
**GUIDELINES FOR THE USE OF THE
ENVIRONMENT PROTECTION
(NOISE) POLICY 2007**

JUNE 2009

**Guidelines for the use of the
Environment Protection
(Noise) Policy 2007**

Guidelines for use of the Environment Protection (Noise) Policy 2007

For further information please contact:

Information Officer
Environment Protection Authority
GPO Box 2607
Adelaide SA 5001

Telephone: (08) 8204 2004

Facsimile: (08) 8124 4670

Free call (country): 1800 623 445

Website: <www.epa.sa.gov.au>

Email: <epainfo@epa.sa.gov.au>

ISBN 978-1-921125-75-1

June 2009

Disclaimer

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so, however, some detail may not be captured. It is important, therefore, that you seek information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

© Environment Protection Authority

This document may be reproduced in whole or part for the purpose of study or training, subject to the inclusion of an acknowledgment of the source and to it not being used for commercial purposes or sale. Reproduction for purposes other than those given above requires the prior written permission of the Environment Protection Authority.

TABLE OF CONTENTS

- PREFACE 1**
 - The role of the Guidelines 1
 - Background to the Policy 1
- INTRODUCTION 3**
 - What is noise? 3
 - The A-weighted decibel scale 3
 - What is an Environment Protection Policy? 5
 - Why do we need a Noise Policy? 5
 - Benefits of a Noise Policy 5
- OVERVIEW OF THE NOISE POLICY 7**
 - Policy framework 7
 - Scope and enforcement of the Noise Policy 7
- CLAUSE BY CLAUSE EXPLANATION 15**
 - Part 1 Preliminary 15
 - Part 2 Objects of the Policy 31
 - Part 3 Measurement procedure 31
 - Part 4 General noise control provisions 41
 - Part 5 Development authorisation applications 45
 - Part 6 Special noise control provisions 49
 - Division 1 Construction noise 49
 - Division 2 Domestic noise 51
 - Division 3 Rubbish collection, street sweeping machines, etc 54
 - Division 4 Building intruder alarm systems 56
 - Division 5 Frost fans 56
 - Part 7 Guidance documents 59
 - Schedule 1 Noise excluded from Policy (clause 6) 59
- REFERENCES 60**

List of figures

- Figure 1 The level of common sounds on the dB(A) scale 4

List of tables

- Table 1 Current legislation for use by administrative authorities 8
- Table 2 Adjustment of ambient noise influence 38

PREFACE

The role of the guidelines

The *Environment Protection (Noise) Policy 2007* (Noise Policy) provides a legal framework for the assessment of a wide range of often complex noise issues. This is a technical document developed for use by acoustic engineers and government officers, and is intended to be read in conjunction with the Noise Policy. Information sheets regarding some of the more common noise issues have also been developed for the general public and specific industries.

These guidelines provide a clause-by-clause explanation, and include examples to assist in understanding and using the Policy. The guidelines are referred to in clauses 3(1), 4(1) 'characteristics' and 14(1)(b)(ii) of the Policy.

Background to the Policy

Virtually all processes generate noise. It is an inherent part of most activities and includes an almost unlimited range of sources from the singing of birds through to the hum of a power station. The response to noise by individuals can be as wide and as varied as the number of activities that produce it.

For many years, regulators have tried to set acceptable limits to assess nuisance from noise. However to set limits for all situations can often result in unreasonable requirements. A contemporary noise policy needs to have the flexibility to consider the range of factors that influence how a person responds to the noise, including:

- the level of the noise (its loudness)
- how long the noise occurs
- whether the noise is predictable
- the presence of certain characteristics, such as a tone (ringing or humming), impulse ('bangs' or impacts), a modulation (where the noise level changes in its loudness, tone or character) or low frequency (base noise which has the ability to travel and penetrate or bend around structures) noise
- the time of day that the noise occurs
- the activities of the person affected
- the relationship between the person affected and the noise
- familiarity with the noise and its purpose
- the area in which the person is affected and the noise is located, and how loud or quiet that area is expected to be
- the history of the area in which the person is affected and the noise is located
- the solutions that are applied to the noise in other similar situations
- the capacity to deliver the solutions that result in noise reduction.

Through consideration of the above factors, the Noise Policy balances the interests of those whose legitimate activities cause noise, and the rights of those who are exposed to and potentially affected by the noise.

INTRODUCTION

What is noise?

Noise is often commonly defined as unwanted sound.

Sound is produced by small fluctuations in air pressure. As an example, the sound from a drum results from fluctuations in air pressure caused by the movement or vibration of the drum hide. The eardrum is able to perceive these fluctuations with great sensitivity.

The loudness of a sound is predominantly related to the size of the fluctuations, but is also related to their frequency, or the rate at which they are produced.

The loudness of sounds can range from those which the human ear can just detect (the threshold of hearing) to those that exceed a threshold of pain. Given that sound is produced by changes in air pressure, the international standard unit of acoustic pressure is based on that for pressure measurement, the micropascal (μPa).

The range between the faintest audible sound and the loudest sound the human ear can stand is so large (20 μPa to 63 million μPa) that it would be cumbersome to express sound pressure fluctuations in these units. Instead, this range is compressed by expressing the sound pressure on a logarithmic scale, the unit of which is the more commonly known decibel (dB).

The logarithmic scale is different to a linear scale. A doubling of the sound pressure, say from 20 μPa to 40 μPa , produces an increase of 6dB.

In subjective terms, a 3dB increase is often described as a just noticeable difference.

The A-weighted decibel scale

The frequency of a sound is the rate at which the fluctuations are produced per second. Practically all sounds contain a mixture of frequencies.

The mix of frequencies affects the perceived loudness. A high-frequency sound (eg screeching or whistling) at the same acoustic pressure as a low-frequency sound (eg thunder) will be perceived to be louder. This is because the human ear is most sensitive to mid-range and high frequencies and is less sensitive to the lower frequencies.

To ensure measured levels approximate the human response, a weighting scale is used. It is known as the 'A' scale and the units are referred to as 'A-weighted decibels' and written as dB(A). The dB(A) scale discriminates between sounds in much the same way as people do.

Some examples of typical sound levels in dB(A) are shown in Figure 1. All further reference to noise levels in these Guidelines will be in dB(A) unless noted otherwise.

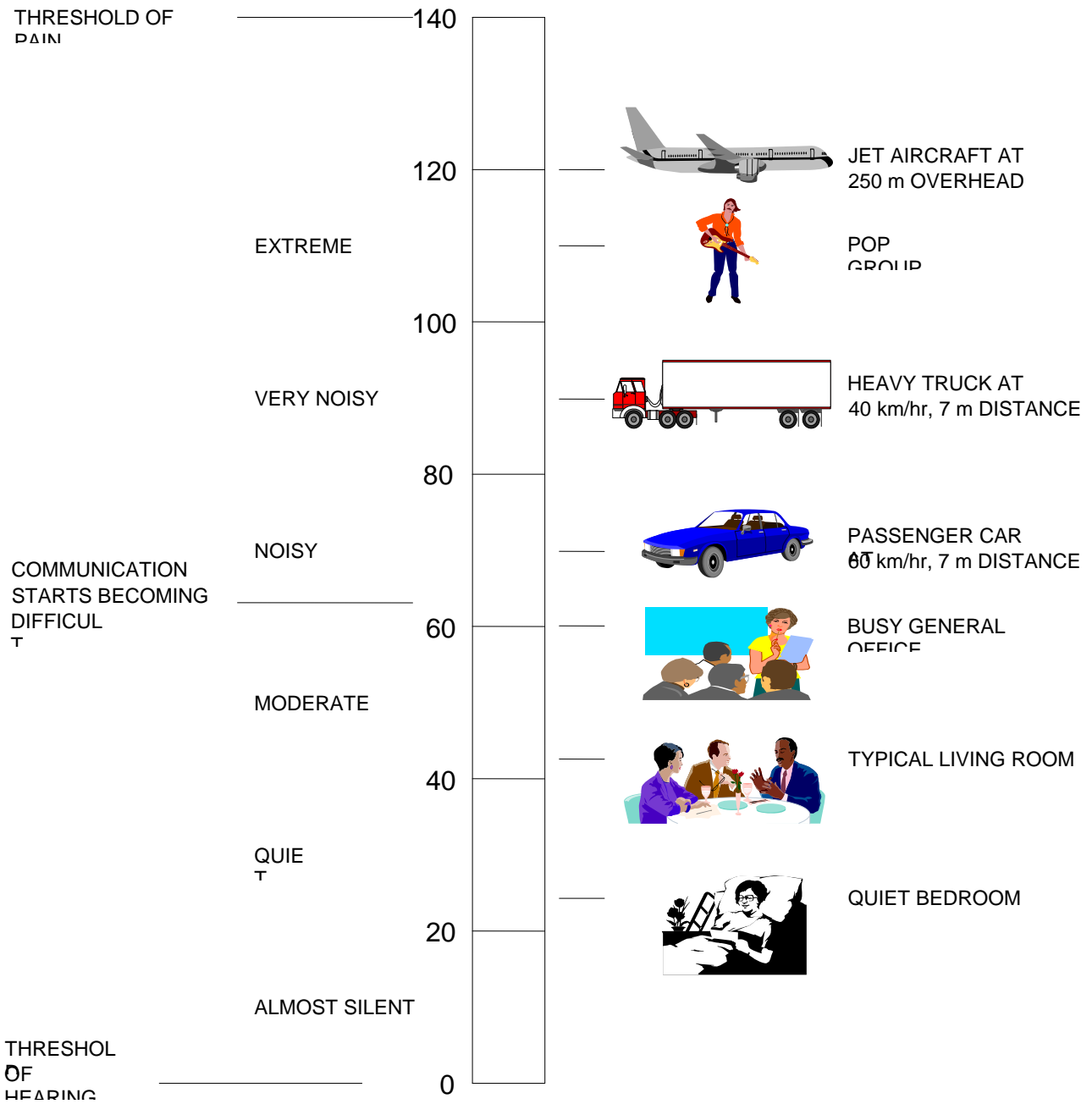


Figure 1 The level of common sounds on the dB(A) scale. (Source: ARRB 1998a, with modifications)

What is an Environment Protection Policy?

An Environment Protection Policy (EPP) is a legislative tool provided under the *Environment Protection Act 1993* (the EP Act). An EPP can be made for any purpose directed towards securing the objects of the Act. This may include setting out guidance to assist in interpreting the Act as it applies to noise, or setting *mandatory provisions* that will be enforceable as offences.

The Environment Protection (Noise) Policy 2007 (Noise Policy) incorporates a range of regulatory tools depending on the issue. In general, guidance is provided on the starting point (the indicative noise level¹) for action, and the factors to consider in determining what action to take. For more defined situations, such as the operation of an air conditioning unit at a dwelling, mandatory provisions are used. For more complex situations, descriptive and informative guidelines are called up by the Noise Policy.

Why do we need a Noise Policy?

The control of noise presents challenges. If uncontrolled, it can be a long-standing and serious nuisance for many, leading to reduced quality of life or potential health problems stemming from anxiety or loss of sleep. Individual responses to noise are subjective and can vary widely.

The generation of noise is an inherent by-product of most activities and so the range of noise sources and their associated impacts can vary greatly. Noise may come from a single emission point from an identifiable source. The noise may occur occasionally (eg a harvester working in a field) or be continuous (eg from a factory manufacturing a product).

Unlike other forms of pollution, noise is not readily visible and once the activity ceases there is no lasting evidence of it, but it is a pollutant none the less. It is within the definition of both a pollutant and environmental nuisance in the EP Act.

Noise pollution leading to environmental nuisance is an offence under section 82 of the EP Act and could, if of a high impact or wide scale, amount to material environmental harm, potentially attracting serious penalties. The general obligation not to pollute under section 25 applies to noise as much as to other pollutants.

Before the EP Act, noise was regulated by the *Noise Control Act 1977*. With the introduction of the current Act in 1993 two sets of noise controls were brought in as EPPs. These were the *Environment Protection (Machine Noise) Policy 1994* and the *Environment Protection (Industrial Noise) Policy 1994*. The Noise Policy replaces both policies.

Benefits of a Noise Policy

An effective Noise Policy will balance social, economic and environmental considerations in the management of noise issues.

The Noise Policy strives for this balance by:

- ensuring that protection from excess noise is in accordance with World Health Organization guidelines²
- articulating the factors that must be considered in delivering a balanced outcome

¹ Clause 5 of the Noise Policy.

² Berglund B, Lindvall T and Schwela DH (1999), World Health Organization Guidelines for Community Noise.

- providing guidance on special or unique activities whose noise characteristics, impacts, social worth or economic benefits are not adequately represented by the general noise provisions
- progressing sustainable development within the state by providing planning authorities with the framework for balanced and consistent environmental standards
- providing a regulatory tool that leads to an equitable approach for industry and the community, and
- providing a framework to consistently manage new and emerging noise issues through a streamlined EPP amendment process.

OVERVIEW OF THE NOISE POLICY

Policy framework

The Noise Policy is subordinate legislation under the EP Act and enforced through the Act. There are a number of mechanisms within the Act and the Policy to secure compliance.

Section 25 of the EP Act is defined as the general environmental duty and is a general obligation not to pollute:

s25. (1) A person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm.

The objective of the Noise Policy is to define the requirements to secure compliance with this section.

There are also a number of mandatory provisions nominated within the Noise Policy as Category B offences. Compliance with these provisions is required under section 34 of the Act.

Example: Category B offence

Mandatory requirements in the Noise Policy attract a Category B Offence. Section 34 of the Act provides the following penalties for this offence.

If the offence is taken to court:

- \$4,000 maximum (Division 6 fine).
- Where the offence is expiable, \$300 (Division 6 expiation fine).

The Noise Policy may be enforced administratively under section 93(1) of the Act. This section allows the Environment Protection Authority (EPA) to issue an order 'for the purposes of giving effect to an environment protection policy'. The Policy directs the Authority on issues that it must 'have regard' to when deciding whether or not to issue an environment protection order (clause 19).

Part 7 (Guidance documents) of the Noise Policy enables the Authority to issue an order to 'give effect to the guidelines that apply to the activity under this Part'.

Noise can also attract the provisions of section 82 of the Act, which is the offence of causing an environmental nuisance. In extreme cases, where the nuisance (noise) is of 'a high impact or on a wide scale' it can amount to material environmental harm and attract the substantial offence provisions under section 80 of the Act.

Scope and enforcement of the Noise Policy

Given the vast range of activity that generates noise which may cause an adverse impact, noise regulation in South Australia falls under a range of different legislation administered by different agencies and authorities. To ensure there is no duplication of rules, some specific issues are excluded from the Noise Policy.

Some issues are also excluded from the more definitive rules of the Noise Policy due to their limited occurrence. However, the Policy has the flexibility to include any emerging community noise issues if and when required.

Notwithstanding these other Acts and exclusion from the objective standards in the Noise Policy, the general duty provisions of the EP Act apply to all persons, requiring all reasonable and practicable measures to be taken to minimise noise nuisance.

The EPA's priority is to deal with sites, activities and premises that are scheduled as activities of environmental significance (licensed activities) by the EP Act. These sites may generate noise impacts over a wide scale and generally require expert input to reduce noise emissions.

The police and other state government agencies such as the Office of the Liquor and Gambling Commissioner have always been strongly involved in the resolution of specific noise complaints.

Other agencies that have officers authorised under the EP Act can, if required, seek EPA assistance when using this Policy or any other provisions under the EP Act.

Table 1 below shows a matrix of the agencies that can be contacted for advice, resolution or assistance of noise matters. It should be noted that:

- timely and consistent service of a particular issue is subject to an agency's available resources and work load priorities at any given time; and
- in some instances may require the involvement of several agencies.

