractive type industry. In NIRV there are specific processes to apply for determining recommended maximum noise levels where the industry is an earth resources site such as a quarry. It should be noted that recommended maximum noise levels do not apply to blasting activities which should follow the guidelines "Ground vibration and airblast limits for blasting in mines and quarries". It should also be noted that potential variations to maximum noise levels may be applied to certain open-air surface activities, such as site clearing and preparation.

There are separate recommended noise levels for the day, evening and night periods as defined above.

For the assessment of noise, NIRV refers to the procedures provided in SEPP N-1 in the case of major urban areas (as defined by NIRV).

Whilst not used for the derivation of noise limits in regional Victoria, except in the case of major urban areas, SEPP N-1 provides the assessment methodology which allows the application of adjustments to the noise level to account for characteristics which make the noise more or less annoying such as tonality, impulsiveness, intermittency and duration.

6. *Noise Monitoring & Measurement*

Workplace Noise

Noise measurements should be taken at 0.1 to 0.2 m from the worker's ear canal entrance over a period of time that is representative of the noise produced during the tasks.

In most situations the use of a hand-held integrating sound level meter will produce the most useful information for choosing appropriate noise control measures. In situations where workers are highly mobile or access for the person taking the measurement is difficult or unsafe, it may be more appropriate to use personal sound exposure meters also known as dose meters.

Noise measurements should include the combined noise levels of all the tools, machines and processes present as well as the background noise from ventilation systems, cooling compressors, circulation pumps, etc. To identify which noise sources contribute most to workers' exposures, the noise from each source or work activity should also be measured separately.

If a group of workers is exposed to identical sources of noise and their exposure is likely to be the same, then you do not need a separate assessment for each worker. A representative assessment can be done for one or more of the workers

Results should be recorded in a company Noise Monitoring Schedule (an attachment to your Noise

Management Plan) and compared against Workplace Exposure Standard.

A noise assessment should be done by a competent person in accordance with the procedures in

AS/NZS 1269.1 Measurement and Assessment of Noise Emission and Exposure.

The more complex the situation, the more knowledgeable and experienced the person needs to be.

A competent person is one who has accurately calibrated noise measuring instruments and, through training and experience;

- Understands what is required by the OHS Regulations for noise;
- Knows how to check the performance of the instruments;
- Knows how to take the measurements properly; and
- Can interpret the results of the noise measurements.

Environmental Noise

Generally Environmental Noise is a result of uncontrolled workplace noise, i.e. the more effort focused on reducing workplace noise, the less opportunity for that noise to travel.

Noise monitoring should be conducted by an appropriately qualified consultant at identified sensitive receptors or noise sensitive areas to measure the noise levels as set out in Schedule A of SEPP N-1 at scheduled intervals or where a complaint or enquiry has identified a need to address an issue regarding noise management.

Air blast overpressure monitoring should be conducted in the vicinity of the relevant sensitive locations in accordance with AS2187.2:2006 Explosives - Storage and Use - Use of Explosives for every shot undertaken.

Results should be recorded in a company Noise Monitoring Schedule (an attachment to the Noise Management Plan) and compared against the targets as listed in your Work Authority as well as the relevant legislative requirements as listed in SEPP N-1.

Measurement Location

When undertaking a noise assessment, which may also be used to monitor capital upgrades or pit redesign, it is essential to make note of the following on a site map location of noise source:

- Background noise measurement location;
- Source noise measurement location; and
- Topography between noise source and sensitive receivers.

The appropriate measurement location and descriptor should be referenced in your Nosie Management Plan.

Derived Points

For practical reasons it may not be possible to take measurements in a noise sensitive area. In such cases an alternative point is chosen, called a derived point. The policies allow a derived point to be set at any point outside a noise sensitive area. They also specify under what circumstances a derived point may be used as listed below.

(a) Multiple industries

A derived point may be appropriate when there is more than one premise that contributes to the noise received at the noise sensitive area. In this case derived points should be selected so that the noise of an individual premise is measured at each point. Care should be taken in selecting a derived point so that the distance from the premises is sufficient for it to appear as a point source. Where there are a number of noise sources in the premises, it may be necessary to set multiple derived points to control individual pieces of equipment.

(b) Atmospheric effects

Weather conditions can markedly affect the noise level received at a noise sensitive area. This is particularly important when the level is low and the distance between the noise sensitive area and the source exceeds 200 m. When it is believed that the noise received at the noise sensitive area is affected by weather conditions, then a derived point may be used.

It is advisable to use this point in all cases where the noise source is more than 500 m from the noise sensitive area because weather conditions are likely to be the major source of variability in the noise level at this distance.

Measurement Method

Handheld Quick Assessment
The handheld assessment method is useful to get an indication of noise levels. To obtain the most accurate data using this method, hold out the Sound Level Meter (SLM) at arm's length and hold it out to your side with the microphone pointed upwards (i.e. vertical to the ground) to allow soundwaves to travel over the microphone's membrane (rather than against it).

Sound Level Meter (SLM) including microphone mounted on the tripod placement
SLM mounted on a tripod (see left hand picture example, below) is the method used most commonly and is the standard methodology for most noise measurements where compliance/enforcement action may be taken as a result of the investigation.

Difficulties can arise in the measurement of noise due to the placement of the SLM microphone and tripod.

For example if a microphone is located too close to an acoustically reflecting surface then reflections from that surface may artificially increase the noise level.

If the tripod is placed on a rigid surface then vibration through the legs of the tripod may affect the measured level. Noise levels can vary from place to place because of shielding by buildings or other structures.

The microphone should be located so reflections from nearby surfaces are minimised and where a maximum noise level (unaffected by reflections) is obtained. Other difficulties with measurements can include invalid calibration, the quality of model, rough handling of equipment, weather and effects of other unrelated noise.

Measurement and assessment of noise for environmental compliance should be carried out by a professional acoustical consultant who ideally is a member of the Association of Australian Acoustical Consultants (AAAC). The current standard that specifies sound level meter functionality and performance is the AS IEC 61672-1:2004.

Measuring equipment for blasting (where relevant)

Monitoring of air blast overpressure (*see right hand picture example above*) is conducted to ensure allowable levels are
not exceeded.