Table 1 Guide to services

Activity	SA EPA	SA Police	Local government	SafeWork SA	Strata or other similar corporation	PIRSA	Commonwealth	DTEI	Emergency authority	Office of Liquor and Gambling Commissioner	Relevant development authority
Premises licensed by EPA (eg large industrial activities)	1										
Premises not licensed by EPA (eg smaller factories, commercial premises)			1								
Noise from domestic premises (eg power tools, air conditioning units)			1								
Construction noise (EPA licensed sites)	1										
Construction noise (residential and non-licensed sites)			1								
Audible bird scaring devices			1								
Wind farms	1										
General rubbish collection services/other public services			1								
Frost fans			1								
Domestic music or party noise		2									
People noise from schools, child-care centres, churches			2								

Activity	SA EPA	SA Police	Local government	SafeWork SA	Strata or other similar corporation	PIRSA	Commonwealth	DTEI	Emergency authority	Office of Liquor and Gambling Commissioner	Relevant development authority
Noise from stationary vehicles (in driveways)		2									
Motor vehicles in off-road locations (eg trail bikes)		2									
Rail traffic	2										
Helicopter landing sites	2										
Shooting ranges	2										
Premises belonging to a strata or other similar title, or located within the same multi-tenanted building					3						
Liquor licensed premises (music and patron noise)										4	
Dogs and kennels			5								
Noise from animals or birds on domestic premises			2, 5								
Road traffic								6			
Aircraft in transit and general airport noise	2						7, 10				
Water vessels including jet skis								8			
Vibration and blasting at mines						9					
Military firing ranges and defence facilities							10				
Motor racing venues	11, 2										
Occupational noise (impact of noise sources onto their own premises)				12							
Emergency equipment used in life threatening situations									13		
Impact on biodiversity							14				
Development applications											15

1 Environment Protection (Noise) Policy 2007

2 Environment Protection Act 1993, section 25

3 Individual strata or other similar title arrangements, Residential Tenancies Act 1995 and Environment Protection Act 1993, Section 25

4 Liquor Licensing Act 1997, sections 35, 43, 44, 106

5 Dog and Cat Management Act 1995, sections 43 & 51

- 6 Australian Road Rules 224 & 291 and Road Traffic (Vehicles Standards) Rules 149 to 153 (inclusive), administered by the Department of Transport, Energy and Infrastructure (DTEI)
- 7 Airservices Australia (Commonwealth Government), Australian Standard AS 2021
- 8 Harbors and Navigation Regulation, 1994, clause 152
- 9 Mines and Works Inspection Act 1920, section 10 and Mines and Works Inspection Regulations, 1996, Regulation 13
- 10 Commonwealth Jurisdiction—Airports Act 1996
- 11 South Australian Formula One Grand Prix (South Australian Motor Sports) Act 1984, sections 25 & 27c
- 12 Occupational Health, Safety and Welfare Act 1986
- 13 Environment Protection Act 1993, section 25 and individual guidelines developed by the relevant emergency authorities. Fire and Emergency Services Act 2005, section 129. Australian Road Rules (Rule 224)
- 14 Environment Protection and Biodiversity Conservation Act 1999
- 15 Development Act 1993

Noise excluded from the Policy (Schedule 1)

Schedule 1 of the Noise Policy excludes certain noise activities from regulation under the policy.

The excluded activities are outlined in the following pages.

Noise principally consisting of music or voices from domestic premises

This relates to the common complaint of excessive music or voices from domestic premises.

The police issue emergency environment protection orders for noise from domestic premises including music or voices, typically from parties or sound systems. Due to the time of day and environment in which this type of noise occurs, the police are the most effective body to administer this form of domestic noise. The police use the general environmental duty provisions of the EP Act to determine whether noise in a certain situation is unreasonable.

Noise from a school, kindergarten, child-care centre or place of worship

Child-care centres, schools, kindergartens, places of worships and playgrounds are often located immediately adjacent to residences and their impacts are rarely of concern, even though the sound levels can often easily exceed environmental noise criteria such as those contained in the general provisions of the Noise Policy.

Complaints to the Authority regarding school and church noise do occur from time to time and there have been proceedings brought in the South Australian Environment Resources and Development Court to deal with noise nuisance impacts from a child-care centre in one case³.

Typically, such complaints are handled under the general environmental duty provisions of the EP Act rather than through comparison with objective criteria such as those in the Noise Policy, which have not been established for the specific circumstances presented by schools, kindergartens, child-care centres or places of worship.

³ R&D Olson v Windybanks Childcare Centre Pty Ltd, SAERDC 28 (1999).

Aircraft noise

Aircraft noise is assessed under Commonwealth legislation through the *Airports Act 1996*. Airservices Australia is a national government body established by federal legislation to deal with all issues surrounding airports including noise of individual aircraft, curfew hours monitoring, insulation programs and flight paths.

Rail corridor noise

The EP Act was amended in October 2001 to enable the licensing of all users of the rail corridor system.

The licensing system enables specific and targeted conditions relating to noise reduction to be included as a condition of use of the rail corridor.

In 2006, the Land Transport Commission (LTC), a national statutory body, established, amongst other things, to consider a national approach to transport issues, determined to pursue the implementation of a national approach to the setting of noise standards.

Objective noise criteria that would be provided by a Policy would be immediately breached by the high-pitched squeal caused by the interaction of the train wheels and a curved track, predominant in the Adelaide Hills region.

The EPA has implemented conditions on the licences of the track owners, rolling stock operators and locomotive operators. These conditions have led to the development and implementation of a noise and maintenance monitoring programme to improve knowledge on the cause of, and opportunities to address wheel squeal. This will assist the industry and the EPA to identify reasonable and practicable solutions, and ultimately provide reductions in wheel squeal.

The EPA is also assisting LTC in developing a consistent and complementary national approach to rail noise reduction.

Licensed premises

Noise from licensed premises is regulated through special provisions under the *Liquor Licensing Act 1997*. Section 106(1) of that act provides that if:

- (a) an activity on, or the noise emanating from, licensed premises; or
- (b) the behaviour of persons making their way to or from licensed premises, is unduly offensive, annoying, disturbing or inconvenient to a person who resides, works or worships in the vicinity of the licensed premises, a complaint may be lodged with the Commissioner under this section.

This act provides for conciliation and an order, which can become a condition of the liquor licence. Where a matter cannot be conciliated, it is referred to the Licensing Court.

The EPA has produced guidelines⁴ to assist The Office of the Liquor and Gambling Commissioner (OLGC) and planning authorities in assessing applications for new venues. Activities that fall outside of the guidelines, such as outdoor entertaining or smoking areas, may be compared by the OLGC against the Noise Policy levels to assist in providing an objective assessment.

Noise issues associated with existing licensed premises are assessed on a case-by-case basis under section 106 of the Liquor Licensing Act 1977 by the OLGC. Noise from licensed premises is excluded from the objective assessment procedure of the Noise Policy to provide the OLGC

⁴ EPA Guidelines, *Development proposal assessment for venues where music may be played* (2003).

with the flexibility to consider the range of factors under section 106. Notwithstanding this exclusion, comparison with the indicative noise levels and consideration of the factors of clause 19 of the Noise Policy may assist the Commissioner or Licensing Court in situations where an objective assessment procedure is considered useful.

Motor vehicle noise

Noise from individual motor vehicles is regulated by the *Australian Road Rules* and the *Road Traffic (Vehicle Standards) Rules 1999*, under the *Road Traffic Act 1961* which is administered by the Department of Transport, Energy and Infrastructure (DTEI).

General traffic noise is not controlled under the Road Traffic Act. The exposure of persons to noise from arterial roads is addressed by the DTEI, and a guideline document is available to assist in the management of traffic noise '... involving new roads and or major upgrading of existing roads⁵).

Vehicle noise on domestic premises is not assessed by the Noise Policy, but rather by the general environmental duty provisions of the EP Act, that is 'all reasonable and practicable measures should be taken to minimise or prevent environmental harm'.

Noise from dogs and other animals

Noise from barking dogs is controlled by the local council under powers in the *Dog and Cat Management Act 1995*:

45A.(5) Any person who owns or is responsible for the control of a dog is guilty of an offence 11. If the dog (either alone or together with other dogs, whether or not in the same ownership) creates a noise, by barking or otherwise, which persistently occurs or continues to such a degree or extent that it unreasonably interferes with the peace, comfort or convenience of a person.

Other sources of noise involving animals (such as roosters) may be dealt with through the powers of the *Local Government Act 1999*⁶.

Noise from activities in Schedule 1 clause 8 of the EP Act

These activities include aerodromes, helicopter landing facilities, motor racing venues and shooting ranges.

Complaints from these activities are infrequent and the assessment procedures, provided by either a national or interstate approach, are often complex.

Issues surrounding these activities will continue to be assessed on a case-by-case basis. Should the frequency of complaints increase for a certain activity, the Noise Policy provides for the inclusion of a specific assessment procedure in Part 7.

Some motor racing venues or events are the subject of specific legislation, such as the *South Australian Formula One Grand Prix (South Australian Motor Sports) Act 1984*, which enables unhindered operation in recognition of the social and economic benefits, the transient nature and the inability to significantly reduce the noise to surrounding areas of such events.

⁵ Department for Transport, Energy and Infrastructure 2007, *Road Traffic Noise Guidelines*.

⁶ Section 254, Powers to make orders.

Noise from blasting operations

Noise from blasting operations carried out as part of a mining operation within the meaning of the *Mines and Works Inspection Act 1920* or *Mining Act 1970* is assessed by the Department of Primary Industries and Resources SA (PIRSA), generally using a national assessment procedure.

Other activities from a mining operation can be assessed using the provisions of the Noise Policy.

Noise caused by emergency vehicle sirens

The level of noise produced by emergency vehicle sirens is intended to alert and to be intrusive. In the situation of the operation of an emergency vehicle siren, safety and emergency considerations significantly outweigh the impact of any resultant high noise levels, and therefore it is excluded from assessment under the Noise Policy.

Noise outside of the human audible range

In extremely isolated situations, some noise sources may produce noise that is outside of the human audible range, but can still unreasonably interfere with a person's amenity. The exclusion of this situation is to ensure that such an isolated event is assessed using a specific procedure, rather than the Noise Policy.

Assessment of noise using the general environmental duty

While some activities are from the Noise Policy, they may also be regulated by other legislation. For example, this could be licensed premises, helicopter landing sites, shooting ranges and aircraft movements.

Other activities, such as party noise, are subject to the overarching general environmental duty provisions of the EP Act, rather than the specific objective assessment procedure of the Noise Policy.

The Noise Policy simply provides an interpretation of the general environmental duty as it relates to certain situations. The following section 'Subjective Assessment of noise' is provided to assist in assessment of activities excluded from the Noise Policy and not subject to a specific act or assessment approach.

Subjective assessment of noise

For noise to be deemed an environmental nuisance using a subjective assessment, an authorised officer has to form a subjective opinion that the noise unreasonably interferes with the enjoyment of the area.

Most activity results in the emission of noise. The simple fact that a noise is audible and perhaps of a level that constitutes an interference, may not in itself be sufficient to be deemed an *unreasonable* interference.

For example, some domestic activity not specifically addressed by the Noise Policy such as using a roller door, turning on a sprinkler system, spray painting a boundary fence using an air compressor, or putting out a bin can generate high levels of noise that may well interfere with a neighbour. However such activity is unlikely to cause an *unreasonable* interference if it is a reasonable activity undertaken during a normal time of the day, for a normal duration and at a normal frequency of occurrence.

The following considerations provide some guidance on the factors that may be relevant in subjectively deciding whether a noise is unreasonable in the circumstances:

- Is the noise loud either in an absolute sense, or relative to other noise that might be present or expected in the area?

- Is the noise well above the background noise level—that is, during lulls in the noise, is there a significant difference?
- Does the noise include any annoying characteristics, such as fluctuating volume, a tone, a beat or impulse, or a characteristic that is not present or expected elsewhere in the area?
- Is the noise occurring at a time when nuisance is likely, such as during evenings, night or the very early morning hours?
- Is the activity of a duration, volume or characteristic that is significantly different to that expected or typical in the area?
- Is the noise adversely affecting people's activities such as conversation, reading, studying, watching television or sleeping?
- How do other people in the vicinity react to the noise impacts?
- How easy is it to reduce the noise?
- How common is such a noise in other similar environments?
- Is the noise clearly audible within a habitable room during normal sleeping hours with windows open if the occupant desires? Clearly audible means that the noise is audible during the normal course of the appropriate activity while the listener is making no special effort to hear the noise.
- Could a reasonable person tolerate the noise given the time of day and the duration of the emission and/or the fact it is not typical of activities conducted in the area?
- Is the noise loud enough to interfere with normal speech or to disturb normal daytime outdoor recreation during the day?
- When considering music from a domestic party, is the bass beat clearly audible within a neighbouring residence?

Not all of the factors need to be present for an opinion to be formed that the noise is causing an unreasonable interference. Ultimately, the level, nature and/or extent of a noise are important criteria, and reasonable judgment must be used to decide what is acceptable in a given situation.

CLAUSE BY CLAUSE EXPLANATION

Part 1 Preliminary

Clause 1 Short title

Clause 1 names the policy as the Environment Protection (Noise) Policy 2007.

Clause 2 Commencement

Clause 2 provides the date fixed by the Governor of South Australia for the commencement of the Noise Policy. Some legislation incorporates a transition period for some or all clauses to enable familiarisation or to enable a period for industry to establish specific requirements. The Noise Policy was gazetted on 6 December 2007 to come into operation on 31 March 2008.

Clause 3 Interpretation

Clause 3 provides definitions for terms used throughout the Noise Policy.

The use of terms that are defined in Australian Standards, such as background noise level are repeated in full. In several cases, these standard definitions have been further enhanced to ensure the Noise Policy is a standalone document.

The following additional guidelines should be applied to certain definitions:

Ambient, background and extraneous noise

For the purposes of the Noise Policy, ambient noise is the noise associated with the surrounding environment without the influence of the noise source.

Often when measuring a noise source, the ambient noise influences the result. Clause 14(2) of the Noise Policy requires that this influence is removed from any measurement result, to ensure that the assessment is made for the noise source only, and not on what is also being added by the surrounding environment.

Extraneous noise is a term applied by the Noise Policy to an infrequently occurring event, such as the flyover of a passing aircraft, a wind gust in trees, or the occasional passing of local traffic down a side street. Extraneous noise can also include a significant noise that is considered temporary in nature.

Background noise by comparison describes the lulls in the ambient noise. Its technical definition is the noise level exceeded for 90% of the measurement period, the practical effect of which is to exclude all parts of the ambient noise level that are not present for a significant (90%) amount of time. For example, when measuring noise on a suburban street with only the occasional passing of a vehicle, the background noise will represent the noise level when those vehicles are not present.

Clause 15 details the measurement procedure for ambient and background noise.

Characteristic—impulsive, low frequency, modulating and tonal

The presence of a characteristic attracts a penalty under Clause 14(3). A penalty is applied because impulsive, low frequency, modulating or tonal dominated noise is more annoying than a constant, broad and steady noise.

For a penalty to be applied, the Noise Policy requires the characteristic to be fundamental to the nature and impact of the noise. The characteristic should dominate the overall noise impact, rather than simply be part of it.

Objective tests that identify the characteristics may be used to assist in identifying the presence of these characteristics; however, the Noise Policy provides the ability to impose penalties for annoying characteristics based on a subjective assessment without the need for a complex objective assessment.

Impulsive characteristic

A noise source that attracts an impulsive characteristic will often be described as something with a thumping, banging or impact noise that is clearly audible above everything else. It is distinguished by a sharp rise in noise level.

Some examples include the noise from a heavy mechanical press that consistently produces an impact noise as it stamps out a metal template, the noise from the dropping of material that causes a short burst of loud sound as the material hits the ground, or the noise of heavy hammering and banging from a workshop area.

An impulsive characteristic would not be applied to a noise that simply varies in level. The modulating characteristic is established to deal with such a noise. A short burst or impact, or series of impacts, need to be present to apply the impulsive characteristic.

An impulsive characteristic can be identified objectively in accordance with the method in *Australian Standard AS1055.1-1997 Acoustics-Description and measurement of environmental noise*. The method involves measuring the noise using an impulse time weighting 'I' and comparing this against the result for a fast time weighting 'F'. A difference of 2dB or greater is considered by the Australian Standard to indicate the presence of an impulsive characteristic.

Care should be exercised when using this test, for a number of reasons:

- The influence that ambient noise sources can have on the result. For example, passing traffic may be sufficient to cause a 2dB or greater difference between the different time weighted results. To assist in ensuring ambient noise does not influence the result, a sound level meter that allows for concurrent measurement of fast and impulse time weighting should be used and care should be taken during the measurement period to isolate the noise source; and
- It is possible to exceed the 2dB difference for noise sources that are subjectively considered to exhibit a modulating characteristic under this Noise Policy, rather than an impulsive characteristic. An example is that of intermittent passing traffic which can exhibit a difference of 2dB over a 15-minute period.

Therefore the test should generally be used to show the impulsive characteristic is not present. This is done by recording a test where the difference is less than 2dB. Care should be exercised with a test to definitively show the presence of an impulsive characteristic, particularly where the difference is close to 2dB.

Low frequency characteristic

A noise source that attracts a low frequency characteristic will often be described as something with a rumbling, rolling, roaring or booming noise that is clearly audible above everything else.

Some examples include the noise from a locomotive as it moves away from a resting position, the take-off of a jet aircraft or the rumbling sound of thunder in nature.

A low frequency characteristic would not be applied to a noise that simply has low frequency content in amongst noise in other frequencies. The tonal characteristic is established to deal with such a noise. The noise needs to be distinctly and solely low frequency in nature to apply the low frequency characteristic.

An objective test to identify low frequency noise has not been established by an Australian Standard. However, such a test could comprise measuring and comparing 'A' and 'C' frequency weighted equivalent noise level results. A difference of 15dB or more is established in the *New South Wales Industrial Noise Policy* (1999) as a measure to establish the presence of a low frequency characteristic.

Modulating characteristic

A noise source that attracts a modulating characteristic will often be described as something with a varying, fluctuating, pulsating, or changing noise characteristic that is clearly audible above everything else.

Modulation can occur to the loudness, as in the case of a forklift moving about on a loading apron or as occurs on the edge of a road with intermittent traffic. It can also occur due to a change to the frequency content, as in the case of a wailing siren.

The modulation, or rise and fall of the sound, can also occur over a short period, such as the bark from an engine brake, which rises and falls in level many times over a one-second period, or the noise experienced when the rear window of a car is left down and the speed of the vehicle is sufficient such that the wind noise produces a pulsing sound.

A modulating and impulsive penalty should not be applied to the same characteristic on the sole basis that an impulsive noise inherently rises and falls in level. For example, a penalty for modulation would not be applied to a mechanical press in addition to the penalty for the impulsive characteristic. However, there will be circumstances where both a modulating characteristic and impulsive characteristic are applicable. An example is a forklift moving around on a loading apron that is producing a sharp impact noise every time it passes over a spoon drain. The modulating characteristic is associated with the fluctuating noise level as the forklift moves around the apron, and the impulsive characteristic is associated with the impact noise as the forklift goes over the drain.

An objective test to identify modulating noise has not been established by an Australian Standard. However, such a test could comprise a time trace of either the overall level or the level of one or some of the octave bands. The time trace would need to show a significant rise and fall occurring. The test for an impulsive characteristic may also indicate the presence of a modulating characteristic in some circumstances.

Tonal characteristics

A noise source that attracts a tonal characteristic will often be described as something with a pitch or sharply defined note that is clearly audible above everything else.

Some examples include the noise from a reversing signal on a truck, the noise from a whistle, the squealing noise generated by train wheels going around curves, or the distinctive note that can be heard from an unmuffled high performance motor held at constant speed.

Note that the reversing signal on a truck may attract a penalty for a modulating characteristic due to the rise and fall of sound and a penalty for a tonal characteristic due to the distinctive tone used to attract attention, but only if both dominate the noise impact and are not simply audible in the ambient noise.

A tonal characteristic would not be applied to a noise that only exhibited tonality at a point in time. An example is the noise from a wailing siren. At any instance in time, a wailing siren exhibits a tone, but this tone moves across the frequency spectrum over time to generate a modulating noise.

A tonal characteristic can be identified objectively in accordance with the method in Australian Standard AS1055.1-1997 Acoustics—Description and measurement of environmental noise. The method involves comparing noise levels in adjacent one-third octave bands. The

Australian Standard considers that a noise level in a one-third octave band that exceeds the level in each of the adjacent one-third octave bands by 5dB or more indicates the presence of a tonal characteristic.

Ambient noise influence

The subjective assessment in determining whether to apply a penalty is carried out with the influence of the ambient noise present. The ambient noise influences the assessment by producing its own characteristics that are typical of the environment and that may have the effect of masking the characteristics from the noise source.

For example, it is likely that a penalty for a modulating characteristic will apply to a forklift moving around on the loading apron of a warehouse located in a quiet suburban side street. If that same warehouse were located on a major road, then it is unlikely that penalty would apply. This is because the rise and fall of the ambient noise masks the forklift noise; even though the characteristic of the forklift noise has not changed, the perception of its impact has.

The objective tests noted above should therefore be inclusive of the ambient noise. If it is not possible to separate the noise source from the ambient noise to deliver a conclusive objective test, then it is likely that a penalty does not apply to the noise source.

For example, measurements at two metres from a pump indicate the presence of a tone. The noise affected premises is approximately 50 metres away across a major road. The objective test for tonality is repeated at the noise affected premises, and the influence of the ambient noise is such that the tone does not show up. A penalty is therefore not applied. In subjective terms, the tone is clearly audible when next to the pump, but when crossing the road, it can no longer be detected, and is therefore not fundamental to the nature and impact of noise from the pump.

Clause 4 Land uses and land use categories

Clause 4 sets the rules for determining land use categories under the Noise Policy.

The defined land use category will determine the indicative noise level under clause 5, and therefore this clause is central to the proper working of the Noise Policy.

There are seven available land use categories under the Noise Policy:

- Rural Living
- Residential
- Rural Industry
- Light Industry
- Commercial
- General Industry
- Special Industry.

Prior to using clause 4, a locality must be assigned to the noise source and the noise affected premises.

'Locality' has a specific definition under clause 3 to ensure there is no confusion with the same term used in the planning system. In most situations, the locality will be the zone under the Development Plan in which the noise source or noise affected premises is located. The exception is where that zone is broken down into policy areas or precincts or similar, subject to a separate and specific set of land use rules, whereby the locality is defined by the policy area or similar.

Once the locality has been determined, clause 4 requires an assessment of the land use that is principally promoted in that locality.

Example 1

The noise from a compressor used by an automotive workshop is the subject of a complaint by a neighbouring residential property.

The workshop (noise source) is located in a Light Industry zone according to the relevant Development Plan. The residential property (noise affected premises) is in a Residential zone.

For the purposes of clause 4, the locality for the noise source is the Light Industry zone and the locality for the noise affected premises is the Residential zone.

Example 2

The noise from an exhaust fan used by a panel beater is the subject of a noise complaint.

The panel beating shop (noise source) is located in Policy Area 6 of the Light Industry zone, according to the relevant Development Plan.

For the purposes of clause 4, the locality for the noise source is Policy Area 6.

Clause 4(1) sets the rules for principally promoted.

Clause 4(1)(a) deals with a locality that promotes only one type of land use, such as a residential zone. In this situation, the land use being principally promoted by a locality is expected to be self evident.

Clause 4(1)(b) and (c) deal with a locality that promotes a mix of land uses.

Where a land use is clearly given precedence above all others in a locality, clause 4(1)(b) classes this as the land use being principally promoted.

Where a number of land uses are equally promoted to generate a mixed zone, clause 4(1)(c) defines each of the individual land uses as principally promoted. For example, a zone promotes the development of residential and retail land uses to form a mixed zone. The land uses principally promoted in the mixed zone in accordance with clause 4(1)(c) are both residential and commercial.

The Noise Policy does not require a complete analysis of all of the Development Plan provisions for a locality. If it is not evident which land uses are principally promoted by reading the principal objectives of the locality, then clause 4(2) requires consultation with the local council to assist the Authority in its assignment.

Once a land use principally promoted by the Development Plan has been determined, a land use category that best describes it is assigned under clause 4(3).

Given there is a larger number of land uses principally promoted in the planning system than the seven land use categories in the Noise Policy, there will be situations where it is not evident which land use category should be assigned. Again, in this situation, clause 4(4) requires consultation with the local council to assist the Authority in its assignment.

Example

It is important to note that the land use category assigned under the Noise Policy is independent of the actual land use for the noise source or the noise affected premises (subject to clause 11).

For example, the noise from a ventilation system used by a small cabinet-making business is the subject of a complaint by a neighbouring residential property.

The business and adjacent dwelling are in the same locality according to the relevant Development Plan. The locality principally promotes dwellings on larger allotments (minimum area of 2,000 m²) and promotes country living land uses.

The Rural Living land use category under the Policy is the best fit for a locality that principally promotes a country living land use.

The fact that the locality includes a small cabinet-making land use is not relevant under clause 4. This is because the Policy defines the amenity of the locality according to its desired character, rather than the existing land uses within an area. Note this is a different assessment philosophy than the revoked Environment Protection (Industrial Noise) Policy 1994.

The following examples are provided to assist in assigning a land use category. The land uses listed are those that are likely to be principally promoted for the locality of the noise source or noise affected premises.

The list is not exhaustive. In addition, it should not be used by entering the specific land use for the noise source or noise affected premises. As noted in the example above, the Noise Policy uses only the locality to define the land use category, rather than the land use of the noise source or the noise affected premises.

The following examples of land use categories are intended as a guide. In all cases, the Development Plan zone description should be read to determine the land use category is principally promoted by the Development Plan.

Rural Living land use category

The land uses principally promoted by a locality assigned to a Rural Living land use category under clause 4 of the Noise Policy would typically include:

- dwellings on allotments with a minimum permitted area of 2,000 m², in a rural setting without significant farming activity
- hobby farms.

In addition, the Rural Living land use category may be assigned to a locality that principally promotes a park or reserve set aside for public recreation or enjoyment in a country or non-urban setting. This category would generally not apply to space that is intended to act as a buffer between conflicting land uses.

Residential land use category

The land uses principally promoted by a locality assigned to a Residential land use category under clause 4 of the Noise Policy would typically include dwellings such as

- detached houses
- semi-detached or duplex houses
- row houses
- units
- apartments

- flats
- retirement villages.

In addition, the Residential land use category may be assigned to a park or reserve set aside for public recreation or enjoyment in a residential urban area. This category would generally not apply to space that is intended to act as a buffer between conflicting land uses.

Rural Industry land use category

The land uses principally promoted by a locality assigned to a Rural Industry land use category under clause 4 of the Noise Policy would typically include:

- animal boarding or breeding facilities
- abattoirs
- bird rearing or egg laying facilities
- cattle, sheep or other animal feedlots
- crop farms
- dairies
- forestry operations
- general farming
- horticulture
- pastoral farms including large scale grazing for sheep or cattle
- piggeries
- viticulture
- wineries.

The title 'Rural Industry' is not intended to create a link to the term 'industry' as defined in the Development Act 1993. The term 'industry' has been used in the Policy to indicate that the locality principally promotes a primary industry or associated activity. For example, in general farming zones, where the land use principally promoted is agriculture and residences are contemplated, the Rural Industry land use category would be assigned.

Light Industry land use category

The land uses principally promoted by a locality assigned to a Light Industry land use category under clause 4 of the Noise Policy would typically include:

- automobile repair workshops including crash repairers, spray painters and motor trimmers
- cabinet makers
- footwear or clothing manufacturers
- home industries
- upholsterers
- premises used for the testing, manufacturing, processing, repairing, dismantling, treatment, or packaging of goods where the activity is on a small scale.

Commercial land use category

The land uses principally promoted by a locality assigned to a Commercial land use category under clause 4 of the Noise Policy would typically include:

- amusement premises such as theatres, cinemas, dance halls, swimming pools or gymnasiums
- administrative offices
- bus depots
- civic centres
- consulting rooms
- department stores
- further education institutions
- hospitals, health centres and health clinics
- hotels, taverns, club premises and reception lodges
- libraries
- offices (general, professional, governmental)
- petrol filling stations
- police stations
- premises used principally for meetings of community, professional, business, social or cultural groups
- professional rooms
- restaurants and take-away food facilities
- retail shops
- showrooms and display areas
- telephone exchanges
- veterinary clinics and premises
- warehouses and wholesale premises.

General Industry land use category

The land uses principally promoted by a locality assigned to a General Industry land use category under clause 4 of the Noise Policy would typically include:

- abrasive blasting facilities
- ceramic works such as production of bricks, tiles, pipes and the like
- concrete batching works
- extractive industry
- freight transport depots
- fish processing
- foundries (depending on the envisaged scale and extent of impacts into adjacent properties)
- glass manufacturers (depending on the envisaged scale and extent of impacts into adjacent properties)
- hot mix asphalt preparation
- landfills

- large-scale commercial bakeries or food preparation facilities distributing to a broad range of retailers
- premises used for the testing, manufacturing, processing, repairing, dismantling, treatment or packaging of goods where the activity is on a scale such that it has the potential to adversely impact on users in the vicinity
- public service depots
- pumping stations
- scrap metal recovery facilities
- surface coating works such as metal finishing, galvanising, large-scale powder coating and the like
- waste treatment and disposal works including recycling centres, incineration works and the like
- large-scale printers and publishing facilities.

Special industry land use category

This land use category may in some instances be of a similar nature but larger scale than General Industry. The land uses principally promoted by a locality assigned to a Special Industry land use category under clause 4 of the Noise Policy would typically include:

- premises used for the testing, manufacturing, processing, repairing, dismantling, treatment, or packaging of goods where such activity is on a large scale and has the potential to adversely affect large areas and operates over a 24-hour period, but excluding primary industry and associated activities
- premises used for the purpose of providing water, sewage treatment, electricity, gas, power or other similar and broad public infrastructure on a large scale
- petroleum refineries
- petrochemical plants
- paper mills
- ship building yards
- electricity generating stations
- steel mills
- larger scale foundries
- vehicle manufacturing plants
- bulk handling, storage and shipping facilities
- sewerage treatment works.

Clause 5 Application of the policy

Clause 5 sets the indicative noise levels for a noise source.

An indicative noise level is calculated by reference to the land use categories selected in accordance with clause 4. The calculation method is discussed in further detail below.

The indicative noise levels provide the trigger to investigate if further action is to be taken with respect to reducing the noise from the noise source. The exception to the indicative noise levels providing the relevant test is where the background noise level is sufficiently high, which is discussed further under clause 18.

The term 'indicative' is used because simply exceeding the level does not necessarily mean action must be taken to reduce that noise. There are a range of factors to consider in determining what action, if any, is taken when noise is shown to exceed the indicative noise levels. These factors are discussed in clause 19.

The indicative noise levels are underpinned by the recommendations in the World Health Organization (WHO) guidelines⁷.

The adverse effects linked to noise exposure are discussed in detail in the WHO publication and include:

- effects on residential behaviour and annoyance
- effects on mental health and performance
- disturbance of rest and sleep
- psycho-physiological effects
- interference with speech communication
- noise-induced hearing impairment.

The indicative noise levels established for a Residential land use category protect against the potential onset of adverse impacts associated with any of the above effects.

There is limited research that establishes a definitive dose-response relationship for noise levels above those recommended in the WHO. Therefore, the WHO recommended noise levels are generally considered to be stringent and conservative benchmarks.

The indicative noise levels have been graded according to the acoustic amenity of the different land use categories. The least intensive land use category is rural living which is assigned the most stringent indicative noise levels. The most intensive land use category is special industry which is assigned the least stringent indicative noise levels.

The indicative noise levels are graded for each land use category from rural living through to special industry in the following increasing order of expected activity and hence noise generation:

- 1 Rural Living (lowest noise level)
- 2 Residential
- 3 Rural Industry
- 4 Light Industry
- 5 Commercial

⁷ Berglund B, Lindvall T and Schwela DH (1999), World Health Organization Guidelines for Community Noise.

6 General Industry

7 Special Industry (highest noise level).

The indicative noise factors for the Rural Living land use category are lower than for Residential areas due to the envisaged amenity of such an area, generally considered to be a place to escape from the relative hustle and bustle of suburban or township life. In comparison, a Rural Industry land use category will often incorporate land uses, such as general farming, where the ambient noise environment is extremely low for a large percentage of the time, similar to a Rural Living area. However, localities that principally promote land uses that fall into the Rural Industry land use category, such as general farming, also envisage a high level of primary production associated activity from time to time, and therefore, higher noise levels are accommodated by the Policy for this category.

The increase in indicative noise levels for the other land use categories (Commercial and the range of industrial categories) reflects the different level of expected amenity within these land use areas. This approach is consistent with other legislation around Australia.

The levels are separated into day and night periods. This recognises the type and level of activity carried out by communities during the day compared with those at night. As for other elements of the indicative noise levels, this approach is consistent with the WHO guidelines.

The amenity of an area is often influenced by other localities. For example, the amenity of both a residential zone and a general industry zone will be different at their interface than in the heart of their respective zones.

Under clause 5, if different land use categories *interface* or if there is a *mixed use* zone, the indicative noise level is the average of the indicative noise levels for each of the individual land use categories. This is discussed in further detail under clause 5(5).

Clause 5(1)(a)(i) and (ii) recognise the specific situation of both the noise affected premises and the noise source being located in a general or special industry locality. It ensures the noise source can operate over a 24-hour period provided it can achieve the day time noise level at the noise affected premises.

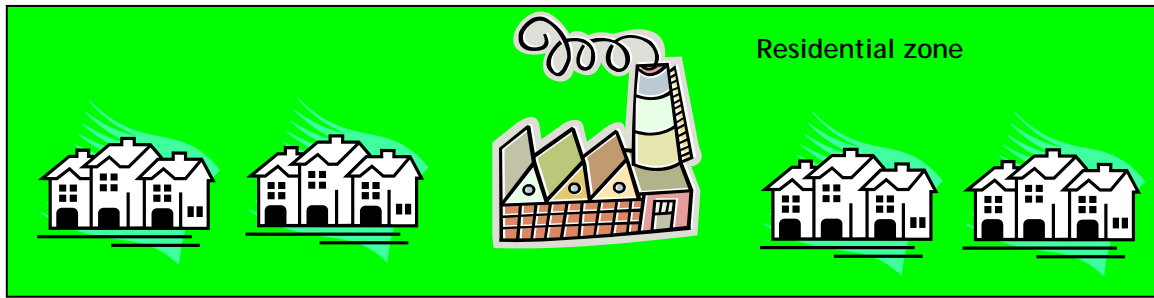
Clause 5(1)(b) deals with all other situations, including where the noise affected premises is not within a general or special industry locality.

Clause 5(2) refers to the period for which a complaint is made, and establishes the changeover period from day time to night time. These periods are consistent with long- held and current Australian legislation and the WHO recommendations.

Clause 5(3) defines the method to select the indicative noise factor according to Table 1 or 2 at clause 5(9) of the Noise Policy. This factor is then used in clauses 5(4) to 5(6) as relevant to determine the indicative noise level for the noise source.

Clause 5(4) deals with the situation of both the noise source and the noise affected premises being in the same locality, which in turn principally promotes one land use. An example would be an industry and surrounding dwellings all being located in a residential zone (see 'Single use' figure).

Single use



Clause 5(4) assigns the indicative noise level for that land use category to the noise source. This ensures that the noise source produces a level of noise that is considered appropriate for the locality.