Allowable levels (*AS 2187.2-2006 Explosives - Storage and Use - Use of Explosives*) are as follows:

Issue	Level	Allowable Exceedance
Air Blast Overpressure	115 dB (Lin Peak)	5% of total number of blasts over a 12 month period
	120 dB (Lin Peak)	Nil

7. Noise Hazards

A hazard is anything with the potential to cause harm to the safety and health of people, to equipment, property or to the environment.

Risk is the likelihood and possible consequences of exposure to the hazard.

Crushing and Screening Plant located in Pit so as to reduce Environmental Noise

Exposure to noise is cumulative and a worker may perform a number of noisy work activities over time which, in combination, may expose the worker to hazardous noise.

Identification of noise hazards must be undertaken in consultation with your workers and their health and safety representatives where applicable. As a guide, if you need to raise your voice to communicate with someone about one metre away, the noise is likely to be hazardous to hearing.

A checklist is provided to assist in the identification of noise hazards in your workplace.
Refer attachment A – Noise Hazard Checklist

Regular inspections of the workplace, talking to workers and observing how tasks are carried out will assist you to identify noise hazards. Identify where noise is being generated considering not just plant and equipment but tasks or processes as well.

Where noise can be immediately controlled, do so, otherwise enter the noise hazard into the relevant document to plan its control, e.g. Issue of Resolution Procedure, Site Hazard Register or Noise Management Plan.

Information regarding noise levels from the manufacturers or suppliers of existing plant and equipment used at the workplace should be obtained or the purchaser may set supplier objectives such as new plant or equipment improving on noise level of the old plant or equipment being replaced.

Workplace Changes:

A noise assessment should be conducted where change to the physical work environment or an introduction of new or modified plant and equipment has the potential to create a noise hazard.

Where new plant and equipment is to be introduced through purchase lease or hire arrangements the invitation to tender should specify a maximum acceptable level of noise emission.

If plant is to be purchased directly, without tender, noise emission data should be obtained from suppliers to enable the plant with the lowest practicable noise level to be selected.

Any design or re-design of workplace environment and its associated equipment should take into account any potential noise hazards and identify controls to ensure noise levels are reduced as far as is reasonable practicable.

Common Sources of Hazardous Noise

Quarries and Sand Plants

- Mobile Equipment - loaders, drills, rock hammers, dump trucks, reverse alarms, water carts, grader, dozer;
- Overburden stripping and rehabilitation activities;
- Fixed Plant - crushers, screens, pug mills, conveyors, start up sirens, hydraulic power packs, compressors, water pumps;
- Blasting, and blast warning sirens;
- Maintenance and workshop activities; and
- Road transport.

Concrete Plants

- Mobile Equipment – loaders;
- Fixed Plant – batch stations, conveyors and alarms, bin filling, compressor;
- Maintenance and workshop activities, de-dagging activities;
- Road transport; and
- Public address systems.

Note:
Workplace noise can easily transmit to environmental noise and is influenced by many factors such as workplace layout, workplace controls and weather conditions that may assist in carrying the noise to the receiver.

Safe Work Australia Common Source and Sound Level Table	
Typical Sound Level in dB	**Sound Source**
140	Jet engine at 30 m
130	Rivet hammer
120	Rock drill
110	Chain saw
100	Sheet-metal workshop
90	Lawn-mower
85	Front-end loader
80	Kerbside Heavy traffic & Lathe
70	Loud conversation
60	Normal conversation
40	Quiet radio music
30	Whispering
0	Hearing threshold

Pain can be felt at this threshold

8. *Noise Control - The Hierarchy of Controls*

As with all workplace hazards, the risk associated with those hazards must be controlled through alignment with the Hierarchy of Controls.

The Victorian OHS Regulations 2007 require duty holders to work through a hierarchy of control to choose the control measure that most effectively eliminates or minimises the risk in the circumstances.

The hierarchy ranks the ways of controlling the risk of hearing loss from noise from the highest level of protection and reliability to the lowest so that the most effective controls are considered first.

The Hierarchy of Controls for Noise		
Eliminate	Eliminate the need to use a particular piece of plant, equipment or process	**Safe Place Controls**
Substitute	Substitute the hazard with plant or processes that are quieter	
Isolate	Isolate the noise by using distance, barriers, enclosures, sound-absorbing surfaces	
Engineer	Modify equipment or process to reduce hazardous noise levels	
Administer	Provide training, signage, safe work instruction, job re-design	**Safe Person Controls**
PPE	Provide and train personnel in use of HPD	

Effective risk control generally involves a single control measure or a combination of two or more different controls.

Initially controls can be short or long term;

Short-term controls may be in a form of lower level Safe Person Controls, e.g. Administrative and PPE controls. These controls may not be adequate or sustainable to lower the risk over a long-term duration. These short-term controls allow the safe continuation of work.

Long-term Safe Place Controls, e.g. Elimination, Substitution, Isolation and Engineering controls may take longer to implement. Where short-term controls cannot reduce the risk to an acceptable level, the exposure of people to the activity or environment must cease until long-term controls are implemented and the risk has been reduced to an acceptable level.

Eliminate the Risk of Hazardous Noise

The most effective control measure is to eliminate the source of noise completely, for example, by ceasing to use noisy plant and equipment, eliminate the work process so hazardous noise is not generated or by not introducing equipment that generates hazardous noise into the workplace. Additionally, work with other Work Authority operators; industry groups and visit other quarry sites to determine new best practice.