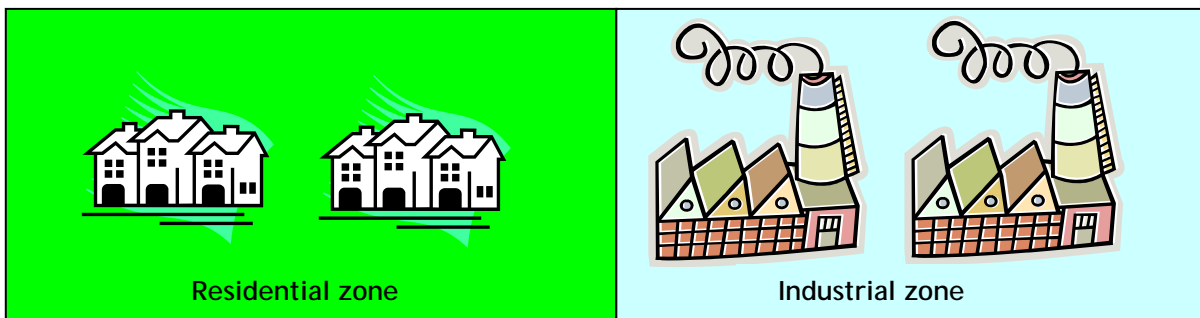
For the example of the industry located within a residential zone, by reference to Table 2 at clause 5(9) in the Noise Policy, the indicative noise levels assigned to the industry would be 52dB(A) for operation during the day and 45dB(A) for operation during the night at the noise affected premises.

Clause 5(5) considers two situations not addressed by clause 5(4):

- where the noise source and the noise affected premises are in different localities (interface); or
- where the noise source and the noise affected premises are in the same locality, but there are a number of land uses principally promoted by that locality (mixed use).

For both the interface and mixed use situations, clause 5(5) requires an averaging of the indicative noise factors for each of the land use categories determined in accordance with clause 4.

Interface



Example

A manufacturing industry is located in an industrial zone that promotes manufacturing and other general industry land use (see above figure).

The zone interfaces with a residential zone that promotes urban residential land uses. A complaint is received from a resident in the residential zone regarding the manufacturing industry operating at night.

Clause 5(5) requires that where the noise affected premises (the dwelling) and the noise source (the manufacturing industry) are in separate localities, but where they interface, the indicative noise level is the average between the two. As the level for a general industry land use category at night is 55dB(A) and the level for a residential zone at night is 45dB(A), then the indicative noise level for the interface assigned to the noise source is the average of 55 and 45, or 50dB(A).

Mixed use

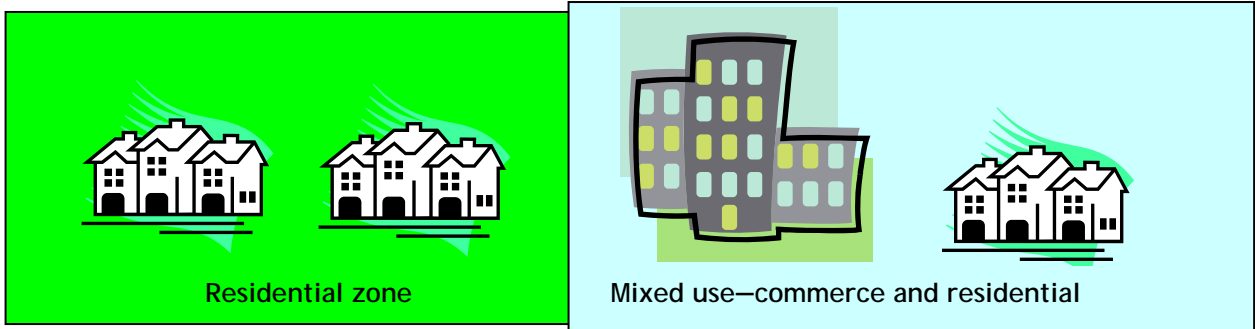


Example

A resident located in a mixed use zone within the CBD that promotes a mix of commercial and residential land uses, is concerned about the operation of a cooling tower serving an office building that operates through the night (see above figure).

The noise source (office tower) and noise-affected premises (residence) are in the same zone. The zone promotes a mix of both residential and commercial land uses. The level for a residential land use category at night is 45dB(A). The level for a commercial land use category at night is 55dB(A). Under clause 5(5), the indicative noise level assigned to the noise source for a mixed zone is the average of 45 and 55, which is 50dB(A).

Mixed use and interface



Example

A resident located in a residential zone is concerned about the noise from refrigeration plant associated with an adjacent local shopping centre (see above figure). The local shopping centre is located in a zone principally promoting both commercial and residential land uses. The residential zone therefore interfaces with a mixed use zone.

Clause 5(5) requires that where the noise affected premises (the dwelling) and the noise source (the local shopping centre) are in separate localities but they interface, the indicative noise level is the average between the two. As noted in the previous examples, the indicative noise level for a residential land use category at night is 45dB(A) and the level for a mixed use locality comprising residential and commercial land use categories at night is 50dB(A). The average of the night time indicative noise levels is 47.5dB(A). Clause 5(7) requires a fraction to be rounded to the nearest whole number. Therefore the indicative noise level for the interface assigned to the noise source is 48dB(A).

A noise source straddling the boundary between two localities



Example

A light industry straddles the boundary between a light industrial zone and a zone that promotes commercial land use.

The two zones interfaces with a residential zone promoting urban residential land uses (see above figure). A complaint is received from a resident in the residential zone regarding the light industry operating at night.

Clause 5(5) requires that where the noise affected premises (the dwelling) and the noise source (the light industry) are in separate localities but where they interface, the indicative noise level is the average between the two. As noted in the previous examples, the indicative noise factor for a residential land use category at night is 45dB(A).

In this case, because the light industry is straddling a zone boundary, the indicative noise factor for the light industry should be an average between the commercial zone and the light industry zone, similar to if it was in a mixed use locality comprising light industry and commercial land use categories.

Therefore, the indicative noise factor to be used for the light industry at night should be $(55 + 50) \div 2 = 52.5\text{dB(A)}$. The average between the residential indicative noise factor and the light industry/commercial indicative noise factor is 48.75dB(A) . Clause 5(7) requires a fraction to be rounded to the nearest whole number. Therefore the indicative noise level for the interface assigned to the noise source is 49dB(A) at night.

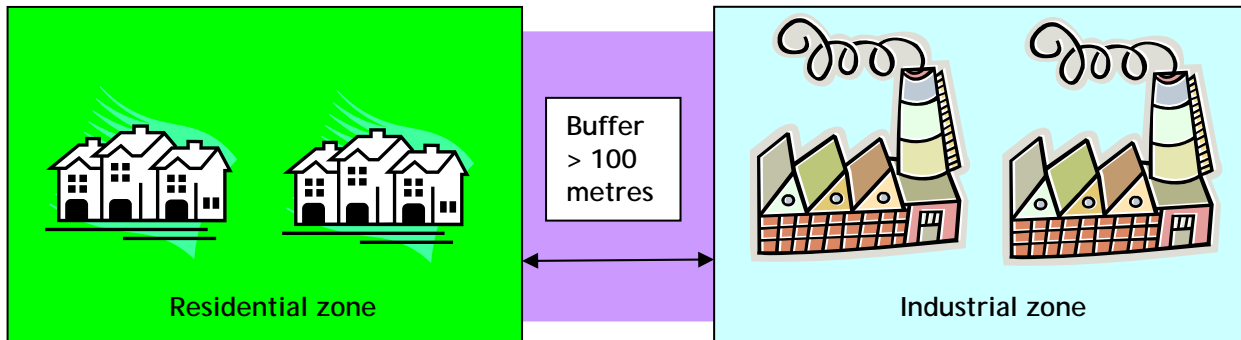
Clause 5(6) is the exception to clause 5(5) which occurs in the interface situation, when the two localities are separated by a distance of greater than 100 metres.

A locality in this context could be a development plan zone, policy area or precinct. Also see the definition in clause 3.

In this situation, it is considered that the compromise made in the averaging process is no longer applicable. A practical example where this may apply is in areas where council has provided for a buffer zone, to separate potentially incompatible land uses.

Clause 5(6) applies the indicative noise level to the noise source as if the noise source was located in the same locality as the noise affected premises.

Buffer



Example

A manufacturing industry is located in an industrial zone that promotes manufacturing and other general industry land use. The zone interfaces with a zone that is set aside for public landscaped open area (see above figure). A residential zone promoting urban residential land uses is on the other side of the open area, some 150 metres from the industrial zone boundary. A complaint is received from a resident in the residential zone regarding the manufacturing industry operating at night.

Clause 5(6) requires that where the noise affected premises (the dwelling) and the noise source (the manufacturing industry) are in separate localities separated by more than 100 metres, the indicative noise level is that assigned to the locality of the noise affected premises. As the level for a residential zone at night is 45dB(A), then the indicative noise level for the noise source is also 45dB(A) in this situation. This level needs to be met at the residential zone boundary closest to the industrial zone.

One method that can be used to determine the separation distance between localities is to draw a line between the closest points on the two property boundaries of the noise source site and the noise affected premises and then calculate the distance between the boundaries of the two localities that intersect that line.

Under clauses 5(4) to 5(6), the seven listed land use categories may be applied in over 20 possible combinations.

Clause 5(8) recognises that an external location may not always be the ideal measurement place (refer to Part 3–Measurement Procedure).

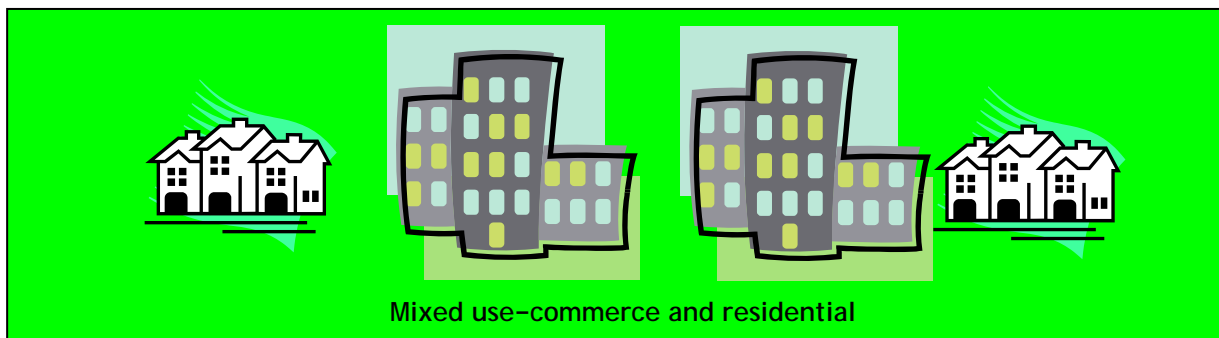
Where the assessment leads to noise measurement inside a habitable room, rather than outside as with typical environmental noise assessments, clause 5(8)(a) requires comparison with the satisfactory noise levels recommended by *Australian Standard AS/NZS 2107-2000 Acoustics–Recommended design sound levels and reverberation times for building interiors*.

Given that the standard does not adjust for the amenity of the locality as per clause 5, clause 5(8)(b) also assigns a noise level based on the general procedure described above under clauses 5(4) to 5(6).

The 20dB(A) used in clause 5(b) is derived as the minimum noise reduction that is expected across a typical residential facade with the windows closed.

The greater of the two results derived from clauses 5(8)(a) and (b) is used as the indicative noise level for the noise source.

Internal measurement



Example

A resident located in a mixed use zone within the CBD that promotes a mix of commercial and residential land uses, is concerned about the operation of a cooling tower serving an office building that operates through the night (see above figure).

The residential building is an apartment-style development and the complaint is associated with noise in a living room. The living room has a sealed window that cannot be opened, installed to minimise the noise impact of a major road directly below. Noise from the road significantly diminishes during the weeknights.

Clause 5(8)(a) assigns the satisfactory level from Australian Standard AS/NZS 2107-2000, which is 35dB(A) in a living room for apartments near major roads.

Clause 5(8)(b) assigns the indicative noise level which would otherwise be assigned to an external measurement location, less 20dB(A), to account for the minimum reduction expected across the building facade. The indicative noise level for an external measurement location is 50dB(A) (refer to the earlier mixed use example). Therefore, the result derived from clause 5(8)(b) is 30dB(A). The greater of the two results is used, and the indicative noise level for a measurement within the living room of a mixed zone is 35dB(A).

Clause 6 Application of Policy

Clause 6 requires that the Noise Policy is not applied to the following:

- the items outlined in Schedule 1; and
- a noise source subject to an environmental authorisation, order or exemption in place prior to the gazettal of the Policy.

A summary of the items of Schedule 1 and the rationale for their exclusion is provided in the 'Noise excluded from the Policy' section of these guidelines.

The exclusion of noise sources subject to an authorisation, order or exemption in place at the time of gazettal is to ensure a transition process can occur where the requirements of the Policy may differ from those within the standing legal instrument. At the time of renewal or expiry of those instruments, the Policy would apply.

Clause 7 Revocation of other policies

Clause 7 revokes the existing noise policies under the EP Act to enable replacement by the Noise Policy.

The existing policies that are revoked by clause 7 are the Environment Protection (Industrial Noise) Policy 1994 and the Environment Protection (Machine Noise) Policy 1994. Both were based on the *Noise Control Act 1972* and as such were considered as transitional policies.

Clause 8 Amendment of Policy without following normal procedure

Clause 8 provides a streamlined process to incorporate minor policy amendments and facilitate an efficient response to emerging issues.

The existing process to amend a policy under section 28 of the EP Act is an onerous task. Historically, minor modifications to current policies have not been undertaken due to the nature of the process.

Clause 8 identifies those areas that may be amended under a modified process. The sections of the Policy that may be amended under the streamlined process are parts 3, 6 and 7. These amendments are still subject to the comprehensive consultation and approval process specified under clause 8(3).

Part 3 of the Policy details the measurement procedure and is largely technical in content. Recognising that measurement equipment and available technology will change over time, this section is expected to require amendment from time to time to remain current.

Part 6 of the Policy relates to specific activities. These specific approaches are often simplified and streamlined with mandatory provisions. It is important the approaches consider sufficient factors to ensure a fair result. It is therefore expected that modifications will be required from time to time to ensure a fair and reasonable balance.

Part 7 of the document provides for guidelines prepared under section 25 of the EP Act. This area of the Policy is the most likely to be adapted to meet any significant emerging issue. The ability to prepare a set of guidelines for an emerging issue and insert those guidelines into the Noise Policy via Clause 8 ensures a timely response with appropriate consultation.

Part 2 Objects of the Policy

Clause 9 Objects

Clause 9 defines the objects of the Policy.

The first core objective of the policy under clause 9(b) is to establish noise goals that, if achieved, secure compliance with the EP Act.

Secondly, where noise exceeds those noise goals, the Policy establishes what requirements the Authority will impose to address the noise issue.

Thirdly, the Policy seeks to establish a consistent approach to development applications under the Development Act. Noise issues are inherently more difficult to resolve once established, and therefore the Policy addresses noise at the development stage.

Finally, the Policy acknowledges there are special activities or sources that require specific management. These activities can be addressed through the application of special provisions or guidelines under the Policy.

Clause 9(a) sets an objective to establish a measurement procedure to deliver the above core outcomes.

Part 3 Measurement procedure

Part 3 of the Policy provides the measurement procedures for assessment of noise against the policy.

Clause 10 Application of part

Part 7 currently includes guidelines for wind farm noise assessment and for audible bird scaring devices, but may also be used for other complex noise issues as they arise.

Both wind farms and audible bird scaring devices require specific and unique measurement procedures. In particular, wind farms need to be measured in a high wind-speed environment, whereas part 3 precludes measurement in these conditions due to the interference problems that can arise.

Clause 10 therefore provides the flexibility to apply specific requirements for the measurement of some activities, such as wind farms and audible bird scaring devices that may otherwise be precluded by the application of part 3.

Clause 11 Instrumentation

Clause 11 sets the minimum accuracy requirements for instruments used to measure and assess noise under the policy. Sound level meters (SLM) must comply with either *Australian Standard AS 1259-1990 Acoustics-Sound level meters* or *AS IEC 61672-2004 Electroacoustics-Sound level meters* for SLMs manufactured after 2004, and their accuracy must be tested every 24 months by a NATA⁸ registered laboratory.

The instrumentation must be calibrated before and after each series of measurements to ensure accuracy for that measurement set. The term 'series of measurements' has been specifically chosen to enable a number of measurements to be taken at a particular site over an extended period of time, without the requirement to calibrate between each of those defined measurements or at the start and end of each day.

Clause 12 Noise affected premises and measurement place

Clause 12 defines the appropriate location to collect noise data for assessment against the policy. In general, the measurement position is at the noise affected premises. Clause 12(1) defines these premises as a residence or a business, that must be in separate occupation, or not on the same land, as the noise source. The noise source must be audible at the measurement location to proceed.

Clause 12(1)(b) also enables measurements to occur at a park or reserve or place of public recreation, in recognition of the expected amenity associated with these locations. Care should be taken when selecting such a measurement location given the broad scope the clause provides. In general, the noise source should be recently established, the measurement should be made at a time when the park or reserve is regularly frequented, and it should be made at a representative location used by people for enjoyment of the surroundings. In addition, so as not to give an artificially higher than usual measurement, the park or reserve should be set aside for passive use only and should not include community sport facilities, playgrounds, skate parks and the like.

Clauses 12(3), (4) and (5) set the rules for the selection of the measurement location on the noise affected premises by establishing a selection hierarchy for a relevant measurement location as follows:

- 1 Outside, away from other reflecting surfaces which can also be a location that gives an equivalent result to a location at the plane of an open window (refer third point below).
- 2 Outside, close to reflecting surfaces, for an entertaining area only.
- 3 Inside, at the plane of an opening.

⁸ NATA: National Association of Testing Authorities.

- 4 Inside a room with the openings into that room closed (please refer to 'Measurement with acoustic treatments' box at the end of this section⁹).

Clause 12(3) requires an external measurement location 3.5 metres from a vertical reflecting surface be used in the first instance (refer to 1), if it is deemed practicable and relevant by the investigating officer¹⁰.

The term 'relevant' has been included specifically to ensure a measurement location that provides an indication of the impact of the noise source on the envisaged amenity of the noise affected premises.

If it is not practicable or relevant to measure at a location that is 3.5 metres from a vertical reflecting surface, the measurement location selection hierarchy required by clause 12(3) is to determine if there is any other location outdoors that is practicable and relevant. This may be within 3.5 metres of a vertical reflecting surface, and should only be selected if it is in an outdoor area used for passive recreation such as under a porch or covered entertaining area. A location immediately outside of a window should not be used, as a more specific location (refer to 3) is provided for this scenario.

Clause 12(4) is invoked if an outdoor location cannot be found. In this instance the measurement location hierarchy is to select an openable window to a habitable room (refer to 3). A window can include a screened door which connects directly into the habitable room. The habitable room should be the one that is most relevant in providing a measure of the impact of the noise source¹¹.

This will generally be the habitable room closest to the noise source. A habitable room is defined by the Policy as any room other than a store, laundry, bathroom or toilet.

The window should be opened as wide as possible. In circumstances where the window opening is limited or the type of window is such that it may affect the result when compared to a wide and open sliding style window, then a measurement should be taken inside the room in accordance with clause 12(5)¹².

Clause 12(5) is invoked if there are practical or technical limitations in opening a window (refer to 4). In this instance the final measurement location in the hierarchy is inside the habitable room with the windows to that room closed. The habitable room should be the one that is most relevant in providing a measure of the impact of the noise source¹³.

Example 1

An air conditioning unit is located in the breezeway between two dwellings. The noise is evident in the adjacent carport and in a first-floor bedroom that has a window facing the breezeway. The distance between the two dwelling facades is less than three metres.

⁹ Despite the measurement procedure in clause 12, if acoustic treatments have been applied to a building to protect it from external noise and to provide internal noise amenity, measurements should be taken inside the room, with the benefit of the acoustic treatment/s. For example, if double glazed windows have been installed to reduce internal noise, then measurements should be taken inside the room with window closed. In this case, the compliance levels are those given in clause 5(8).

¹⁰ Refer to footnote 9.

¹¹ Refer to footnote 9.

¹² Refer to footnote 9.

¹³ Refer to footnote 9.

The noise is only just audible in the front and rear yards of the dwelling, but significant in the carport area and audible in the bedroom.

The first location to check under the hierarchy provided by clauses 12(3), (4) and (5) is one that is outdoors and 3.5 metres from a vertical reflecting surface. This would require the compliance measurement to be taken in the front or rear yard. These locations, whilst practicable, are not considered relevant by the officer because they do not provide a measure of the impact of the air conditioning unit.

The second location to check is any other possible outdoor location. The carport area is the closest to the noise source, but is not considered relevant, because it is a transient space and given the concern is the noise in the bedroom at night. The bedroom does not have a balcony, however, if it did, then this would be considered the measurement location in accordance with the selection hierarchy.

The third location to check is the openable window to the most affected habitable room. The bedroom is the closest habitable room to the noise source. The measurement is taken at the plane of the open bedroom window during the night time period.

A measurement location inside the room would only be selected if the window could not be opened, or if the window arrangement was considered to affect the reading compared to a wide, open sliding window.

Example 2

A complaint regarding a local concrete batching plant is made by a person who resides in a rural area on a large landholding. The dwelling is approximately 300 metres from the plant, but the landholding extends right up to, and shares a boundary with, the plant.

The first location to check is one that is outdoors and 3.5 metres from a vertical reflecting surface. This is anywhere between 3.5 metres from the house and 300 metres away at the noise affected premises property boundary with the plant.

The relevant measurement location in this situation would typically be adjacent the house rather than at a point on the edge of the property. This is because the land closest to the noise source is not 'regularly frequented', as required by clause 12(2).

Clauses 12(2), (3), (4) and (5) provide an authorised officer with flexibility to determine the most relevant measurement position. This will allow accurate assessment of noise impacts in a wide range of situations¹⁴.

Historically, under previous noise policies, measurement locations adjacent to reflecting surfaces were not able to be selected. This was to ensure that the results were not increased due to reflections. However, it often precluded an assessment being made at the most relevant location. For example, a location to assess the impact of an air conditioning unit was often in the rear garden of a dwelling away from the unit, rather than the nearest bedroom window or an outdoor covered area used for sitting and relaxation adjacent to the unit itself.

A mitigating circumstance when assessing a noise issue occurs when a reflecting surface has been recently introduced at the noise affected premises, such as the construction of an outdoor covered area, the effect of which has been to introduce a new relevant measurement location at which the noise source now no longer complies.

Clause 12(6) is in recognition of the specific measurement process for the assessment of frost fan noise, which, amongst other things in Part 6 Division 5, requires the windows to be closed, whether they can be opened or not.

¹⁴ Refer to footnote 9.

Clause 13 General procedures

Clause 13 provides the general rules for the measurement and assessment of noise during on-site investigation and generally reflect accepted practice.

The selection of a measurement location at least 3.5 metres from a vertical reflecting surface under clause 13(a)(i) is only required if it is practicable *and relevant* to do so. Refer to the clause 12 discussion regarding a relevant measurement place and the selection hierarchy.

Clause 13(a)(iv) requires that the wind velocity at the measurement location should not exceed five metres per second. This is to limit the influence of wind generated noise on the microphone itself, as well as limiting the influence of extraneous noise that generally increases with increasing wind speeds.

Clause 13(a)(v) requires that extraneous noise or other influences that are not associated with the ambient noise environment or the noise source be avoided. Typically this would involve a pause in the measurement during the flyover of a plane, gusts of excessive wind noise in the trees, noise from crickets, birds or passing of occasional local traffic.

Clause 13(a)(vi) requires that a noise assessment must account for any significantly varying meteorological patterns in the area. This clause relates to the influence that meteorological patterns can have on noise propagation where the noise source is more than approximately 100 metres from the noise affected premises.

When undertaking a measurement where the noise source is more than 100 metres from the noise affected premises, the measurement should be taken in meteorological conditions under which the complaint is occurring if it is possible to clearly identify these. This may require the establishment of a personal logging or diary procedure for the complainant to identify times and weather conditions when the greatest impacts occur.

Where such conditions cannot be established, the measurement can be made under any weather conditions considered relevant for comparison against the Noise Policy. The weather conditions at the time of measurement should always be recorded including the time of day, the amount of cloud cover, and the strength and direction of any breeze.

If such a measurement is taken and the result exceeds the noise goals of clause 18, then it would be the responsibility of the noise source to show that such conditions are not a significant pattern in the locality. A significant pattern is considered to be weather conditions that would provide the same or greater noise level at the noise affected premises for more than 10% of the year or 30% of any one season during the day or night period as relevant. If the weather pattern exists for less than those percentages, then the associated noise level should not be used for direct comparison against the Noise Policy, however the general environmental duty should still apply to the site.

If the measurement is taken and the noise goals of clause 18 are achieved, then no further action would be taken unless other significant weather patterns that may increase the noise level above the goals are considered to exist, during which time, another measurement should be taken.

To assist in determining the meteorological conditions conducive to noise propagation, reference should be made to the meteorological categories contained in CONCAWE Report 4/81¹⁵, or other similar meteorological categorisation methods.

¹⁵ Manning, CJ et al (1981), *The propagation of noise from petroleum and petrochemical complexes to neighbouring communities*, Conservation of Clean Air and Water in Europe (CONCAWE), Report 4/81, Den Haag, Netherlands.

Example

An industry in a rural setting operates over a 24-hour period and complaints have been received about the noise levels during the night. Noise diaries recorded by the residents reveal the complaints only occur with a light breeze from the noise source to the noise affected premises.

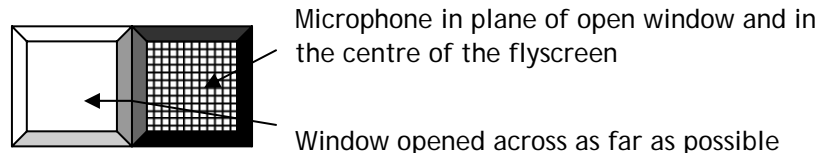
Noise level measurements that exceed the noise goals are taken at approximately 4 am. The meteorological conditions at the time of the measurement were recorded as a clear sky with light breeze from the noise source to the noise affected premises. These conditions equate to CONCAWE meteorological category 6, which is most conducive to noise propagation from the noise source to the noise affected premises.

A review of the meteorological conditions from the closest Bureau of Meteorology site reveals the conditions that result in a meteorological category 6 occur for more than 10% of the time of interest (10 pm to 7 am) over the year. Therefore, the measurement results stand and a comparison against the Noise Policy can be made.

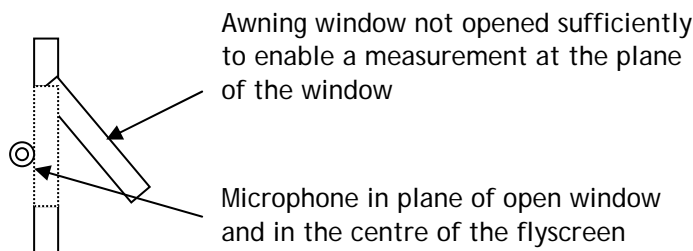
If the percentage of time for meteorological category 6 was found to be less than 10% of the time of interest over the year, then the measured noise level would not be used for comparison with the Noise Policy and measurements would be taken under other weather conditions. If the only weather conditions that result in the noise source exceeding the noise goals is meteorological category 6, then the general environmental duty should still be applied to the site.

Clause 13(b) provides the general rules for measurement at the open plane of a window. Refer to clause 12 Measurement Place, for discussion regarding selection of a relevant measurement location which may include an open window.

The window must be open as wide as possible, with the microphone being located in the middle of that opening. The other general rules for an external measurement still apply. A wide, open sliding window is shown in elevation in the diagram below with the correct microphone position also shown.



Clause 13(c) provides the general rules for measurement within a room where the window cannot be opened or where it cannot be opened sufficiently to deliver a similar result to a wide open sliding window. Refer to clause 12 Measurement Place for discussion regarding selection of a relevant measurement location which may include within a room. An awning type window is shown in section in the following diagram, for a situation where a measurement inside the room, rather than at the plane of the open window, will be required.



Clause 13(c)(i) outlines the measurement location within the room relative to walls and windows. It also requires a microphone location that provides the highest reading within that room. This recognises that varying noise levels can occur within a room depending on the type

of noise source and the room dimensions, and requires movement of the microphone location throughout the room to determine the location for the highest reading.

The other general rules for an external measurement still apply in clause 13(c).

Clause 14 Source noise level procedures

Clause 14(1) sets general rules that apply to the source noise level to enable comparison against the Policy.

Clause 14(1) sets the default period for the measurement at 15 minutes reinforcing normal practice for environmental noise measurements.

The default period may be changed provided the modified period is equally representative of the impact of the noise under investigation.

Example 1

A cooling tower serving a shopping centre operates at a constant noise level at the nearest noise affected premises.

A measurement period substantially less than 15 minutes can be selected because the resultant (continuous) noise level over a lesser period will be equal to the continuous noise level over a 15-minute period.

The reduced measurement period for a constant noise source should be such that the noise level (continuous) does not change by more than 0.1dB in a one-minute period.

Example 2

A delivery truck unloading process at a shopping centre that occurs at 5 am every morning is the subject of a noise complaint.

The delivery truck arrives and the process to unload from the moment it arrives through to when it leaves occurs over a 25-minute period. A range of noises result from the unloading process, including the use of air brakes on arrival, forklift movements, the operation of the truck's refrigeration system, and reversing tones when the truck departs. All of these noises contribute to the complaint.

A measurement of the total unloading process is taken. The highest noise level recorded in any 15-minute period within the unloading process, when penalised for the presence of characteristics in accordance with clause 14(3), is used for comparison against the Policy.

Example 3

A scaffolding company transports and stores a large number of metal rods on their site. The release of the rods into their storage area generates a peak noise event which is both impulsive and tonal, due to the sound of falling metal rod on metal rod. The noise is present for only 30 seconds in any one 15-minute period.

The default period of 15 minutes is still used for comparison against the Noise Policy. In a situation where the noise source is present for only a short period of time, a practical method is to measure the noise level (continuous) over that short period and then mathematically determine the noise level (continuous) when applied over a 15-minute period. This result will be lower than the measured noise level.

The default period of 15 minutes is used because the levels in the Policy are established based on a constant period of exposure of up to 15 hours during the day and nine hours at night. Therefore, 15 minutes would generally be the shortest measurement period for which a meaningful comparison with the Policy can be made.

However, the measured noise level would have 8dB(A) added to it due to the presence of two characteristics in accordance with clause 14(3).

Clause 14(2) requires that the influence of ambient noise should be removed from the source noise level measurements for the purposes of comparison with the noise goals.

The simplest method to ensure the ambient noise is removed from the source noise level is to measure at a time when the ambient noise is sufficiently low [more than 10dB(A) below the source noise level]. Another common method in a varying ambient noise environment is to eyeball the instantaneous noise measurements against what is being heard at the measurement location to identify the noise source above the ambient. This method should only be used by experienced practitioners who are able to convert the instantaneous noise measurements back to an equivalent (or continuous) level.

It is also possible to mathematically remove the influence of the ambient noise (continuous) from the source noise (continuous) by logarithmic subtraction. Care should be exercised using mathematical adjustment, which is generally only applicable where the ambient noise environment is reasonably consistent.

The following table provides a method for mathematical subtraction, where:

A = the measured result on site of the noise source plus ambient noise level (continuous).

B = the result of the ambient noise level (continuous) only measurement.

C = the noise source level (continuous) only with the influence of the ambient noise level (continuous) removed in accordance with clause 14(2), for the purposes of comparison with clause 18.

Table 2 Adjustment of ambient noise influence

A minus B	C
0	At least A minus 10*
1	At least A minus 5*
2	A minus 4 [†]
3	A minus 3 [†]
4	A minus 2
5	A minus 2
6	A minus 1
7	A minus 1
8	A minus 1
9	A minus 1
10 or more	A

Notes:

* Such a result indicates that it is unlikely that noise from the noise source is an issue due to the masking effect of the ambient noise. This should be evident under the background noise level test of clause 18(2)(a).

^{*}, [†] Extreme care should be exercised with such results as it indicates a difficult measurement. The measurement should be repeated over a number of periods to give confidence in the result. It may require measurement during periods of low ambient, even if that does not correspond to the time of complaint, to get a definitive result.

Clause 14(3) establishes the rules for the application of penalties to the source noise level for the presence of characteristics.

Characteristics are defined in Part 1 clause 3. The penalties are applied in recognition of the annoyance generally associated with a noise which is dominated by a tonal, modulating, low frequency dominated or impulsive characteristic.

A penalty is applied for every characteristic present up to a maximum of 10dB(A). In previous legislation each characteristic warranted a 5dB(A) penalty, however, the practical effect of this was a reluctance to acknowledge and apply more than one penalty due to the significant difference it made to the measured result.

A sliding scale is used under clause 14(3), whereby the presence of any one characteristic attracts a total penalty of 5dB(A), two characteristics a total penalty of 8dB(A) and three or four characteristics, a total penalty of 10dB(A).

Example: Clause 14(3) Penalty for Characteristics

A forklift moves scaffolding rods around on a storage site. The release of the rods into their storage bins generates a peak noise event which is both impulsive and tonal, due to the sound of metal rod on metal rod. The forklift moves around to various bins and collection areas, and its noise level varies significantly in doing so. The ambient noise level is at a low level and does not diminish or mask the impact of the forklift moving and dropping scaffolding rods.

The source noise level (continuous) over a 15-minute period during movement of the forklift and release of the rods is 50dB(A) measured in accordance with Part 3 of the policy.

The release of the rods is associated with the presence of two distinct characteristics that are fundamental to the nature and impact of the noise, being impulsiveness and tonality. The movement of the forklift is associated with the presence of one distinct characteristic that is fundamental to the nature and impact of the noise, being modulation. Clause 14(3)(c) therefore requires the application of a 10dB(A) penalty.

The source noise level (continuous) used for comparison with the indicative noise level determined under clause 5 becomes 60dB(A).

Clause 14 (3) is not applied to a source noise level (continuous) for the purposes of the background plus 5dB(A) test of clause 18(2)(a). This is because the test in clause 18(2)(a) is preserved as a simple and conservative comparison against the ambient environment.