Substituting Plant, Equipment or Processes to Reduce Hazardous Noise

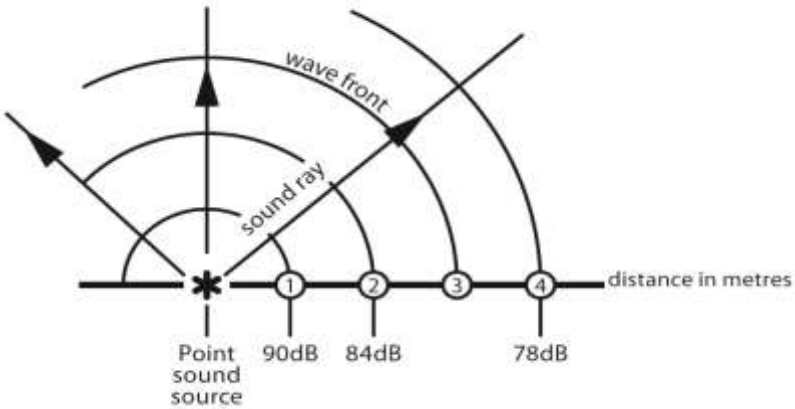
- Substitute the source of noise with plant or equipment that generates less noise whilst remaining efficient. Use battery powered rather that air powered tools if possible;
- Amend times of blasting, rock pick activity or other noise transmitting processes to times more amicable to the community;
- Use mesh guards instead of plate metal where being impacted by rock, lower plant/drop height, line chutes with rubber mats; and
- Use synthetic screen mats or cloths to replace the traditional metal plate or woven wire.

Isolating the Source of Hazardous Noise

Examples of isolation include:

- Establishing enclosures or sound proof covers around noise sources;
- Using barriers or screens to block the direct path of sound;
- Locating noise sources further away from workers;
- Using remote controls to operate noisy plant and or equipment from a distance; and
- Locating fixed plant in pit surrounded by rehabilitated benches that reflect or absorb sound.

Sound spreading in an open space away from reflecting surfaces and measured at a certain distance from the source is reduced by about 6 dB for each doubling of that distance. Sound is reduced less when spreading inside an enclosed space.



If a small sound source produces a sound level of 90 dB(A) at a distance of 1 m, the sound level at 2 m distance is 84 dB(A), and at 4 m is 78 dB(A), etc.

Extract from SWA Code of Practice - Managing Noise and Preventing Hearing Loss at Work

General Engineering Controls to Reduce Hazardous Noise

Examples of general engineering controls include:

- Eliminating impacts between hard objects or surfaces;
- Internally clad buildings/rooms where hazardous noise is generated with sound absorbing materials;
- Minimising the drop height of objects or the angle that they fall onto hard surfaces;
- Using absorbent lining on surfaces to absorb the fall or impact of objects; Fitting exhaust mufflers on internal combustion engines;
- Fitting silencers to compressed air exhausts and blowing nozzles;
- Isolating a vibrating noise source to separate it from the surface on which it is mounted using rubber mounts and flexible connections;
- Fixing damping materials (such as rubber) or stiffening to panels to reduce vibration;
- Fitting sound-absorbing materials to hard reflective surfaces;
- Turning down volume controls;
- Changing fan speeds or the speeds of particular components;
- Changing the material, the equipment or its parts are made of;
- Repairing loose and rotating parts, replacing worn bearings, gears and squealing conveyor idlers;
- No loose items;
- Speed of conveyors; and
- Reducing the drop height and by preventing material.

Engineering Controls Specific to Quarries and Concrete Plants

Mobile Equipment:

- Self-adjusting and/or 'broadband' reverse alarms fitted to off road mobile equipment;
- Sound suppressed drilling rigs;
- Well maintained roadworthy road trucks fitted with high efficiency mufflers; and
- Sound absorbing linings fitted to off road engine covers.

Processing Plant

- Enclosing crushing and screening plant or batch plant discharge / mixing stations in a building internally clad with sound absorbent materials;
- Stone baffles and/or chute linings to reduce both noise and wear;
- Feed bin and load hoppers lined with sound absorbent, wear resistant materials;
- Sand maintained at suitable moisture content so as not to be reliant on bin vibrators to discharge materials;
- Enclose sound radiating surfaces where possible, for example, screens and gyratory crusher chamber;
- Sound absorbing linings at impact points, for example, chutes and feeders;
- Reducing the number of sound radiating surfaces. For example using rigid chute work, minimising the speed of belts (therefore the speed of the material), and minimising the drop height of material in chutes;
- Minimise the number of transfer points and the height material falls;
- Utilise sound absorbing screening media where material quality can be maintained for example, synthetic or rubber screen mats;
- Utilise flexible rubber mountings under all crushers, to avoid metal on metal contact;
- Utilise plant automation. For instance: automating the crushing chamber levels will minimise the occurrence of 'rock on steel' noise;
- Place stockpiles to absorb noise; and
- Fully enclose and sound suppress generators.

Meta/chute	dB(A)
No lining	119
Loose conveyor belt lining	116
25 mm thick rubber lining	102

Examples of lining a chute to reduce the noise level

Extract from Control of noise in quarries Health and Safety Executive (UK)

9. *Administrative Controls*

Noise Management Training

Workers who are potentially exposed to hazardous noise should undertake training on commencement of employment and at periodical intervals that covers the following topics:

- The sources of hazardous noise on your site;
- The tasks at the workplace that have the potential to give rise to hearing loss and the likely noise exposure level;
- Health effects of exposure to excessive noise;
- Controls to reduce personal exposure to hazardous noise;
- The detrimental effects hearing loss and tinnitus have on the quality of life, both at work and socially;
- Effects to the community of environmental noise;
- Controls to reduce the transmission of environmental noise;
- Purpose and nature of audiometric testing;
- Use, fitting and care of hearing protector devices that are correct for the environment in which they are used;
- How to fit, wear, clean, store and maintain hearing protection devices;
- How to report defects in hearing protectors and noise control equipment or raise any concerns regarding hazardous noise; and
- The purpose and nature of audiometric testing.

Records of the training including detail of content, names of attendees, their acknowledgement of the training and any assessment results should be maintained. Employers must retain any audiometric test results and audiological examination reports as a confidential record for as long as they are applicable, which may depend on individual circumstances.

Before discarding test results or examination reports, employers should consider matters such as whether the person tested is still an employee, whether the employee is required to use hearing protection, and whether the employee has been given an audiological examination. Employers should also be aware that the audiometric tests they provide will be considered by hearing loss assessors in the event an employee makes a claim for impairment benefits.

Safe Work Procedures

Documentation that directs or guides work practices such as Safe Work Procedures, Work Instructions, Job Safety Assessments and Safe Work Method Statements should include the following information;

- The requirement to use hearing protection devices (HPD): where and when;
- The correct fit and use and procedures for cleaning, storage, maintenance and replacement of HPD; and
- How to ensure controls for personal exposure to hazardous noise or the reduction of transmission of environmental noise are working effectively.

Work schedules should be established so that noisy work is done when only a few workers are present, e.g., the required workers, however, not after hours of operation.

Signage

Hearing protection signage shall be located in all locations where noise levels exceed or have the potential to exceed the exposure standard. The signage shall:

- Comply with 'AS 1319 – Safety Signs for the Occupational Environment;
- Be erected at the noise source, for example, next to the bench grinder or to the entrance where the noise is being generated such as the entrance to plant rooms; and
- Be erected at all areas where HPD are required.

Where sign-posting is not practicable, you should make other arrangements to ensure that workers and know when personal hearing protectors are required. For example:

- Attach prominent warning notices to tools and equipment indicating that personal hearing protectors should be worn when operating them;
- Provide written and verbal instructions on how to recognise circumstances in which personal hearing protectors are needed;
- Ensure effective supervision of identified hazardous tasks; and
- Ensure employee compliance with proof recorded by management.

Purchase, Hire and Lease

Prior to the introduction (purchase, hire, and lease) of plant or equipment to the site, the risk associated with foreseeable or potential noise hazards should be identified and where applicable, controlled as far as is reasonably practicable. For instance, noise levels in front, behind and at the side of the plant with being lower than the last purchase is a good principle.

Suppliers of plant and equipment have a duty under the Victorian OHS Regulations 2007 to provide details of the noise emissions being generated from the plant and equipment that they supply.

Where foreseeable or potential noise hazards are identified and cannot be immediately controlled to an acceptable level, the introduction should not proceed.

Either an alternate safer supply is identified or a formal risk assessment shall be conducted in consultation with relevant workers to ascertain whether risk can be reduced to an acceptable level through the adoption of certain controls.

Design, Manufacture, Supply and Install

When designing, manufacturing, supplying or installing new plant and equipment any risk associated with foreseeable or potential noise hazards should be identified and where applicable, controlled as far as is reasonably practicable.

Designers, manufacturers, suppliers and installers all have a duty under the Victorian OHS Regulations 2007 to provide details of the noise emissions being generated from their intended design, manufacture, supply or installation.

Employers have a duty under the Victorian OHS Regulations 2007 to ensure they request and take into account these details and act on them accordingly with the objective of reducing the introduction of hazardous noise as far as is reasonably practicable.

Consultation

Employers have a duty under the Victorian OHS Regulations 2007 to ensure they consult with relevant workers, (those who shall operate, inspect and maintain the plant and equipment) when making decisions in regards to hazardous noise and the controls they elect to establish and implement to reduce that hazardous noise as far as is reasonably practicable.

Community Engagement

The communities we reside in as an industry allow us a "social license to operate" and can easily reject that social license if we do not respect their rights by adhering to legislative requirements.

Routine and scheduled consultative meetings with the community (i.e. those impacted) should be established and sustained so as to identify and manage any issue or concern before they become a complaint.

A procedure to immediately act on any community issues, concerns or complaints should be established and sustained.

Health Surveillance

All workers who are potentially exposed to noise equal to or greater than the exposure standard must undertake audiometric testing especially when hearing protection is required:

- At the pre-employment or on commencement stage to provide a baseline as a reference for future audiometric test results;
- When reasonably requested to do so by a health and safety representative of the employee's designated work group; and
- At 2 year intervals thereafter.

Before introducing an audiometric testing program, you must consult with your workers and their health and safety representatives. It is important that your workers understand that the aim of the testing is to evaluate the effectiveness of control measures to protect their hearing.

Workers should be given the results of audiometric testing accompanied by a written explanation of the meaning and implications. Only with the consent of the worker should you provide their results to other parties.

Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) Requirements							
							
Safety	**Safety**	**Hearing**	**Face**	**Gloves**	**Dust mask**	**Respirator**	**High Vis'**

Hearing protection devices such as ear-muffs or ear-plugs should be used in the following circumstances;

- When the risks associated with hazardous noise exposure cannot be eliminated or minimised by other more effective control as listed in the hierarchy of controls;
- As a short term control until long term controls are implemented; and
- Where further protection is required over and above what has been achieved using other noise controls.

Selection of Hearing Protection Devices and Protection Factor

Hearing protection devices should be selected;

- In accordance with AS/NZS 1269.3 Occupational Noise Management – Hearing Protector Program;
- In consultation with workers who will be wearing them considering the comfort, weight, fit and clamping force of the personal hearing protector;
- What other PPE you will need to wear, such as, hard hats, safety glasses and goggles, respirators, face shields or welding mask and how these will affect hearing protection devices fit and comfort;
- Considering the suitability for the nature of the working environment and the work tasks, for example, ear-plugs are difficult to use hygienically for work that requires them to be inserted with dirty hands and in these circumstances, ear-muffs are more appropriate; and
- Taking into account recent results of noise monitoring ensuring the class of protection aligns with the level of exposure as per the table below.

SWA - recommended class of hearing protector	
Class	**Measured exposure LAeq,8h dB(A)**
1	Less than 90
2	90 to less than 95
3	95 to less than 100
4	100 to less than 105
5	105 to less than 110

Inspection of Hearing Protection Devices

Hearing Protection Devices must be regularly inspected to ensure they remain in clean and effective working condition.

The inspections should check that:

- Ear-muff seals are undamaged;
- The tension of headbands is not reduced;
- There are no unofficial modifications; and
- Compressible ear-plugs are soft, pliable and clean.

If disposable ear-plugs are used, they should only be worn once only.

Type of Hearing Protection Devices

(Download from Seton Australia Website)

Electronic Earmuffs

Includes the ability to connect to a two way radio system for communication in high noise environments.

Sound Management Earmuffs

Blocks out other noise while voice frequencies can be heard more clearly with less distortion.

Hard Hat Earmuffs

Earmuffs snap in place during use and swing back when not needed.