Clause 14(3) is not applied to Part 6 Division 5 (frost fans).

Clause 15 Background noise level and ambient noise (continuous) procedures

Clause 15 sets general rules that apply to the measurement of the background noise level and the ambient noise level (continuous).

Clause 15(1)(b) requires that the period for measurement should be adequately representative of the nature of the ambient noise. Generally, this means the ambient noise measurement should include the same influences that are present during the noise source measurement.

Clause 15(2) deals with the situation where the ambient noise (continuous) or background noise cannot be determined, because it is not reasonable or practicable to stop the noise source, or because there is extraneous noise adversely affecting the measurement. The clause allows for the selection of an alternative remote location subject to the requirements of clause 15(2)(a) to (c) inclusive.

Example: Clause 15(2)

A large industry that cannot be shut down is located two residential blocks away from a major road. Between the major road and the industry is a residential area, with no significant ambient noise sources other the influence of the major road.

An alternative location will therefore be two blocks away from another section of that same major road that carries the same or similar traffic content and where the influence of the industry and other significant ambient noise sources are not present.

When relying on the background noise level test under clause 18(2)(a) to satisfy the general environmental duty, the lowest background noise level regularly expected at the noise affected premises over a 15-minute period should be used. The 15-minute period should be at a time when the noise source is expected to operate under the conditions for which a complaint occurs.

Typically, the process to determine the lowest background noise level will initially be to undertake an attended measurement. The time of the measurement should be such that it is likely to deliver the lowest background noise level. For example, for a complaint during the night time from a 24-hour operation, a measurement at 3 am on a weeknight would be required. The ambient noise sources that may contribute to the background noise level should be determined during the attended measurement.

If it appears from the results of the attended measurement that the test under clause 18(2)(a) may be applicable, then continuous logging of background noise levels every 15 minute over the period of interest should be undertaken to confirm the lowest result. The logging should be carried out over a sufficient period to enable a conclusion to be drawn regarding the likelihood of having captured the lowest regularly occurring background noise level.

The ambient noise sources that may contribute to the background noise level should be considered when determining the period of logging required.

The shortest acceptable logging period would be the night (10 pm to 7 am) or day (7 am to 10 pm) as relevant to the complaint. This length of logging period would only be used where the background noise is expected to be regular and consistent from day to day. This is most likely to occur in the vicinity of a major road corridor. A longer period will be required where variation is expected, as will be the case where the weather conditions are the major influence.

In general, the lowest 15-minute background noise level recorded during the period of complaint is used. Other practices, such as averaging the results, or determining the 90th percentile, of a number of 15-minute background noise level results is not acceptable for the clause 18(2)(a) test.

Clause 16 Rounding

Clause 16 recognises the level of accuracy appropriate for an environmental noise assessment when taking into account the influence of meteorological conditions, sound level meter accuracy, the flexibility within the measurement procedure and the use of indicative noise levels. Therefore, all measurements taken for the purpose of comparison with the Noise Policy are rounded to the nearest whole number. Note that fractions between 0.5 and 0.9 should be rounded up, whilst fractions between 0.1 and 0.4 should be rounded down.

Part 4 General noise control provisions

Clause 17 Application of part

The General Noise Provisions establish the rules to secure compliance with the general environmental duty of the EP Act for most noise sources, other than those excluded by Schedule 1, or subject to more specific or tailored rules within Part 6 or Part 7.

Clause 18 Compliance with noise goals satisfies general environmental duty

Clause 18 establishes the circumstances that a noise source will satisfy the general environmental duty of the EP Act, and, as such, will be under no legal obligation to take further noise reduction measures.

There are two tests to secure compliance, either of which can be met.

The first test under clause 18(2)(a) is commonly known as the 'background plus 5dB(A) test'. It is retained as a long established method for determining the potential annoyance of a noise. Noise, which exceeds indicative noise levels and may be considered excessive in some circumstances, can be masked by background noise, and therefore be considered acceptable. The background plus 5dB(A) test is used in this circumstance.

The background plus 5dB(A) test is used by the Noise Policy as a simple comparison against the influence of the ambient noise environment. It is not subject to a penalty for characteristics under clause 14(3) and therefore, the noise measurement procedures of the Noise Policy generally require the background noise level used in the assessment to be the lowest expected during the time of complaint from the noise source.

The second test comprises comparison of the assessed noise with the indicative noise levels, as determined in accordance with clause 5. This will be the more commonly used test, because complaints more readily occur when the noise source (continuous) is more than 5dB(A) above the background noise level of the ambient noise environment.

If *both tests* cannot be met, then clause 19 is invoked, which provides the criteria for determining the action to be taken. Note that only one of the above tests needs to be met to satisfy the requirements of the Noise Policy.

The inability to meet both of the tests in clause 18 is, in itself, no indication that excessive noise is being generated and that action must be taken. The clause 18 tests are not mandatory because the tests make no account for the broad range of factors that affect the impact of the noise. Rather, the noise goals are established on the basis of a noise source generating the relevant level over the full day and/or night time period and therefore provide a conservative line under which no further action needs to be taken, regardless of those factors.

It should be noted that noise from the noise source can still be audible and may annoy some people even when complying with one or both of the tests under clause 18.

Clause 19 Criteria for determining action to deal with non-complying noise

Clause 19 establishes the criteria that the Authority must have regard to when determining what action, if any, to take if the noise goals under clause 18 cannot be met. The clause 19 criteria also assist in determining the time to implement those actions.

The action taken will be subject to the facts and degrees of each situation when considered against the clauses 19(a) to (i) inclusive.

For example, clause 19(a) could result in action being taken because the noise source exceeds the indicative noise level by a significant margin. Clause 19(a) could also result in a decision

to take no further action because the noise is present for such a short period of time. Other examples are provided below.

The application of the Noise Policy to a range of situations will provide further assistance in deriving actions and timeframes from the criteria.

The following are provided as examples only and should not be interpreted as how similar situations should be or would be resolved by the EPA. Each situation should be assessed and resolved based on its own merit.

Examples

Clause 19(a): The amount by which the noise exceeds the relevant level and its frequency and duration.

Example 1

A manufacturing plant that has a history of noise complaints is investigated by an authorised officer who measures a source noise level (continuous) that, when adjusted for characteristics in accordance with clause 14, is 15dB(A) above the night time indicative noise level, and 20dB(A) above the lowest background noise level. The main noise source is a recently installed cyclone extraction unit which can be retrofitted with a range of commercially available measures to reduce the noise, and that operates 24 hours a day. In this case, where the amount above the relevant level is substantial, the impacts are of a constant and long duration, and a solution is readily available, there should be a need to take corrective action within a short timeframe.

Example 2

A works depot that otherwise meets the relevant noise levels uses a mechanical street sweeper to clean a concrete apron during normal daytime business hours at the end of each week. The process results in noise levels 5dB(A) above the indicative noise level, but this only occurs for five minutes. The street sweeper has a proprietary muffler in place and there are noise levels in the ambient environment of a similar level and duration. In this situation, there should be no need to take action under the Noise Policy provided a more suitable time for the concrete cleaning is not available.

Clause 19(b) The ambient noise is of a similar level, character, regularity and duration to the noise source.

Example 1

A trucking firm operates two separate freight depots. One depot is adjacent to a major highway carrying heavy vehicles. The ambient noise of the area is dominated by the highway. The second depot is located away from any major roads and is serviced by an access road that is normally only used by heavy vehicles associated directly with the depot.

In this situation, the heavy vehicle movements associated with the second depot (located away from a major road) will generate greater annoyance for surrounding residents. A higher emphasis should be placed on corrective action for the second depot in accordance with clause 19(b).

Example 2

During vintage, a winery has a number of trucks entering and leaving its site throughout the night. The winery is located on a major road carrying many heavy vehicles servicing other wineries in the vicinity. The noise levels at the nearest residential land use from trucks using the major road are greater than, and at a greater frequency of occurrence, than the noise level associated with a truck moving on the winery site. In this situation, there should be no need to take action under the Noise Policy, provided the character of the noise is similar. An example where the character of the noise from trucks on the road differs from trucks moving on the winery site will occur where reversing on the site is common, and reversing tones emanate from the site.

Clause 19(c) The time of occurrence of the noise.**Example**

The unloading process at a warehouse occurs at approximately 3 am to correspond with the truck company's preferred route. This has occurred regularly for the past eight years. Recent complaints have been received and whilst the noise level is only marginally above the indicative noise level, it is disturbing sleep at the nearest house.

There are limited noise reductions measures that can be taken without changing the loading dock arrangement, which is not possible on the site.

The truck company reviews the current route arrangements, and determines that with minimal disruption the unloading process can be changed to occur between 10 pm and 10.30 pm. Whilst the noise level or the period of assessment has not altered, the Noise Policy recognises the time of occurrence is now acceptable and no further action should be taken.

Example

A peaking power station is located approximately 500 metres from an isolated dwelling. The same supply company operates a peaking power station with the same capacity at 500 metres from a country township. The cost to provide acoustic treatment to the power stations to achieve a minor noise reduction is estimated as \$2 million. Priority is placed on reducing the noise from the power station adjacent the country township due to the wider scale of impacts and the cost of treatment per house. Acoustic treatment for the isolated dwelling is allowed in lieu of enforcing the upgrade of the total power station site.

Clause 19(e) and (f) The land uses and activity existing in the vicinity when the noise source was first undertaken and when the occupancy of the noise affected premises first occurred.

Clause 19(e) and (f) acknowledge that encroachment of conflicting land uses on or in established areas should be considered when determining the timing or extent of action required to reduce excessive noise. The concepts of existing use and buyer beware are often raised when investigating noise issues. The Noise Policy, through clauses 19(e) and (f), gives due consideration to the concepts.

Example

A cabinet maker has operated for the past 15 years on the edge of a light industrial area. In the last five years, adjacent vacant land has been subdivided and a housing area developed.

In the same council area, a similar sized cabinet maker gains development approval adjacent to an established housing area.

Whilst the solutions to reduce noise impacts will be similar in both situations, the new cabinet maker adjacent the established housing area should be made to implement the solutions in a significantly reduced timeframe in comparison to the long established cabinet maker.

All efforts should be made to assist the established cabinet maker to make the transition to the new situation in which the business has been placed by changes to land uses in its vicinity. Clause 19(e) and (f) promote this transition.

On the other hand, clauses 19(e) and (f) place the onus of responsibility to implement noise reduction measures in as short a timeframe as practicable with the newly established cabinet maker adjacent a long established residential area.

Clause 19(g) and (h) Whether Development Plan provisions have changed since the noise source activity was first undertaken or since the occupancy of the noise affected premises first occurred.

Clause 19(g) and (h) provide further consideration to the concept of existing use rights by considering changes to the Development Plan, and therefore the applicable indicative noise levels that may have affected an existing land use.

For example, if a Development Plan has been changed to promote residential land use in an area where a manufacturing industry has been operating for a long period of time, clauses 19(g) and (h) promote a transition period to occur and provide for an extended period to implement noise reduction measures.

Another example may occur where existing rural living properties in an expanding wine region are located in an area re-zoned to promote viticulture and winery development. In this instance, Clause 19(g) and (h) provide for the implementation of noise reduction measures in the shortest practicable timeframe.

Clause 19(i) Any other matter to be taken into account under clause 25 of the EP Act or determined to be relevant by the Authority or another administering agency.

Clause 25 of the EP Act is known as the general environmental duty. The general environmental duty is to take all reasonable and practicable measures to prevent or minimise noise when considering the sensitivity of the receiving environment, financial implications and the state of technical knowledge.

Clause 19 establishes the sensitivity of the receiving environment through consideration of a range of factors including the number of people affected and any special needs for quiet, the land use and Development Plan history of the area, and the influence of the ambient noise environment.

Example

A new gas turbine power plant is found to be generating a noise level that is 3dB(A) above the relevant indicative noise level. On investigation, it is found that the turbine does not incorporate an air intake attenuator and that this is the primary cause of the elevated noise level. Throughout the industry, air intake attenuators are standard on all new gas turbine plants and proprietary products are available. The general environmental duty would indicate a need for corrective action without the existence of any industry based financial or technical impediments.

The general environmental duty may also provide protection against seeking a solution that is not reasonably practicable or tested. It may be unreasonable for an order to require a noise level to be achieved where such a solution is not possible with current technology or state of knowledge.

Clause 19(i) also provides the ability for the Authority to consider any other matter determined to be relevant. This is in recognition of the complex set of factors applicable to a broad range of potential situations under clause 19 and the inability for these factors to be an exhaustive list. Therefore, where relevant but unforeseen factors arise, the Policy provides the flexibility to consider these.

It should be recognised that the clause 18 noise goals are not mandatory and, following consideration of the factors laid out in clause 19, assessment by the Authority or other administering agency may permit the noise source to continue operating at levels in excess of the noise goals.

Example

A wheat farm is located in a general farming zone. A number of residences exist adjacent the wheat farm within the same zone, with some of these residences used for rural living purposes, and others associated with an agricultural land use other than wheat farming.

The general farming zone principally promotes a range of agricultural activity.

The wheat farm is the only land use in the area that needs to harvest overnight and many complaints have been received about the night-time noise level associated with harvesting activity.

The noise level from the harvesting process has been measured at 65dB(A) with the machinery at the closest location to the houses over a 15-minute period. The noise is reasonably steady over that 15-minute period and a penalty for characteristics under clause 14 is not considered to be warranted.

The background noise level is of the order of 25dB(A) with no appreciable ambient noise sources in the surrounding environment. The indicative noise level of 50dB(A) is derived from the Rural Industry land use category at night.

A practicable option to reduce the noise level by 15dB(A) at each affected residence does not exist. The harvesting method is no different to any other within the industry, and a muffler has been fitted to the equipment.

The duration of the harvesting period is limited to an extremely small portion of the year.

The farmer has modified his harvesting method to harvest the areas closest to the residents either during the day, evening or as early into the night as possible. In addition, the local residents are made aware of the times of harvest prior to it being undertaken.

Under clause 19, it is determined that the above factors should allow for the continuation of harvesting at levels well in excess of the noise goals subject to maintaining the muffler in good working order, minimising the amount of night-time harvesting immediately adjacent to the property boundary, and informing local residents prior to the beginning of the harvest period.

Part 5 Development authorisation applications

Clause 20 Development authorisation applications

Clause 20 provides the rules which apply to assessment of development applications under the EP Act. A principle of clause 20 is to provide for a consistent but more stringent assessment procedure to the general noise provisions in Part 4 of the Noise Policy. The more stringent procedure is in recognition of a range of factors including the increased sensitivity to noise of noise affected premises to a new noise source, the increased scope for inclusion of reasonable and practicable noise reduction measures to new development, and the cumulative effect of noise.

An objective of clause 20 is to extend the noise policy beyond the management of existing complaint situations to a more proactive approach that provides clear expectations for developers and the community. It also provides planning authorities with the template to set consistent environmental standards across the state's Development Plans.

Clause 20(1) sets the scope of application to proposed development referred to the Authority under the Development Act 1993, which is development of environmental or major environmental significance.

Whilst the scope of application is in accordance with the statutory role of the Authority, the provisions in clause 20 should be used by both the EPA and planning authorities as a basis for consistent assessment of other proposed development where an assessment of the potential for noise nuisance is required. For specific activities, Parts 6 and 7 of the Noise Policy will be more applicable and should be used.

Clause 20(2) provides the links between the defined terms in other Parts of the Noise Policy with the proposed development, and in so doing, establishes the noise source as the proposed development, the noise affected premises to be those premises in the vicinity of the development, and the source noise levels to be those predicted for the development. If the subject of a development application relates to a noise receiver (for example, a new land division encroaching up to an existing industrial area), then Part 5 does not apply.

Predictions of the source noise levels for distances over 100 metres should be made using default weather conditions that are equivalent to CONCAWE meteorological category 6 at night, and CONCAWE meteorological category 5 for the day period. A different weather category to the default values can be used for comparison against the Noise Policy where it can be shown that the associated weather conditions occur for less than 10% of the year and 30% of any one season during the day or night period as relevant.

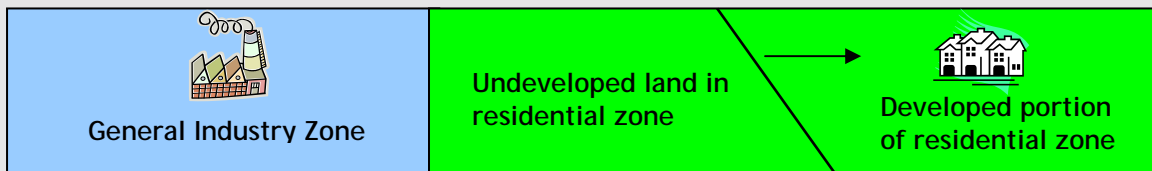
Clause 20(2)(b) provides for the rules of clause 20 to apply to future premises. This should only occur where the Development Plan establishes a zone that principally promotes residential or rural living land uses in the vicinity of the proposed development and an *approved* development application exists for future dwellings that are closer to the noise source than existing premises. In other cases, the existing premises should be used as the noise affected premises. An example follows below.