A large range of ear plugs are available to suit all requirements

Note:
Ear-plugs are difficult to use hygienically for work that requires them to be inserted with dirty hands and in these circumstances, ear-muffs are more appropriate

If disposable ear-plugs are used, they should only be worn once only

10. *Noise Management Plan*

Objective of the Plan

The objective of a site Noise Management Plan is to protect the acoustic environment at the surrounding residences (sensitive receptor), to demonstrate the site's ability to control nuisance noise, and to minimise the likelihood of a complaint. Specifically, the plan will:

- Identify existing sensitive receptors;
- Identify background readings for the Work Authority;
- Identify performance targets for the Work Authority;
- Identify the potential noise sources emitted by the Work Authority;
- Detail what controls will be in place; and
- Detail procedures in place to handle complaints.

How to Establish, Implement and Maintain the Plan

The CMPA have provided a site specific Noise Management Plan (Plan) template for use by members. The template provides guidance to and examples of what information is required to populate the Plan so as to achieve the above listed objectives. The Plan would have to be completed in consultation with a qualified person.

Refer to Attachment B Noise Management Plan Template

11. *Review of Noise Hazard Controls*

Once risk controls have been implemented they are reviewed and monitored in consultation with a qualified person to ensure that they:

- Have either eliminated the risk or reduced the risk to an acceptable level;
- Do not create another hazard;
- Allow a person to conduct their work safely in a safe environment; and
- Are sustainable and are maintaining that risk at the targeted level.

The review of risk controls shall be conducted in consultation with workers whose health and safety may be affected by the hazard, for example, those who work within, maintain or clean the workplace; those who use, store or handle the product; and those who operate or maintain or clean the plant or equipment.

Consult your workers and their health and safety representatives and consider the following:

- Are the control measures working effectively in both their design and operation?
- Are all noisy activities being identified?
- Have new work methods or new plant made the work quieter?
- Has instruction and training provided to workers been successful?
- Have new requirements or information indicated that current controls are no longer the most effective?
- Is an alteration planned to any structure, plant or process that is likely to result in a worker being exposed to hazardous noise?
- Has an incident occurred as a result of a worker being exposed to hazardous noise? and
- Have any audiometric tests revealed changes in hearing threshold levels?

12. *Definitions*

Units of Noise

Unit	Description
dB	Decibels, a logarithmic unit of measurement for the loudness of sound
dBA	'A' weighted decibels, which approximates how the human ear responds to noise at moderate levels
dBC	'C' weighted decibels, which approximates how the human ear responds to noise at very high levels
LAeq	"Equivalent Sound Level"It is common practice to measure noise levels using the A weighting setting built into all sound level meters. LAeq is the main unit used for assessing Occupational Noise
Leq	"Equivalent Sound Level" Leq is the preferred method to describe sound levels that vary over time, resulting in a single decibel value which takes into account the total sound energy over the period of time of interest.
SLC80	Sound level conversion. Is a standard that hearing protection is measured against. An SLC80 rating indicates that the hearing protection will provide at least the listed attenuation to at least 80% of users

Other Definitions

Acoustic Calibrator — A device for applying a sound pressure of known level to the microphone of a sound measuring system, for the purpose of calibration.

Acoustic or Acoustical — Means containing, producing, arising from, actuated by, related to, or associated with, sound.

Attenuation — Means a reduction in the magnitude of sound.

Audiogram — A chart or table relating to a person's hearing threshold levels for pure tones to frequency.

Audiometric Test — The measurement of the hearing threshold levels of a person by means of monaural pure tone air conduction threshold tests.

A-Weighting — A standardised frequency response used in sound measuring instruments, specified in Australian Standard AS 1259. Historically it was developed to model the human ear response at low sound levels.

However A-weighting is now frequently specified for measuring sounds irrespective of level and studies have shown a relationship between the long term exposure to A- weighted sound pressure levels and hearing damage risk.

Background Level — The sound of the normal quiet state of the area without the presence of intrusive, man-made noise sources. Distant traffic is included in the background because it is so widespread.

C-Weighting — A standardised frequency response used in sound measuring instruments, specified in Australian Standard AS 1259.13. Historically it was developed to model the human ear response at high sound levels. It is now used to measure peak noise levels.

Extractive Limits	The furthermost points from which the site can extract rock from. These are defined in the Work Plan and are regulated.
Frequency	Also known as pitch: pitch of a sound is determined by the rate of vibration, or frequency, of the sound wave.
Hazardous Noise	Noise that exceeds the exposure standard for noise in the workplace.
Impact Noise	The sound created when a surface is struck by an object.
Metropolitan Region	The SEPP N-1 area of application, as defined in SEPP N-1. It covers much of, but not all of the current greater Melbourne area.
Muffled	To make a sound quieter.
NIHL	Noise Induced Hearing Loss.
Noise-Sensitive Area	Mainly homes, but can include, for example, motels and tourist establishments - does not include schools.
Octave-Band Levels	The pitch or frequency of sound, divided into octave bands for the purposes of design and assessment. Each octave band represents a frequency range, from low to high. A design based on octave-band criteria enables more targeted control of low-frequency noise.
Plant	Includes any machinery, equipment, appliance, implement, or tool and any component or fitting thereof or accessory thereto.
Reasonably Practicable	The Victorian OHS Act 2004 Section 20 sets out what is meant by "so far as is reasonably practicable" and lists five matters that require consideration and must be taken into account: a) The likelihood of a person being exposed to harm; b) The potential seriousness of that harm; c) What is known, or ought to be known, about the risk; d) How to eliminate the risk, and e) The availability, suitability and the cost of eliminating or reducing the risk.
Reverberation	The persistence, by echo or reflection, of sound in an enclosure after the emission by the source has stopped.
Safety and Health Representative	Means a safety and health representative elected under Part IV of the Occupational Safety and Health Act 2004.
Sensitive Receptors	The nearest residences to the extractive limits of the Work Authority.
SEPP N-1	State Environment Protection Policy no. N-1.
Sound Exposure Meter (SEM)	Sound Level Meter (SLM).
Sound Pressure Level (SPL)	Or noise dosemeter means an instrument for measuring a person's daily noise exposure levels by automatically integrating sound energy over a measurement period. The instrument is worn by the person concerned. An instrument consisting of a microphone, amplifier and indicating device, having a declared performance, and designed to measure a frequency-weighted and time weighted value of the sound pressure level. The relative magnitude of sound pressure, customarily expressed in decibels referenced to 20 micro pascals.
Tinnitus	Ringing or other noises in the head or ears which can be caused by exposure to excessive noise.
Work Authority	The authority given to a site to operate a quarry granted in accordance with the Mineral Resources (Sustainable Development) Act 1990.
Work Plan	Operational parameters of the Work Authority which is statutorily endorsed under the Mineral Resources (Sustainable Development) Act 1990S.

13. *Attachments to this Document*

Attachment A - Noise Hazard ID Sheet

Site		Conducted by	
Site Location		Date	

Yes to any of the following indicates the need to carry out a further assessment potentially inclusive of a noise assessment if exposure to the noise cannot be immediately controlled.

Hazard Identification Questions	Yes	No
Is a raised voice needed to communicate with someone about one metre away?		
Do your workers notice a reduction in hearing over the course of the day? (This may only become noticeable after work, for example, needing to turn up the radio on the way home)		
Are your workers using noisy powered tools or machinery?		
Are there noises due to impacts (such as hammering, pneumatic impact tools) or explosive sources (such as explosive powered tools, detonators)?		
Are personal hearing protectors used for some work?		
Do your workers complain that there is too much noise or that they can't clearly hear instructions or warning signals?		
Do your workers experience ringing in the ears or a noise sounding different in each ear?		
Do any long-term workers appear to be hard of hearing?		
Have there been any workers' compensation claims for noise induced hearing loss?		
Does any equipment have manufacturer's information (including labels) indicating noise levels equal or greater than any of the following: (a) 80 dB(A) LAeq,T (T= time period over which noise is measured)? (b) 130 dB(C) peak noise level? (c) 88 dB(A) sound power level?		
Do the results of audiometry tests indicate that past or present workers have hearing loss?		
Have the site received any complaints from neighbours or receptors?		

Attachment B – Noise Management Plan Template

Company Name Noise Management Plan – *Site Name*

Site Photo

History

Provide details of company history and commitment to the management of both workplace and environmental Noise

Hard copies of this document are uncontrolled documents. Controlled Copies are only available on the *Company Name* intranet site	Page 1 of 14	Approval Date: *00/00/00*	*Doc Number*

Company Name Noise Management Plan – *Site Name*

Contents

How to use this Noise Management Plan Template

This Noise Management Plan Template has been designed for you to complete with your company and site specific information in consultation with a qualified person.

Black font whether in general text or as a heading is a fixed part of this template but can also be amended to suit your specific requirements.

Blue bold italic font is an instruction providing you with advice on how to populate this template.

Red italic font is an example only and needs to be amended to suit your operations.

Introduction

Overview

This Noise Management Plan lays out *Company Name's* position and policies in relation to the various areas of work involved in noise control, management and monitoring.

This, as with all plans used by *Company Name's* management, is a living document and is continuously being upgraded to meet the current best practice. It forms one part of the company's management system to attain the required outcomes and acts as an area-specific reference tool. This Plan will be updated as new technologies come about, best practice changes, skills develop and where there is an identified need for change with the support of specialist consultants where required.

Purpose of the Noise Management Plan

The purpose of the *Company Name and site's* Noise Management Plan (the Plan) is to protect the acoustic environment at the surrounding residences, to demonstrate the site's ability to control nuisance noise, and to minimise the likelihood of a complaint. Specifically, the plan will:

- Identify existing sensitive receptors;
- Identify background readings for the Work Authority;
- Identify performance targets for the Work Authority;
- Identify the potential noise sources emitted by the Work Authority;
- Detail what controls will be in place; and
- Detail procedures in place to handle complaints.

Audience

This plan has been drawn from the statutorily endorsed Work Plan and is intended to inform:

- Community aiming to understand and have trust in the controls established to protect the acoustic environment at surrounding residences;
- Regulators monitoring compliance of activities at the quarry generating noise; and
- Employees planning or undertaking noise-generating activities

Relevant Regulation and Documentation

All noise management procedures on site will comply with the EPA Guidelines Noise from Industry In Regional Victoria (publication 1411) and appropriated sections of the State Environment Protection Policy N-1 (SEPP N-1).

Glossary of Terms

Term	Description
EPA	Environment Protection Authority Victoria
Extractive Limits	The furthermost points from which the site can extract rock from. These are defined in the Work Plan and are regulated.
Sensitive receptors	The nearest residences to the extractive limits of the Work Authority
SEPP N-1	State Environment Protection Policy (Control of Noise from Industry, Commerce and Trade) no. N-1
Work Authority	The authority given to a site to operate a quarry granted in accordance with the *Mineral Resources (Sustainable Development) Act 1990*
Work Plan	Operational parameters of the Work Authority which is statutorily endorsed under the *Mineral Resources (Sustainable Development) Act 1990*

Site Overview

Site Details

Site Name: *AAAAAAAAAAAAAAA*

Work Authority: *AAAA12*

Address: *BBBBBBBBBBB*

Site Location Map

Place Site and Surrounds Map here,
Maps scale must be of size to include all sensitive receptors

Figure 1 Map Name

Surroundings

Provide description of surrounds, listing land purpose, any significant native flora or fauna, major infrastructure and distance from boundary

Consultation and Communication

Existing Sensitive Receptors

Existing sensitive receptors are identified below and previously on Figure 1.

Receptor ID	Address	Distance from Phase 1 processing plant	Distance from *WA No'* boundary
1			
2			
3			
4			
5			

Table 1 Noise Sensitive Receptors Locations

Complaints

Refer to Company Community Engagement Plan as an attachment to the statutorily endorsed Work Plan and list specific procedures that cover the following:

- ***How feedback will be received from receptors;***
- ***How complaints will be received, recorded, investigated and how actions will be taken to act on and resolve those complaints.***

Background Readings

- *Details of background noise monitoring;*
- *When was it conducted;*
- *Location of where it was conducted and proximity to receptors;*
- *Who it was conducted by;*
- *What protocol was it conducted in compliance with, e.g. EPA Guidelines Noise from Industry in Regional Victoria.*

People and Responsibility

Quarry Site Manager/Owner

The Quarry Site Manager is responsible for ensuring that all processing plant and mobile equipment noise suppression measures are effective, that all employee and site noise monitoring (i.e. noise level monitoring by external parties) are arranged and undertaken within the required timeframes and that site audiometry testing is arranged for all employees, signage is installed and the use of relevant PPE (ear plugs/muffs etc.) is regularly monitored.