Clause 20(3) establishes that the noise goal for the proposed development will be the indicative noise level derived in accordance with the Noise Policy, less 5dB(A). For the scope of application of clause 20, the assessment of development is more stringent than the assessment of an existing situation by a factor of 5dB(A). This may not be the case for other development of a specific kind assessed using the provisions of Parts 6 and 7 of the Noise Policy.

Example

A foundry is proposed for development in a general industry zone that interfaces with a residential zone.

The residential zone is only partially developed and a significant tract of undeveloped residentially zoned land exists between the closest existing premises and the general industry zone.



The night-time level is the critical requirement, because of the 24-hour nature of the development. Clause 20(3) sets the noise level for assessment of development to 45dB(A), or 5dB(A) less than the indicative noise level.

The level of 45dB(A) is applied at the nearest existing residential location.

Clause 20(2)(b) allows for future premises to also be considered. A check is made with the council and there are no approved development applications for future premises closer than the nearest existing residential premises. If there were, a level of 45dB(A) could be applied to this future dwelling in accordance with the clause.

Notwithstanding that a development application has not been approved at this point in time, the undeveloped portion of the residential zone is envisaged to be developed in the future. Therefore, a practical approach would be to require the proposed noise source to achieve the following:

- 1 a level of 45 dB(A) at the nearest existing residential premises; and
- 2 a level corresponding to the indicative noise level 50dB(A) at the general industry zone interface with the residential zone.

This approach ensures:

- 1 compliance with the requirements of Part 5 of the Policy for all existing premises;
- 2 a reasonable level of amenity for future dwellings in the undeveloped portion of the residential zone; and
- 3 the ability for the foundry to operate unhindered in the future because it will achieve the indicative noise level of the Policy in the undeveloped portion of the residential zone.

Clause 20(4) limits the impacts from new development on a quiet locality to the World Health Organization (WHO) recommendations for community noise¹⁶.

A quiet locality is defined in the Noise Policy as a locality (zone, policy area, precinct or the like) which would be assigned a Rural Living or Residential land use category in accordance with the provisions of the Noise Policy. The development does not need to be proposed for a site in the quiet locality for clause 20(4) to apply. Clause 20(4) underpins the Noise Policy as it provides for the long-term achievement of the WHO recommendations in residential areas.

When using clause 20(4), if a noise affected premises is in a quiet locality, the noise level shown are not the automatic default noise levels; they are the ceiling noise levels. For example, if after carrying out the averaging pursuant to clause 5(5), the indicative noise level, less 5dB(A) required by clause 20(3) is less than 52dB(A) day and 45dB(A) night, then the lower levels—and the maximum of 60dB(A) required by clause 20(4)(c)—should be used. It is only when the averaged indicative noise level, less 5dB(A) [clause 20(3)] is greater than 52dB(A) and 45dB(A) night that clause 20(4)(a) and (b) are used. Clause 20(4)(c) should be used in any case where the noise receiver is in a quiet locality.

Clause 20(5) establishes that the provision of information and documentation associated with the prediction of noise levels and assessment of impacts under clause 20 is the responsibility of the applicant for the development.

This information will not need to be sought for all development applications. The Authority may determine that the potential for noise nuisance is not sufficient to need to seek that information, or it may have sufficient data based on development of a similar kind or nature or other information that enables the Authority to assess the impacts of the proposed development without further information from the applicant.

A method to determine the need for an acoustic report is provided in the EPA's Guidelines for separation distances¹⁷. If the separation distance is less than that recommended then that may trigger a need for further information.

When in doubt, an acoustic report provided by an independent acoustic engineer, should be sought from the applicant. An acoustic engineer is defined for the purposes of these Guidelines as an engineer deemed by the EPA to have sufficient experience in acoustics and who is eligible for membership (full member) of both the Australian Acoustical Society and the Institution of Engineers, Australia.

An acoustic engineer's report should provide the following minimum information:

- site description including the relative location of noise sensitive receivers
- the noise sources on the site

¹⁶ Berglund B, Lindvall T and Schwela DH (1999), World Health Organization Guidelines for Community Noise.

¹⁷ Guidelines for separation distances (2007c).

- the scope of the assessment
- the criteria used in the assessment
- details of any measurements undertaken and/or sources of historical data for the noise sources;
- operational assumptions used
- the prediction method and weather conditions used
- summary of predicted noise levels versus the criteria
- details of any recommended acoustic treatment/s
- with the acoustic treatment/s in place, what will the predicted noise level be at noise affected premises
- conclusion based on the above.

The default weather conditions used for predicted noise levels should be those that correspond to a CONCAWE meteorological category 6 at night, and a meteorological category 5 for measurement during the day period.

A different weather category to the default values can be used for comparison against the Noise Policy. It is the responsibility of the developer to show that the default conditions are not a significant pattern in the locality.

Clause 20(6) acknowledges that, in a similar way to the tests provided under clause 18 of the Noise Policy, the inability to meet the tests in clause 20 is, in itself, no indication that excessive noise is being generated by the proposed development. As for clause 18, the clause 20 tests are not mandatory because the tests make no account for the broad range of factors that affect the impact of the noise. Rather, the clause 20 tests provide a conservative line under which no adverse impacts are expected, regardless of those factors.

Clause 20(6) establishes the criteria that the Authority must have regard for when determining its response to a development that does not achieve the objective tests in clause 20. The criteria are consistent with those in clause 19.

It should be recognised that, following consideration of the factors laid out in clause 20(6), the Authority may determine that the proposed development can operate at levels in excess of the objective tests of clause 20. If this is the case, then section 25 of the EP Act is deemed to be met and environmental harm or nuisance is not created.

Example 1

A large gas turbine power plant providing base load infrastructure is proposed for development in a special industry zone that interfaces with a residential zone.

The indicative noise level for night-time operation is 53dB(A). The night time level is the critical requirement, because of the 24-hour nature of the development. Clause 20(3) sets the noise level for assessment of development to 48dB(A), or 5dB(A) less than the indicative noise level.

The factors for consideration under clause 20(6) are determined by the Authority to not constitute any allowance to exceed the assessment level of 48dB(A), due to the 24-hour nature of the development, the lack of any major ambient noise sources, the widespread nature of the impact and the ability for the proposal to implement reasonable and practicable noise reduction measures.

Clause 20(4) is invoked because the noise affected premises are located in a residential zone. Therefore the night-time level for assessment becomes a continuous level of 45dB(A).

Information is sought from the applicant for documentation providing predictions and technical details that show the proposal can achieve a noise level of 45dB(A) at the nearest noise affected premises.

Example 2

A workshop is the subject of an upgrade including the relocation of existing roller doors away from nearby residents and the construction of an office area off to the side. There is no proposal to extend the existing hours of operation or to increase activity on the site.

Complaints have been received regarding noise from the workshop and the upgrade provides the opportunity to reduce the existing impacts, particularly with the relocation of the doors away from residents.

In this situation, it is difficult to identify the component of the work that represents the new noise source. A new noise source would be assessed in isolation under Part 5. An alternative method of assessment where it is difficult to identify the new component of work is to require noise from the total site to not increase and to achieve the indicative noise level of the Policy, as distinct to the indicative noise level less 5dB(A). In any case, the total noise from the premises should not exceed the requirements of clause 18(2).

Such an approach would result in reduced noise levels from the total site and bring that site into compliance with the Policy.

Part 6 Special noise control provisions

Part 6 establishes special controls for noise sources that may be the subject of more definitive controls. These noise sources are generally associated with activities on or adjacent to residential land uses but can include any activity which would benefit from being subject to more specific or tailored provisions than provided for by the general provisions (Part 4) of the Noise Policy.

Part 6 incorporates mandatory provisions which attract a defined penalty upon failure to comply. This penalty is a Category B offence under the EP Act, with a maximum fine of \$4,000 or a \$300 expiation fee.

The special noise sources addressed in Part 6 are:

- construction noise
- domestic noise (fixed noise sources and general activity)
- rubbish collection, street sweeping, mulching machines, etc
- building intruder alarms
- frost fans.

Part 6 may be amended using the simplified procedure under clause 8.

Division 1 Construction noise

Division 1 deals with the source of a relatively large number of common complaints received by the Authority regarding construction noise, in particular early starts on construction sites in residential areas. The control strategy recognises that construction activity can be inherently noisy, and aims to achieve a balance between allowing that work to proceed and minimising its impact on neighbouring properties.

The revoked noise legislation in South Australia did not specifically address construction noise other than limited reference to some equipment used on construction sites. The Noise Policy

provides transparency and consistency for the construction industry and the community in relation to noise regulation.

Division 1 has been established to deal with typical construction activity carried out over a normal construction period. Therefore, a site with a particularly noisy activity that is consistent over and beyond a 12-month period of duration or that generates vibration or that undertakes other activities not associated with a typical construction site should be subject to additional requirements in accordance with the general environmental duty of the EP Act. These may include the development of a Noise Management Plan or a monitoring program to control the additional impacts.

The general philosophy of Division 1 is that construction noise is inherently noisy with limited opportunities to reduce that noise, however, it is also temporary, and as long as it is carried out during acceptable hours taking all reasonable and practicable noise reduction measures, it is considered acceptable. Division 1 also allows operation outside of the hours deemed acceptable, provided the noise levels generated do not wake up a person (as defined by the recommended limits of the WHO) or where mitigating circumstances exist (such as public safety). This philosophy is applied to other Divisions in Part 6, and can be applied to other similar issues where shorter term impacts occur.

Clause 21(1) defines construction activity to include demolition work, site preparation, and building maintenance or repair work. It also includes the operation of vehicles within or entering or leaving the construction site, and captures activities at or within the immediate vicinity of the site.

An issue associated with dealing with construction noise has been identifying the person responsible for the work. Clause 21(1) therefore provides an ability to identify the relevant person to ensure compliance and can include the owner, occupier, contractor and head contractor.

Clause 22 applies the Division only to works that are required to be authorised under the Development Act. This is to ensure maintenance work around the home is assessed under the appropriate division relating to domestic activity (refer to Division 2). The Division does not include works on public infrastructures such as roadways or railway systems due to the specific requirements such projects often have, which often include operation at night.

Clause 23(1) (a) restricts the hours of construction activity where it has an adverse impact on residential amenity.

The test that determines whether noise is having an adverse impact is provided in clause 23(3) and is based on the potential for sleep disturbance in accordance with WHO recommendations. An adverse impact is where noise exceeds the levels in clause 23(3).

Construction activity that does not exceed the levels in clause 23(3) is not subject to restricted hours of operation.

Clause 23(1)(b) enables construction activity to be undertaken outside the specified hours under mitigating circumstances. For example, construction activity requiring a crane may occur outside the specified hours if the only safe and practicable location for that crane is on a busy road that carries heavy vehicle and pedestrian traffic during the day. Another common example provided for by clause 23(1)(b)(ii) is the ability to perform concrete pours before 7 am on days when the temperature will exceed 35°C. Where such events are allowed prior to 7 am, the general environmental duty to take all reasonable and practicable measures to reduce noise still applies. In the example of the concrete pour, this would mean: ensuring the council in which the activity is occurring agrees that it is necessary to commence prior to 7 am due to the forecast temperature and consent to do so has been obtained from the council; to minimise the impact of the early morning start, all preparatory work has been

completed the day before the pour; and it can be demonstrated that the neighbours have been informed of the need to pour before 7 am.

During the specified hours for construction activity, noise level limits are not placed on site activity but all reasonable and practicable measures to minimise noise should be taken in accordance with clause 23(1)(c). Clause 23(1)(c) provides for rectification of any unnecessary noise from the construction site whilst allowing for normal activity, sometimes at high noise levels, to continue.

The measures listed in 23(1)(c)(i) through (vii) provide a list of simple and straightforward controls to minimise off-site impacts. They can be enforced through the issue of an environment protection order following an inspection by an officer appointed under the EP Act. As noted previously, this list may need to be expanded for some construction sites with additional impacts above and beyond the norm.

Clause 23(2) makes it mandatory to comply with the noise level limits or restricted hours of operation, unless a the mitigating factors provided for in Clause 23(1)(b) apply with supporting evidence.

Clause 23(3) defines the test for an adverse impact on amenity. The WHO guidelines provide sleep disturbance criteria for both a continuous noise level and an instantaneous maximum event. Therefore, both a continuous and maximum noise level test is provided in clause 23(3).

Clause 23(4) recognises that a sufficiently loud ambient noise environment will reduce the impact of construction noise. This clause is an exception to clause 23(3), allowing the levels set in the tests to be increased in the presence of sufficient ambient noise.

For Clause 23(4)(b) to be invoked, maximum noise levels in the ambient environment have to consistently exceed 60dB(A). The occasional passing of traffic, or infrequent noise from planes is not consistent enough to be used to invoke clause 23(4)(b). A major road, where noise from traffic is effectively always present provides an example of the consistency required to invoke this clause.

Once invoked, the source noise level does not result in an adverse impact on amenity unless it exceeds the consistent ambient maximum noise level, or unless it exceeds the frequency of occurrence of maximum noise events in the ambient environment.

Example

A complaint is received about a nail gun that is being used on average once per minute from 6 am. The average noise level is within the 45dB(A) requirement, but the maximum noise level is 65dB(A). The noise affected premises is in the vicinity of a busy road. From 6 to 6.15 am, 30 vehicles have passed with a maximum noise level of approximately 70dB(A) from each pass-by.

The nail gun is not considered to have an adverse impact on amenity under Clause 23(4)(b) because neither the maximum noise level of the nail gun exceeds the consistent maximum noise level of 70dB(A), nor does the number of nail gun impacts exceed the number of passing vehicles. If the rate of nail gun impacts was increased to greater than one per 30 seconds, then construction activity could not start until the hours specified in clause 23(1)(a).

Division 2 Domestic noise

Division 2 will assist the Authority and local councils to manage one of the most common sources of noise complaints: noise from domestic premises.

This division recognises the inherently noisy nature of some domestic activities, such as general maintenance around the house, and aims to balance the need for the activities to occur at reasonable times against the impact on neighbouring properties.

Clause 24 limits the application of Division 2 to specific activities and machines. The Division intends to capture the use of machinery, tools and equipment on domestic premises. Common examples include the use of lawnmowers, leaf blowers, drills, hammers and other handheld tools, air conditioning units and pool pumps. Other common sources of noise from domestic premises, such as party noise, will continue to be assessed under the general environmental duty provisions of the EP Act. Reference should be made to Schedule 1 for a list of these activities.

Clause 25 Fixed domestic machine noise

Clause 25 specifically addresses noise from fixed domestic machines such as air conditioning units and swimming pool pumps.

Mandatory noise levels are established to address the combined effect of all fixed noise sources within a residential property. The levels and times are the same as those set for residential land use under the general provisions of the policy.

Clause 25(1) makes it an offence for an installer to install a machine in a position that results in noise levels that cause an adverse impact on amenity.

Clause 25(2) makes it an offence for an owner or occupier of a domestic premise to operate a machine that results in noise levels that cause an adverse impact on amenity or that is producing a noise that could be fixed by maintenance or repairs.

The tests which determine whether noise is having an adverse impact are provided in clause 25(5) and are based on WHO recommendations.

Clause 25(3) provides a level of protection to an installer for issues that may have arisen after the installation. An installer is not guilty of an offence unless there is proof that:

- the machine is operating without an audible defect; and
- a barrier which provided sufficient noise reduction at the time of installation is still in place.

In addition, clause 25(4) provides a defence to an installer if an installer can prove that plans existed (before installing the machine) for the owner or occupier to construct a barrier that would provide sufficient noise reduction.

Example 1

An installer places an air conditioning unit along the side of the house inside a solid sheetmetal fence. The sheet metal fence provides sufficient noise reduction to the neighbour to comply with the noise level limits of clause 25(5). The resultant noise levels are recorded.

Following installation and operation of the unit, the fence is removed by the owner of the premises and replaced with a brush fence. The brush fence allows noise through it, and the levels in clause 25(5) are subsequently exceeded. The installer has a defence under clause 25(3) as a result of the removal of the solid fence.

Example 2

An installer advises against locating an air conditioning unit adjacent the boundary with the neighbouring property. The owner of the house informs the installer that a solid wall is to be built on the property boundary and presents a plan and quote for its construction. A record is kept of the plan by the installer.

Following installation and operation of the unit, a complaint is received. The installer has a defence under clause 25(4) as a result of the evidence of a plan to construct a solid fence.

Clause 25(5) defines the test for an adverse impact on amenity. It is based on the WHO recommendations for annoyance during the day and the potential onset of sleep disturbance effects during the night.

Clause 25(6) recognises that a sufficiently loud ambient noise environment will reduce the impact of fixed machine noise. This clause is the exception to clause 25(5), allowing the levels set in the tests to be increased in the presence of sufficient ambient noise.

Clause 26 Noise from domestic activity

Clause 26 addresses the broad range of noise from machinery, tools or other equipment used at domestic premises. Common examples include noise due to lawnmowing, home repair work, leaf blowers and hand tools.

Machinery, tools or other equipment are not intended to include other activity that occurs on domestic premises that may be annoying, such as the early morning operation of a roller door, starting a vehicle, or putting out and collecting rubbish bins. These activities will continue to be controlled on a case-by-case basis under the general environmental duty provisions of the EP Act. Reference should also be made to Schedule 1 for a list of domestic activities excluded from the objective measures of the Noise Policy and also assessed under the general environmental duty provisions including music, voices, vehicles and dogs.