Responsibilities are nominated in ***(list detail of document that specifies quarry managers responsibilities)***

All Employees

All employees are required to comply with the ***(list detail of documents that specify quarry employee responsibilities and Issue of Resolution procedures)***

CMPA form 1325 Issue Resolution may assist in this process.

Training

Management Training

List detail of training that covers noise management that the quarry manager has undertaken

For example

- *Diploma of Surface Extraction Operations;*
- *Occupational Health & Safety Management Systems (as required);*
- *Environmental Emergency Response (as required); and*
- *Hazard Identification (as required)*

Employment Training

List detail of training that covers noise management that employees have undertaken:

For example

- *Work Safely and Follow WHS Policies and Procedures (RIIWHS201D); and*
- *Conduct Local Risk Control (RIIRIS201D).*

Risk Management

List detail of company hazard and risk management procedures:

For example

- *Workplace Health and Safety Policy;*
- *Environmental Policy;*
- *Hazard and incident reporting procedures;*
- *Hazard incident registers;*
- *Noise control procedures;*
- *Documents that direct safe work practices inclusive of noise control, e.g. Job Safety Assessment, Safe Work Method Statements, Safe Operating Procedures, Safe Work Procedures, Work Instructions.*

Provide detail of when and where company Risk Matrix is used

Insert Company Risk Matrix that measures the likelihood of an incident occurring and the consequence if it does

Identification of Key Noise Sources

(Add to or extract from the below prompt list to suit your operations)

The key noise sources at a quarry that have potential to generate noise have been identified and include:

- *Dozer, excavator, grader and dump truck (overburden stripping and rehabilitation);*
- *Construction and decommission activities;*
- *Rock drills (drilling holes in preparation for blasting);*
- *Blasting;*
- *Generators, water pumps;*
- *Excavators (secondary breaking activities);*
- *Face loaders/excavators (raw product handling);*
- *Off-road haul trucks (haulage of raw material to the processing plant);*
- *Processing plant (sizing and sorting of raw materials);*
- *Front end loaders (product handling, loading and feeding the processing plant);*
- *Road trucks (product delivery);*
- *Ancillary plant and equipment;*
- *Light vehicles (employee vehicles, maintenance vehicles and service vehicles); and*
- *Maintenance activities.*

Noise Control through Site Design

List all noise control strategies that have been incorporated in to your site design and layout.

Use the following as a prompt list:

- *The site location and proximity/distance to sensitive receptors;*
- *Buffer zones between the extractive area and sensitive receptors;*
- *The layout of the site using natural barriers, including topography, earthen bunds and both permanent and temporary re-vegetation;*
- *Hours of operation considering the potential impact upon sensitive receptors;*
- *The site access road: does it follow the natural topography, what is it's gradient, can it be seen on the skyline?*
- *Position of weighbridge, office complex, workshops and processing plant: can they be seen on the sky line or are they below the skyline?*
- *Site staged extraction plans to minimise foot print and overall impacts;*
- *Terminal faces and rehabilitation timelines.*

Noise Control through Management Procedures and Practices

List all noise control strategies that have been incorporated in to your Management Procedures and Practices.

Use the following as a prompt list:

Policy & Procedures

- *Induction process inclusive of noise controls;*
- *Cartage contractor control, e.g. exhaust brake avoidance, low speeds, roadworthy reports;*
- *Purchasing procedures for plant and equipment inclusive of pre purchase noise assessments;*
- *Industry Association memberships, employees attending workshops, identification of best industry practices;*

Site Upkeep

- *Road inspection and maintenance and its association with noise reduction;*
- *Plant inspection and maintenance and its association with noise reduction;*
- *Commitment to revegetation, pest plans and animal wildlife plans and commitment to natural balance.*

Personnel Protection

- *Processing Plant Control Room noise controls. Such as double glazed windows, insulation and door seals to control personal exposure to processing plant noise.*
- *Vehicles noise controls - Such as cabins that have wall and floor sound insulation to control personal exposure to engine noise.*
- *Personal Hearing Protection Controls – Such as selection, use and maintenance of PPE, training in Noise Control, Personal Noise Exposure Monitoring and Audiometric testing.*

Controls within Job Descriptions

Describe how the job description regime is introduced to employees and how employees are mentored, observed, supervised and performance reviewed.

List examples of content using the following as a prompt list:

- *The importance of avoiding the unnecessary revving of mobile or stationary motors.*
- *Operating processing plant, turning off items of plant when not in use and ensuring that the plant settings and KPIs are met.*
- *Operating mobile plant, speed limits are set throughout the site.*
- *Operating the dump truck and face loader/excavator that the first bucket into dump trucks is to be done slowly with smaller material.*
- *Operating the dump truck, that a consistent speed is maintained when travelling between the quarry face and processing plant and that loading into the primary hopper is done in a controlled manner.*
- *Operating the rock hammer, restricting use to times more amicable to community and in areas where sound travel is limited as far as is practicable.*

Capital Plant and Equipment

List approach to the purchase and maintenance of plant, equipment, vehicles, tools and the specific noise controls you have established and implemented for mobile equipment and processing plant.

Use the following as a prompt list:

All processing plant, vehicles, tools or other equipment used onsite must be maintained to company standards. When purchasing new capital plant and equipment, the selection process must consider noise emissions to ensure the most efficient and quiet for a particular task is selected. The use of defective capital plant and equipment will result in disciplinary action.

The following specific controls will be applied:

Mobile Equipment

- *Self-adjusting and/or 'broadband' reverse alarms will be fitted to off road mobile equipment;*
- *Where necessary, fully sound suppressed drilling rigs will be engaged to carry out drilling;*
- *Company Name will engage modern, well maintained roadworthy on road trucks fitted with high efficiency mufflers; and*
- *Sound absorbing linings will be fitted to off road engine covers.*

Processing Plant

- *Sound radiating surfaces are enclosed where possible. For instance: screens and gyratory crusher chamber;*
- *Sound absorbing linings are used at impact points. For instance: chutes and feeders;*
- *Where possible reducing the number of sound radiating surfaces. For instance: using rigid chute work, minimising the speed of belts (therefore the speed of the material), and minimising the drop height of material in chutes;*
- *Minimise the number of transfer points and the height material falls;*
- *Utilise sound absorbing screen media where material quality can be maintained. For instance: synthetic or rubber screen mats;*
- *Utilise flexible rubber mountings under all crushers, to avoid metal on metal contact;*
- *Utilise plant automation. For instance: automating the crushing chamber levels will minimise the occurrence of 'rock on steel' noise;*
- *Place stockpiles to absorb noise; and*
- *Fully enclose and sound suppress generators.*

Traffic Management Plan

Provide details of the site Traffic Management Plan inclusive of document title, summary of contents and who it is communicated to. Use the following prompt list as an example.

The Traffic Management Plan "titled" identifies mandatory PPE signage and speed limits, and implements a site code which outline requirements for both on and off road operators and drivers. This controls noise emissions from vehicle movements including the movement of road trucks on public roads.

Cartage contractors will only be engaged if they agree to the "Company Name" Cartage Contractor Hire Agreement "document title and number" which requires at all times, the Authorised Cartage Contractor to maintain the vehicles in a roadworthy, mechanically sound, properly painted and cleaned condition, fit for the purpose of delivering quarry materials.

Operating Parameters

Performance Targets

Overview

Depending on your proposed sites location, performance targets for noise levels at receptor locations will be based on either the following Guideline or Policy:

- ***EPA Guidelines Noise from Industry in Regional Victoria (NIRV publication 1411) or,***
- ***State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1)***

Provide a brief overview of what Guideline or Policy is applicable to your proposal as stated within your Work Plan and complete the table with appropriate recommended levels as outlined in either the Guideline or Policy.

Period	Recommended Level	Applicable Times
Day	## dB(A)	0700 - 1800 Monday to Friday
		0700 – 1300 Saturday
Night	## dB(A)	0600 – 0700 Monday to Saturday

Where your proposed site location may overlay both the Melbourne Metro Area, (SEPP N-1) or Noise from Industry in Regional Victoria (NIRV publication 1411) you may need to establish two tables listing Recommended Levels for receptors in either zone.

Blasting

To complete this section you will need to establish a Blast Management Plan. The CMPA provide a suitable template for the establishment and implementation of a Blast Management Plan. Complete the following as relevant to your operations:

The Blast Management Plan – "company name, document tile and number" will lay out "company name's" position and policies in relation to the various areas of work involved in blasting. Within this Plan, "company name" ensures that the air blast overpressure from blasting operations, as measured in the vicinity of any sensitive location in accordance with AS2187.2:2006 Explosives - Storage and Use - Use of Explosives, does not exceed 115 dB(L) on more than 5% of blasts fired in a 12 month period, and 120 dB(L) at any time.

Monitoring Protocols

Provide a description of you Noise Monitoring Protocol inclusive of the following information,

What Policy or Guideline is your Noise Emissions intended to comply with?

Noise emissions have been modelled in accordance with the SEPP N-1 and are predicted to comply with the respective daytime and night time recommended maximum noise levels for the "Company and site name".

Who will conduct the noise monitoring, at what intervals and how will you manage complaints on an as needed basis?

Noise monitoring will be conducted by an appropriately qualified consultant at the identified sensitive receptors to measure the noise level (LAeq) as set out in Schedule A of SEPP N-1 or Noise from Industry in Regional Victoria (NIRV publication 1411) or where a community complaint has identified a need to address an issue regarding noise management.

What protocol will noise generated from air blast overpressure comply with?

Air blast overpressure monitoring will be conducted in the vicinity of relevant sensitive location in accordance with AS2187.2:2006 Explosives - Storage and Use - Use of Explosives for every shot.

List how you will schedule the monitoring and assess and review results.

Both these requirements will be included on "Company and site name" Environmental Monitoring Schedule. In addition, the Quarry Manager (and consultant) will retain and review any monitoring undertaken, and compare the monitoring results against relevant legislative requirements and licence conditions.

Recording and Auditing

Record Keeping

List all records that will be kept, their retention time and their accessibility to stakeholders.

For example:

- *Community Issues and Complaints Register;*
- *Noise Monitoring Schedule and Results;*
- *Shot Firers Records Book inclusive results from of Air Blast Overpressure from Blasting Operations;*
- *External and Internal Audits and Investigation Reports.*
-

Auditing and Review

Provide a description of how the Noise Management Plan will be audited and reviewed to ensure it meets its objective and targets.

For example:

The Quarry Manager will retain any information related to any outcomes resulting from the implementation of the Noise Management Plan and its associated activities being but not limited to:

- *Noise monitoring results;*
- *Noise hazard reports;*
- *Audiometric testing results;*
- *Community issues and complaints.*

The Quarry Manager and the "Company Name's" Noise Management Consultant will assess and review these outcomes at 1 year intervals taking into consideration:

- *Relevant legislative requirements and licence conditions;*
- *The objectives of the Noise Management Plan;*
- *The concerns of the community.*

Actions to address these outcomes will be planned and made available to all relevant stakeholders.

References

Internal Documents

List all company internal documents referred to in establishing this Noise Management Plan.

External References

List all externally referenced documents/websites referred to in establishing this Noise Management Plan.

Consultation during Development of this Noise Management Plan

List all persons and the organisation, company they represent inclusive of the author and who persons consulted in the establishment of this Noise Management Plan.

Accessibility

Who can access this Noise Management Plan?

- *Company employees;*
- *Authorised Consultants;*
- *Regulators;*
- *Members of the Community;*
- *Other.*

How they can access this Noise Management Plan

- *Company web site;*
- *Formal request.*