Clause 26(1)(a) restricts the hours of use of machinery, tools or other equipment at domestic premises where it has an adverse impact on residential amenity. The hours of use have not changed from the Environment Protection (Machine Noise) Policy 1994 (now revoked), which in turn, were based on the 1977 Act, and as a result, the times are widely understood in the community.

The test that determines whether noise is having an adverse impact at night is provided in clause 26(3) and is based on the potential for sleep disturbance in accordance with WHO recommendations.

The use of machinery, tools or other equipment that does not have an adverse impact is not subject to the restricted hours of operation.

Example

Jack uses his back shed most nights after work to pursue his woodworking hobby and uses a variety of hand tools as well as hammering from time to time.

A neighbour has complained about the noise from the shed, which extends past the 8 pm limit in clause 26(1)(a) of the Noise Policy.

The noise level from Jack's shed can achieve the limits in clause 26(3) if some acoustic insulation is installed as lining in the shed and the roller door facing the neighbour is kept closed.

Jack can continue to use his shed outside of the specified hours provided he achieves the noise level tests in clause 26(3).

During the specified hours, noise level limits are generally not placed on normal domestic activity but all reasonable and practicable measures to minimise noise should be taken in accordance with clause 26(1)(b). Clause 26(1)(b) therefore provides for rectification of any unnecessary noise from domestic premises whilst allowing for normal activity, sometimes at high noise levels, to continue.

The measures listed in clauses 26(1)(b)(i) through (v) comprise simple and straightforward methods to minimise noise to neighbours. If necessary, they can be enforced through the issue of an environment protection order following an inspection by an officer appointed under the EP Act.

Clause 26(2) makes it mandatory to comply with the noise level limits or restricted hours of operation.

Clause 26(3) defines the test for an adverse impact on amenity at night. It is based on the WHO recommendations for the potential onset of sleep disturbance effects. Sleep disturbance can occur due to a continuous noise level or instantaneous maximum events. Therefore, both a continuous and maximum noise level test is provided for in clause 26(3).

Clause 26(4) recognises that a sufficiently loud ambient noise environment will reduce the impact of noise from a domestic activity. This clause is the exception to Clause 26(3), allowing the levels set in the tests to be increased in the presence of sufficient ambient noise.

Clause 26(5) recognises that the assessment assumes that the total duration of the activity is typical of a domestic premises. For example, activity over two days during the specified hours may be acceptable, whereas a more intensive or prolonged activity that occurs every day during the specified hours may not. Under the latter situation, clause 26(5) enables the regulatory authority to impose an allowable noise level, consistent with the general provisions of the policy for more intensive or prolonged activity in a residential area.

Example

Jack retires and starts to use his shed regularly during the day. His hobby of building small children's desks becomes well known amongst family and friends, and he begins to increase his level of activity to meet demand.

Whilst Jack is only working in his shed during the hours specified in clause 26(1)(a), he is working for a portion of almost every day.

A complaint is received, and it is found that the noise level is 55dB(A) due to the saws and various other woodworking machines being used.

Jack wants the chance to continue to use the shed every day and so he investigates how to get to 52dB(A) imposed by the issue of an environment protection order in accordance with clause 26(5). He can achieve the noise level by installing a solid wall of plasterboard to the wall of his shed facing the neighbour.

Jack is able to continue to use his shed without restriction following the installation of the plasterboard lining.

Division 3 Rubbish collection, street sweeping machines, etc

Division 3 will assist the Authority to manage the source of common complaints from rubbish collection noise. This clause addresses other noise sources such as street sweepers and road-based mulching machines, or machines used on behalf of a council or business for an organised program of maintaining a public resource such as a street or park.

Division 3 recognises that such activities are inherently noisy and that options to reduce noise are limited. However, the aim is to achieve a balance between allowing essential work to proceed and minimising its impact on neighbouring properties.

Division 3 uses a similar framework to Division 1, placing restrictions on activity that has an adverse impact on residential amenity. An adverse impact is deemed to occur above a specified maximum noise level in accordance with WHO recommendations. Only a maximum level is specified as these activities generally occur over a short period of time.

Clause 27(1) defines the application of the division to include rubbish collection undertaken on behalf of a council or business as an organised program; the operation of street sweepers, blowers, power saws, mulching equipment, lawnmowers and the like undertaken on behalf of

a council or business; demolition work as an organised program for a street or public park or similar.

Clause 28(1)(a) restricts the hours of the types of the said activities above where there is an adverse impact on residential amenity during the night.

The test that determines whether noise is having an adverse impact is provided in clause 28(3) and is based on the potential for sleep disturbance from a single noise event in accordance with WHO recommendations.

Activity that does not have an adverse impact is not subject to the restricted hours of operation.

Activity that exceeds these limits must only occur between specified hours. These hours reflect the typical and accepted working hours of the waste collection and council related industries in residential areas (7 am to 7 pm Monday to Saturday, and 9 am to 7 pm Sundays and Public Holidays).

Clause 28(1)(b) enables the activity to be undertaken outside the specified hours under mitigating circumstances. For example, rubbish collection can occur outside the specified hours if the only safe and practicable time for collection on a busy road is before 7 am.

During the specified hours, noise level limits are not placed on the activity, but all reasonable and practicable measures to minimise noise should be taken in accordance with clause 28(1)(c). This clause provides for rectification of any unnecessary noise from the activity, such as the need to undertake maintenance to rectify a squealing brake, whilst allowing for normal activity, sometimes at high noise levels, to continue.

The measures listed in clauses 28(1)(c)(i) through (vi) comprise simple and straightforward controls to minimise off site impacts. They can be enforced through the issue of an environment protection order following an inspection by an officer appointed under the EP Act.

Clause 28(2) makes it mandatory for the person who causes the activity, and the contractor, if relevant, to comply with the noise level limits or restricted hours of operation, unless the mitigating factors provided for in clause 28(1)(b) apply with supporting evidence.

Clause 28(3) defines the test for an adverse impact on amenity. It is based on the WHO recommendations for the potential onset of sleep disturbance effects for a single noise event. Therefore, only a maximum noise level test is provided in clause 28(3).

Clause 28(4) recognises that a sufficiently loud ambient noise environment will reduce the impact of the relevant activity by allowing for the comparison of the maximum noise levels in the ambient environment against the maximum noise levels from the relevant activity.

As for other similar clauses in Part 6, for clause 28(4) to be invoked, maximum noise levels in the ambient environment have to consistently exceed 60dB(A).

Example

A complaint is received about excessive noise from rubbish collection occurring at 6 am outside a residence.

A maximum noise level from the truck is measured at 68dB(A). The road is not busy and alternative routes exist for the collection vehicle to take prior to 7 am that do not impact on residential areas. The route is therefore altered to ensure rubbish collection does not occur until after 7 am at a residential location, in accordance with the specified hours in clause 28(1)(a).

Complaints continue to be received about squealing brakes on the truck. It is considered that maintenance would eliminate this noise and therefore an environment protection order is issued in accordance with clause 28(1)(c)(vi) to undertake that maintenance in a reasonable timeframe.

The Policy provides transparency and consistency for the waste collection and other similar industries. It requires the organiser of the activity and the contractor conducting the works to take all reasonable and practicable measures to minimise noise impacts, but these requirements are not beyond those generally taken by the industry.

Division 4 Building intruder alarm systems

Division 4 deals with building intruder alarm systems, particularly the ongoing or long-term unattended operation of alarms. The Division recognises that an inherent function of an alarm is to generate noise, and aims to achieve a balance between allowing the alarm to function and minimising the impact on neighbouring properties. Clause 29 restricts the application of Division 4 to building intruder alarm systems. It does not apply to fire and smoke alarms or alarms fitted to motor vehicles due to the low number of complaints arising from these.

Clauses 30(1)(a) and (b) reinforce the design requirement for alarms installed since 1986 in accordance with the *Australian Standard AS 2201-1986 Intruder Alarm Systems*. This requirement is the ability to automatically cease operation after five minutes [clause 30(1)(a)], and not reactivate from the same sensor that was previously triggered until reset manually via the control panel [Clause 30(1)(b)].

Owners of a system installed before 1986 may be required to modify their system to ensure the noise automatically ceases, to comply with this requirement. The cost of the modification will vary from installation to installation; however, it is likely to be of the order of cost of the expiation notice if it operates in breach of the clause 30 provisions. It is understood that some alarms installed post-1986 may not comply with this standard either, and would also need to be modified.

Clause 30(1)(c) ensures the location of the audible part of the alarm is as far as practicable from neighbouring properties, whilst still achieving its effectiveness. There may be other locations on the building to mount the audible alarm that is not as close to the noise affected premises and that would result in a reduction of noise at the neighbouring property.

Clause 30(2) makes it mandatory for the owner and the occupier, if not the same person, to comply with the provisions of clause 30.

Division 5 Frost fans

Division 5 aims to achieve a balance between protecting primary production through the effective use of frost fans and minimising the impact on neighbouring properties.

As frost fans are used during the early morning hours under frost conditions, noise levels within the habitable room most exposed to frost fan noise, with windows closed, becomes the critical test. A habitable room does not include a bathroom, store, toilet or laundry.

External noise levels are also used in Division 5, but only as a means to indicate compliance if they are met. That is, if the external noise level is met, then noise from the frost fan is not considered excessive under Division 5. However, if the external noise level is not met, then this does not automatically imply the noise level is excessive. Under such a circumstance it is possible to achieve compliance with the provisions of Division 5, provided the indoor noise level can be met.

The indoor noise levels are based on the range of results from various sleep disturbance studies and adjusted for the amenity of the receiving environment.

The reliance on an indoor noise level provides an opportunity for noise reduction at the facade of the noise affected premises. This is important because options for frost fan noise reduction are limited.

The allowable levels are less stringent than would be required for a continuous noise source in a rural industry under the general provisions of Part 4. This is due to the restricted operation of the fans, generally to less than 20 hours of the year under South Australian conditions.

Clause 32(1)(a) ensures the fans operating characteristics are such that it is restricted to protecting the necessary area of crop only. This is because the operating speed of a fan can have a significant effect on the generated noise level. Clause 32(1)(a) therefore minimises the impacts from frost fans by limiting the operating speed whilst still ensuring their effective operation.

Clause 32(1)(b) ensures the fans are only operated when the risk of a frost is reasonably likely. A method to control this is to automatically operate the fans only when the temperature drops to a temperature that is known to result in frost formation. The temperature that triggers operation should be as close to the scientifically established temperature for frost formation at the site as is reasonably practicable. This is a common control mechanism and should be provided for most frost fan installations where noise impacts may arise.

Clause 32(1)(c) enables the fans to be operated outside of a frost period and between 7 am and 10 pm on the same day for the purposes of maintenance work.

Clause 32(1)(d) establishes the allowable noise levels for a frost fan installation. The associated table in clause 32(6) summarises the allowable noise levels which are broken down into outdoor and indoor noise levels for different land use categories associated with the noise affected premises.

Clause 32(2) requires that measurements first be taken outside for comparison with the 'measurements outside' column of the table contained in clause 32(6). If achieved, no further actions other than compliance with the provisions of clause 32(1) need to be met.

If not achieved, then a measurement must be taken inside the most exposed habitable room for the purposes of comparison with the measurement inside column of the table in clause 32(6). The measurement inside must occur with the windows to the habitable room closed.

Clause 32(3) requires that all frost fans on a premise must be operated at the same time for the purposes of comparison with the allowable noise levels.

The selection of the relevant land use category in the clause 32(6) table is governed by clause 32(4). Clause 32(4) requires assessment of the land uses principally promoted by the Development Plan provisions relevant for the noise affected premises.

A detailed discussion and examples of the selection of land use categories is provided under Clause 4 of this Guideline.

If this assessment results in the selection of a Rural Living or Residential land use category, then that category is used in the table. In any other case, the rural industry or light industry land use category is used. A determination of the land use category 'in any other case' under clause 32(4)(b) is not required. If an assessment were undertaken, it may be that it results in a different land use category than rural industry or light industry; however, this row should still be used.

Clause 32(5) requires the operator or occupier of a premises at which a frost fan installation is operated to comply with Clause 32(1). This is not assigned a category offence provision that can be expiated because of the potential practical difficulties and limitations in reducing noise from a frost fan.

The assessment method under Division 5 is based on Authority guidelines prepared in 2000. These guidelines have been subject to a planning appeal brought before the Environment Resources and Development Court, in which the Court upheld the general approach¹⁸.

Example

A vineyard uses two frost fans. The vineyard and the nearest noise affected premises are located in a zone that principally promotes viticultural development. The type of frost fan installed can service an area up to 200 metres in any direction from the fan when operated at full speed. The size of the crop being protected is at most 150 metres from the fan in any direction. The speed of the fans can be reduced to cover the size of the crop being protected with a governor on the frost fan engine. Clause 32(1)(a) is therefore not complied with due to an excessive operating speed.

The fans are operated manually based on the previous night's forecast, which has resulted in a number of occurrences where the fans were operating without a frost forming. Clause 32(1)(b) is therefore not complied with due to operation outside of the time when it was reasonably likely for a frost to occur.

The noise level from both fans at full speed when measured under weather conditions that could result in a frost is 62dB(A) outside. The noise level of the fans at a reduced speed to service the size of the crops is 58dB(A) outside.

The noise affected premises does not fall within either the Rural Living or Residential land use category and therefore under clause 32(4)(b) the higher noise level of 55dB(A) outside from the table in clause 32(6) is used.

Because the noise level outside exceeds 55dB(A), a noise level within the habitable room that is most exposed to noise from the frost fan installation is taken, with the windows to that room closed.

The indoor noise level at a reduced speed is 37dB(A). Clause 32(1)(d) is therefore not complied with due to an indoor noise level in excess of the allowable level provided by the table in clause 32(6).

The owner of the noise affected premises accepts as a solution upgrade of his windows to the rooms facing the frost fans to a 10.38 laminated sound reducing glass, which is predicted by an acoustic engineer to result in a sufficient reduction in indoor noise levels to achieve the allowable noise level of 35dB(A).

An environment protection order is issued in accordance with clause 32(5) containing requirements to operate the fans at a reduced speed, to provide an automatic start-and-stop control method triggered by temperatures established to generate frost in the area and to install acoustic rated glazing to certain windows of the nearest house.

¹⁸ Jones, Pedler, Harnath and Allchurch v The Barossa Council and Wild, SAERDC No 317 (2001).

Part 7 Guidance documents

Part 7 of the Policy provides the Authority with the ability to give effect to listed guidelines through the issue of an environment protection order.

The guidelines are developed to address specific issues that have broad community and industry interest. The management of such issues is assisted by the provision of examples, case studies and background information, and are often complex situations more suited to a range of solutions, rather than a restricted and prescriptive method.

Two guidelines prepared by the Authority are currently included in Part 7, being the *Audible Bird Scaring Devices Environmental Noise Guidelines (2007a)* and the *Wind Farms Environmental Noise Guidelines (2003)*. The wind farm guidelines are currently under review and a new guideline will soon be available.

These guidelines contain within them a detailed summary of their provisions if further information on their content is required.

Part 7 may be amended via the simplified process provided by clause 8 to include new guidelines that may be prepared by the Authority in the future.

This recognises that management of such issues is subject to ongoing research and it may be necessary to adopt guidelines to incorporate new information. Any such inclusion is still subject to the detailed consultation process required under clause 8.

Schedule 1 Noise excluded from Policy (clause 6)

A detailed summary of the noise excluded from the Policy is provided in the *Noise excluded from the Policy* section of these Guidelines.

REFERENCES

Australian Standard, AS 1259–1990 Acoustics–Sound level meters.

Berglund B, Lindvall T and Schwela DH (1999), *Guidelines for Community Noise*, World Health Organization, Geneva.

Manning CJ et al (1981), *The propagation of noise from petroleum and petrochemical complexes to neighbouring communities*, Report 4/81, Conservation of Clean Air and Water in Europe (CONCAWE), Den Haag, Netherlands.

South Australian Department for Transport, Energy and Infrastructure (2007), *Road Traffic Noise Guidelines*, DTEI, Adelaide.

South Australian Environment Protection Authority (2003), EPA Guidelines: Development proposal assessment for venues where music may be played, EPA, Adelaide, viewed 28 May 2009, <www.epa.sa.gov.au/pdfs/guide_music.pdf>.

— (2007a), *Environmental Noise Guidelines: Audible Bird Scaring Devices*, EPA, Adelaide, viewed 28 May 2009, <www.epa.sa.gov.au/pdfs/guide_bird.pdf>.

— (2007b), *Guidelines for separation distances*, EPA, Adelaide, viewed 28 May 2009, <www.epa.sa.gov.au/pdfs/sepguidepcd.pdf>.

Court judgments

Jones, Pedler, Harnath and Allchurch v The Barossa Council and Wild, SAERDC No 317 (2001).

R&D Olson v Windybanks Childcare Centre Pty Ltd, South Australian Environment Resources Development Court 28, 14 May 1999.

Policy and legislation

Environment Protection (Noise) Policy 2007, <www.legislation.sa.gov.au>.

Environment Protection Act 1993, <www.legislation.sa.gov.au>.